Sometimes, you cannot see the wood for the trees
(Heywood 1546)



"And see this ring right here, Jimmy? ... That's another time when the old fellow miraculously survived some big forest fire."

(Larson 1986)

New Developments in the Interpretation of Dendrochronology as Applied to Oak Building Timbers

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and the
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Thesis submitted to the University of Oxford in partial fulfilment of the requirements for the degree of Doctor of Philosophy

Trinity Term 2005 [i.e 2006] (Corrs 6.i.06)

ABSTRACT

NEW DEVELOPMENTS IN THE INTERPRETATION OF DENDROCHRONOLOGY AS APPLIED TO OAK BUILDING TIMBERS

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and the
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DPhil

Trinity Term 2005 [i.e. 2006]

The ring-width data for 3313 oak samples with complete sapwood were studied from mainland Britain, together with 1067 additional samples from various other European locations. Regression analysis of the material showed that there was a relationship between the number of sapwood rings, the mean ring width of the heartwood, and to a lesser degree the number of heartwood rings present. A method of producing models using datasets where complete sapwood was available was devised, which produced individual felling date ranges for each sample. One model was found to be suitable for all of England and Wales from the Roman period to the present, and produced a success rate of 96%, with 94% of the samples tested giving a felling date range narrower than the 36-year empirically calculated range previously used.

Analysis in the variation of felling dates within individual phases of construction found a significant proportion of timbers had been stock-piled. A method was developed of combining individual felling date ranges using Bayesian methodology, and allowing for the possibility of stock-piling, dramatically reducing the usual empirically-derived felling date range. This reduction was as much as 90%, depending on the number of samples combined. Testing of this procedure with independent data has achieved a 95% success rate. Samples exhibiting extreme or sudden changes in growth rate were found to be unsuitable, as well as those from cathedrals due to their exceptionally long periods of construction.

The comparison of over 100 examples of dendrochronologically-dated buildings with independent dating evidence showed a good correlation between felling and construction dates. Analysis of these demonstrated that most structures were erected in less than half a year, and usually during the summer season.

The combination of the various aspects of this research has resulted in a better understanding of how medieval buildings were constructed, and allows an improved interpretation of tree-ring dates, including both precise and estimated felling date ranges.

ACKNOWLEDGEMENTS

I would first like to thank my colleague in the Oxford Dendrochronology Laboratory, Michael Worthington, for his initial suggestion in undertaking this research degree, and for his help in dealing with various lab crises subsequently arising during this time. Encouragement to embark on this research was also given by Dr Martin Henig of the Institute of Archaeology, Prof Malcolm Airs of Kellogg College, Prof Martin Biddle of Hertford College, and Prof Mike Tite, then director of the Research Laboratory for Archaeology.

Julian Munby, historic buildings manager at Oxford Archaeology, acted as second supervisor, and his profound knowledge of historic buildings and documentary sources was much appreciated. But the most profound expression of gratitude is reserved for my principal supervisor, Dr Christopher Ramsey, director of the Oxford University Radiocarbon Accelerator Unit. He has spent innumerable amounts of time in discussing all aspects of the research, helped in adapting the suite of OxCal programs, and attempting to explain the intricacies of Bayesian logic. The research and resulting thesis is undoubtedly improved through his diligent attention.

This research would not have been possible if it were not for the generosity of other dendrochronology laboratories in providing additional primary source data. David Brown and Prof Mike Baillie (Queens University Belfast), Dr Martin Bridge (University College London), Robert Howard and Alison Arnold (Nottingham University Tree-Ring Dating Laboratory), Cathy Groves and Ian Tyers (Sheffield University Dendrochronology Laboratory), and Anne Crone and Dr Coralie Mills (AOC Scotland Ltd) all provided material from the British Isles. Additional data was kindly made available for other areas of Europe through the kind efforts of Dr André Billamboz (Landesdenkmalamt Baden-Württemberg, Germany), Dr Tomasz Wazny (Academy of Fine Arts, Warsaw, Poland), Dr Niels Bonde (The National Museum of Denmark), and Felix Walder (Labor für Dendrochronologie, Zürich, Switzerland). Much of the data provided had to be retrieved from archives, converted, and formatted at some effort, as David Brown, Tomasz Wazny, and others know full well.

Other samples were obtained courtesy of J J Eyston Esq for the Mapledurham Estate, the Oxford University Estates Directorate, the Historic Royal Palaces Agency, English Heritage, and Oxford Archaeology.

Advice and assistance by members of the University are gratefully acknowledged. First and foremost are the hours of help in developing the database by Rob Eadie of the Computing Department. Dr Peter Savill and Ian Gourlay of Plant Sciences discussed the biological aspects of the research and provided material from their earlier research, and Dr Marriot from the Department of Statistics advised on relevant aspects of the data analysis. Nigel James from the Bodleian Library assisted with the map plotting. Dr Adrian Allsop, Dr Alistair Pike, and of course Jane Simcox also provided support in their respective fields at the Research Laboratory for Archaeology.

Martin Allwright kindly developed a number of conversion programs for entering the ring width data into the relational database. Dr Nat Alcock is acknowledged for his initial suggestion of looking at aspects of statistically combining felling date ranges, and D Haddon-Reece is thanked for his discussions over various aspects of statistics.

The study of documentary evidence was greatly assisted by Edward Roberts who provided many of the transcripts used herein, along with Dr Christine Ferdinand and Dr Robin Darwell Smith of Magdalen College, as well as Bob and Jean Meeson. Dr Nat Alcock, Dr James Ayers, David Clark, John Dallimore, Dr Chris Dyer, Linda Hall, Bob Meeson, and Barrie Trinder all provided examples of probate inventories, both published and unpublished, known to them. Edward Roberts kindly read over various chapters. And not to be outdone, Dr Martin Bridge has assisted over a variety of aspects of this research, as well as enduring at least two earlier versions of this thesis, all of which is greatly appreciated.

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GLOSSARY

The following are definition of terms used in the database, followed by more general terms used throughout the thesis as a whole. They are drawn from many sources as quoted or amended.

Accounts: Where building accounts exist for a building or phase, these would be noted and referenced in the Phase Table.

Building: A structure often comprising of two or more blocks dating from different phases joined together.

Building Type: This has been broken down to the following five categories:

Agricultural includes various non-domestic buildings such as barns, cart sheds, dovecotes, and stables ranging in status from peasant to gentry, but would not include large monastic tithe barns.

Domestic includes houses and cottages, both rural and urban, which have been built by private house holders. Small manor houses would be included in this category.

Church covers cathedrals and monasteries as well as all parish and town churches including vicarages, but not granges, or barns

Commercial includes warehouses and waterfronts, but not town shops if they have domestic living accommodation within.

Public includes courthouses, guildhalls, market halls, bridges, waterfronts, or any form of educational establishment, including colleges, schools, and libraries.

Conversion: The method of converting the tree into the end building component is recorded. If the tree is used entire, being only squared up, then it is recorded as *whole*. If the tree has been cut into two or four pieces, then it is noted as *halved* or *quartered*. When the tree had been cut into multiple slabs, it is recorded as *planked*, and if it had been radially split into wedge-shaped sections, then it will be shown as *riven*.

County: Post-1975 reorganisation of local government boundaries have been used, even where these have been recently abolished in the recent formation of Unitary Authorities. This is the manner in which most historic buildings are categorised. However, the re-instated historic counties of Somerset and Gloucestershire have been used instead of the now abolished post-1975 county of Avon.

Dates: When dates are given in the phase table these relate to the date of the phase of building. Where a variety of tree-ring dates are included within a phase, then only the latest date would be given. In the sample table, the dates given are the season and year in which the tree was felled. For winter felled trees, which would have been felled anytime between October to the following March, the earlier year would be given which would represent the last fully-developed ring.

Date Type: Most of the dates presented in the Sample Table are those dated absolutely through dendrochronology. However, some samples with complete sapwood will not be dated through *dendro(chronology)*, but by *assoc(iation)*, being part of a phase which has been dated either through other samples or other means.

Defrassed: The action of removing sapwood from an old oak structural timber suffering from beetle attack

Heartwood/sapwood boundary date: The last heartwood ring at the transition from heartwood to sapwood.

Increment borer: An auger-like instrument with a hollow shaft that is screwed into the trunk of a tree and from which an increment core is extracted using an extractor (a long spoon inserted into the shaft that pulls out the core).

Laboratory: This identifies where the data used has originated from. OX signifies Oxford, SH stands for Sheffield, MB relates to Martin Bridge, NT is for Nottingham, BF is for Belfast, and SC for Scotland

Last measured ring date: The last heartwood ring date from a sequence where there is no evidence of sapwood. This is not to be confused with heartwood/sapwood boundary date (see above).

Latitude and **Longitude**: Displayed in six digits.

Management: Evidence of woodland management is evidenced through tree-ring analysis through exceptionally good or poor *cross-matches* between a group of samples, or through *distressed* ring sequences.

Mean ring width: This is the arithmetical mean of all rings present in the sample.

Mean sensitivity: A statistic measuring the mean percentage, or relative, change from each measured yearly ring value to the next (Douglass 1936 in Fritts 1976); that is, the average relative difference from one ring width to the next, calculated by dividing the absolute value of the differences between each pair of measurements by the average of the paired measurements, then averaging the quotients for all pairs in the tree-ring series (Fritts 1976). Sensitivity is a dendrochronological term referring to the presence of ring-width variability in the radial direction within a tree which indicates the growth response of a particular tree is "sensitive" to variations in climate, as opposed to complacency.

NGR: is the national grid reference, which is limited to six digits.

Origin: The probable origin of the tree is recorded. If the trees are not overly large but have fairly sensitive, even, ring widths, then it is likely to have originated in a *woodland*. If on the other hand the timber originated from a very large tree with very wide, complacent centre rings (see sensitivity), then it is likely to have originated from a *parkland* situation. Distorted, widely variable ring widths suggest *hedgerow* trees, whilst others which cannot be reliably categorised are left empty.

Phase: This relates specifically to a phase or single program of building construction, or alteration to an existing building

Pith: The proximity of the centre of the tree is noted on the Sample Table. A 0 is entered if the pith is present, otherwise the estimated number of rings missing is shown. If too many rings are missing to allow an estimate to be made through the curvature of the rings, then nothing is entered in this field.

Rings: This is the total number of rings of the sequence, both heartwood and sapwood combined.

Sample: For the purposes of this study, a sample represents a single tree, when ever this can be clearly identified. Sometimes this might be represented by a single core or slice from a timber, or from multiple cores or slices from a single timber which allows the retention of a complete ring sequence, or from two or more timbers which have clearly originated from a single tree on the basis of physical features or outstanding tree-ring matches.

Sample Code: This is the computer file name for the data set, as used by the laboratory which produced it. This is a combination of letters and numbers and is limited to 8 characters. It is possible that laboratories may use the same sample code or file names. These would be differentiated in the table by the use of the laboratory code.

Sapwood: These are the sapwood rings only. In counting sapwood rings, only complete sapwood rings are counted. If the sapwood at the heartwood/sapwood transition commences in the latewood, with the earlywood already converted to heartwood, then the whole ring is considered heartwood. Similarly, if a sample was felled in the spring or summer, then this last incomplete ring is not measured and is not counted. For further information on what constitutes sapwood see Chapter 4.3.

Season: This is the season of felling, and is usually of one of three seasons. The tree starts growing about March to April, and until May or June the earlywood is produced, known also as spring growth. This consists of between one and three rows of spring vessels, often decreasing in size, and is noted as *spring* felling. Sometimes this can be more accurately pin-pointed when just a few spring vessels are visible. After May/June, the latewood or summer growth commences, and is differentiated from the proceeding spring growth by the dense band of tissue. This summer growth continues until just before the leaves drop, in about October. Trees felled during this period are noted as *summer* felled, but it is difficult to be too precise, as the width of the late wood can be variable, and it can be difficult to distinguish whether a tree stopped growing in autumn or *winter*. When the summer growth band is clearly complete, then the tree would have been felled during the dormant winter period. Sometimes a sample will clearly have complete sapwood, but due either to slight abrasion at the point of coring, or extremely narrow growth rings, it is impossible to determine the season of felling. This is shown on the Sample Table as *unknown*.

Sensitivity: The growth of trees can be affected by slope gradient, sun, wind, soil properties, temperature and snow accumulation. The more a tree's rate of growth has been limited by such environmental factors, the more variation in ring to ring growth will be present. This variation is referred to as sensitivity and the lack of ring variability is called complacency. Trees showing sensitive rings are those affected by conditions like slope gradient, poor soils, little moisture. Those showing complacent rings have generally constant climatic conditions such as a high water table, good soil, or protected locations.

Situation: Is defined where a building was situated when originally constructed, i.e. a small house in a large town might well have been in a village or rural situation when built. *Rural* includes all village and rural locations including hamlets which do not have a parish church. *Urban* includes all urban situations from a county or market town to a metropolis such as London.

Standard deviation: The mean scatter of a population of numbers from the population mean. The square root of the variance. Variance is the square of the mean scatter of a statistical population of numbers from the population mean. The square of the standard deviation (Fritts 1976). This is calculated using 0_n as this is the method used historically by most dendrochronologists.

Standardisation: The process that removes undesirable long-term variations from a time series of measured tree ring properties by dividing the actual measurements by those predicted from a statistically derived equation that relates tree growth over time to tree age. Usually this process tries to remove the growth trends due to normal physiological ageing processes and changes in the surrounding forest community.

Statistical calculations of datasets: The total ring sequences will given three statistical measures, the mean ring width (*MRW*), the mean sensitivity (*MS*), and the standard deviation (*SD*). These set of three calculations are then calculated for two sub-sets of the whole, one for the heartwood rings, and the other for the sapwood rings. In the Segment Data Table, these three calculations will be produced for each decade segment for each sample.

Status: This field relates primarily to the status of the builder, and as a consequence, the resources that could be drawn on:

> **Low** covers peasant type cottages, small cruck buildings, hovels, etc, generally of a single range. No decoration with perhaps the exception of some plain chamfering.
>
> **Middle** includes merchant class urban buildings, base cruck halls, farmsteads, parish churches, etc. Generally these are of two or more ranges and are decorated with some degree of chamfering or embellishment.
>
> **High** covers major gentry manor houses and associated buildings, college buildings, and cathedrals.
>
> **Royal** includes major building projects such as fortresses, palaces, or hunting lodges built for the crown.

***t*-value**: Whilst it may not be the best statistical indicator, Student's (a pseudonym for W S Gosset) *t*-value (Pearson 1990) has been widely used amongst British dendrochronologists. The cross-correlation algorithms most commonly used and published are derived from Baillie and Pilcher's CROS programme (Baillie and Pilcher 1973), although a faster version (Munro 1984) giving slightly different *t*-values is sometimes used for indicative purposes

Type of sample: This category records the type of end use the timber had been converted into. This includes the following members: beam, board, brace, collar, joist, lintel, pile, post, purlin, rail, stave, stud, and tiebeam, etc. If a category is not included here, it is entered as *misc*.

Tree ring: A layer of wood cells produced by a tree or shrub in one year, usually consisting of thin-walled cells formed early in the growing season (called earlywood) and thicker-walled cells produced later in the growing season (called latewood). The beginning of earlywood formation and the end of latewood formation form one annual ring, which usually extends around the entire circumference of the tree.

Tree-ring chronology: A series of measured tree-ring properties, such as tree-ring width or maximum latewood density, that has been converted to dimensionless indices through the process of standardisation. A tree-ring chronology therefore represents departures of growth for any one year compared to average growth. In Britain, and during the course of this study, a tree-ring chronology will be the meaned dataset of a group of raw-ring width measurements, presented in 0.01mm.

1. INTRODUCTION

1.1 PRINCIPLES OF TREE GROWTH AND DENDROCHRONOLOGY

Dendrochronology has, over the past 20 years, become one of the leading and most accurate scientific dating methods. Whilst not always successful, when it does work, it is precise, often to the season of the year. Tree-ring dating is well known for its use in dating historic buildings and archaeological timbers to this degree of precision. However more ancillary objects such as doors, furniture, panel paintings, and wooden boards in medieval bookbindings can sometimes be successfully dated.

The science of dendrochronology is based on a combination of biology and statistics. Fundamental to understanding how dendrochronology works is the phenomenon of tree growth. Essentially, trees grow through the addition of both elongation and radial increments. The elongation takes place at the terminal portions of the shoots, branches, and roots, while the radial increment is added by the cambium, the zone of living cells between the wood and the bark (Eckstein 1984, 5). In general terms, a tree can be best simplified by describing it as a cone, with a new layer being added to the outside each year in temperate zones, making it wider and taller.

An annual growth ring is composed of the growth which takes place following winter dormancy through the spring and summer. When the leaves are shed in October or November, the tree becomes dormant for the winter period and no growth occurs. For the European oak (*Quercus robur* and *Q. petraea*), as well as many other species, the annual ring is composed of two distinct parts - the spring growth or earlywood, and the summer growth, or latewood. Earlywood is composed of large vessels formed during the period of shoot growth which takes place between March and May, which is before the establishment of any significant leaf growth, and is produced by using most of the energy and raw materials laid down the previous year (Baillie 1982, 46). Then, there is an abrupt change at the time of leaf expansion around May or June when hormonal activity dictates a change in the quality of the xylem and the summer, or latewood is formed. Here the wood becomes increasingly fibrous and contains much smaller vessels. Trees with this type of growth pattern are known as ring-porous, and are distinctive in the contrasting open, light-coloured earlywood vessels compared to the dense, darker-coloured latewood.

Dendrochronology depends on the variation in the width of the annual rings as influenced by climatic conditions common to a large area, as opposed to other more local factors such as competition and insect attack. It is through the comparison of these climate-induced variations in ring widths that tree-ring dating allows calendar dates to be ascribed from a firmly-dated sequence to one which is not (Eckstein 1984). If a tree section is complete to the bark edge, then when dated a precise date of felling can be determined, precise to the season of the year, depending on the degree of formation of the outermost ring. Therefore, a tree with bark which has the spring vessels formed but no summer growth

can be said to be felled in the spring, although it is not possible to say in which particular month the tree was felled (**Figure 1.1**).

Another important dimension to dendrochronological studies is the presence of sapwood. This is the band of growth rings immediately beneath the bark and comprises the living growth rings which transport the sap from the roots to the leaves. This sapwood band is distinguished from the heartwood by the prominent features, colour change and the blocking of the spring vessels with tyloses, the waste products of the tree's growth. The heartwood is generally darker in colour, and the spring vessels are blocked with tyloses. The heartwood is dead tissue, whereas the sapwood is living, although the only really living, growing, cells are in the cambium, immediately beneath the bark. In European oak (*Quercus* sp), the difference in colour is generally matched by the change in the spring vessels. Some other species of oak, such as the American white (*Q. alba*), and the American red (*Q. rubra*) have distinctly different characteristics of sapwood. Generally, however, the sapwood retains stored food and is therefore attractive to insect and fungal attack once the tree is felled and therefore is often removed during conversion.

Sapwood in European oaks tends to be of a relatively constant width and/or number of rings. By determining what this range is with an empirically or statistically-derived estimate is a valuable aspect in the interpretation of tree-ring dates where the bark edge is not present. The smaller the number of sapwood rings, the more precise the estimated felling date range will be.

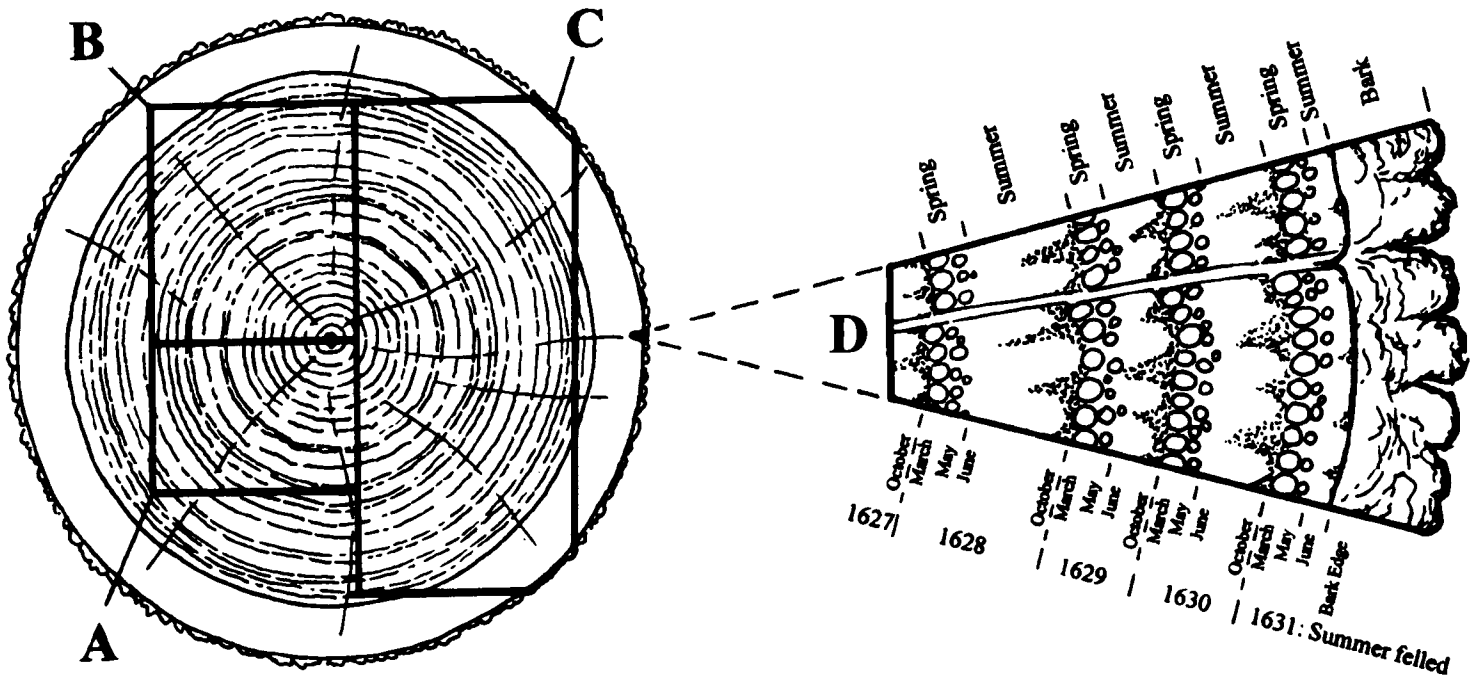


Figure 1.1: Section of tree with conversion methods showing three types of sapwood retention resulting in A) *terminus post quem*; B) Felling date range, and C) precise felling date. Enlarged area showing the outermost rings of the sapwood with growing seasons (Miles 1997, 42)

1.2 *RESEARCH OBJECTIVES*

The purpose of this thesis is to enhance the interpretation of dates derived through dendrochronology in mainland Britain. Where sapwood is missing or incomplete, the viability of reducing or narrowing estimated felling date ranges is investigated. This will greatly aid in the better understanding and phasing of historic buildings and archaeological timbers. Where precise felling dates are obtained from samples with bark edge, further research is carried out to understand more fully how this relates to the actual process of building.

1.2.1 The Problem of Predicting Sapwood and Felling Date Ranges

Whilst the science of dating timbers through dendrochronology has advanced significantly over the past decade, the interpretation of these tree-ring dates, either with or without complete sapwood, has not developed to the same degree. A major problem encountered by most archaeologists, building historians, and other end users, is the estimation of felling date ranges when the outer rings of sapwood are lost. This problem is so widespread that approximately 40% of the 1800 phases dated up to the end of 2004 could only produce felling date ranges rather than precise dates, with a further 8% only having a *terminus post quem* (*tpq*), or felled after date, determined (Alcock *pers comm*).

From 1987 to 1997, a fairly wide-ranging sapwood estimate of 10-55 rings was used for the whole of the British Isles (Hillam *et al* 1987), but this was reduced by between 25% and 30% in 1997 (Miles 1997). These estimates were based on empirical studies of sapwood ring counts and did not take into account any other associated factors such as growth rates or tree age. The present research used a much wider range of samples from all over mainland Britain to see if it is possible to further refine sapwood estimates in a way which would be acceptable to the wider dendrochronological community. This would then help to remove the plethora of varied sapwood estimates presently used by various laboratories, and would be of immense value to the end user of tree-ring dating.

Another problem is how to deal with presenting a single felling date range for a group of samples which, whilst coeval, have nevertheless produced slightly differing felling date ranges. Clearly it is desirable to present one combined felling date range for the whole phase, rather than a number of ranges. Previous methods have taken the area of common overlap of the various ranges, or the more statistically-correct method of taking the mean heartwood/sapwood boundary date and then applying the normal sapwood range to this. However, this does not really use any of the information contained within the data except to truncate the earlier part of the range to allow for present sapwood. It was considered desirable to come up with a statistically-acceptable method of reducing this range, but still keeping within certain confidence levels.

1.2.2 Problems in the Interpretation of Felling Dates / Ranges

As had already been demonstrated in the author's earlier study (Miles 1997), felling dates for timbers within a phase of construction can vary by one or two years if not more, within a single structure. This may be explained through the stock-piling of timber, windfalls, or other vagaries of the timber trade. It was proposed to further this study of different-year felling of timbers and to try and correlate these with other contextual information such as type of structural member and other variables.

Coupled with this, further research has been carried out on comparing precise felling dates with documentary dates, date inscriptions, and contemporary building accounts. It is only through the comparison of precise felling dates with independent building dates that a clearer understanding can be obtained of how trees were converted and used in the construction of historic buildings. It was proposed to compare a wide range of buildings producing precise felling dates with documentary accounts and date inscriptions throughout Britain, ranging from castles and cathedrals down to the vernacular level cottage. Again this should prove to be of particular value to the end user of tree-ring dates in allowing a better understanding of how *construction* dates might be derived from tree-ring dates.

2. PREVIOUS RESEARCH ON SAPWOOD ESTIMATES

First, a literature review was undertaken to investigate other methods of estimating sapwood, both in Britain as well as in Europe. Dendrochronology has been employed in the study of historic buildings and archaeological timbers for almost 50 years now in some parts of Europe, and research has revealed a wide range of methods of dealing with the problem of estimated felling dates. Indeed such an extensive number of studies had been undertaken over the past 40 years that it was necessary to summarise these more briefly than might otherwise have been desirable due to space limitations. However, it is hoped that the essence of the methods of the various practitioners has been satisfactorily outlined.

Unless stated otherwise, the timber species discussed in this chapter are the European oak (*Q. robur* and *Q. petraea*). On the continent, research has been arranged geographically with an emphasis on Germany. In the British Isles however, sections have been arranged by groups of researchers or laboratories, as fields of study are often disparate and overlapping.

2.1 CONTINENTAL EUROPE

2.1.1 Germany

The first serious attempts at calculating a statistically-reliable sapwood estimate for European oak were produced in the 1960s by Ernst Hollstein at Hamburg and Bruno Huber at Munich. Hollstein concentrated on the areas around Trier in western Germany where almost 200 historic building and archaeological timbers with complete sapwood were studied. He worked out several different sapwood estimates based on two factors: 90% confidence distribution of sapwood ring counts and the age of the tree (Hollstein 1965, 12-27). Rather than presenting these as overall ranges, Hollstein used an arithmetic mean with a standard deviation.

Age Group:	*No. of sapwood rings (± std dev)*
Less than 100 years	16.0 ± 4.5
100 to 200 years:	20.4 ± 6.2
Over 200 years:	25.9 ± 7.5

Table 2.1: German sapwood estimates grouped by age of tree (Hollstein 1965)

Hollstein stated that 90% of the West German trees had between 12 and 30 sapwood rings, or years, whilst the extremes of below 10 and above 40 rings were very scarce, perhaps representing 1% of the total. For this group of timbers, he gives an absolute range of 7 to 46 rings of sapwood. He gives an example, using the range for 100-200 year old oaks, of between 12 to 31 years with 90% probability, and 11 to 34 rings for an increase of probability to 95%. It is not made clear why the 90% range of 20.4 ± 6.2 should translate to 12 to 31 years rather than 14.2 to 26.6 years (Hollstein 1978, 33-9).

What was particularly important is that Hollstein was the first person to note a direct relationship between the age of the tree and the mean sapwood value (Bridge 1983, 25). He noted a

similar relationship in a group of trees from Anatolia, almost 1500 miles away to the south-east (Gürsu and Bernhart 1964, 222-47).

During this same period in Germany, Bruno Huber seems to have worked with figures which varied between 20 and 25 rings (Baillie 1982, 55); however, the amount of deviation was fully explained (Huber 1967, 145-56).

Further work by Hollstein in the 1970s related tree age to 493 data points with the age varying between 15 and 400 years (**Figure 2.1**). Of these, 9.5% or 47 had fewer than 30 rings, including 4 with no heartwood at all (Hollstein 1980, 273). This material was re-worked by Ian Tyers to 95% confidence levels using 446 trees over 30 years old, to give a range of 8.2-38 sapwood rings. When this dataset is divided between immature (under 100 years old) and mature (over 100 years), the increase of sapwood rings as the tree grows older is confirmed. Some 232 immature samples produced a 95% probability range of 7.4 to 28.8 rings, whilst 214 mature trees produced a range of 11.6 to 40.5 (Hillam *et al* 1987, 165-85).

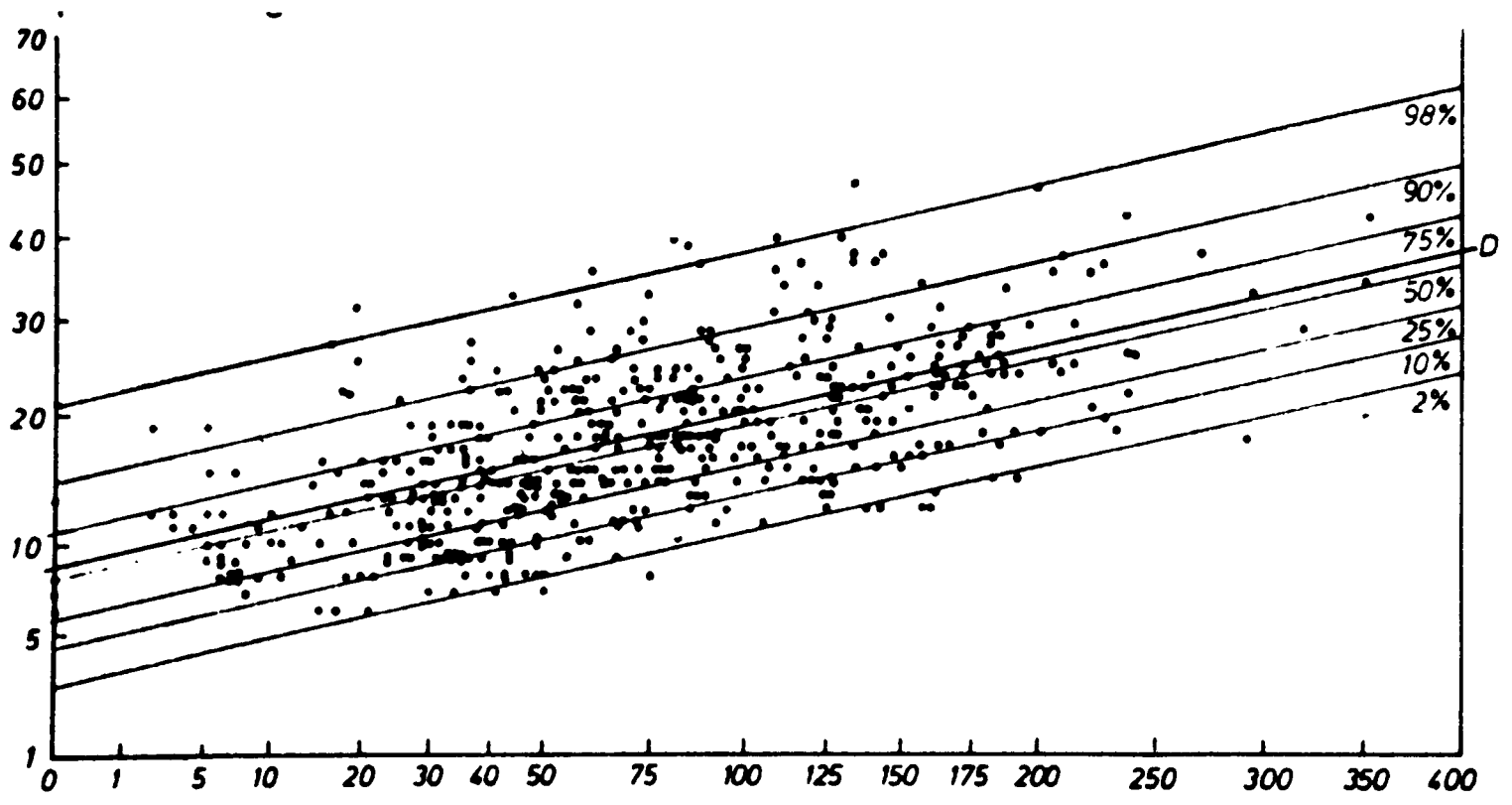


Figure 2.1: Distribution of 493 sapwood samples from Germany showing sapwood rings on the vertical axis and tree age on the horizontal axis (Hollstein 1980, 34)

Also during this period, Bauch, Eckstein, and Brauner from Hamburg used estimates which varied between 15 and 25 rings, but it is not clear whether this is based on 90% or 95% confidence level, or what the sample base was (Bauch *et al* 1975, 32-40). By 1984, Eckstein was quoting a single range of 15 to 25 rings. It should be noted that he has now dropped the arithmetic mean in favour of an overall range (Eckstein 1984).

Hillis (1987, 7-21) published an interesting work reviewing earlier work on the technical properties in sapwood in Germany in 1987. He states that in some species the number of sapwood rings is dependent on the age of the tree. He found that trees with rapid growth rates could have the same number of sapwood rings but greater width than slow-growing and suppressed trees. As a result, open or

moist sites often support trees with wider sapwood than trees in crowded stands or growing on drier soils.

He noted that the number of sapwood rings in mature oak varied in different parts of Europe during the past 800 years. The lowest was noted in Finland with a mean of 14 rings (Baillie *et al* 1985), with similar values in north Poland (Eckstein *et al* 1986), both relating to living trees.

Another phenomenon Hillis noted was the fact that the number of sapwood rings increases as the top of the tree is approached. However, in *Abies grandis*, which contains about 40 rings of sapwood, the proportion of sapwood increased with the height when the years of sapwood were expressed as a percentage of the age of the cross-sectional disc. When the sapwood area was expressed as a percentage of disc area, the proportion of sapwood was not affected by height (Puritch 1977). He states that 'As expected, the percentage number of sapwood rings in *Quercus* species increased as the height above ground level increased (Trendelenburg and Mayer-Wegelin 1955), although the actual number of sapwood rings remained about the same'.

He also noted the strong correlation relating to the age of the tree. 'The percentage volume of sapwood and the number of growth rings decreases with age (e.g. Trendelenburg and Mayer-Wegelin 1955, Harris 1955), although the actual number of rings in the sapwood, and its width, may increase. This increase has been observed in dominant *Quercus* and *Picea* species (Trendelenburg and Mayer-Wegelin 1955)... and has been attributed to the increase in the size of the crown of the tree'. Hillis states that Hollstein's findings of 16 to 26 sapwood rings in Europe for trees between the age of 50 to over 200 years has been confirmed.

In relation to the rate of growth, he found that dominant *Quercus* trees have half the number of growth rings of sapwood than suppressed trees of the same age (Trendelenburg and Mayer-Wegelin 1955). Environment also affects the formation of sapwood, in that 'the greater the water uptake of the tree, the lower the tendency of the living cells to form heartwood, as they are still needed to provide the crown with sap' (Pilz 1907).

2.1.2 Switzerland

In 1995 Ruoff, of the Labor für Dendrochronologie in Zurich, published a method whereby the number of sapwood rings is predicted based on the mean ring width of the outer heartwood rings (Ruoff 1995). Whilst recognising the relationship of the number of sapwood rings to the age of the tree, they understood that this latter variable was not always possible to determine in some dendrochronological samples. This was updated in 2004 by Walder and Wyprächtiger, who used a remarkably large group of 9538 samples all retaining both pith and bark edge, determined the mean ring width for the last nine heartwood rings and first sapwood rings, and arranged the data in ascending mean ring-width order. This data was then divided into groups 0 to 0.5 mm, 0.5 to 0.7 mm, and then one tenth of a millimetre increments to 3 mm, with 0.25 mm segments up to 4.5, then 4.5 mm to 5 mm, and 5 mm to 6 mm (**Figure 2.2**). The sample depth in each group ranged from 10 to 560, with an average of 280. A

sapwood estimate was then determined for each of these 34 groups, including the mean number of sapwood rings at 95% confidence level, the standard error, and the standard deviation. Thus, by calculating the mean ring width of the last nine heartwood rings and first sapwood ring, the relevant sapwood estimate was then used. This average number of sapwood rings ranged from 19.85 years for samples with mean ring widths of less the 0.5mm, to 6.1 years for samples with greater than 6mm mean ring width (**Table 2.3**).

This method is significant in that this is the first practical application of using mean ring widths to predict sapwood, apart from Fletcher (see *Chapter 2.2.2* below) who used this in conjunction with a constant width rule for sapwood.

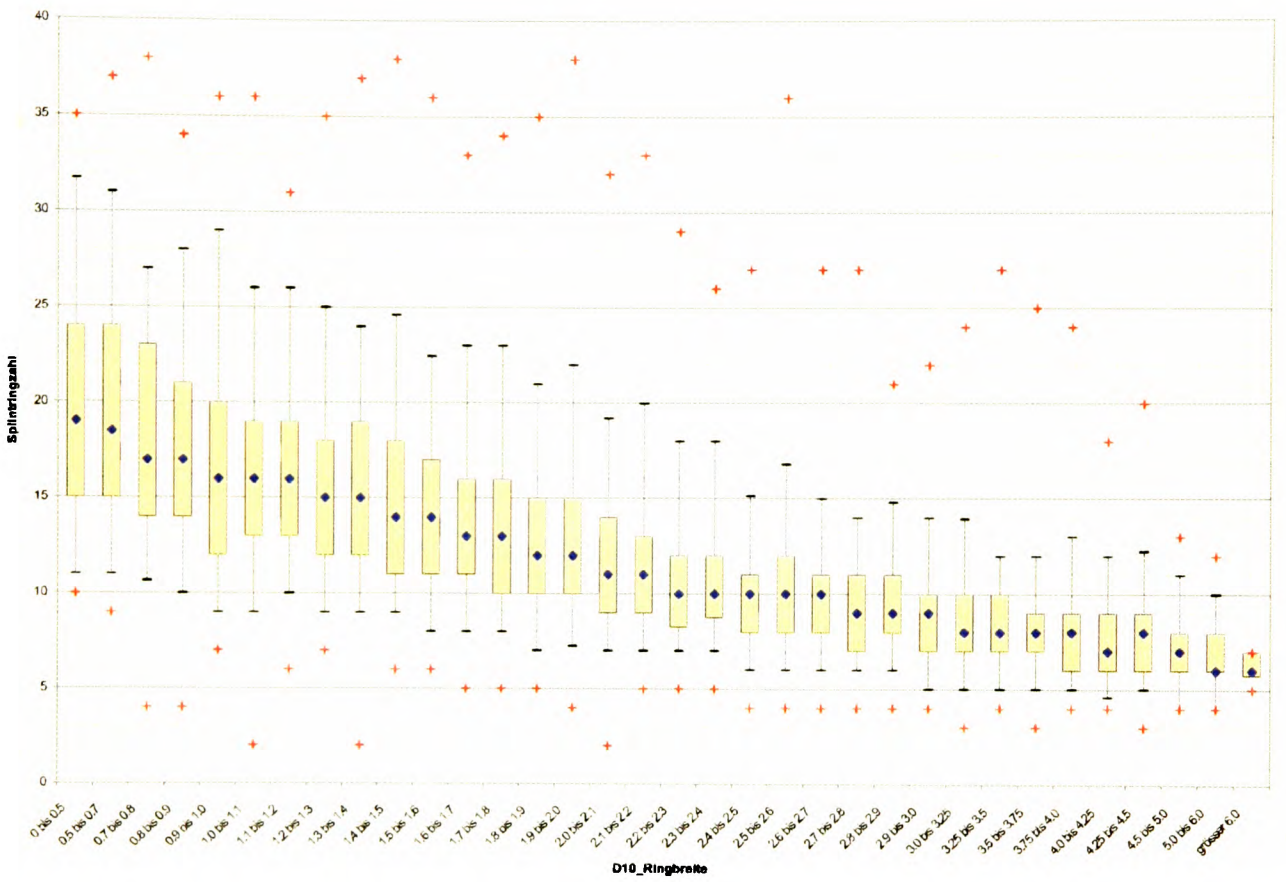


Figure 2.2: Swiss felling date ranges based on individual groups of mean ring widths (Walder *pers comm*)

2.1.3 Eastern Europe

In 1974 a study of *Quercus robur* from Moldavia (Gordienko *et al* 1974, 14-17) found that the sapwood percentage was 'smaller in weakened (distressed and dying) trees with red stain than in healthy ones (12.27% vs. 35-39% of stem volume)'.

In Poland, Wazny had produced a 90% sapwood estimate of 9 to 23 years for Eastern Pomerania (Wazny 1990). This was based on 164 historic timbers and produced a skewed mean of 15 (Wazny and Eckstein 1991, 35-49). For Wolin in north-west Poland higher numbers of sapwood rings were found (14 to 26 years with a skewed mean of 17), but this was based on only 29 samples. However, this reduction in sapwood rings from west to east was also noted in studies in living trees (Wazny 1990).

mean ring width in mm	*number of samples*	*average no of sapwood rings*	*confidence level*	*standard error*	*standard deviation*
D10_Ringbreite	**N**	**Splintringzahl**	**Vertrauen**	**Std.Fehler**	**Std.Abw.**
0 bis 0.5	72	19.85	1.47	0.73	6.24
0.5 bis 0.7	216	19.84	0.81	0.41	6.03
0.7 bis 0.8	190	18.09	0.78	0.40	5.47
0.8 bis 0.9	224	17.59	0.73	0.37	5.53
0.9 bis 1.0	231	17.00	0.72	0.37	5.57
1.0 bis 1.1	295	16.71	0.58	0.30	5.07
1.1 bis 1.2	292	16.40	0.57	0.29	4.93
1.2 bis 1.3	310	15.54	0.54	0.27	4.79
1.3 bis 1.4	315	15.69	0.52	0.26	4.65
1.4 bis 1.5	366	14.91	0.49	0.25	4.77
1.5 bis 1.6	330	14.47	0.51	0.26	4.70
1.6 bis 1.7	383	13.83	0.46	0.24	4.63
1.7 bis 1.8	367	13.57	0.49	0.25	4.75
1.8 bis 1.9	364	12.73	0.46	0.24	4.50
1.9 bis 2.0	363	12.82	0.48	0.24	4.60
2.0 bis 2.1	394	12.00	0.39	0.20	3.93
2.1 bis 2.2	373	11.61	0.40	0.20	3.91
2.2 bis 2.3	364	10.84	0.36	0.18	3.50
2.3 bis 2.4	362	10.73	0.34	0.17	3.26
2.4 bis 2.5	376	10.15	0.32	0.16	3.12
2.5 bis 2.6	363	10.33	0.36	0.18	3.47
2.6 bis 2.7	344	9.92	0.35	0.18	3.32
2.7 bis 2.8	304	9.33	0.33	0.17	2.90
2.8 bis 2.9	283	9.62	0.32	0.16	2.77
2.9 bis 3.0	239	9.05	0.34	0.17	2.67
3.0 bis 3.25	560	8.76	0.23	0.12	2.78
3.25 bis 3.5	405	8.36	0.24	0.12	2.44
3.5 bis 3.75	290	8.15	0.29	0.15	2.52
3.75 bis 4.0	194	7.91	0.35	0.18	2.51
4.0 bis 4.25	151	7.76	0.36	0.18	2.26
4.25 bis 4.5	74	7.85	0.55	0.28	2.39
4.5 bis 5.0	79	7.16	0.45	0.22	2.00
5.0 bis 6.0	55	6.64	0.44	0.22	1.64
grösser 6.0	10	6.10	0.53	0.23	0.74
gesamte Stichprobe	9538	12.25	0.10	0.05	5.20

Table 2.3: Summary of felling date ranges based on individual groups of mean rings widths from Switzerland (Walder *pers comm*)

Grynaeus (1998) produced similar ranges with a small group of 23 samples from a well lining made up of immature trees between 30 and 50 years old. This produced a mean sapwood value of 18.9 years, with an absolute range of between 10 and 26 years. This was compared to a mean sapwood value of 16.6 years for a group of 184 samples which had a much wider absolute range of between 6 and 36 years.

In Lithuania, an average number of 17 sapwood rings is used (Pukiene and Ozalas 2005, 35). In Hungary, Grynaeus has noted that archaeological material has a differing number of sapwood rings to that found on more modern timbers (Grynaeus 2005, 51-2).

In 2000, Tyers (2000) produced two estimates for Baltic oak. One is based on 17 coffin boards from Hull with complete sapwood, giving a total range of 9 to 17 years (**Figure 2.3**). The other is what he describes as a 'pseudo-sapwood distribution' based on samples with incomplete sapwood but with the felling date estimated by others within the same group with bark edge. By calculating the difference between the known heartwood/sapwood boundary dates on the incomplete samples, and the actual felling date on other samples within the same group, he had assembled a collection of 117 samples, and produced a 95% range of 8.5 to 24, with a mean of 14.3 (**Figure 2.4**). All of these examples are illustrated with histograms.

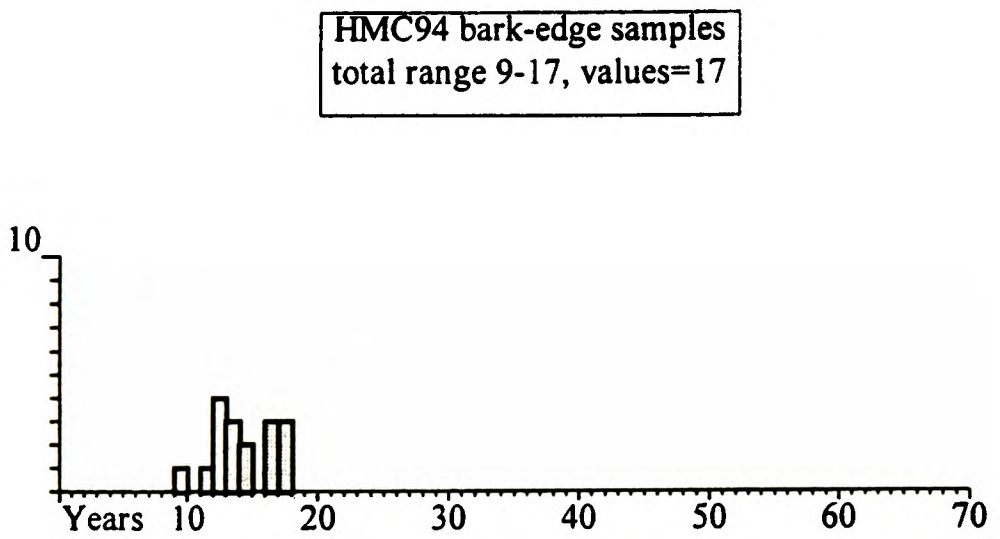


Figure 2.3: Histogram of the sapwood values of the 17 Baltic samples with bark edge from Hull Magistrates Court, with vertical axis showing number of samples (Tyers 2000)

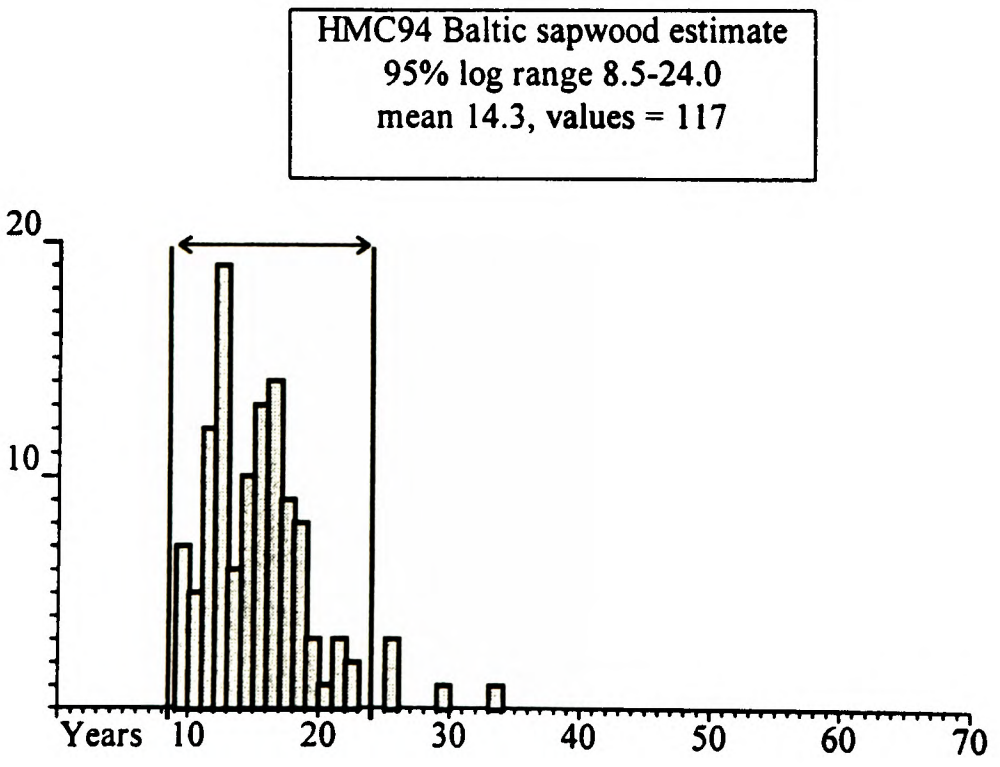


Figure 2.4: Pseudo-sapwood distribution derived from 117 dated timbers from the Hull coffins with some planks complete to bark edge. The calculated 95% range assumes a skewed distribution is present based on the English and Welsh examples, with vertical axis showing number of samples (Tyres 2000)

2.1.4 Italy and Southern Europe

In northern Italy, a value of 16.5 ± 5.4 has been used as far back as the 1970s. However recent work by Martinelli has found sapwood rings to be highly variable and to have a relationship with the age of the tree. She uses the mean ring width and the age of the tree in estimating sapwood, and where the inner part of the timber is missing to the pith, an estimate of the total age of the tree is made (Martinelli 2005, 29-30).

Work on oak around the Aegean by Kuniholm and Striker (1987, 385-98) produced a sapwood estimate based on 21 individual sites each represented by between 4 and 70 samples, totalling 314 samples. They give a mean of 25.6 ± 9 (**Table 2.2** below), and noted a large variation in date ranges between sites (**Figure 2.5**). They conclude that there is no correlation between number of sapwood rings and other factors such as geographical location, altitude, or date. The samples were obtained over an area several hundred kilometres across.

As early as 1964, sapwood estimates based on the age of the trees were compiled for a group of trees from Anatolia (Gürsu and Bernhart 1964, 222-47).

No. of rings	*Site*	*No. of samples*
34±4	Çanakkale, C. Hasan Paşa Köşkü	4
33±8	Arnaia, Chalkidiki, forest	10
33±7	Meteora, Rossanou Monastery	8
32±12	Aiani, Hg. Demetrios	11
32±7	Palamas, Hg. Athanasios	11
31±6	Pythion, Castle	5
30±11	Devecikonağı, forest	25
27±11	Istanbul, Belgrade Forest	70
27±9	Karabük, Zonguldak, forest	10
27±8	Thessaloniki, Vlatadon Monastery	19
27±5	Siatista, Nerandzopoulou House	6
26±8	Yenice, Zonguldak, forest	11
26±3	Çanakkale, Kilit Bahir Castle	14
23±6	Rendina, Monastery	8
23±5	Didymoteichon, Ç. S. Mehmet	23
21±6	Thessaloniki, Nea Panaghia	18
20±6	Ambelakia, Schwarz House	10
20±3	Livadia, Paterma Forest	13
18±4	Teriachio Forest, Ioannina	13
18±3	Thessaloniki, Frourio Vardari	21
13±1	Istanbul, St. Sophia	4

Table 2.2: Mean number with standard deviations of sapwood rings in 21 sets of Aegean oak samples (Kuniholm and Striker 1987)

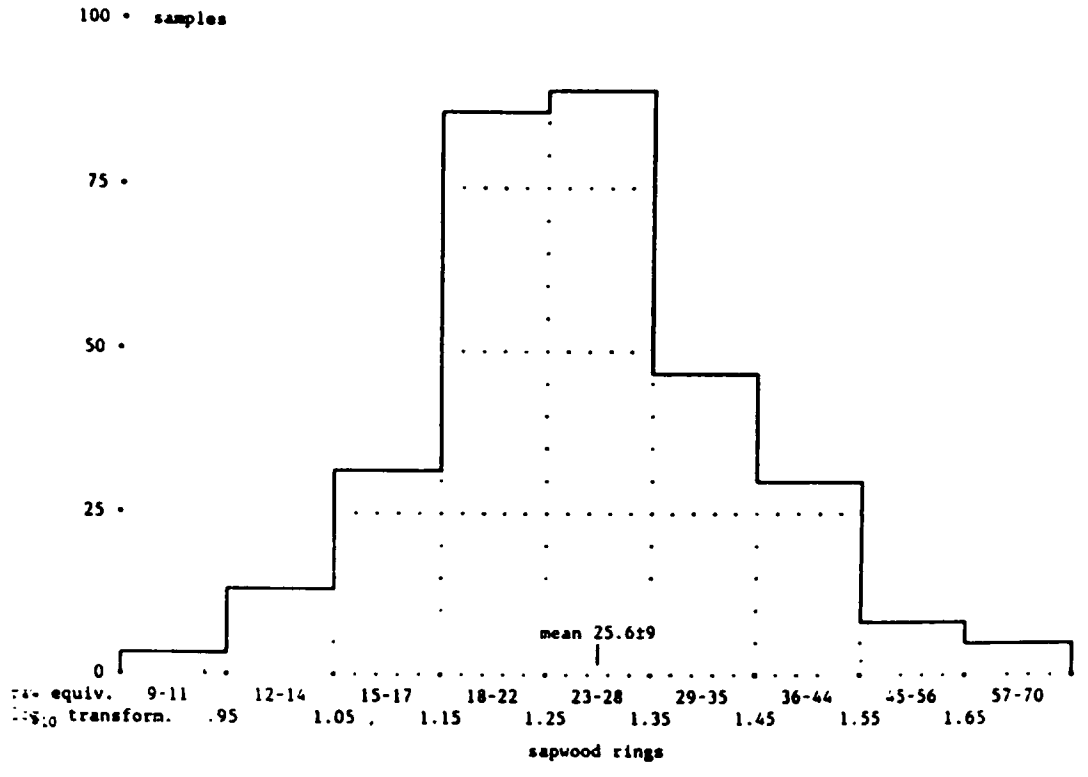


Figure 2.5: Distribution of number of sapwood rings in Aegean oak (April 1987) (Kuniholm and Striker 1987)

Age Group:	*No. of sapwood rings*
100 to 200 years	20.6 ± 4.1
Over 200 years	29.4 ± 7.1

Table 2.3: Anatolian sapwood estimates grouped by age of tree (Hollstein 1965)

2.1.5 Scandinavia

A study of living trees has given a range of 13.9 ± 3.2 for Finland (Baillie *et al* 1985, 317-9), while Brathen has noted a mean of 16 sapwood rings for 67 oaks in the Gotha River area of Sweden (Bråthen 1982, 19).

2.1.6 France and the Low Countries

In a study of Cluny buildings, a 95% sapwood estimate of 10 to 40 rings has been given for this region of central-eastern France by the Laboratoire de Chrono-Ecologie de Besançon. However, this is qualified by adopting a wider felling date range of 10 to 90 years if the tree is over 150 years old, as the outermost rings are sometimes only 0.1 mm thick. A theory of minimal removal of heartwood to the heartwood/sapwood boundary is also advanced, with a maximum of 10 years for trees less than 150 years old, and a maximum of 50 rings for trees over 150 years old, giving felling date ranges of 10 to 50 and 10 to 140 years respectively, instead of the usual *termini post quem* dates. However, boards with no heartwood/sapwood boundaries are identified as problematic, with only a *tpq* being suggested as appropriate (Lambert *et al* 1997, 229-33).

In 1987 an estimate was produced by Pilcher derived from 118 modern oaks from in Northern France. The living tree were sampled at breast height and produced a 95% range of 15 to 43, with a mean of 25.3. Pilcher applied a factor of 1.217 to account for the increase in sapwood rings further up

the tree as suggested by Hughes (see *Section 2.2.3* below), giving a range of 18 to 52, with a mean of 31. Pilcher also mentions outliers with as few as 5 rings of sapwood, or as many as 90 (Pilcher 1987).

This was slightly revised in 1989 with an estimate of 18 to 50 for Northern France and the Loire valley (Jones *et al* 1989, 100). At the same time a range of 9 to 28 rings is proposed for Brittany, but this is only a 90% range based on 219 living trees. They state that some will lie outside this range, possibly as much as 20 years later.

In a review of European dendrochronology, Courtenay (1997, 42-75) repeats the range of 18 to 50 rings for northern France and the Loire valley.

Courtenay also mentions that Hoffsummer (2002, 38) produces felling date ranges using a sapwood-width method in eastern Belgium similar to that proposed by Fletcher (1978b, 303). This method uses the database of Gassman in Neuchâtel, and calculates the average amount of sapwood from the last heartwood rings to be 2 cm wide, which in turn averages to 16 rings or years, with an additional variable of ± 5 years for the felling date range.

2.2 BRITISH ISLES

2.2.1 Queen's University Belfast - M G L Baillie

In 1973 a Belfast-based study looked at a group of 37 post-medieval and modern timbers with complete sapwood (Baillie 1982, 57-9). In addition to the number of sapwood rings and the overall age of the trees, the mean radius was also recorded. This information was shown on two distribution plots, one showing the number of sapwood rings against the age of the tree, and the other the number of sapwood rings against the mean ring width.

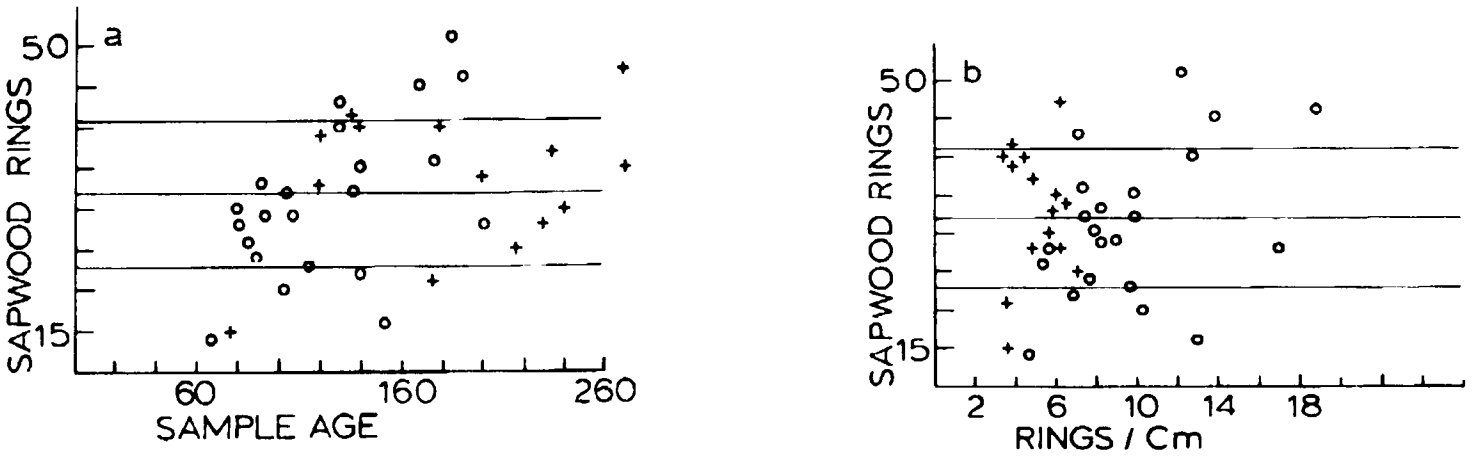


Figure 2.6: Distribution of sapwood rings against tree age (left) and mean ring width (right) for Irish oaks (Baillie 1982, 59)

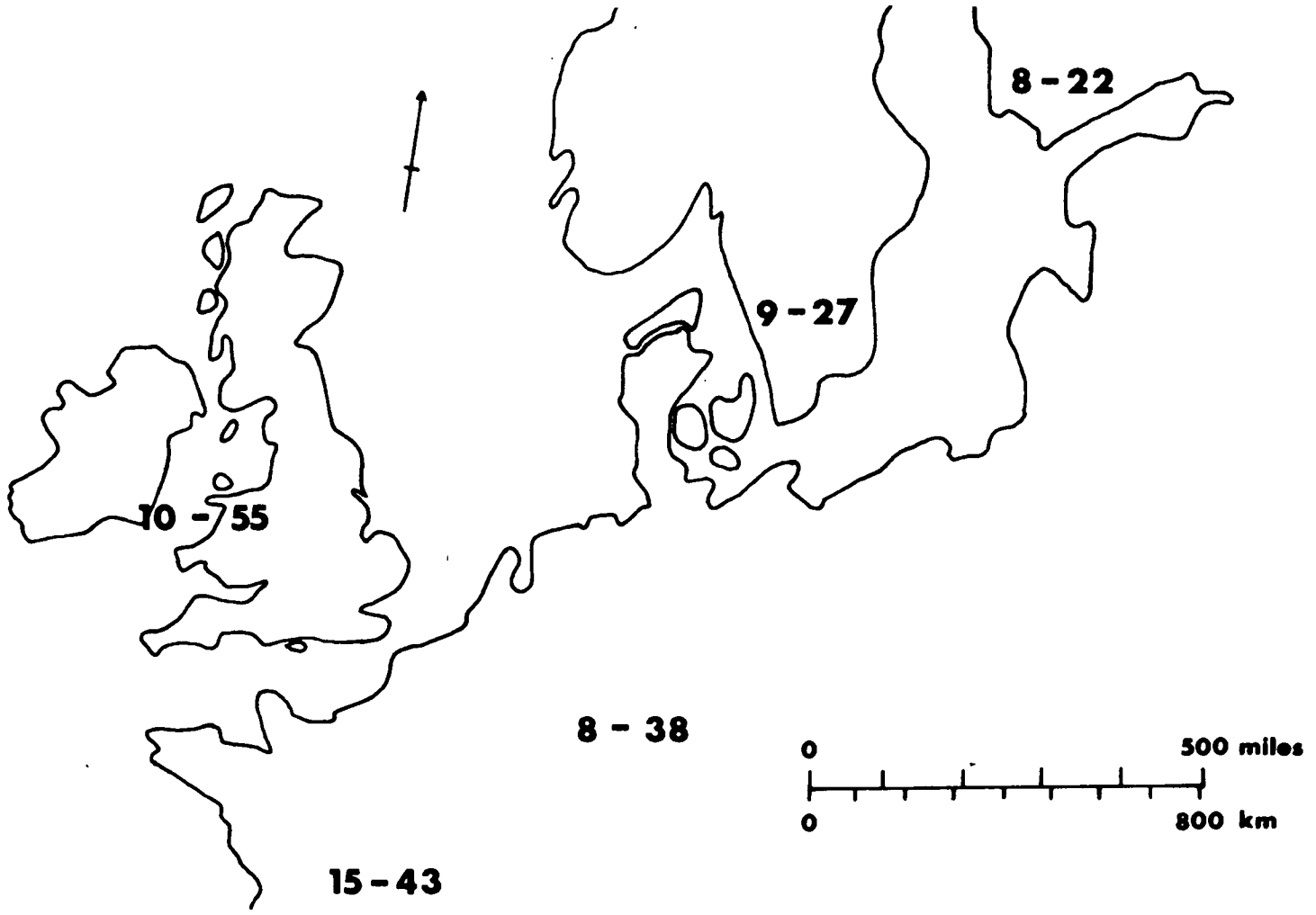


Figure 2.7: Sapwood numbers for oaks from different areas within Europe showing an apparently systematic decrease with distance from the Atlantic (Hillam *et al* 1987)

Unlike Hollstein, Baillie concluded that for trees containing more than 80 growth rings, there was no significant relationship between the number of sapwood rings and the age of the tree. He further adds that samples with fewer than 80 rings are unlikely to date at all, and were therefore not relevant. As regards possible correlation with mean ring width, Baillie felt that again there was no clear relationship, although modern samples seemed to be faster-grown than the historic material. He found that samples from Ireland had a range of 12 to 50 rings which were used in making up the mean. However, there were some extreme examples with 90 sapwood rings, with other examples with no sapwood rings at all in a localised area around Belfast, but these were not used in building up the sapwood estimate. His conclusion therefore was that a single mean sapwood value should be valid for all mature trees. This is presented as an arithmetic mean of 31.8, and calculated at one standard deviation gives a range of 32 ± 9 (Baillie 1982). At 95% this gives a range of 14-50 years (Baillie 1995, 21-5).

Baillie also concluded that there were more sapwood rings in the west than east across Europe. This was amplified in 1985 when sapwood distribution graphs from the British Isles, Germany, and Finland were published (Baillie *et al* 1985, 317-19).

2.2.2 *Oxford University: J M Fletcher - RLAHA; P Savill and I Gourlay - Dept of Forestry*

At Oxford, Fletcher initially suggested the one inch rule, where the number of sapwood rings is based on the number of rings in the outermost inch (25 mm) of heartwood (Fletcher 1978, 303). Like Hollstein (1980, 273), Fletcher felt that there were more sapwood rings in slower-grown timbers than in faster grown ones. Based on this, he suggested a range of 20-30 for slower grown panels and boards, and 15-20 for faster-grown building timbers.

This method was not generally accepted by most other workers in Britain, notably Hughes *et al* (1981, 381-90), Baillie (1982), and Bridge (1983). They felt that the variation in sapwood width is too large to support the use of a constant width value for the calculation of sapwood. However, Hoffsummer in eastern Belgium does use a similar method in calculating sapwood rings (Courteney 1997).

In 1980, Fletcher published a paper which expands on his one inch rule (Fletcher 1980, 32-8). In southern England he noted that oaks over 80 years old rarely had sapwood less than 25 mm or more than 40 mm in width. He also noted that faster-grown oaks, i.e. when the rings are wide, would have fewer rings of sapwood than in trees where the rings are narrower. He concluded that the higher number of sapwood rings used by Baillie and Hillam was due primarily to older, slower-grown trees being studied. Hollstein, on the other hand, found many more young, faster-grown trees in Germany. Fletcher concluded that the Irish and northern English estimates may be as much as 20 years too long for many timbers used in the south of England. In this paper he produced four ranges or mean dates with + and - values based on the mean ring width of the latest heartwood and sapwood rings of the sample, as in his 'one inch' theory. In 1982 these values were revised and expanded, and these estimates were used by Fletcher for oaks under 100 years old until his retirement (Fletcher and Tapper 1982, 49). One exception is the value for timbers with 3.0 to 4.0 mm mean ring width, for which no value was given in 1980, but an intermediate value of 8-13 rings was given in Fletcher (1982), and finally revised in Fletcher and Tapper (1982):

Mean width of last 1" (25mm):	*Likely number of rings in the sapwood as presented in:*		
	Fletcher (1980)	*Fletcher (1982)*[1]	*Fletcher & Tapper (1982)*
3.0 to 4 mm	-	(8-13)	8 - 15
2.4 to 3 mm	10 - 15		10 - 16
1.8 to 2.39 mm	15+6, -4		12 - 20
1.3 to 1.79 mm	20+7, -5		15 - 25
1.29 mm or less	25+8, -5		20 - 32 (0.9 - 1.2 mm)
0.8 and under			25 - 40

[1] (Fletcher 1982, 79-84)

Table 2.4: Sapwood estimates by mean ring width (after Fletcher 1980, Fletcher 1982, and Fletcher & Tapper 1982)

The above method however is complicated by the fact that some of the material included in the above study was recognised as of Baltic origin (Bridge *pers comm*). This method was refuted by Hillam *et al* (1984, 1-4) who tested the limits proposed by Fletcher above on an independent data set of

106 samples, and found that 43% lay outside the limits proposed (**Figure 2.8**). A later study by Hillam *et al* (1987, 165-85) noted a slight trend for fewer sapwood rings in younger oak trees under 100 years old, as well as a relationship between fewer sapwood rings and wider mean ring widths as previously suggested by Fletcher.

The dataset of 106 samples of immature trees (**Figure 2.8**), and another group of 91 samples of mature trees, were plotted with the mean ring widths (**Figure 2.9**). Whilst the mature group showed little correlation between mean ring width and sapwood numbers, the immature group showed a significant correlation to the extent that a lower range could be applied. However, they considered this to be of little practical use, and suggested that the graph be used with caution. This does, however, somewhat confirm Fletcher's conclusions, although his figures do not adequately allow for the variation of these data sets. Nevertheless, they conclude that Fletcher's method is unsuitable for English archaeological timbers, although they suggest that careful use of mean ring widths may allow smaller ranges to be used in immature trees.

Independently at Oxford, a study of sapwood rings and their relationship with both height and tree age was carried out (Savill *et al* 1993, 371-5). They found that the sample base with which they worked (36 trees from the Forest of Dean) was too small to make any conclusive determination of the relationship between the number of sapwood rings and the diameter at breast height. They did, however, find a clear relationship between the age of the tree and number of sapwood rings, as shown in **Table 2.5** below:

Age Class	*Sample Size*	*Mean number of sapwood rings (std deviation)*	*Number of sapwood / total rings (variance)*
< 50	2	12.0 (1.41)	0.27 (0.032)
51 - 100	13	21.2 (3.32)	0.26 (0.035)
101 - 150	13	24.0 (4.65)	0.20 (0.029)
> 150	8	28.9 (10.57)	0.15 (0.038)

Table 2.5: Mean number of sapwood rings in four age groups (Savill *et al* 1993)

In addition to English trees from the Forest of Dean and Bagley Wood, Oxford, a number of trees from Germany were also studied. They found that average number of sapwood rings was 9.5 (± 2.2) for oaks at 40 years of age, not dissimilar to the results of the English trees shown above.

Savill *et al* (1993) also found that faster growing trees tended to have fewer sapwood rings, but the results were not wholly consistent, and it was concluded that further samples were needed to resolve this aspect. They also noted that the study of two trees from Bagley Wood, Oxford, showed some correlation in the number of sapwood rings increasing as one progressed up the trunk. This is discussed in more detail under the work done at Liverpool Polytechnic.

2.2.3 *Liverpool Polytechnic - M Hughes, P Leggett, S Milsom, and F Hibbert*

The work at Liverpool led by Hughes and Milsom was notable for showing a relationship between height above ground and sapwood numbers. In 1978, 38 measurements from a group of 20 living oaks were sampled at Maentwrog in North Wales by Leggett *et al* (1978, 187-94). They concluded that a mean number of sapwood rings was 27.21 ± 0.8 (standard error), later presented as having a standard deviation of 4.9. What was most useful with this material was the sampling at intervals of 2 metres up the trunk of the tree, thus allowing any variation in sapwood rings counts to be identified. A further study of 81 measurements from 11 of these trees by Milsom (1979) conducted subsequently shows that the number of sapwood rings increases with height up the stem, resulting in a higher figure of 34 ± 7 proposed as being more appropriate for building timbers which might come from higher up the bole (Baillie 1982, 58).

Leggett went on to produce another estimate for north-west England based on 44 measurements from 22 trees, and resulting in an estimate of 29.9 ± 9.0 (Leggett 1980, in Bridge 1983, 26).

These earlier studies were superseded by an important paper on sapwood estimates put out in 1981 by Hughes *et al*, summarising their earlier work as well as that of other researchers (Hughes *et al* 1981, 381-90). Much of the paper is based on 175 samples from 125 living trees in North Wales and north-west England. All but 10 of these samples were from new sampling from seven woodland sites in Cumbria, Cheshire, Staffordshire, and Gwynedd in North Wales. Three measurements were made from each sample: number of sapwood rings, number of heartwood rings, and width of sapwood. Three methods of determining sapwood are discussed:

Method A proposed by Fletcher (1978), where the sapwood is constant at about an inch, and that the number of sapwood rings may be derived by dividing the mean width of the most recent rings present into the assumed sapwood width.

Method B derives an empirical equation for sapwood ring number using some variable related to tree age or growth rate from a sample of timbers retaining complete sapwood.

Method C is that used by Hollstein (1965) where a statistical description is made of the population of measurements of sapwood number from which the new unknown number is assumed to come. This then allows the calculation of the expected sapwood number within certain confidence limits (Hughes *et al* 1981, 386).

Hughes discredits method A due to the fact that sapwood is often variable in width, with the mean 31.9 mm produced from the study of 125 trees. The other flaw which Hughes raises is that the trend of the running mean ring width often shifts in the order of one or two decades, as noted by Pilcher *et al* (1977, 713-29). Hughes concludes that as both assumptions on which this method is based are invalid, they are not applicable in this region, or any other region in the British Isles, and should therefore be viewed with considerable caution.

Method B was similarly discounted as there was no useful predictive equation for sapwood ring counts from other timber properties such as number of heartwood rings or growth rate. Hughes found

no such correlation in the study of the Maentwrog trees, or in the wider 125-tree group. Of this group, only 93 samples were from trees of more than 80 years old.

Only the third method, C, was considered to have any value in predicting sapwood ring numbers. This was drawn on a large data set of samples with complete sapwood and tree age. Whilst it was not possible to determine what type of site trees used in buildings or archaeological sites grew, it was possible to determine, through the age of the tree, a general distribution of sapwood rings. The approach had been used by Hollstein (see *Section 2.1.1* above), in that the age of the samples were divided in to three classes with those less than 100 years in one, between 100-200 in another, and over 200 in a third. Significant variations in sapwood ring counts were noted in the British material, with a similar trend to that noted in the German material, albeit some six or seven years higher. The results are shown below in **Table 2.6**.

Age Group:	*No. of sapwood rings ± standard deviation:*
Less than 100 years	23.7 ± 5.9
100 to 200 years:	26.7 ± 8.6
Over 200 years:	32.4 ± 8.9

Table 2.6: Distribution of sapwood rings and standard deviations by age of tree (Hughes *et al* 1981)

Hughes then uses an estimate of all the 175 samples giving a 90% confidence level of 15 - 40.5, and 95% confidence level of 13.7 - 44.6, with a mid-range of 24.7.

When calculating an empirically-derived sapwood estimate, there are accepted procedures to follow (Haddon-Reece *pers comm*). Firstly, summary statistics are calculated for the observed data. This includes the arithmetic mean, variance and standard deviation, skewness, and kurtosis. The data are then assessed using these summary statistics to determine whether they are normally distributed. If the data are found to be skewed beyond the range of acceptable skew for a normal distribution, then they must be transformed to adjust the skewness within acceptable normal limits. A typical method of transformation is to replace each sapwood count with a logarithm of that datum value. Then sample statistics are re-calculated on the transformed data and the tests for normality applied again.

Only after all the transformations have been proved to be normal within acceptable limits is it correct to make comparisons between the data set under study and another. Although there are several possible methods of transformation to correct skew, the logarithm method is usually chosen because it addresses the underlying exponential law that governs tree growth (Haddon-Reece *pers comm*). This is the method used by Hughes *et al* (1981) as well as Hillam *et al* (1987).

What is more interesting is the application of the increase in the mean sapwood number found when sampling higher up the trunk of the tree. Although based on only ten trees which have been sampled at 2 m intervals up to 10 m high, a new mean of 30 is produced, which gives a similarly-increased 95% range of 19 - 50. This is compared to Baillie's 1973 estimate of 31.8, which is based on a random selection of samples from varying points along the trunk. Hughes *et al* (1981) concludes that further information should put this 'height adjustment' on a sounder basis.

This characteristic was also found at Oxford by Savill *et al* (1993, 371-5). Here some 36 trees of both *Quercus robur* and *Q. petraea* were sampled at breast height in the Forest of Dean, and two trees from Bagley Wood, Oxford, were sampled at 1 metre intervals up to a height of 20 metres. They found that the number of sapwood rings was consistent for the lower 10 or 11 metres of the trunk, but above this the proportion of sapwood rings to heartwood rings increased rapidly. The ratio of sapwood rings to the total number of rings showed a curvilinear relationship with the height of the trunk, rising at an increasing rate with the height. The fact that the sapwood rings do not increase appreciably for the first 10 metres of the trunk was similar to results noted by Trendelenburg and Mayer-Wegelin (1955) and McGinnis and Shigo (1975), both summarised in Hillis (1987). Savill *et al* describes the form of the sapwood within the trunk as 'two nested modified cones with slightly convex rather than straight sides'. There is an approximately constant thickness of sapwood outside of the central core of heartwood. The taper of the core increases with increasing height. They quantify the number of sapwood rings in the tree in the following **Table 2.7**.

Regression	r^2	
	Tree 1	*Tree 2*
Number of sapwood rings *vs.* height	0.76	0.68
Proportion of sapwood rings *vs.* height	0.87	0.90

Table 2.7: Correlation coefficients for polynomial regressions of number and proportion of sapwood rings vs. height up the stem.

2.2.4 Sheffield University / Museum of London - J Hillam, R Morgan, C Groves, I Tyers

One of the earliest sapwood estimates originating from the University of Sheffield was by Ruth Morgan in 1975 (Morgan 1975, 221-30). She states that sapwood remains at a uniform width of 3-5 cm and with about 25 rings, and that it is possible to estimate the felling date of the tree even if only one sapwood ring survives. This rudimentary sapwood estimate has not been discussed in detail, and it is not known what basis it was produced.

In 1984, Hillam, Morgan, and Tyers (1984) responded to Fletcher (1982) concerning the dating of the short ring sequences on the basis of mean ring widths. They demonstrated through a 106 sample data set from Roman and Iron Age sites that 43% of the samples with complete sapwood lie outside the limits set by Fletcher's values (**Figure 2.8**). They concluded that sapwood estimates based on small data sets of less than 100 are not reliable, and recommended a 45-year range of between 10 and 55 years of sapwood (Hillam *et al* 1984, 1-4).

This was further discussed in an important study conducted by Hillam, Morgan, and Tyers (1987, 165-85). Here the 10-55 year range was again presented, and mention made of a slight trend for fewer sapwood rings in younger oak trees under 100 years old, as well as a relationship between fewer sapwood rings and wider mean ring widths as previously suggested by Fletcher (1978). However, these factors were not quantified and only a general sapwood range of 10-55 years was proposed to be used for the whole of the British Isles, for both mature and immature oak trees. However, they suggested a

narrower range of 10 - 45 might be used for immature trees. Further discussion of their findings is discussed above under Fletcher's work on mean ring width (see *Chapter 2.2.2*).

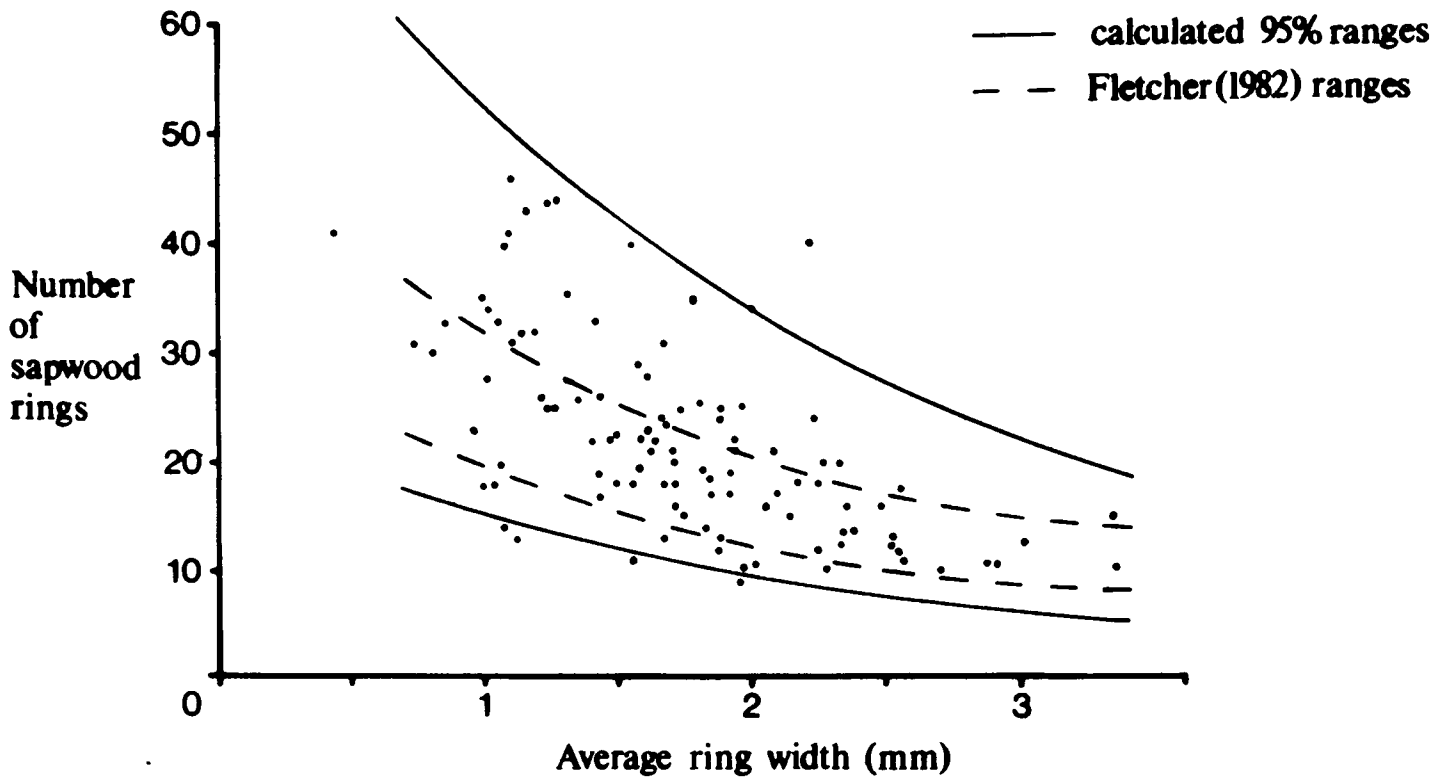


Figure 2.8: Relationship between sapwood estimates and average ring widths for immature trees of less than 100 years (Hillam *et al* 1984)

A comprehensive review of previous sapwood ranges by other researchers across Europe is presented, and what is particularly useful is that they have updated and converted these where necessary, to comparative 95% confidence levels. Using unpublished material by Baillie, Pilcher, and Briffa, they published the following table:

Area:	*Description:*	*Sample base:*	*Absolute range of sapwood:*	*Arith. mean:*	*Standard Deviation:*	*Log. 95% range:*
Ireland	Baillie 1982	65	14 - 62	31.32	8.99	16.74 - 53.93
	Modern & Post Medieval	49	14 - 52	32.24	8.91	16.85 - 56.65
England	Roman	61	10 - 66	23.59	9.71	10.05 - 47.55
	Fiskerton Iron Age	58	9 - 61	23.47	11.71	7.90 - 55.00
	Norwich & Ludlow Modern	30	16 - 62	29.43	10.33	14.44 - 53.69
	N Wales & North-west	175	10 - 55	25.80	8.0	13.70 - 44.60
France	Modern	118	12 - 49	26.58	7.04	15.25 - 43.26
Germany	Hollstein (amended) *	446	7 - 66	19.00	7.54	8.22 - 37.95
Sweden	Brathen 1982	69	9 - 32	15.84	4.65	8.73 - 26.55
Finland	Modern	60	7 - 24	13.85	3.19	8.32 - 21.80

* (Hollstein 1980, 273)

Table 2.8: Comparisons of sapwood ranges for Europe as of 1987 (Hillam *et al* 1987)

Hillam *et al* (1987) noted the general reduction of mean sapwood rings and variance eastwards across Europe, and the variation in sapwood rings both around the trunk's circumference and up the length of its trunk, as noted by Hughes *et al* (1981). The marked skewness of the data is presented in a series of histograms. The problems of presenting a felling date range from a skewed mean are

discussed, and the authors agree with the method proposed by Hughes *et al* (1981) in which the data are transformed to logarithms to adjust for this, and to present the 95% confidence limits.

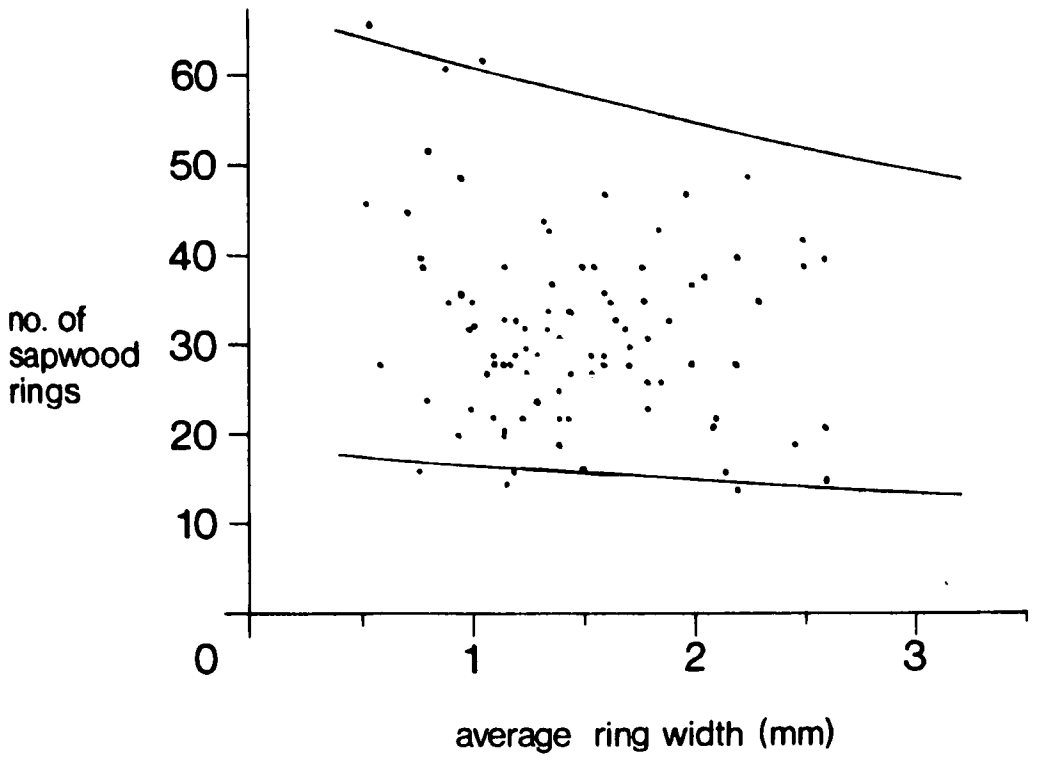


Figure 2.9: Relationship between sapwood estimates and average ring-widths for mature trees of over 100 years (Hillam *et al* 1987)

The paper by Hillam *et al* (1987) agrees that the increase in sapwood rings the further up the tree the sample is taken is more representative of the type of archaeological or building timbers often encountered, and that samples taken from modern trees at breast height give an under-estimate of the variation of values encountered in archaeological contexts.

Area:	*Description:*	*Sample base:*	*Absolute range:*	*Arith. mean:*	*Standard Deviation:*	*Log. 95% range:*
British Isles	Immature	106	9 - 46	22.35	9.11	9.16 - 46.33
	Mature	91	14 - 66	31.74	10.23	15.59 - 58.15
Germany	Immature	232	7 - 35	15.47	5.36	7.39 - 28.83*
	Mature	214	11 - 66	22.83	7.68	11.63 - 40.52

* The more recent study of Hollstein in 1980 included 47 samples less than 30 years old, which represents almost 10% of the sample base, and significantly distorting the conclusions.

Table 2.9: Summary of British and German estimates (Hillam *et al* 1987)

Discussion on tree age reveals a number of problems in previous studies. It is acknowledged that younger trees tend to have fewer sapwood rings, and that many archaeological samples do not contain the entire radius of the tree, making the determination of the tree age impossible in many cases. Instead, the data are divided into either 'mature' if over 100 years in age, or 'immature' if under this threshold. This then allowed many more samples to be included in the study, even though the actual ages of the trees were unknown. The results of this breakdown are shown in the table below for both British and German examples:

Hillam *et al* (1987) conclude that more data would enable more groupings to be made on the basis of tree age. Based on the above British data, they proposed a 95% sapwood range of 10 to 45 years for immature trees under 100 years old, and 15 to 60 for mature trees over 100 years old. A similar trend is noted in the German examples, although it would appear that almost 10% of Hollstein's data were from trees less than 30 years old.

Geographical variation is discussed and plotted, although the data are not universally mature or immature, or covering all of the areas sampled. They demonstrate the variability of sapwood rings across Europe, with a definite lowering in numbers from west to east, and a similar decline from north to south within Britain itself. However, given the difficulty in provenancing imported timbers, they conclude that a 10 to 55 year estimate (45 year range) be used for all samples.

In an analysis of English structural timbers from Peterborough Cathedral, Tyers (1999) justifies the use of the wider-ranging estimate of 10 to 55 rather than the narrower range proposed by Miles (1997). This is because he felt that there was a strong correlation between tree age and sapwood numbers. He considered the narrower range recently published by Miles to have been derived from trees that were generally both faster grown and less long-lived, whereas the timber employed in the Peterborough roofs were from trees aged between 200 and 300 years old and more. He supports Hollstein's 1980 paper and his own from 1987 (Hillam *et al* 1987).

In January 2000, Tyers reviewed sapwood estimates for both English and Baltic material (Tyers 2000). He stated that most previous sapwood estimates have been based on living trees, with archaeological and historic building timbers being used only recently. He studied a group of 1585 samples from England and Wales, from which was derived a 95% confidence level sapwood estimate of 9.9 to 46.6, with a mean of 21.5, which he has rounded to 10 to 46 (**Figure 2.10**). This estimate is very similar to that independently produced by the research undertaken by Miles in 1997. No other details of how this was calculated are given.

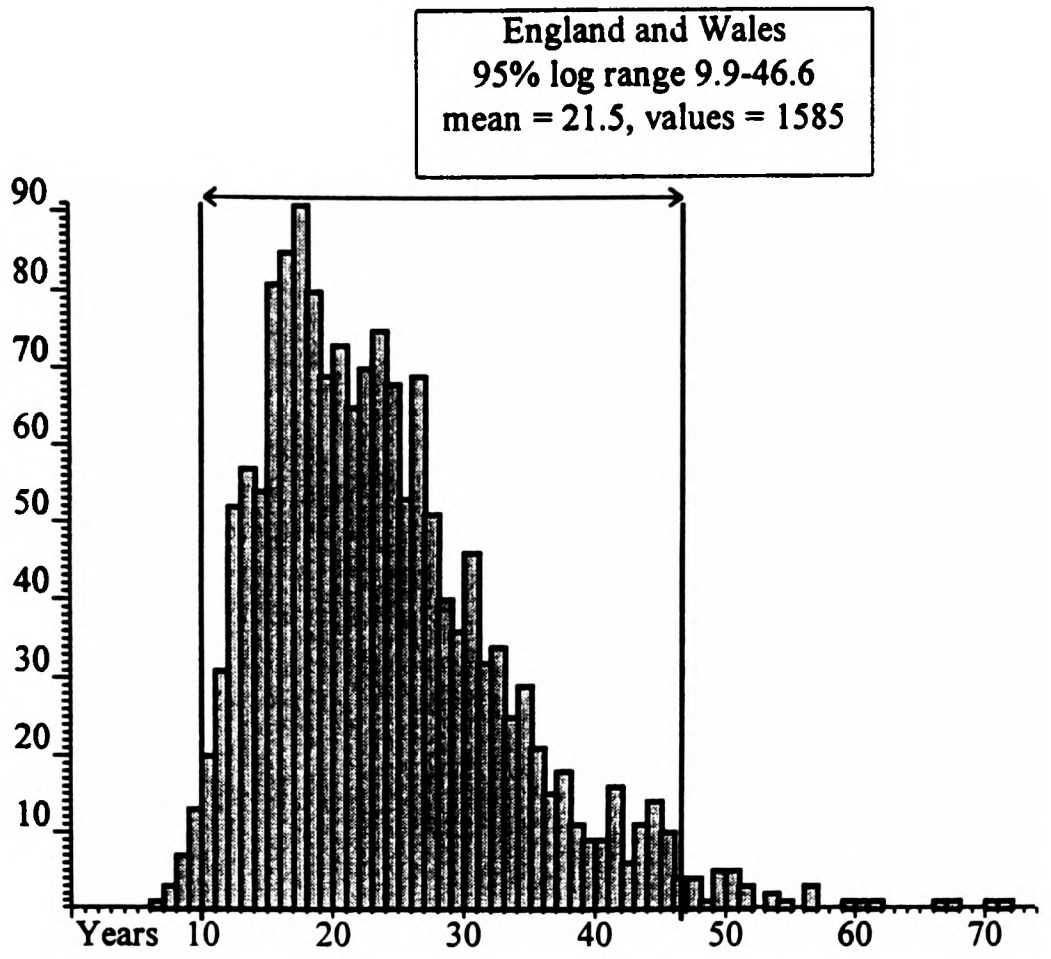


Figure 2.10: Distribution of sapwood rings for 1585 datapoints from England and Wales with sample number shown on vertical axis (Tyers 2000)

2.2.5 Nottingham University - R R Laxton, C D Litton, and R E Howard

Two years after the formation of the Nottingham University Tree-ring Dating Laboratory in 1977, they published a paper in which a rudimentary sapwood estimate was given (Laxton *et al* 1979, 23-34). This is given as between 25 to 30 rings and is based on the paper by Leggett *et al* (1978, 187-94). However, by 1985 they are noting some examples of sapwood of between 13+ and 18+ rings (Howard *et al* 1985, 39-40).

A study of East Midlands timbers used in building up the East Midlands master chronology (Laxton and Litton 1988, 53-4) cites Hughes *et al* (1981) estimate of 15 and 50 rings, with an average of 30. Although they suggest giving an estimated felling date by adding 30 to the heartwood/sapwood boundary, they state the best practice is to give the inner and outer ranges of the 95% estimate.

In 1993 and 1994, work in Kent was published by Nottingham University, produced a new estimate of between 15 and 35 rings with a mean of 25 (Pearson 1994, 148-150). This was based on a sample base of 18 timbers, with a small number of others from the south-east with substantial amounts of sapwood present. They stated that this may be narrower than had been used hitherto, and this may be due to the fact that the samples are from a restricted geographical area, and only from the late medieval period, 1300-1550 (Howard *et al* 1993a, 46).

Nottingham explained that dates without complete sapwood are presented as an estimated date based on adding 25 years to the last heartwood ring date, and qualified with *circa* (*c*). When presented with the full 95% date range, this estimated precise date is in brackets with date range on either side, i.e. 1316-(1326)-1336 (Pearson 1994, 150).

In 1997, Nottingham used a sapwood range of 15 to 35 in their study of Sherwood Forest timbers used historically in the area, based only on mature trees (Laxton 1997, 73-98). They also advocate the presentation of estimated felling dates by using the mid-range date as the most likely felling date. This does not take into account the skewed nature of the data as noted by other researchers, nor does it make clear that this is an *estimated* range rather than a precise date.

2.2.6 Portsmouth Polytechnic / London Guildhall University / University College London - M Bridge

In 1983, Bridge carried out research into sapwood findings for Bradfield Woods, Suffolk where 21 trees were sampled twice, and found the mean number of sapwood rings to be 16.7 with a standard deviation of ± 4.90, and giving a 95% range of 16.6 ± 10.02. These trees had less than 100 rings, and are compared to Hollstein's German estimate for similar aged trees of 16.0 with standard deviation of 4.5. Bridge conducted similar studies of sapwood for Hayley Wood, Cambridgeshire (23.03 ± 12.18), and Hockley Woods, Essex (21.4 ± 10.07). He concluded that the average number of sapwood rings were significantly lower than other previously published figures for oaks to the north and west. He also noted that there was a correlation between the number of sapwood rings and the width of the sapwood band with the mean ring-width of the tree in both Bradfield and Hockley woods (Bridge 1983, 215, 228). However, this had not been noted by Leggett in North Wales or Cheshire (Leggett 1980). As there was no agreement between these two studies, he felt that there could not be any universally-applied method of estimating sapwood rings.

2.2.7 AOC Scotland – A Crone and C Mills

Work in Scotland by Crone and Mills rarely involve native oak – much of it in the medieval and post-medieval periods is imported from northern Europe. For what native oak does exist, the 10 to 55 year range has been used (Hillam *et al* 1987). However, a recent study of over 104 oak samples with complete sapwood and pith dating from the sixth century AD Buiston crannog showed that all were from immature trees between 30 and 70 year in age. Regression analysis was carried out on this group of samples, and a sapwood estimate for each number of heartwood rings was calculated, ranging from 14 to 21 years of sapwood for samples with 30 heartwood rings, to 21 to 29 years for samples with 70 heartwood rings, with about 89% probability. Crone concluded that the immature trees had substantially fewer sapwood rings than the 10 to 55 year range used for older trees, and that tree age had a direct relationship to the number of sapwood rings (Crone 2000, 181-5).

2.2.8 Ancient Monuments Laboratory / Oxford University - D Haddon-Reece, D Miles

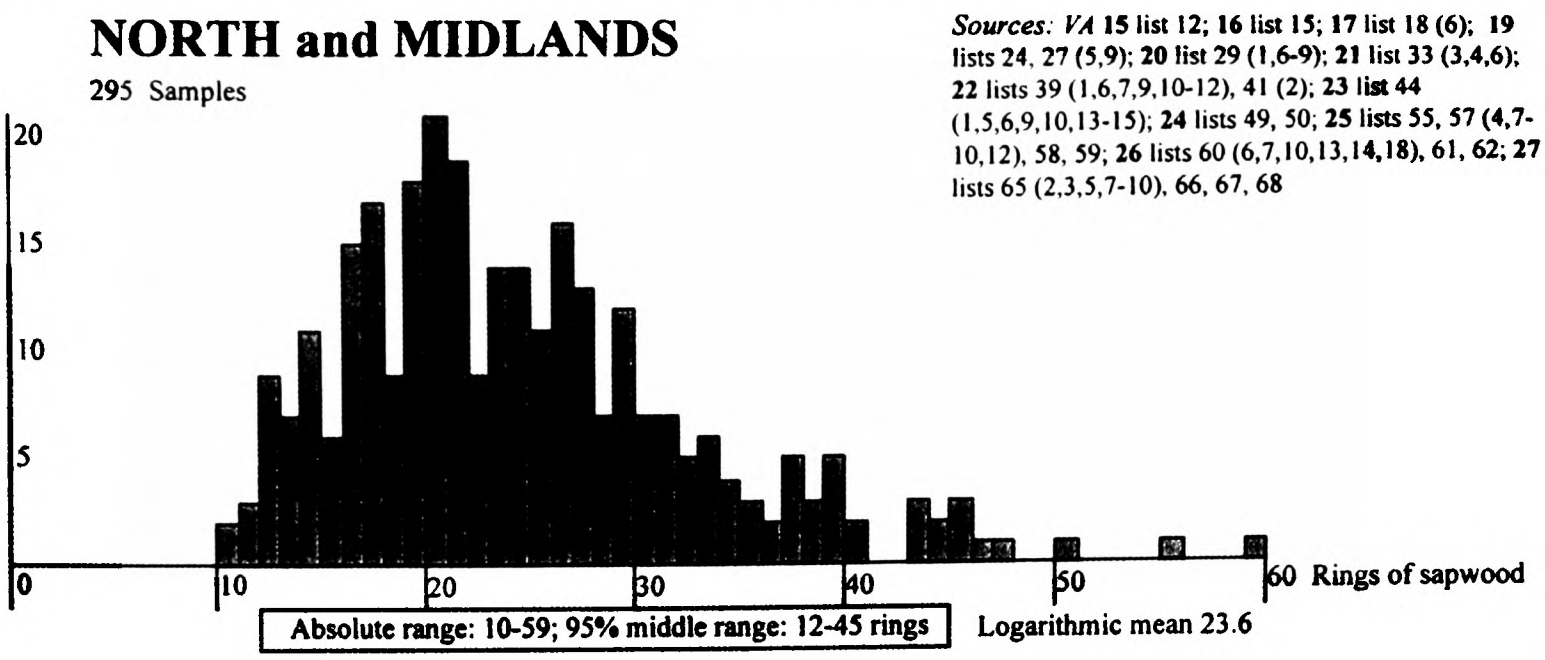
At the Ancient Monuments Laboratory, a trend for lower sapwood numbers in Oxfordshire material had been noted as early as 1989 (Haddon-Reece *et al* 1989, 46). In 1990, a 95% range of 10 to 30 years was produced from a group of about 100 building timbers from Oxfordshire, many of them

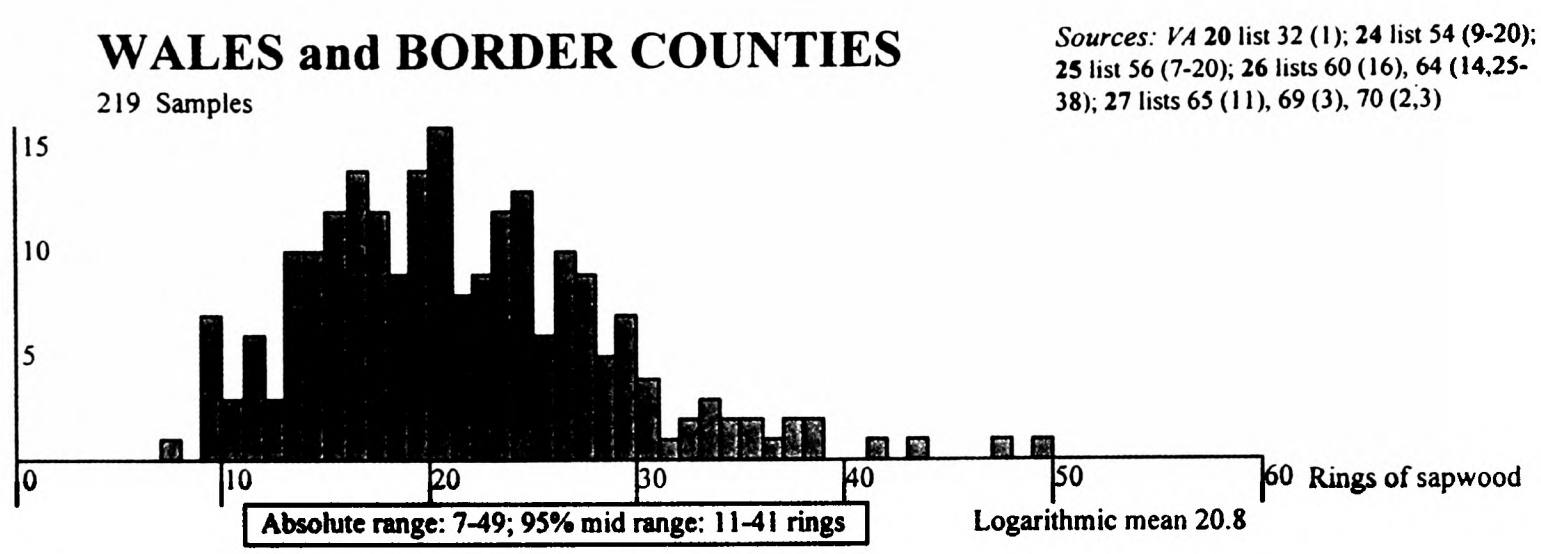
from immature trees. In this study, a positive but weak correlation was noted between the numbers of rings in the heartwood and the sapwood, but was insufficiently strong to be used as a basis for extrapolation. Similarly, the data was also subjected to Fletcher's method, based on the number of rings within the last surviving inch, and in very general terms this method produced a confidence range very similar to, but broader than the 10 to 30 range. However, it was felt that this was not a robust method due mainly to the great variability in the width of sapwood and mean ring width (Haddon-Reece *et al* 1990, 46).

In 1993, an interim sapwood estimate of 11 to 45 rings was published for Shropshire (Miles and Haddon-Reece 1993, 54-60). This was based on a data set of 47 samples.

In 1997 a paper was published in *Vernacular Architecture* concentrating on the subject of sapwood estimates and their interpretation (Miles 1997, 40-56). This paper outlined the process of dating, and highlighted some of the problems associated with using tree-ring dates, setting forth a number of suggestions as to how these might be overcome. Examples of how precise felling dates compared with documentary dates were summarised, allowing a more informed approach to the interpretation of felling dates. The dendrochronological evidence for timber stock-piling was also presented. Finally, the process of estimating missing sapwood rings was reviewed, and with the data generated over the past decade, new sapwood estimates were proposed which substantially reduced those previously used for the British Isles as a whole.

After a review of previous sapwood estimates, and the problems in applying a general sapwood estimate of 10 to 55 years to English timbers due to the weighting of Irish material, the need for a substantial revision was identified. As Irish timber has substantially higher number of sapwood rings on average than those from England, it was concluded that the combining of these two groups of data led to a wider range, all-encompassing range being produced. However, as much more data had since been produced within the last decade, particularly in southern England, it was possible to revise sapwood estimates to be more appropriate for the southern, rather than to apply one estimate to satisfy the whole of the British Isles.





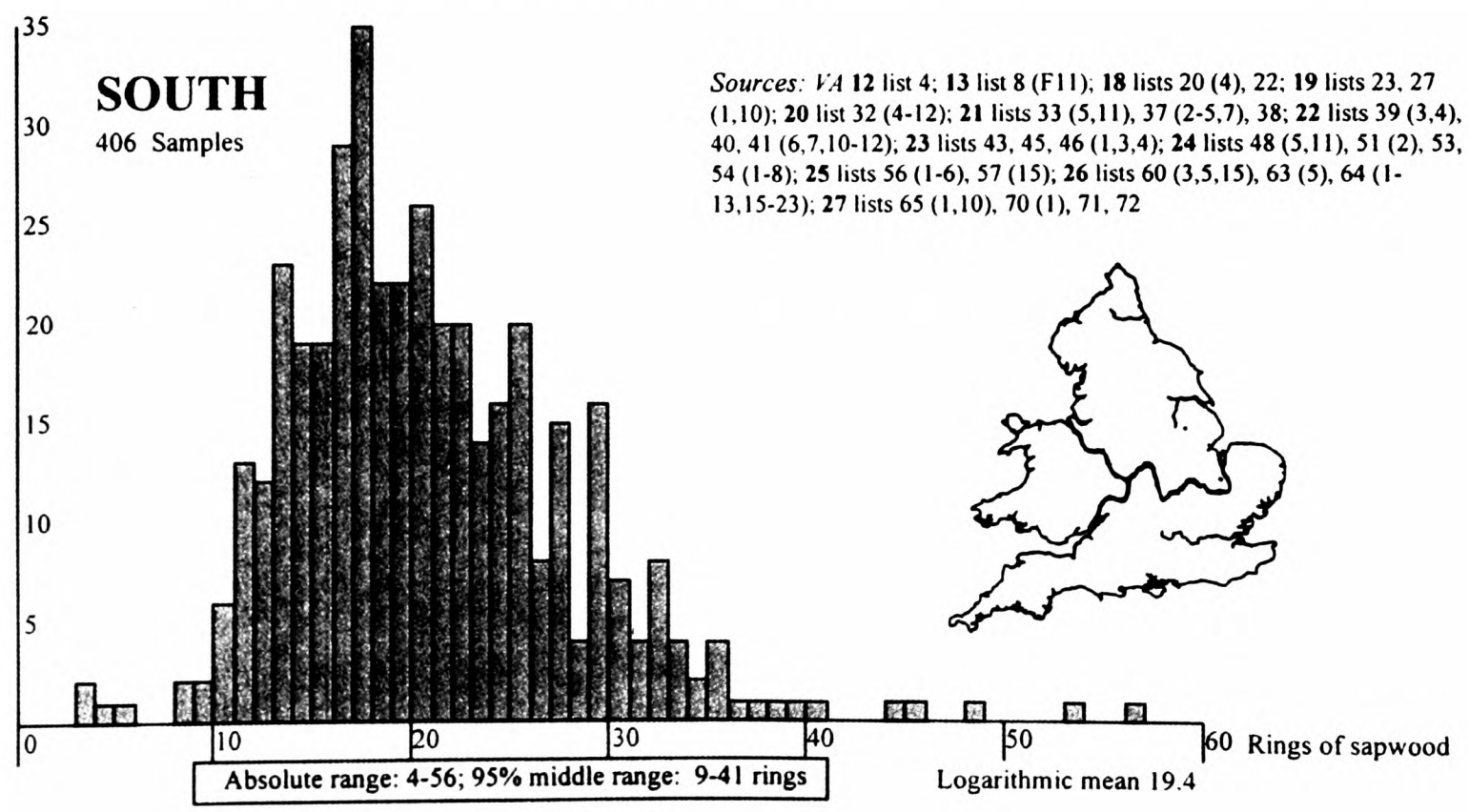


Figure 2.11: Sapwood distribution graphs for (a) Northern England and Midlands, (b) Wales and border counties, (c) southern England, with number of samples shown on vertical axis, (Miles 1997)

Figure 2.11 shows three histograms of sapwood ring counts. These have been compiled from published dates from primarily standing buildings up to and including those published in *Vernacular Architecture* **27**, including complete sapwood counts from *dated* samples. Altogether, just over 900 sapwood ring counts have been used, 295 of these from the Midland counties of Cheshire, Staffordshire, West Midlands, Northamptonshire, Cambridgeshire, and everything immediately to the north, 219 from Shropshire, Hereford & Worcester, and Wales, and 406 from all other southern counties up to and including Gloucestershire, Warwickshire, Bedfordshire, Suffolk and Norfolk. Whilst these histograms are rudimentary, and do not include any sapwood counts from undated, unpublished, archaeological timbers, or living trees, they are nevertheless representative of historic medieval and post medieval building timbers for which most dendrochronologists are particularly anxious to apply estimated felling date ranges. All show substantially fewer sapwood rings than the estimate of 10-55 rings by Hillam *et al* (1987), but from north to south there is only a slight reduction of about five rings on average. They also all have skewed distributions averaging fewer rings than the arithmetical centre of the range.

Taking these data sets at face value, and not applying any refinement in averaging the overall trends, one can nevertheless see that a substantially reduced sapwood range might be applied to building timbers in these respective geographic areas. For the north, we have an absolute range of 11 to 60 rings, and by using the same methods as Hillam, Morgan and Tyers as well as Hughes, Milsom and Leggett, a 95% middle range would be between 12 and 45 years. Similarly, the timbers from Wales and the Welsh/English border counties have an absolute range of 8 to 50 rings, with a 95% middle range of between about 11 to 41 years, whereas those from the south of the country have an absolute range of 4 to 57 rings, and a 95% middle range of 9 to 41 years. However, in light of the closeness in ranges between different parts of England, one should be somewhat cautious in using felling date ranges derived from small numbers of samples from individual counties without any further attributions such as mean ring width, etc., being taken into account.

2.3 DISCUSSION

2.3.1 Problems caused by differing sapwood estimates

The use of sapwood estimates is vital in the interpretation of timbers without bark edge. Sapwood estimates have also been used to provide dates for phases of building, and groups of timbers without any heartwood/sapwood boundaries. They have also been used to tentatively date whole chronologies, although the problems of art-historical dating and the use of *terminus post quem* or *tpq* dates are fraught with difficulties, as Baillie discusses in *A Slice Through Time* (Baillie 1995, 21-5).

An example of problems in the interpretation and presentation of sapwood rings is well illustrated in the RCHME's Kent volumes edited by Sarah Pearson (Pearson 1994, 148-50). Here, Nottingham University initially dated a series of buildings with incomplete sapwood, and presented the dates as estimated precise dates or most likely felling dates, sometimes with an accompanying date range. These were based on a range of 15 to 50 rings, but on completion of the project, they revised the

sapwood range to 15 to 35, a reduction of the range by a third. This also shifted the estimated most likely felling date back by five years. This change, whilst desirable, can cause confusion in later years if conflicting felling date ranges are published.

2.3.2 Summary review of sapwood research

This chapter has summarised work resulting in over 75 different sapwood estimates being produced by more than a dozen laboratories and researchers during the past 40 years in Europe alone. These have ranged from as low as 9 to 17 rings for a sample base of 17 timbers from the Baltic (Tyers 2000), to a range of 15 to 60 for 91 mature British trees (Hillam *et al* 1987). Unfortunately, this has also resulted in an immense amount of confusion for the end user of dendrochronology, many of whom have had their felling date ranges changed significantly more than once since the initial dating of the timber (Pearson 1994).

A wide variety of factors have been used to determine these sapwood estimates - some are based on mean ring width, others on the age of the tree, geographical area, empirical studies of ring counts alone, mean sapwood width, or on a combination of some these attributes. Sapwood estimates have also been presented in a wide variety of ways, some as a single arithmetic mean, some as an arithmetic mean with standard deviation, while others as a skewed mean with standard deviation. More recently, estimates have often been presented as a range without an arithmetic or skewed mean, some being calculated at one standard deviation (68%), some at two standard deviations (approximately 95%), or sometimes at a 90% confidence level. Many of the same estimates have even been presented in three or more different forms over the course of several decades.

There are several different variables which have shown some relevance and potential in the determination of sapwood dates:

Tree age: As early as 1965 Hollstein realised the significant correlation of tree age to years of sapwood. In Germany he found that trees between 100 to 200 years old had about 27.5% more sapwood rings than immature trees less than 100 years old, and that trees over 200 years old had 60% more sapwood rings than immature trees. This trend was also noted, in Anatolia where Gürsu and Bernhart (1964) noted 40% more sapwood rings in mature oaks. In Wales and north-west England, Hughes *et al* (1981) found that for oaks between 100 and 200 years, and for oaks over 200 years old, they had 12.5% and almost 37% more rings respectively than immature oaks. This has also been supported by more recent research by Hillam *et al* (1987) where they found a 40% increase in sapwood rings for oaks over 100 years old, and a similar trend was noted by Savill *et al* (1993) on a very small group of samples from the Forest of Dean. Therefore there is a general consensus between five independent laboratories that there is a significant correlation between the age of the tree and the mean number of sapwood rings. This is perhaps more variable as the tree grows older, but still something which should be researched further.

Geographic variation: Baillie (1995) made the significant observation that the numbers of sapwood vary considerably geographically across Europe, both from an east-west as well as a north-south direction. Wazny also detected an east-west variation in sapwood numbers in both historic timbers as well as living trees in Poland (Wazny 1990). Fletcher also noted that many of the timbers found in southern England have far fewer sapwood rings than cited by other dendrochronologists, and this was similarly found by Bridge (1983) and Haddon-Reece *et al* (1990). This evidence has also been supported by Hillam *et al* (1987) and Tyers (2000). This shows a reduction in sapwood rings by as much as 43% from Ireland to Finland, and a trend of 18% reduction just from the north of England to the south (Miles 1997). This is significant enough to reduce the 95% sapwood ranges from 11 to 46 years in the north to 9 to 41 in the south.

Mean ring width: Fletcher is noted for having relied heavily on the use of mean ring widths for immature trees in the south of England, and whilst not universally accepted, similar findings have been found by Hillam *et al* (1987). However, Hillam *et al* (1984) have demonstrated through a 106-year data set of Roman material that 43% of the sapwood values lay outside those predicted by Fletcher and Tapper (1982). In Oxfordshire timbers, Haddon-Reece *et al* (1990) detected a much closer, but still broader, relationship to Fletcher's mean-ring width theory. Bridge (1983) also reported a similar relationship to sapwood width and mean ring width.

Variation in sapwood rings along the trunk: The work of Hughes *et al* (1978) is notable for the discovery that the number of sapwood rings increase higher up the bole of the tree. Whilst this work is based on only ten trees in north-west Wales, it does show an increase by as much as 25% in sapwood rings as the top of the trunk is approached. From Oxford, Savill *et al* (1993) showed that the first 10 metres of the trunk showed little variation in sapwood rings, but again this is based on the study of only two trees from Bagley Wood. Given the variability of the results based on such a small sample base, coupled with the problem of determining where in a trunk an archaeological timber has been sampled, this method of estimation is not likely to hold much potential for archaeological and historic building timbers.

Allowance for a skewed distribution of sapwood rings: Early sapwood estimates such as Hollstein (1965 and 1980) used an arithmetic mean for the distribution of sapwood. However, Hughes *et al* (1978 and 1981) were the first to conclude that the distribution of sapwood is not even, but is positively skewed. Their use of logarithms to transform the data has been instrumental in creating a more statistically-reliable method of determining felling date ranges showed a shift of more than a year between the arithmetic and logarithmic means. This method of calculating sapwood estimates has since been used by Hillam *et al* (1987), and Miles (1997), as well as more recently by Tyers (2000).

It is because of this wide divergence in various practices that this study is being undertaken in an effort to allow a more uniform approach the problem of sapwood estimation, and which would be universally acceptable to both dendrochronologists and end users.

3. PREVIOUS METHODS OF INTERPRETATION

Generally, dendrochronological studies have concentrated on producing dates for tree-ring sequences, and it was the archaeologists or building historians who interpreted those dates as to when the building or object had actually been constructed. Two different aspects have been summarised here: first is the problem of presenting estimated felling date ranges for a sample or a group of estimated felling date ranges, and the second is how the problem of variation between felling dates within a single phase are identified and addressed.

3.1 INTERPRETATION OF FELLING DATES AND DATE RANGES

Estimated felling date ranges, whilst simple in theory, can be presented in a number of different ways. Some are perhaps too simplistic, whilst others can give too much information which, when presented out of context, can be misleading and a higher degree of precision than actually exists.

Laxton and Litton (1988) proposed a method of determining a felling date range from a group of timbers with incomplete or no sapwood (Ibid., 56-7). In one hypothetical case study, three samples had some sapwood, finishing in relative years 1603, 1604, and 1609. A fourth sample with no sapwood finished in relative year 1613. Only the three samples with some sapwood were averaged together to produce an average relative date of the last heartwood ring of 1605. To this was added 30 rings, being the mean number of sapwood rings, giving an estimated felling date of 1635. They also give a range for the felling date as 1632 to 1655. It is not clear how this range is derived. Another example gives two samples with incomplete sapwood with H/S boundaries of 1248 and 1265, with an average H/S boundary date of 1257. They calculate by adding 30 to the estimated felling date of 1287, and correctly calculate a 95% felling date range of 1272 to 1307 for the group of two (Laxton and Litton 1988, 56-7).

In 1997 it was found that determining which sapwood estimate is most appropriate for a particular site can be somewhat problematical, efforts to refine these further for particular samples can be even more contentious (Miles 1997, 40-56). Obviously, the lower limits of any given sapwood range can be reduced by any surviving sapwood. Otherwise, it is sometimes possible for the dendrochronologist to use his/her experience to further qualify the felling date range. A trend often noted is for slow-grown trees with narrow mean ring widths to have more sapwood rings than those from fast-grown trees with wider rings. For instance, timbers from the same hypothetical example with complete sapwood may exhibit relatively narrow mean ring widths, whereas high numbers of sapwood rings may lead to an estimated felling date range qualified as between 1610 and 1655, with the most likely felling date being in the later part of range. Conversely, sites in the south of the country often have fast-grown immature trees with wide mean ring widths. These might be qualified as between 1610 and 1655, with the most likely felling date being in the earlier part of the range.

In the past, one method of presenting felling date ranges has been for the selection of a most likely date within an estimated felling date range. This might be the middle of the range or a skewed date, presented as '1610-(1635)-1655' or '1635 -25 +20'. However, this manner of presenting dates can

be misleading and is frequently misquoted. Whilst the date of 1635 might have the highest number of recurring sapwood rings within a data set, there is also an almost equally high probability of the date being 1634 or 1636. While there is a 95% chance of the actual felling date falling within the overall estimated felling date range, there is probably less than a 7 or 8% chance of the actual felling date being the same as the estimated 'most likely' date, as **Figure 2.11** clearly illustrates. As we can see, there is little difference in probability in other immediately adjacent date positions, especially once the graphs have been averaged.

More problematical is the presentation of a series of felling date ranges for a single phase of building. **Figure 3.1** shows a group of samples from a single site. The method advocated by Nottingham (Laxton *pers comm*) was to determine the average heartwood/sapwood boundary of all the relevant dated samples and then calculate the felling date range from this, adjusting the lower end of the range to take into account any surviving sapwood. This method, whilst statistically correct (Haddon-Reece *pers comm*), does not take into account the area of common overlap. Another method whereby the individual felling date ranges are overlaid, and the area of the estimated sapwood common to all samples is selected and presented as the felling date range for the group (Groves *pers comm*). The problem with this method is, despite its obvious attractions by providing a tighter date range, that it cannot be justified statistically.

However, this is not very helpful when trying to present a series of dates and date ranges within a table or histogram. One example of how this might be overcome can be found in the recent paper 'Nottinghamshire Houses dated by Dendrochronology' (Laxton *et al* 1995, 45-54) where precise dates are denoted by a dot, whilst felling date ranges are delineated by a bar with a dot superimposed at the position of the most likely date (**Figure 3.2**). Because the scale of the histogram is small, and no calendar dates are ascribed for individual points, the likelihood of quoting non-specific dates as precise ones is minimal.

Recently, a Bayesian approach to sapwood estimates was developed by Millard (2002). Here, through generating probability density functions for dates, they can be incorporated into Bayesian analysis, as illustrated by the development of a more rigorous analysis of the felling date of a group of timbers that are assumed to have been felled contemporaneously. He concludes that by using this method, a felling date range of 10 to 40 years can be reduced to 9 to 36 rings, and that a *terminus post quem* date of 12 years would be appropriate for the same group of timbers.

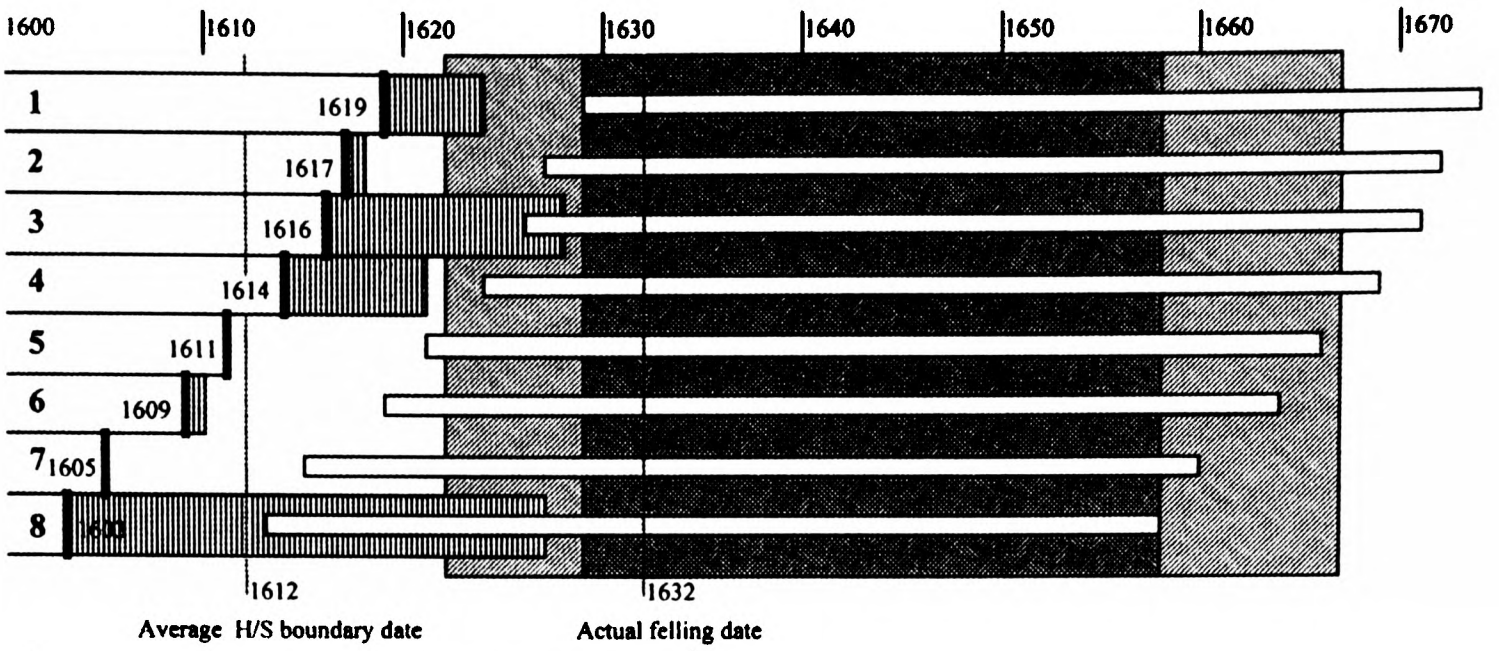


Figure 3.1: Methods of combining a number of individual estimated felling date ranges to produce a combined range for the phase (Miles 1997)

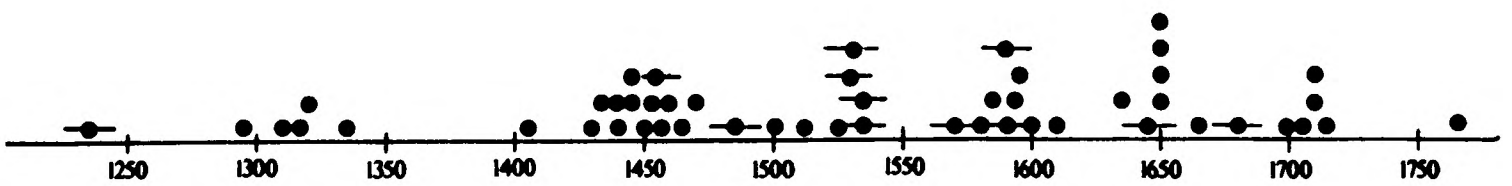


Figure 3.2: Method of presenting precise dates and estimated felling date ranges (Laxton *et al* 1995, 53)

3.2 EVIDENCE FOR STOCK-PILING TIMBER

Another important aspect of the interpretation of tree-ring dates is the evidence for stock-piling. This is a subject which has rarely been discussed in any detail by other researchers. Most dendrochronologists as well as building historians generally take the view that the timber has always been used green, i.e. unseasoned, and that the trees would have all been felled at one time. Whilst the former is generally true (although a log can remain 'green' for five years or more in the round), the latter is not as straight forward.

In 1997, it was demonstrated that stock-piling, or use of previously felled timber, was not uncommon, and that this was generally detected through multiple felling dates not far apart within a single phase (Miles 1997, 40-56). Generally speaking, the term 'stock-piling' suggest timbers reserved for several years or more by large and wealthy institutions such as colleges or religious foundations. However, in this thesis this term is used for any instance where timbers have been stored either as leftovers from a previous building, or from timbers obtained from different sources, etc. In the 350 building sites/phases which the author had published in *Vernacular Architecture*, up to and including *VA* **28** (Haddon-Reece *et al* 1987, 1988, 1989, and 1990; Haddon-Reece and Miles 1992; Miles and Haddon-Reece 1993, 1994, 1995, and 1996; Miles and Worthington 1997), 279 phases had complete sapwood giving precise dates. Of these, 188 phases had two or more precise felling dates of which 87, or 46%, gave varying dates suggestive of stock-piling. These dates have ranged between one and thirteen years apart, and in one phase as many as six different dates were detected, but certainly short-term stock-piling is the most common. Only primary-use timbers are included in the above statistics. The distribution in **Table 3.1** below indicates the spread of dates in relation to different samples:

	Span of time between felling dates over instances													
No. of phases with	1	2	3	4	5	6	7	8	9	10	11	12	13	years
2 different dates:	32	16	4	4*	3			1	1				1	
3 different dates:		8	4	3	1			1	2			2		
4 different dates:				1		1								
5 different dates:					1									
6 different dates:						1								

* One sample, with incomplete sapwood, was felled at least 4 years after another sample in the same truss with complete sapwood.

Table 3.1: Variation in felling dates (Miles 1987)

Thus, many sites do have timbers which have been stock-piled to a greater or lesser degree. Nevertheless, this figure of 46% appeared to be remarkably stable, for in analysing the data for this exercise, these precise felling dates were divided into three groups; dates published up to and including *Vernacular Architecture* **25**, those from *VA* **26** and **27**, and the third group from those published in *VA* **28**. The calculations for each set of data were carried out independently, and each time a figure within 0.5% of 46% was obtained. However, considering that dendrochronology sampling might provide felling dates for, at best, one or two percent of the trees used in a typical building, the 46% of phases with more than one precise date being felled in different years would, in reality, probably be more like 60% or 75%.

Of the 46% of the phases for which there is evidence for multiple felling dates, approximately one third of these were spread over two years, while another third was distributed between two and three years apart. This still leaves a significant proportion of examples of samples being felled over a period of four years or more. By applying this evidence to the sites where only one precise felling date was obtained it would suggest that about 30% of these *may* be at least four years adrift of the actual latest felling date. It is really a matter of chance whether the single precise date was obtained from a timber felled just before the time of construction, or from old timber which had been stock-piled.

Only rarely has deliberate stock-piling been detected. Although Shapwick House in Somerset produced only a single precise felling date (Miles and Haddon-Reece 1996, 93-7), some of the principal rafters and collars showed incontrovertible evidence of having been cut to size, but then left to season for at least 5 years before their joints were cut. This was apparent because the collars had severely distorted, but the tenons were perfectly true, proving that the timber was dry by the time the timbers had their joints cut (**Figure 3.3**). It is unfortunate that this roof had been recently defrassed so that the archaeological evidence of stock-piling could not be compared with dendrochronological evidence.

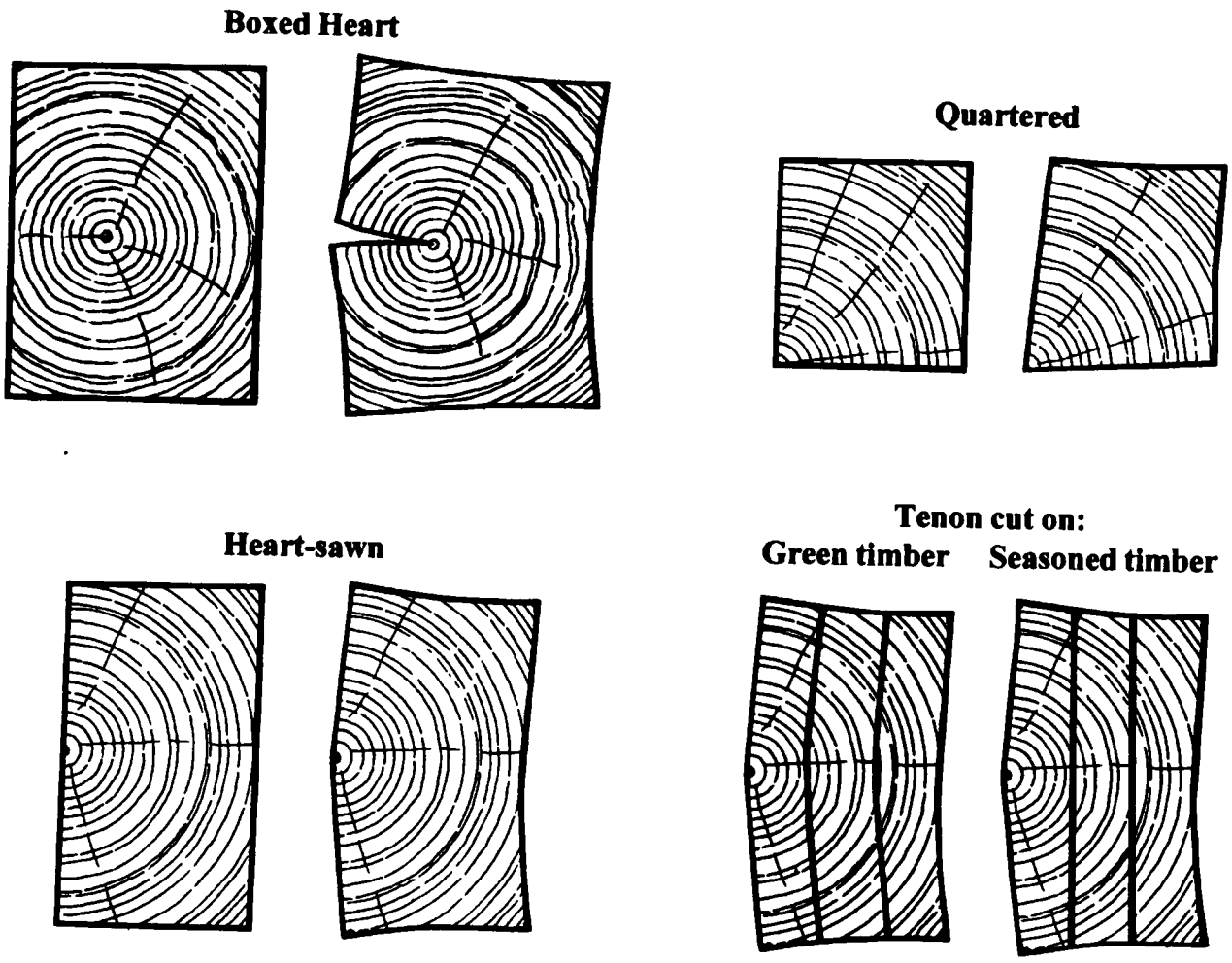


Figure 3.3: Subsequent deformation in oak after conversion (Miles 1997)

Hollstein (1980) is the only researcher to publish a systematic study of variation in felling dates (Hollstein 1980, 36-8). Here he has listed some 23 medieval and post-medieval sites with bark edge. Of these, 9 had felling dates all ending in the same year, 8 had felling dates varying over two years, 5 finishing over three years, and one over 4 years. The distribution is similar to the distribution found in English felling dates shown above.

Another example suggesting stock-piling has been detected, even when the bark edge does not survive. Two virtually contemporary sets of Irish timbers used in the primary phases of Salisbury Cathedral were studied during 2002. The first set is a group of structural timbers used to construct the eastern chapel roofs with three precise felling dates of spring 1222. Some 24 other timbers retained heartwood sapwood boundaries. Given that this roof was the first to be completed during the 35-year construction period of the whole cathedral, it is unlikely that any of the timbers would have been stock-piled. An assumed felling date range was produced for this small population, giving a mean of 31.4 rings and a 95% felling date range of 16 to 56, which was slightly higher than that of 14 to 50 produced by Baillie (1982).

In comparison with this, a group of roof boards from the north nave triforium roof was also studied. Although none of the 18 boards with heartwood/sapwood transition had complete sapwood, one structural timber had a felling date of winter 1254/5. Another assumed felling date range was calculated based on this felling date, and the results were markedly different. Here a mean of 46.4 rings and a 95% felling date range of 27 to 75 years was produced, much broader than the 16 to 56 range for the eastern chapels. Given that both sets of timber came from the same parent sapwood population, this suggests that the second set of timbers included a number of boards which had been stock-piled some ten years or more (Miles 2002a).

3.3 DISCUSSION

In the preliminary 1997 study, evidence suggested that instances of multiple felling dates within a phase of building are far more common than was previously thought (Miles 1997, 40-56). The study recommended that as many complete sapwood samples be obtained from a particular phase of building as possible to correctly identify the latest actual felling dates and allow a better interpretation of probable construction dates. Ideally, research budgets should be broad enough to allow the sampling of at least eight to ten timbers with complete sapwood *if available*. Caution is needed when using single felling dates when interpreting building dates, as the likelihood of them being one or more years out is high. This present study will show that through the gathering of additional data, and identifying the status of the building and the builder, it has been possible to refine this estimate of periodicity and frequency in the felling and stock-piling of timber.

4. MATERIALS AND METHODS

Three main research objectives have been identified: 1) to produce a more accurate method of estimating missing sapwood rings, 2) to find an acceptable method of producing combined felling date ranges for a phase of building, and 3) to better understand how precise felling dates relate to the actual building process. Ancillary to these are the questions of quantifying the variation in felling dates within a single phase of building as well as studying the relationship of the time of year the trees were felled and how they relate to known woodland practices. This chapter outlines the methods used to enable a successful study of these subjects.

4.1 SAPWOOD DATA

To undertake any empirical study of sapwood estimates, a large data set of samples with complete sapwood is needed. Ideally, many of these should include sequences complete to the centre of the tree, and be accompanied by contextual information regarding provenance, date, and other information relating to growing conditions. Initially, much of the material was found within the author's own archive, but to obtain as wide a sample base as possible, outside sources were sought. In addition, new sites were sampled to give more material to work with.

4.1.1 Collection of samples from archaeological and historic building timbers

To achieve this, data sets from as many individual tree-ring samples as possible were gathered, whether dated or not, and which had a complete sequence of rings from the pith through to the bark edge. Over 500 buildings had been dated by the author since 1985, and most of this material was used in this study.

In addition, during the course of the research, additional sapwood samples were obtained from a wide variety of historic building and archaeological timbers. All of these samples were of oak (*Quercus robur* and *Q. petraea*) and taken from what appeared to be primary first-use timbers. Sometimes multiple samples from the same timber were taken in order to obtain a complete sapwood sequence. These were averaged together to form a mean of all the individual radii.

Most of the samples were sampled through coring, using a 16mm hollow auger which were afterwards plugged and stained to match the surrounding surface where the holes were visually obtrusive.

4.1.2 Collection of samples from living woodlands

Several modern woodlands were sampled in the county of Oxfordshire for the study of modern chronology building and intra-site cross-matching (Miles, Worthington, and Bridge *in prep*). Some 25 trees have been sampled in three areas of Wytham Wood to the west of Oxford, 32 trees sampled in Brasenose Wood to the east of Oxford, and over 75 trees sampled at Mapledurham and Hardwick, in the

south-east corner of Oxfordshire. In virtually all instances two cores were taken from opposite sides of each tree, giving over 300 individual core samples.

Sampling was generally done during the winter months or early spring, before leaf break. All samples were taken a breast height, using Swedish increment borers. This resulted in a 5mm diameter core which is placed in a plastic straw and labelled in the field. These were then dried out and then mounted on grooved timber mounts, and then prepared and polished as for the historic building timbers described below. Care was taken to ensure that the timber is thoroughly dried before undertaking the polishing process otherwise the ring boundaries would be blurred. The location of the trees were marked on large-scale OS maps of the woodlands, and the orientation of the cores in relation to compass points recorded in a field book. Other features recorded were the circumference at point of sampling and the type of crown. A photograph of each tree was also taken.

This material proved useful for several reasons:

1. The locations of the trees sampled were varied. Some were from woodland, others from hedgerows, whilst other parkland oaks were selected. This gave an excellent set of data of known provenance and would allow and trends between sapwood numbers and location to be identified.

2. The comparison of two opposing radii from a large population of trees would allow the recording of variation in sapwood numbers within a single tree.

3. The recording of the size and condition of the crown of the tree would also allow a relational study of this compared to width and number of sapwood rings.

4. The study of a large set of modern sapwood data compared to historic sapwood data from the same area would reveal whether there is any chronological difference between timbers felled during different centuries.

The process of taking increment bores from living trees is not likely to cause damage. It is good practice *not* to plug the core holes with dowels, or even worse branches or sticks as they might increase the risk of the trunk cracking or introducing disease. In the group of Mapledurham and Oxford trees sampled in 1999 and 2000, the holes had all closed within a single growing season or two. Similarly, trees sampled between March and May 2002 the holes had already closed by September the same year.

The wood of a living tree compartmentalises in response to wounding (McGinnes and Shigo 1975). Compartmentalisation is the boundary-setting process that tends to limit the loss of normal tissue functioning following the wounding of wood in living trees. The closure of wounds is important, but is largely unrelated to the effectiveness of compartmentalisation (Grissino-Mayer *pers comm*).

4.1.3 Collection of samples from other laboratories

In addition to material collected during the course of this research, and other data retained within the Laboratory, it was intended to obtain ring-width data from other sources as well. This was primarily to obtain sapwood information from other areas of the country not so well represented. As most of the material gathered was from southern England it was vital to balance this with material from the north of the country. Sheffield Dendrochronology Laboratory as well as the Institute of Archaeology, University College London, agreed to make available this information, and English Heritage had agreed to allow access to EH-funded material held at Nottingham University Tree-ring Dating Laboratory. Queen's University Belfast and AOC Scotland were also approached as they had also carried out studies of modern tree-ring samples as well as historic material.

This gave a corpus of over 3000 dated and undated ring sequences with complete sapwood from historic building timbers, although it was not known at the commencement of the research what percentage of these would be complete to the centre of the tree.

4.2 PREPARATION AND ANALYSIS OF SAMPLES

4.2.1 Dry wood samples

All samples must be dry before they can be mounted and prepared conventionally. Small diameter increment cores or defective large core samples were mounted before preparation. Large sections were reduced in size no thicker than 25mm to allow efficient analysis under the microscope stage. This process was done using a variety of wood-working machinery. Sectioned and prepared samples were then sanded on a linisher starting with a coarse 60 grit paper to obtain a rough surface, progressing through a variety of finer grades up to 1200 grit abrasive paper. The surface was then cleaned with compressed air, to allow the ring boundaries to be clearly distinguished.

4.2.2 Wet wood samples

Archaeological samples were not allowed to dry out as the sapwood will collapse. The samples were frozen in a deep freeze for a period of 24 hours after sectioning to 25mm thickness. Once frozen, they were surfaced using a chisel or wood working plane. The samples were then allowed to thaw for a period to allow the surface to remove excess moisture and then measured using the same techniques as for dry samples.

The samples were labelled with a permanent marker giving both the unique sample code and the sample number. With archaeological samples, this was written in permanent marker on plastic-coated archive labels and pinned to the samples. Once the samples had been measured and successfully cross-matched, they were left to dry out for archiving. The samples were then measured under a x10/x45 variable focus microscope using a travelling stage electronically displaying displacement to a precision of 0.001mm, rounded to the nearest 0.01mm. After measurement, the ring-width series for each sample was plotted as a graph of width against year. Next the graphs of each of the samples in the phase under

study were compared visually at the positions indicated by the computer matching and, where found satisfactory and consistent, averaged to form a mean curve for the site or phase. This mean curve and any unmatched individual sequences were then compared against dated reference chronologies to obtain an absolute calendar date for each sequence.

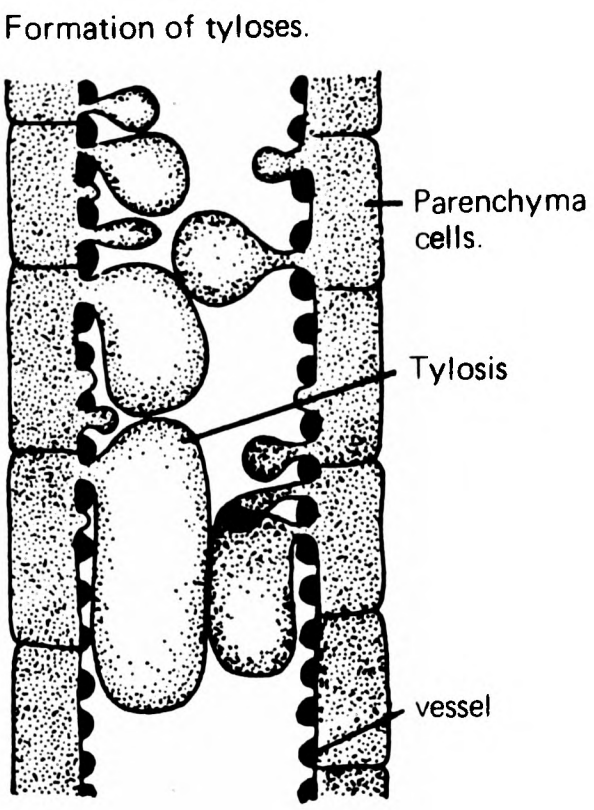
4.3 IDENTIFICATION OF SAPWOOD

The correct identification of sapwood and the heartwood/sapwood boundary was critical to this study. Unless this is reliably undertaken, the majority of the following research and conclusions would be flawed. Similarly, the positive identification of complete sapwood when the bark is missing was also vital in the interpretation of felling dates as well as accurate sapwood ring counts.

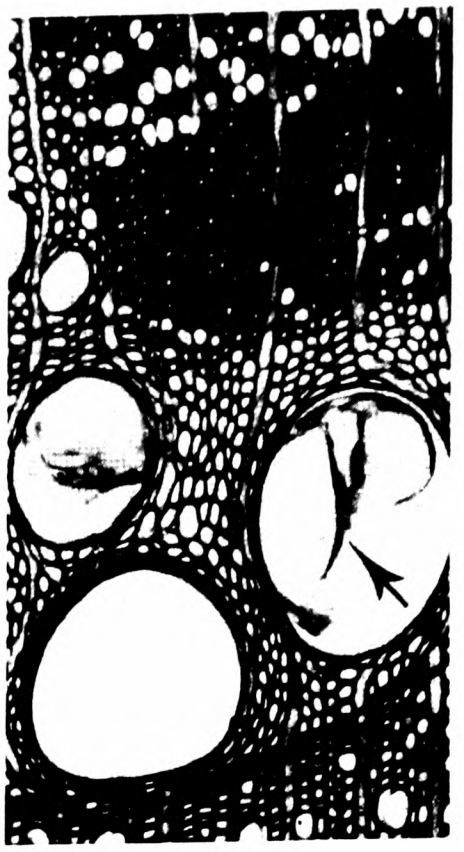
Desch (1948) states that trees of the same age and species have a wider zone of sapwood when grown in the open than when grown under forest conditions in close competition with other trees. He defines 'the line of demarcation between heartwood and sapwood as being either sharply defined or indefinite, and that in some species there is no colour change differentiation between the two': these trees are known as 'all-sapwood' trees, although that is not an accurate description. In many trees the conducting channels are blocked in various ways when the wood becomes heartwood, and any remains of stored food material become changed to tannins and other substances; it is to these changes that the durability of the heartwood may be ascribed. In the absence of colour differences such changes are the only indication of transition to heartwood'.

He continues 'The vessels of the heartwood do not conduct, but are often blocked with what appear to be foam-like structures, known as *tyloses*.....are ingrowing, bladder-like structures from adjoining ray- or wood-parenchyma cells; on a clean-cut end surface of a piece of wood tyloses appear as foam-like structures in the vessels that often glisten because of differences in light reflection from the vessel wall and the membranous walls of the tyloses. In bright light the walls of the tyloses produce rainbow effects, similar to those in soap bubbles. ... The formation of tyloses is brought about by differences in pressure between the parenchyma cells and adjacent vessels: when the vessels are actively conducting the pressures inside the parenchyma cells and vessels are more or less equal, but when the vessels cease to conduct the pressure inside the parenchyma cells is greater than the pressure in the vessels. In consequence, the thin primary wall of the parenchyma pits becomes distended, being blown out like a child's balloon, to fill the vessel cavity'.

Chattaway (1952, 25-34) states that the majority of text-books stress the features of colour, tyloses, and the presence or absence of living cells and starch grains. So long as all these features are used together, errors are avoided, but when they are used separately, difficulties arise, as only one of them, the presence of living cells capable of active metabolism, is absolutely reliable.



Schematic diagram of the formation of tyloses. The pit membranes of the parenchyma cells neighboring the vessels divide and penetrate the vessels themselves, thus blocking the passage of water (Fahn, 1977).



Oak, transverse

Figure 4.1: Microscopic sections of oak showing spring vessels with tyloses (Schweingruber 1988, 101)

Tyloses, as Gerry (1914) has shown, can occur in the sapwood of any wood in which they are a feature of the heartwood. Their formation in a wood is determined by two factors, a stimulus to increased activity on the part of the ray cells, and ray-vessel pitting of a sufficient size for this increased activity to force the protoplast through the unthickened and consequently extensible intercellular membrane, into the vessel lumen (Chattaway 1949).

Starch is a useful characteristic of sapwood, as it is never found in heartwood tissue, but its absence cannot be taken as evidence that a transition to heartwood has occurred. Starch can be very local in its distribution, sometimes being present on one side of a tree and absent from the other. It is also seasonal in its occurrence and may be accumulated for a time and then reabsorbed when it is needed to supply the energy for increased growth. It is the starch contained in the sapwood which attracts the larvae of both the furniture and *Lyctus*, or powder-post, beetles (Desch 1948, 209-13). Sapwood is often badly eaten by these pests, but is usually limited to the sapwood only, the heartwood being resistant to beetle attack. Extreme examples of insect attack will completely destroy the sapwood, leaving only the heartwood/sapwood boundary. However, the sapwood faces exposed to the air, or adjacent to mortices or joints, are generally resistant to beetle attack, probably due to this area being drier and harder, and thus more resistant.

Colour is the most variable feature of all, for it is affected by the moisture content of the wood, the length of time it has been exposed to the air, and other purely physical conditions unrelated to the sapwood-heartwood change; it may also result from pathological causes and it depends on the type and state of the extractives that are present in the cells of the rays and the vertical parenchyma; sapwood

may even, after exposure to the air, be slightly darker than heartwood. Hollstein also noted similar examples of absence of colour change between sapwood and heartwood (Hollstein 1978, 33-9).

The only valuable criterion for distinguishing between sapwood and heartwood is whether the cells of the parenchymatous tissue - ray cells and vertical parenchyma - are live or dead in the standing tree, and it is for this reason that the Committee on Nomenclature of the International Association of Wood Anatomists (1933) decided upon the following definitions: **Sapwood**: Living (i.e. physiologically active) wood, of pale colour. **Heartwood**: Non-living and usually darker wood surrounded by the sapwood.

Sapwood is rarely consistent, either from different timbers within a site or even from within a single tree. Very occasionally, the heartwood/sapwood transition date will be within a year or two of each other, as can be seen in a group of six samples found at the Council House, Shrewsbury Castle (Miles and Worthington 1997), but more often the number of sapwood rings will vary considerably. For instance, one core sample was found to have had 13 more rings of sapwood on one side of a medullary ray than the other, plus a sapwood inclusion, all within 10mm (**Figure 4.2**).

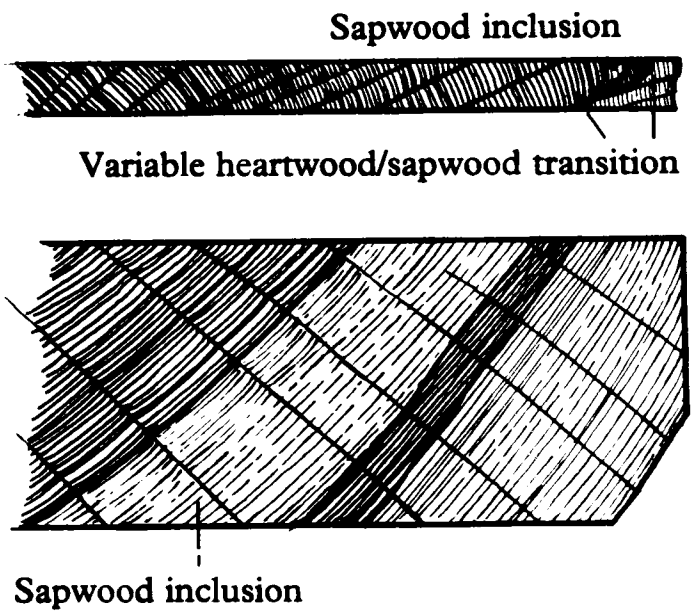


Figure 4.2: Examples of sapwood inclusions (Miles 1997)

There are also rare exceptions, such as finding no sapwood at all, or substantial sapwood inclusions. One modern example, also illustrated in **Figure 4.2**, had a heartwood/sapwood transition 100 years back from the bark edge. This was followed by a band of 35 years of sapwood, then by 20 years of heartwood, then by a final band of 45 years of sapwood. Had only the earlier heartwood/sapwood transition survived, then the estimated felling date range would be some two or three generations earlier than reality. This was also found in a late sixteenth-century building at 14 Callaughton, Shropshire (Miles and Worthington 1997) where two of the principal rafters exhibited a band of decayed sapwood followed by a solid band of truncated heartwood. This had the effect of producing two estimated felling date ranges which were entirely earlier than the actual precise felling date produced by another timber with complete sapwood.

Another example of what was probably a sapwood inclusion has been found in thirteenth-century timbers re-used in the tower of Salisbury Cathedral. Two timbers, re-used originally from one of the early roofs, had identical mortices. One produced a felling date range of 1225-57 based on a heartwood/sapwood boundary of 1216. However, the second timber had a heartwood/sapwood boundary of 1131, nearly a century earlier (Miles *et al* 2004, 23).

These examples graphically illustrate the necessity of taking as many samples as practicable, and allow perhaps an alternative interpretation for single individual felling date ranges which are substantially earlier than other samples within a group.

Sapwood on timbers which have been waterlogged for centuries collapse tangentially when exposed to the air again. The example illustrated in **Figure 4.3** shows the outer band of lighter-coloured sapwood which has collapsed, together with an inner band of heartwood which has also shrunk tangentially, although to a lesser degree. Hillam (English Heritage 1998, 11) discusses this phenomena in that whilst this inner band is actually heartwood due to the presence of tyloses, it has a tendency to decay after the sapwood on sub-fossil oaks. This can then produce a false heartwood sapwood boundary which can lead to a felling date range which is actually too early.



Figure 4.3: Collapsed sapwood and outer heartwood rings from archaeological timber (Schweingruber 1988, 34)

In contrast, the situation is somewhat different in North America where the author has carried out a number of dendrochronology programmes on colonial houses in New England (Miles *et al* 2002; Miles *et al* 2003; Miles *et al* 2005a; Miles *et al* 2005b). Here the species *Q. alba*, or white oak, the sapwood occurs in two bands, with only the outer ring or two being free of tyloses in the spring vessels (Gerry 1914; Kato and Kishima 1965, 55-60). Out of some 100 samples, only a handful had more than 3 rings of sapwood without tyloses. The actual sapwood band is differentiated sometimes by a lighter colour, although this is often indiscernible (Desch 1948). In archaeological timbers, the lighter coloured sapwood does not collapse as it does in *Q. robur*, but only the last ring or two without tyloses shrink

tangentially. In these circumstances the only way of being able to identify the heartwood/sapwood boundary is by recording how far into the timber wood boring beetle larvae penetrate, as the heartwood is not usually susceptible to attack unless the timber is in poor or damp conditions.

As for the American red oak, *Q. rubra*, it would probably not be possible to determine a sapwood estimate as these are what are known as 'sapwood trees' (Chattaway 1952). Whereas the white oak suffers from an excess of tyloses, these are virtually non-existent in the red oak, even to the pith. Furthermore, there is no obvious colour change throughout the section of the tree, and wood-boring insects will often penetrate right through to the centre of the timber. Therefore, in sampling red oaks, it is vital to retain the final ring beneath the bark, or to make a careful note of the number of rings lost in sampling, if any meaningful interpretation of felling dates is to be made.

4.4 RELATIONAL DATABASE

To enable the datasets for each tree-ring sample and their relevant accompanying information to be analysed efficiently, they have been entered into a specially designed relational database. This is comprised of the following tables and fields; definitions of which are listed in the *Glossary*.

Tables:	LOCATION	PHASE	SAMPLE		SEGMENT
Fields:	**LocationID**	**PhaseID**	**SampleID**	Conversion	SampleCode
	County	LocationID	PhaseID	Origin	SampleID
	Parish	Phase	**SampleCode**	Management	SegmentNo
	Building	Description	Rings	TotalMRW	R1
	Type	Date	Sapwood	TotalMS	R2
	Status	AccountPrsnt	Rad	TotalSD	R3
	Situation	AccountRef	Var	H/WdMRW	R4
	NGR		Season	H/WdMS	R5
	Latitude		Date	H/WdSD	R6
	Longitude		DateType	S/WdMRW	R7
	Soil		Pith	S/WdMS	R8
	Lab		Type	S/WdSD	R9
	Elevation				R10
					SegmentID

Table 4.1: Relational database fields, primary keys are in bold

The database has been constructed in the form of four related tables, with spaces for a wide number of variables. A number of fields were calculated automatically, for instance the mean ring width, mean sensitivity, and standard deviation. The complexities of this in a relational database are such that it was found to be more workable to link the database with a spreadsheet that is more suitable for dealing automatically with complicated calculations.

These calculations are achieved by the groups of ring measurements being exported from the relational database into the spreadsheet. Because the individual ring-width measurements are arranged in decades either side of the heartwood/sapwood boundary, the manipulation into groups of all, just heartwood and just sapwood, or decades, is facilitated. The mean ring widths, standard deviations, and

mean sensitivities are then calculated, and then the values automatically transferred back to the database and inserted into the requisite fields.

It was felt that having the data in the relational database would be the most flexible medium for carrying out the various groupings and testing of hypotheses. However, the database had proved to be less user-friendly for importing the large quantity of raw data into segment fields. It has been necessary to first convert the data from the standard lab file format into a numbered decade format centred about the heartwood/sapwood boundary. The problem of importing large numbers of data files has been got over by combining a large group of samples into one file for importing, thus saving a significant amount of time.

The database tables have had front-end forms created, with one form for the Location and Phase tables together, one for the Sample table, and one for the Segment table. This has proved more useful for the importation of ancillary information, some of which are repeated on more than one table.

5. ANALYSIS OF DATA AND TESTING OF HYPOTHESIS

This chapter covers in detail the data obtained using the methodology already outlined. The geographical, chronological, and age distribution of the data is discussed. The data is then analysed to identify possible predictive variables using a step-wise linear regression test. The relationship between various pairs of variables is visually displayed in a series of overlaid plots from which conclusions could be formed. A number of rejected variables are also discussed.

During the course of this research, a number of computer programs were constructed, some incorporated in a developmental version of OxCal. Most of these were by Dr Christopher Bronk-Ramsey, who had developed the original OxCal program (Bronk Ramsey 1995). However, the author was involved in setting out the specifications of the various programs, and in their subsequent revisions.

5.1 THE DATA

5.1.1 Source

Altogether some 4380 samples or datasets, with complete sapwood, were used in the analysis. The vast majority of these originated from mainland Britain, with 3109 samples from England and Wales and 205 samples from Scotland. One sample was immediately excluded from the analysis from the outset: **bu40425** dating to AD 614 from Buiston crannog, Scotland. This had 38 rings, with one missing ring to the pith, but no sapwood rings. This gave a total of 3313 usable samples from mainland Britain.

The majority of the mainland Britain data totalling 2089 datasets was primary material from the Oxford Dendrochronology Laboratory. Whilst not comprising all of the material available in the lab archives going back to 1986, virtually all of the material generated between 1994 and 2004 was included in the database. Most of that produced from 2000 to 2004 was generated during the course of this research. The majority of the data relate to standing buildings, summary date-lists of which having been published periodically (Miles and Haddon-Reece 1995, 1996, Miles and Worthington 1997, 1998, 1999, 2000, 2001, 2002, 2003, and Miles, Worthington and Bridge 2004).

However, as most of this material was geographically biased to the south and west, as well as medieval and post-medieval in date, additional material was sought from other laboratories to help give better coverage both geographically as well as chronologically throughout mainland Britain. Some 109 datasets were obtained, primarily from eastern England (Bridge *pers comm*), together with 346 datasets from Sheffield University Dendrochronology Laboratory (Groves and Tyers *pers comm*), and 562 datasets from Nottingham University Tree-Ring Dating Laboratory (Howard and Arnold *pers comm*), giving better coverage to the north of the country. Finally, 109 Scottish datasets were obtained from AOC Scotland (Crone and Mills *pers comm*), and 109 Scottish and Sherwood Forest datasets from Queen's University Laboratory, Belfast (Baillie and Brown *pers comm*). The distribution of these can be seen in the map in **Figure 5.1**.

In order to assess to what extent geographical location might affect sapwood numbers in Britain, a number of groups of samples were obtained from surrounding regions across northern Europe. Thus 219 samples were from Ireland (Baillie & Brown *pers comm*) which included three samples dating from 1222 used in Salisbury Cathedral but found through dendro-provenancing to have originated from south-east Ireland (Miles 2002a).

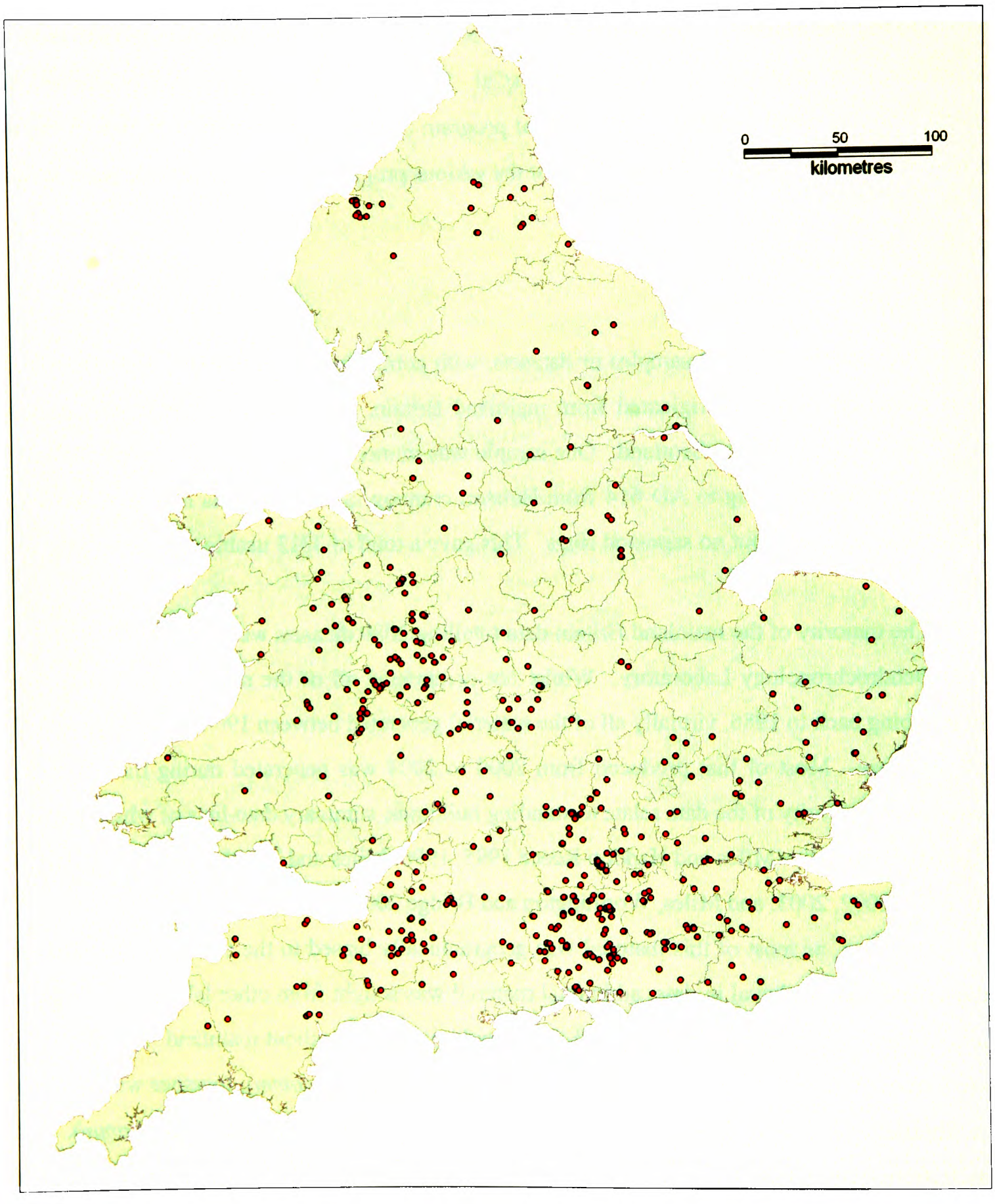


Figure 5.1: Geographical distribution map of 3313 samples from mainland Britain

On the continent, difficulties in obtaining data from French laboratories (Locatelli *pers comm*) resulted in only our own material being available for use, thus only 22 samples from central and

northern France were used, and 40 samples from the Channel Islands. Much better success was found in obtaining data further north and east, with 63 samples from Denmark (Bonde *pers comm*), 447 samples from Poland (Wazny *pers comm*), 264 samples from south-west Germany on the shores of Lake Constance (Billamboz *pers comm*), and a very small collection of 12 samples from Lithuania obtained from work in late 2004 providing the easternmost material (Miles & Worthington unpubl report 2005). Finally, although the actual datasets were not obtained, information containing sapwood, ring count, presence of pith, and mean ring width was obtained for some 2461 samples from Switzerland (Walder *pers comm*). The distribution of these sites is shown in **Figure 5.2**. The summarised data is contained in **Appendix 4**.

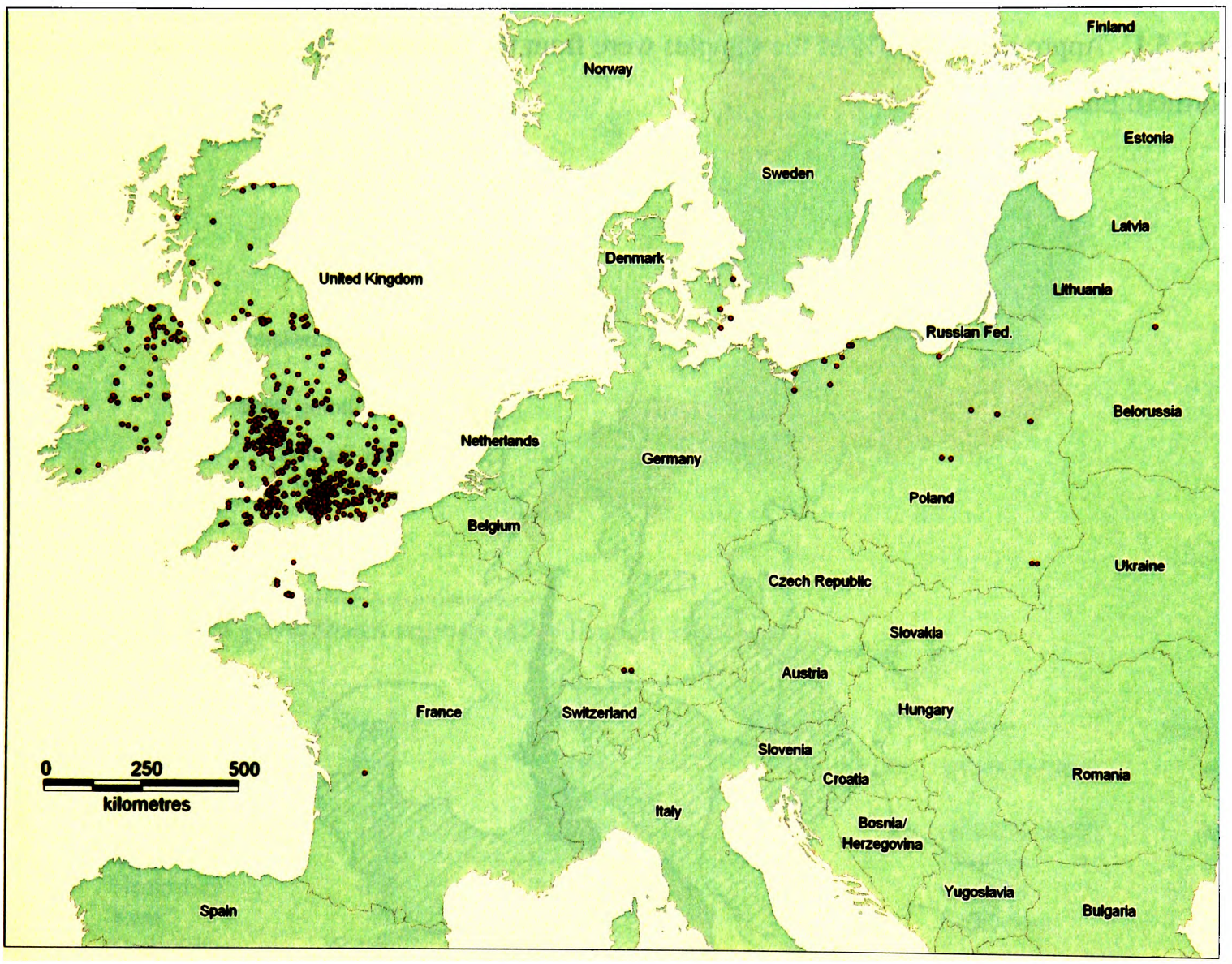


Figure 5.2: Geographical distribution map of 4380 samples from Britain and Europe

5.1.2 Geographical distribution

The majority of the mainland Britain samples were from the area to the south and west of a line stretching from Liverpool to London. This corresponds with the distribution of stone-walled buildings compared to those with timber-framing. This reduction in timber-framed buildings in the north, coupled with the paucity of native northern oak, particularly in Scotland, has undoubtedly created a geographical bias to the southern part of the country (**Figure 5.3**). However, this has been mitigated as much as

possible through the inclusion of data from laboratories in London, Nottingham, Sheffield, and Scotland.

There are also a number of practical reasons why so few samples were obtained from the north: first, the four major county-wide projects in Hampshire (Miles 2003a), Shropshire (Miles 2003b), Somerset, and Kent (Laxton and Litton 1989), together with extensive work in Oxfordshire and Wales (Suggett 2003), resulted in many dendrochronological dates being produced in these areas. Secondly, much of the earlier work done by the Nottingham (Laxton and Litton 1988) and Sheffield labs were less readily available through archiving and time constraints.

In the database the sites were been coded according to local government regions (**Figure 5.4**). The number of samples from each of these is as shown in **Table 5.1**. The distribution of these is shown in **Figure 5.1**. Approximately 75% of the samples were from the British Isles, with the remaining 25% from northern Europe.

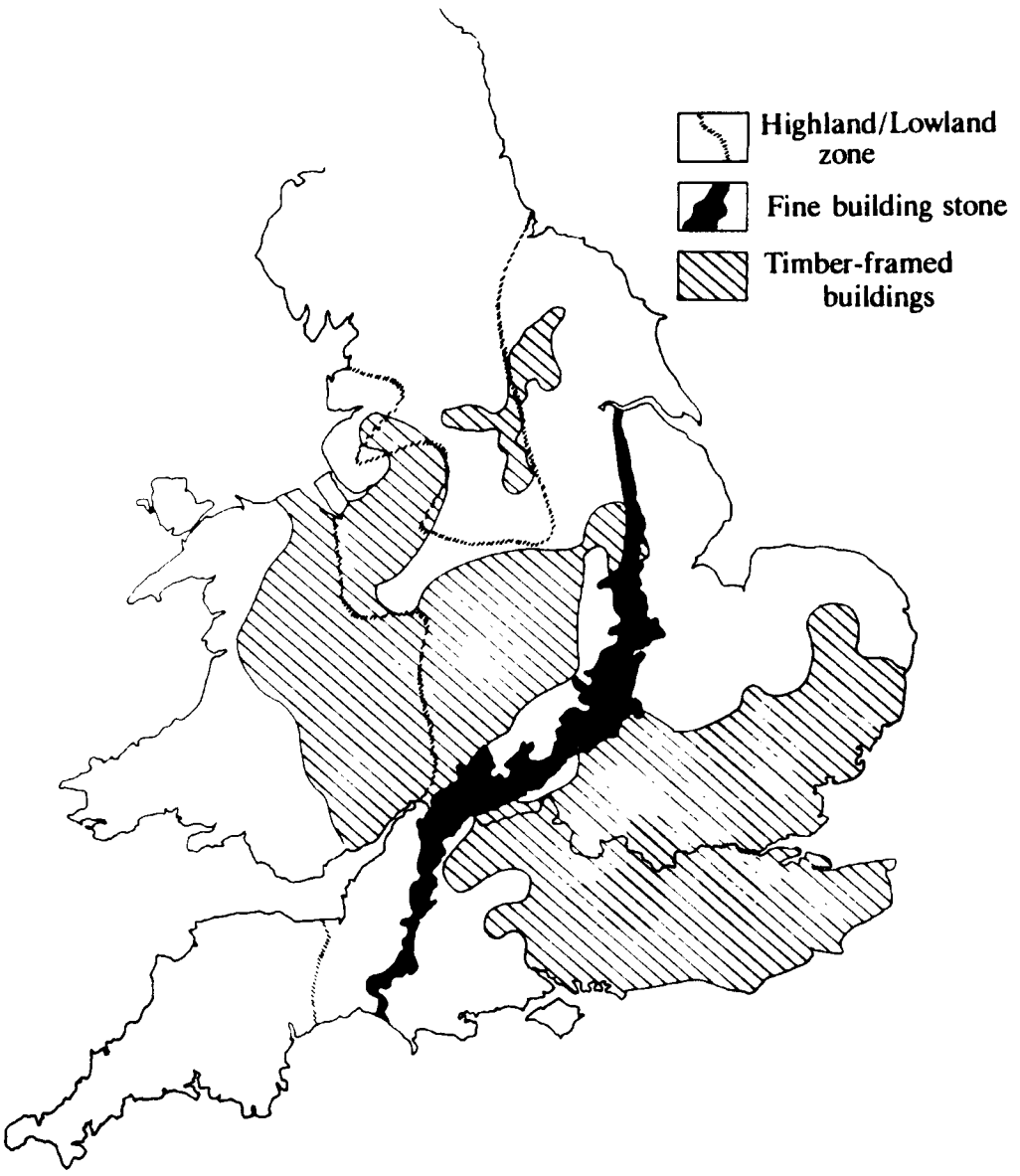
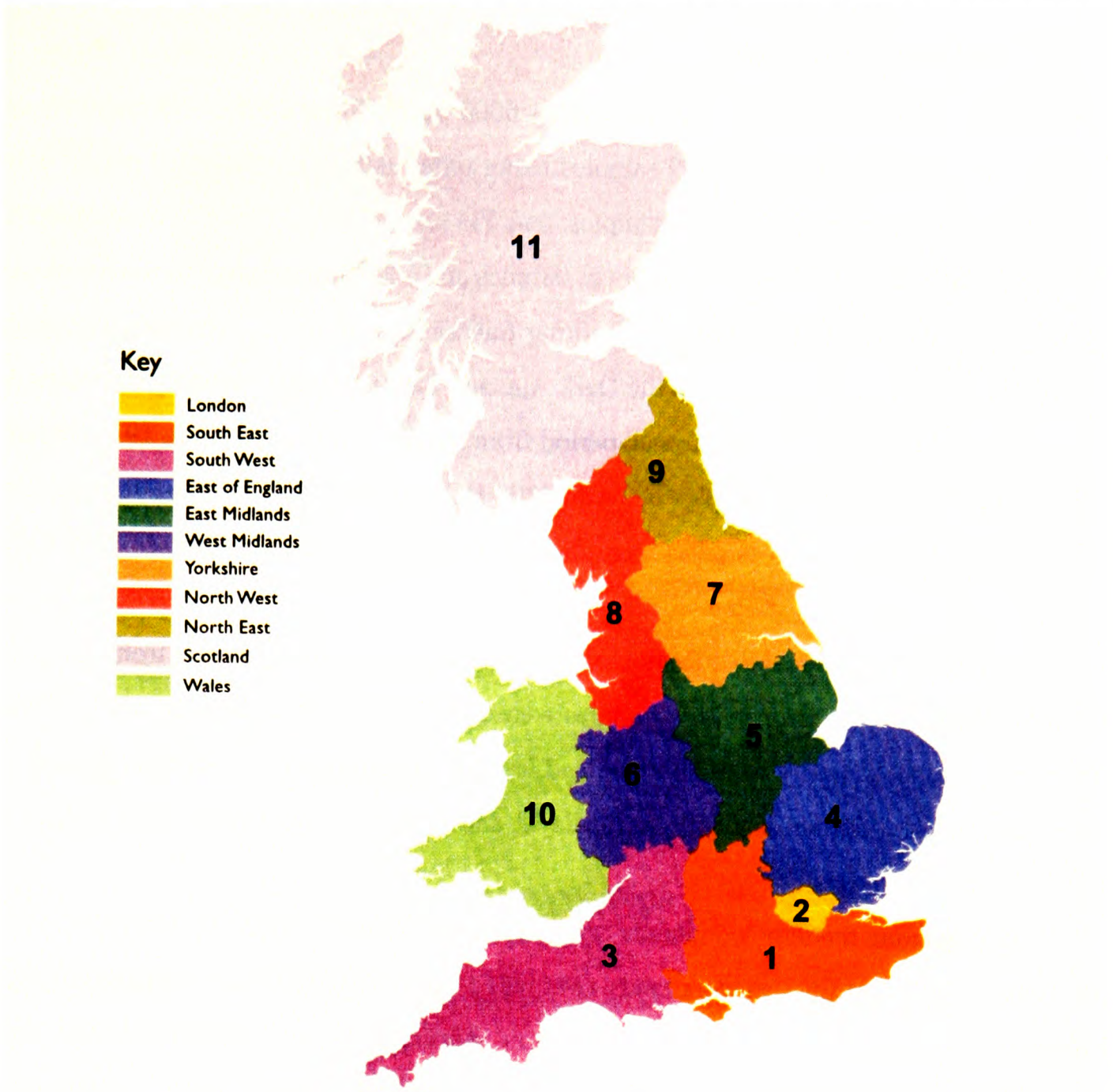


Figure 5.3: Distribution of timber framing in England and Wales in relation to stone areas (Munby 1993, 50)



Created by Arka Cartographics Ltd. for English Heritage. © 12/01.

Figure 5.4: Local government regions (after English Heritage)

	Region:	*Samples:*
1)	SOUTH-EAST	1346
	Berkshire	42
	Buckinghamshire	63
	East Sussex	20
	Hampshire	490
	Kent	80
	Oxfordshire	459
	Surrey	83
	West Sussex	109
2)	GREATER LONDON	104
3)	SOUTH-WEST	385
	Cornwall	30
	Devon	73
	Dorset	13
	Gloucestershire	54
	Somerset	155
	Wiltshire	60
4)	EAST	191
	Bedfordshire	47
	Cambridgeshire	1
	Essex	49
	Hertfordshire	26
	Norfolk	38
	Suffolk	30
5)	EAST MIDLANDS	136
	Derbyshire	19
	Leicestershire	5
	Lincolnshire	22
	Northamptonshire	10
	Nottinghamshire	80
6)	WEST MIDLANDS	541
	Herefordshire	33
	Shropshire	257
	Staffordshire	20
	Warwickshire	176
	West Midlands	3
	Worcestershire	52
7)	YORKSHIRE	42
8)	NORTH-WEST	90
	Cheshire	16
	Cumbria	48
	Lancashire	13
	Greater Manchester	13
9)	NORTH-EAST	68
	Cleveland	5
	Durham	15
	Humberside	5
	Northumberland	19
	Tyne and Wear	24
10)	WALES	206
11)	SCOTLAND	204

Table 5.1: 3313 mainland Britain samples divided by regions and counties

5.1.3 Chronological distribution

The chronological period covered by the data spans 6000 years (**Figure 5.5**). The majority of the data are from the last millennium, with 1499 samples being felled during the medieval period between AD 1000 and AD 1500, 1589 post-medieval samples, and 483 samples from living trees sampled during the past 50 years. Virtually all of the post medieval samples and a large percentage of the medieval material have originated from standing buildings. Working further back in time, archaeological samples were used to produce 220 samples were from the Dark Age and Saxon periods spanning the years AD 500 to AD 1000, 63 samples were from the Roman period from the time 1AD to AD 500, 193 samples between 3168 BC and 2500 BC, and 94 samples between 4200 BC and 3906 BC. Only 64 samples covered the period 2500 BC to 1BC, and no samples were found for the seven centuries between 3200 BC and 3900 BC.

Again, the geographical distribution of the samples varied greatly during from the prehistoric to the modern (**Figure 5.6**). Bronze Age samples were mainly from the Continent, whilst Dark Age and Saxon material came primarily from Scotland and Ireland. Standing buildings from England and Wales provided the majority of the data for the medieval and post-medieval period, with Poland providing additional medieval material.

Samples from modern woodlands were obtained from a variety of locations. Nearly 200 samples came from eight English woodlands, over half of these are from four woodlands in Oxfordshire. Old parkland oaks came from Stoneleigh Abbey in Warwickshire and Cobham Hall in Kent, whilst Sherwood Forest produced samples from the ancient woodland forest. Both Ireland and Scotland contributed 90 and 77 samples respectively, and from further afield, 63 samples came from Denmark, 19 from Jersey, and 12 from Poland.

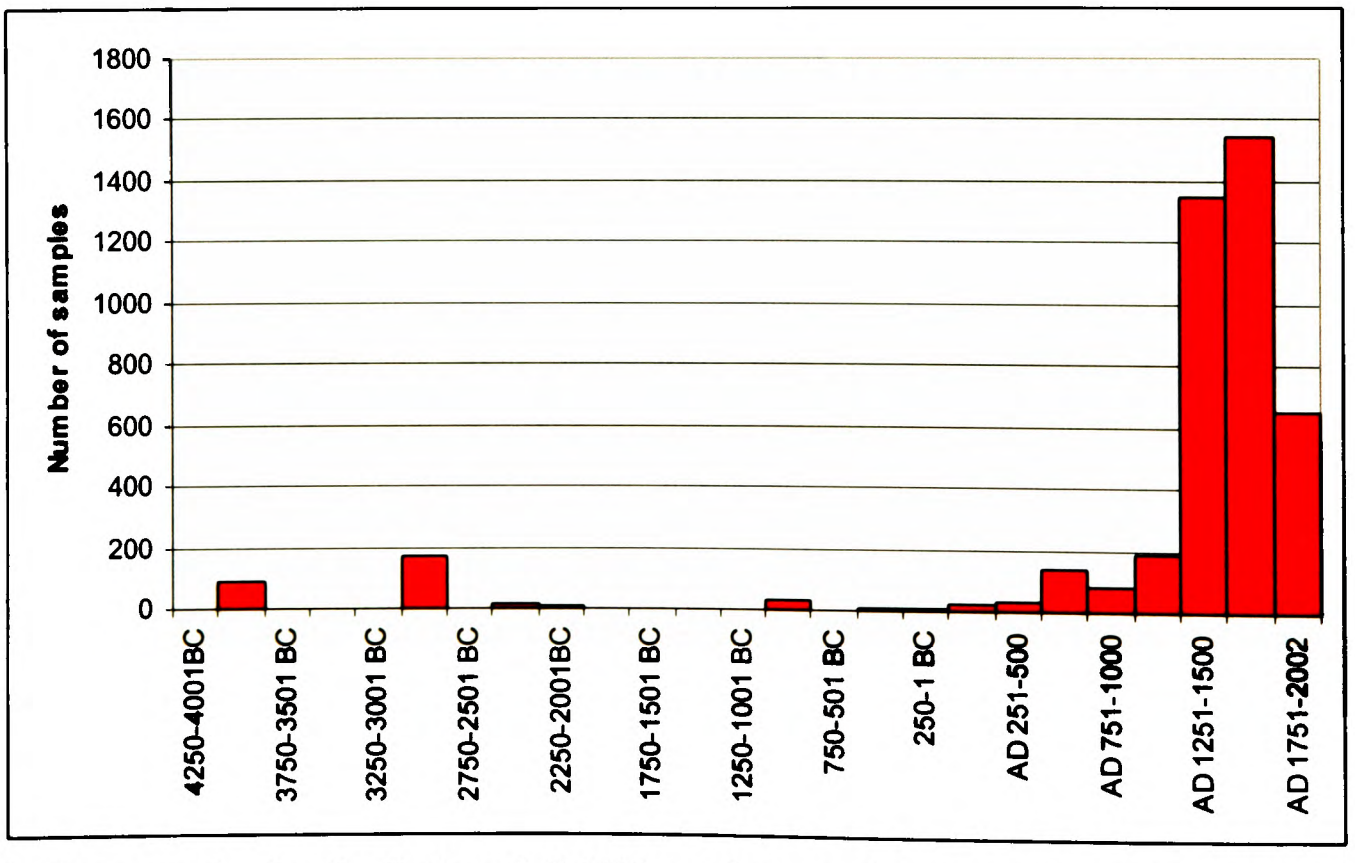


Figure 5.5: Histogram showing distribution of all 4380 samples over chronological period from 4250 BC to AD 2002

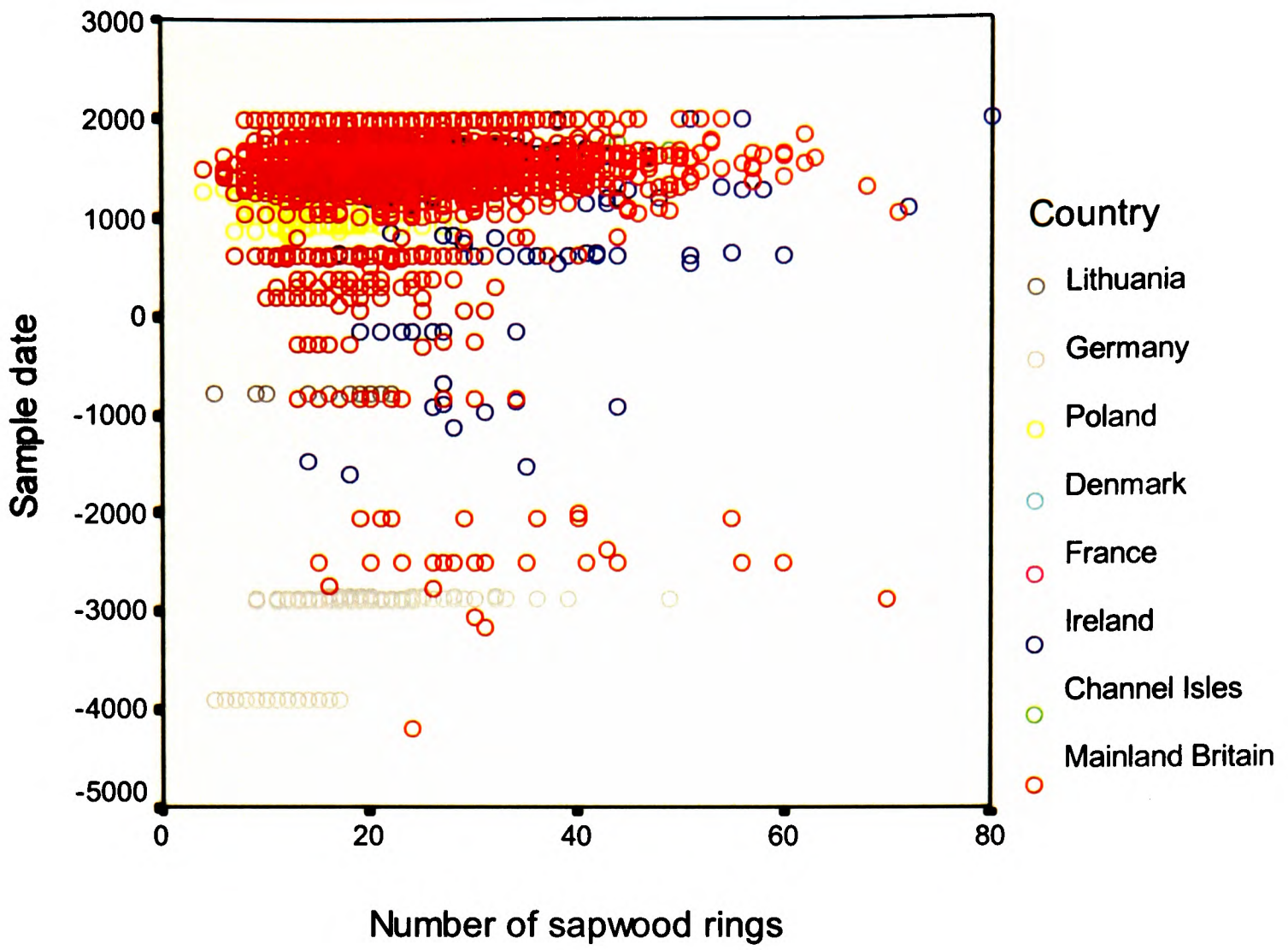


Figure 5.6: Distribution plot over region showing sapwood rings from all 4380 samples against a chronological scale, colour coded to region.

5.1.4 Distribution of tree age

Not all the data obtained were consistent in relation to age of tree, mean ring width, or chronological period. Only nine samples from trees over 300 years in age were found: three were from Sherwood Forest in Nottinghamshire, where the oldest of all had 427 rings, one each from Scotland, Shropshire, and Warwickshire, and a couple from Ireland and one from Poland. Only a couple of these samples reached the centre of the tree, so the actual age of these trees could not be accurately determined. In many cases these would be considerably greater than the ages actually recovered in the physical tree-ring sample, some of which were increment cores from large oaks in parks or forests. Apart from these ancient veterans, the majority of the older trees was from Ireland and Poland and probably originated form very old established woodlands, or possibly even the primary forest or wildwood.

Conversely, the majority of immature trees represented in the database were from the prehistoric lake dwellings of Lake Constance in south-west Germany and the Dark Age Buiston crannog in Scotland, where younger trees were exploited for the piles. Some 80 samples were no more than 25 years old, while the youngest had only 15 years growth. Unlike the older mature trees where the pith or centre of the tree was not present in the sample, the majority of these immature samples did retain the centre of the tree; thus the sampled rings represent the real age of the tree at the point of sampling.

5.1.5 Intra-tree variability of sapwood

One little-known phenomenon of tree growth is the fact that the heartwood/sapwood boundary is not consistent. Of the 4380 samples, 386 were composed of more than one radius. Multiple radii occurred when a second sample had been taken to obtain sapwood complete to the bark edge, or when multiple radii are measured on a boxed-heart slice. Also, many of the modern woodland trees were sampled twice from opposing sides. Of these, 42 had identical heartwood/sapwood boundaries, indicating they had the same number of sapwood rings. The highest instance of intra-site variation between sapwood rings had 107 (28%) varying by one year, and 71 (18%) varying by two years. A significant number of samples had between 3-year and 6-year variations, with 42 to 15 samples respectively. The maximum variation was 31 rings, of which one example was found. A plot of the distribution of these samples with variable heartwood/sapwood boundaries is shown in **Figure 5.7**.

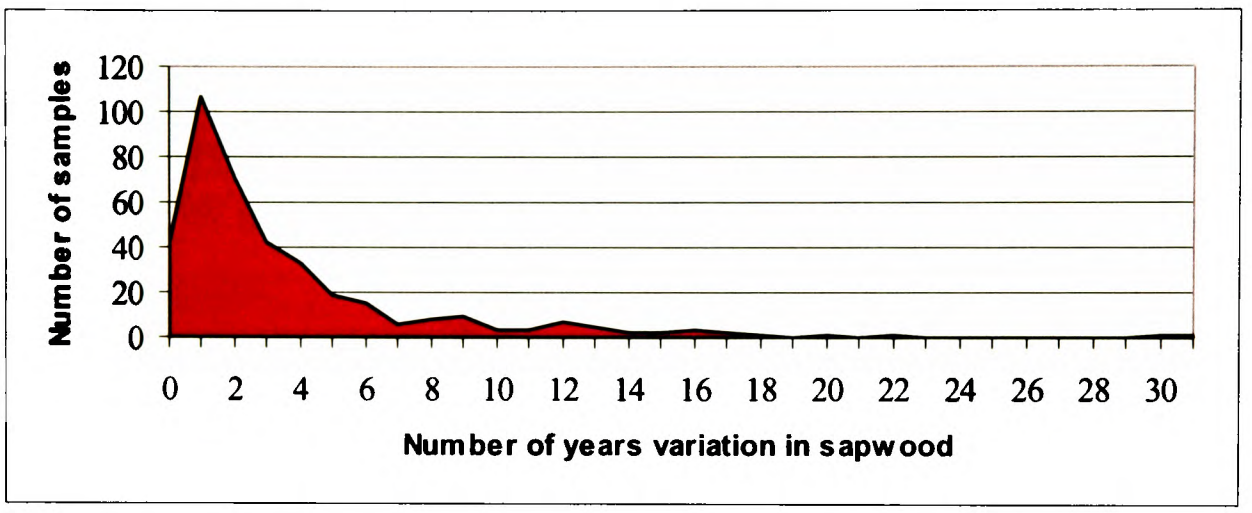


Figure 5.7: Distribution plot of 385 samples with multiple radii showing intra-sample variation

The study of these samples with multiple heartwood/sapwood boundaries clearly demonstrates that almost 90% of trees which have had more than one radius sampled will vary by one or more years. Intra-tree variation in sapwood is probably caused by differences in the size of crown, coupled with the proximity to major branches.

Before proceeding with analysis on such samples, the varying heartwood/sapwood boundary dates are averaged, thus producing a mean number of sapwood rings for the timber or tree. The resulting mean should then treated as a single sample in any further analysis.

5.1.6 Associated data

All of the 4380 datasets included at a minimum the actual ring-width measurements for each year, the absolute chronological date if known, the number of sapwood rings, and the provenance or geographical location of the sample location. Additional information varied considerably from different laboratory sources. All of the Oxford lab samples included the season of felling, site information, and the presence of, or estimated rings missing to, the pith. However, some of these were not readily obtainable from other sources. The data from Sheffield and London were obtained in the Dendro for Windows format (Tyers 1999) which was useful for obtaining most of the above information in the actual dataset with the exception of the site information. The majority of the Nottingham material was

accompanied by the relevant English Heritage Ancient Monuments Laboratory and Centre for Archaeology Reports which again included most of the relevant information, however no distinction was often made as to whether the samples were felled in the spring, summer, or winter. The material from Belfast was somewhat more problematical, in that most of it had been archived, with the accompanying data information needing to be transcribed from data registers, which are arranged chronologically. An added complication was that a few of the earlier datasets had been measured in 20ths and 50ths of a millimetre, requiring careful conversion to avoid serious errors being introduced in those requiring mean ring width as a principal component.

For the datasets obtained from Europe, it was not necessary to have the relevant site information, as the data was being used purely for comparative purposes. However, the material from Germany was remarkably complete in relation to the rings missing to the pith, as were the datasets form Denmark and some of the Polish material. The Dendro for Windows file format has proven particularly useful in providing this information in the actual datafiles themselves.

All samples within the database had a number of statistical characteristics determined. This included the mean ring width for the entire sample, as well as for the heartwood and sapwood separately. The standard deviation was similarly calculated for these three categories, and the mean sensitivity was determined for the whole sample only.

5.2 DETERMINING THE CONSISTENCY OF THE DATA

5.2.1 Determining optimum sample population

The first stage of the research was to try and quantify what size of sample population was representative of a region. For normally-distributed data with a standard deviation of σ , one would expect to be able to estimate the mean with an uncertainty of $\sigma / \sqrt{\eta}$ where η is the size of sample population. Therefore for an empirical range of 30-32 years, a population of 400 samples should enable one to estimate the mean to within $30 \sqrt{400}$ to $32 \sqrt{400}$, which = 1.5 to 1.6 years range at 95%.

To graphically illustrate this, data from the county of Hampshire were selected as it had, at 457, the largest group of samples within a single county. First the data were arranged in alphabetical order by sample code and an empirical 95% felling date range calculated for the first 10 samples. The upper and lower limits of the range were then plotted on a graph (**Figure 5.7**). Then the second 10 samples alphabetically were added to the first and a sapwood range calculated for this group of 20, and similarly plotted. This process was repeated until the entire 457 samples were included in the sample population, and resulted in 46 individual sapwood estimates being calculated on an ever-increasing sample base.

The results show that initially, the ranges can vary by as much as 5 years for the lower end the ranges, and by twice that amount for the upper ends, whilst the sample depth was less than 200. However, by the time the sample population exceeds 240, the variation in ranges seems to have levelled off, with variation of no more than one or two years.

To ensure there was no bias introduced into the alphabetical order of the data, the exercise was repeated with the data in reverse alphabetical order (**Figure 5.9**). This time the minimum variation was about ± 1 year, and the maximum variation about 13 years, but again both plots levelled off after about 250 samples.

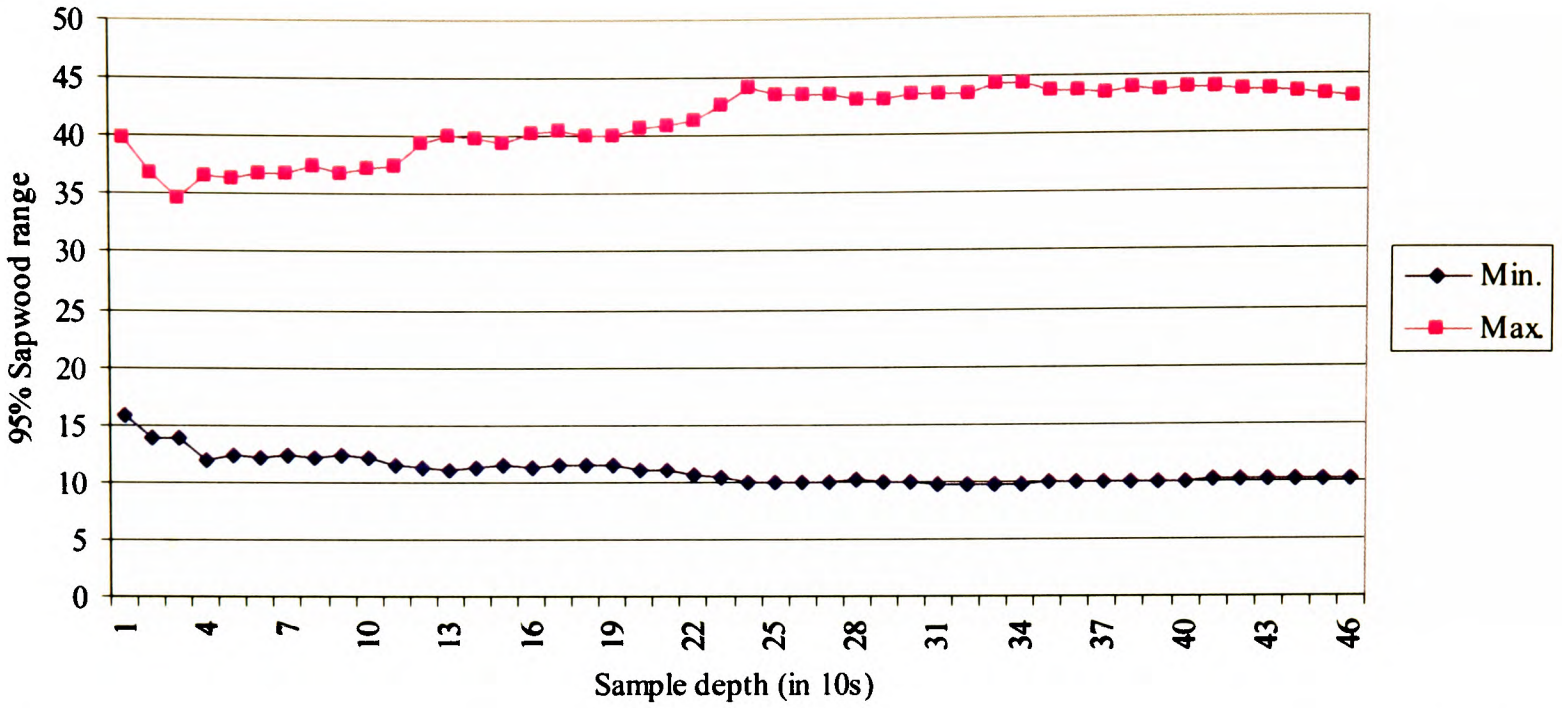


Figure 5.8: Graph showing variation in values for 457 Hampshire samples in cumulating 10-year intervals in A-Z order

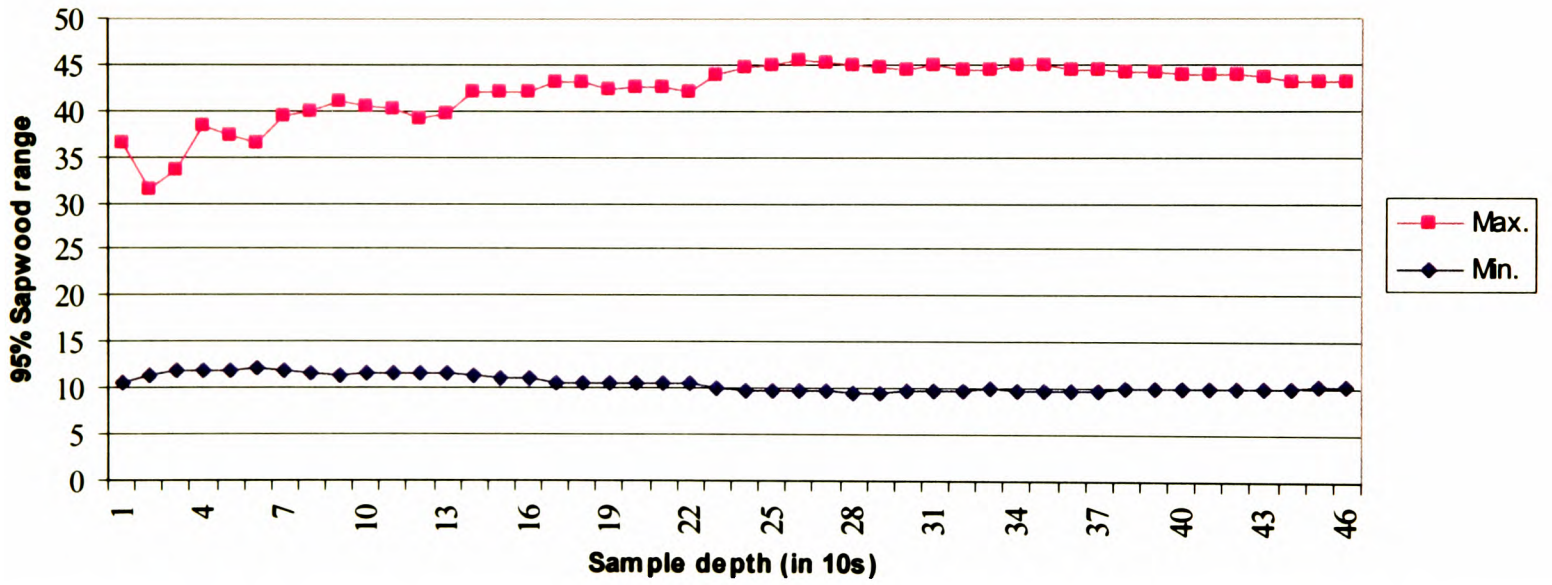


Figure 5.9: Graph showing variation in values for 457 Hampshire samples in cumulating 10-year intervals in reverse A-Z order

5.2.2 Identifying possible predictive variables

Altogether, some 4,380 actual samples have been entered in the database, and statistics for an additional 2,461 Swiss samples obtained. Whilst the majority were from Britain (3313 from England, Scotland, and Wales), they covered a wide geographic range, as well as covering a period of over 5,500 years. It was first necessary to determine how similar these data were, and if found to be variable, to allow an appropriate sub-set of data to be identified on which to perform the analysis. For this, the relational database was converted to a spreadsheet table.

Initially, a stepwise linear regression test was performed in SPSS on the data with the following variables of tree age (R), mean ring width (M), and location as defined by latitude (LAT) and longitude

(LON), together with the number of sapwood rings (S) as the dependent variable (**Table 5.2**). The residual did not decrease significantly after the two main independent variables of heartwood rings present relating to the age of tree, and mean ring width. Therefore it was concluded that the two main independent variables were the mean ring width and the number of rings present in the sample.

Regression Analysis

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	H/WdMRW	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Heartwood	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	LAT	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
4	LON	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: SAPWOOD

b. Models are based only on cases for which COUNTRY = 1 (Mainland Britain)

Model Summary

Model	R (COUNTRY = 1 (Selected))	R Square	Adjusted R Square	Std. Error of the Estimate
1	.402(a)	.162	.162	7.490
2	.430(b)	.185	.184	7.388
3	.432(c)	.187	.186	7.381
4	.434(d)	.188	.187	7.374

a. Predictors: (Constant), H/WdMRW (Heartwood mean-ring width)

b. Predictors: (Constant), H/WdMRW, Heartwood (Heartwood rings)

c. Predictors: (Constant), H/WdMRW, Heartwood, LAT

d. Predictors: (Constant), H/WdMRW, Heartwood, LAT, LON

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35875.606	1	35875.61	639.554	.000(a)
	Residual	185729.63	3311	56.09472		
	Total	221605.24	3312			
2	Regression	40952.394	2	20476.2	375.1738	.000(b)
	Residual	180652.84	3310	54.5779		
	Total	221605.24	3312			
3	Regression	41338.518	3	13779.51	252.9385	.000(c)
	Residual	180266.72	3309	54.4777		
	Total	221605.24	3312			
4	Regression	41744.301	4	10436.08	191.9402	.000(d)
	Residual	179860.93	3308	54.3715		
	Total	221605.24	3312			

a. Predictors: (Constant), H/WdMRW

b. Predictors: (Constant), H/WdMRW, Heartwood

c. Predictors: (Constant), H/WdMRW, Heartwood, LAT

d. Predictors: (Constant), H/WdMRW, Heartwood, LAT, LON

e. Dependent Variable: SAPWOOD

f. Selecting only cases for which COUNTRY = 1

Table 5.2: Results of regression analysis on variables for 3313 mainland Britain samples from SPSS

Coefficients (a,b)

Model		Unstandardised Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	29.951	0.326		91.812	.000
	H/WdMRW	-4.083	0.161	-0.402	-25.289	.000
2	(Constant)	26.125	0.511		51.144	.000
	H/WdMRW	-3.333	0.177	-0.328	-18.803	.000
	Heartwood	0.034	0.003	0.168	9.645	.000
3	(Constant)	40.487	5.419		7.472	.000
	H/WdMRW	-3.432	0.181	-0.338	-18.966	.000
	Heartwood	0.032	0.004	0.163	9.273	.000
	LAT	-0.270	0.102	-0.043	-2.662	.008
4	(Constant)	47.623	6.011		7.923	.000
	H/WdMRW	-3.400	0.181	-0.335	-18.771	.000
	Heartwood	0.033	0.003	0.164	9.317	.000
	LAT	-0.418	0.115	-0.066	-3.637	.000
	LON	-0.302	0.110	-0.049	-2.732	0.006

a. Dependent Variable: SAPWOOD

b. Selecting only cases for which COUNTRY = 1

Excluded Variables(d)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Heartwood	0.168(a)	9.645	.000	0.165	0.807
	LON	-0.008(a)	-0.495	0.621	-0.009	0.981
	LAT	-0.060(a)	-3.733	.000	-0.065	0.970
2	LON	-0.018(b)	-1.154	0.249	-0.020	0.976
	LAT	-0.043(b)	-2.662	0.008	-0.046	0.957
3	LON	-0.049(c)	-2.732	0.006	-0.047	0.760

a. Predictors in the Model: (Constant), H/WdMRW

b. Predictors in the Model: (Constant), H/WdMRW, Heartwood

c. Predictors in the Model: (Constant), H/WdMRW, Heartwood, LAT

d. Dependent Variable: SAPWOOD

Table 5.2: (continued)

5.2.3 Age of tree

In order to compare the predictors of age of tree and mean ring width, it was necessary to compare sub-sets of data on a comparative basis. To allow this to be done systematically, it was decided to group the data regionally. However, no more than about a dozen sets of data could be overlaid clearly on the plots. Therefore, instead of dividing the material from England into subsets of counties, it decided to use the nine local government regions, plus lumping Wales into a separate region and similarly Scotland (see Chapter 5.1.2 above). This also had the advantage of combining adjoining counties with few samples into a regional group with 100 or more samples. Nevertheless, the majority of data were from the south of the country, with the south-east region having 1346 samples. Conversely, the north-east region had only 90 samples, the north-west region 68 samples, and the Yorkshire region with only 42 samples. Otherwise most of the regions averaged about 250 samples.

The samples were first filtered from the database into regions, then natural logarithms were determined for the number of total rings present (heartwood plus sapwood) in the sample and the corresponding mean ring width. The average of the logs for both of these variables in each of the 11 regions in mainland Britain are then calculated, as are the standard deviations. The average of the logs for all of the 3313 samples for mainland Britain was also calculated for both variables.

The logs of the sapwood rings, mean ring widths, and number of rings present in the samples for each region were then subjected to linear regression analysis using SPSS. Using the log of the sapwood rings as the dependent variable, the logs of the mean ring width and the age of tree as independent variables, the unstandardised coefficients for the constant, and the two independent variables. The standard error or residual of the estimate was also determined for each region.

To graphically plot the results from this analysis, a spreadsheet was compiled which used the following from the database table:

Sapwood (S)
Natural log of the estimated age of tree (LNEST)
Natural log of the mean ring width (LNMRW)
Standard deviation of the estimated age of tree (SDEST)
Standard deviation of the mean ring width (SDMRW)

In this and following chapters, the following symbols are used, together with the three coefficients and the residual from the SPSS regression analysis for each region, as well as the average logs for the mean ring width and the number of rings present:

S = sapwood rings	$s = \ln(S)$
M = mean ring width of heartwood	$m = \ln(M)$
R = no. of heartwood rings	$r = \ln(R)$

In plotting s against m, an average of r is used, with the formula

$$s = [\, 3.329 - 0.642m + 0.023\, r \,] \pm 0.2725$$

This formula plots a parallel line for both of the 1σ residual limits. To give an indication of the range of mean of m in the population, we take $\pm\, \sigma\,(m)$. Rather than to plot this as a trapezoidal shape, it is plotted as an ellipse on the s versus m planes. These ellipses have been then transformed into the skew shapes that they are by transforming back to S, M, and R for ease of visual interpretation of the distribution of the data points. However, this will tend to give a larger variation in m than would be found for a specific value of r. The same procedure is used to plot against r. This enables the data to be presented as a series of distribution plots delimited at the 95% extents, rather than showing all of the data as points.

Individual sheets were then produced of the 11 regions of mainland Britain and the perimeters of plotted at 1 standard deviation with each region colour-coded. Two plots were initially constructed – one for the total number of rings present in the sample against sapwood rings (**Figure 5.10**), the other for the mean ring width against sapwood rings (**Figure 5.11**)

An important question that had to be addressed at this point was how to assess and quantify the age of the tree through the rings present in the sample. The process of obtaining samples from historic building timbers often results in the ring sequences only extending back part of the way to the pith, or centre of the tree. This is as a result of the initial conversion of the timber where it is cut into a series of smaller members, or when a tree is cut through-and-through, or where the centre of the tree, or timber, is decayed. All of these result in the inner half, or more, or the ring sequence missing from the sample. Naturally, the primary consideration for the dendrochronologist in sampling is to obtain the outer section of the timber, ideally with sapwood and bark, as it is the felling of the tree that is wanted to be determined, not when it started to grow at the point of sampling.

Of all the 3313 samples from mainland Britain, only 391 samples retained the actual centre of the tree within the sample, and a further 576 samples missing no more than 5 years to the centre. These could be accurately estimated due to the position and curvature of the growth rings at the inner end of the core. A further 339 samples had an estimated 6 to 10 rings missing, and another 189 samples between 15 and 21 rings missing. Another 147 samples had between 25 and 170 rings missing to the pith, and although a few of the higher numbers of missing rings are probably fairly good estimates due to the core being in two disjointed sections with the inner one not dating, those estimates over 15 rings are considerably less reliable than those closer to the pith. Nevertheless, it was possible to give some degree of reliability to some 1642 samples as to roughly how many rings were missing to the pith, and thus how old the tree would have been at the point of sampling. This still left over half the sample population however with no idea of how many rings were missing to the centre.

For the purposes of obtaining a realistic view of the relationship of the variables of mean ring width and age of tree, it was felt worth adding the estimated number of missing rings of these 1642 samples, to the total heartwood and sapwood ring count for the entire 3313 sample population. This would give a better indication of how the entire tree compared in the analysis.

Thus the plot shown in **Figure 5.10** for the total age of tree, including estimated rings missing to the pith, showed a fairly linear relationship between the two variables. This clearly showed fewer sapwood rings in the younger trees than in the older ones, with an average of about 18 years of sapwood for trees 50 years old, to an average of about 28 for trees about 250 years old.

The plots for the various regions showed good correlation between them, although that for Yorkshire was slightly out of synchronicity. However, it must be remembered that this was made up of a population of only 42, and should not be considered a representative sample.

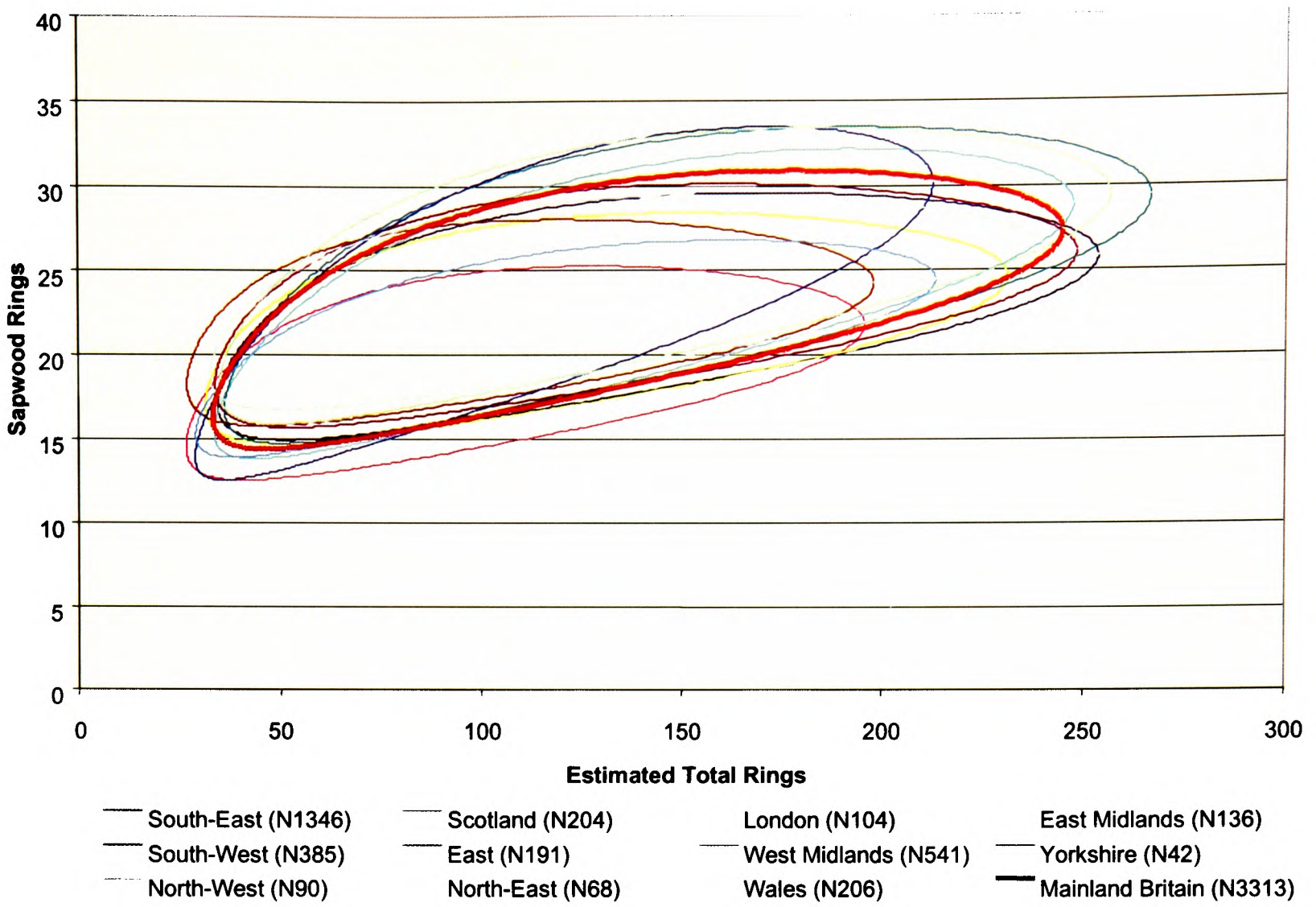


Figure 5.10: Distribution plot of estimated rings vs. sapwood rings in 3313 mainland Britain samples

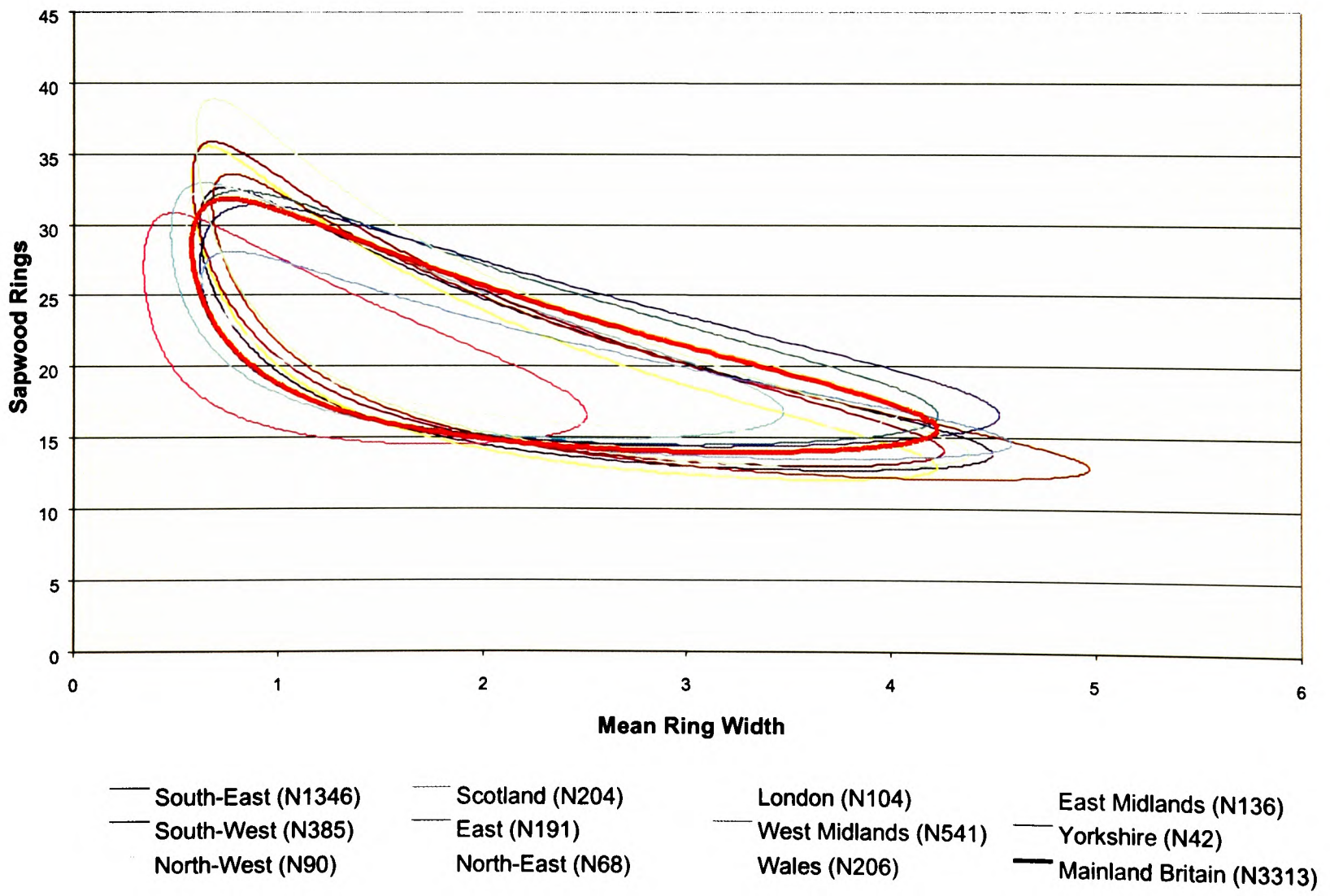


Figure 5.11: Distribution plot of total mean ring width vs. sapwood rings in 3313 mainland Britain samples

5.2.4 Mean ring width

The other independent variable with high correlation with the number of sapwood rings is the mean ring width of the sample. As in the discussion on the total rings in the tree in *Section 5.2.1* above, the total mean ring width for both the sapwood and the heartwood combined was used in producing the plot shown in **Figure 5.11**.

This combined plot showed a good relationship. It illustrated a good trend for having a higher number, as well as a wider range, of sapwood rings the smaller the mean ring width, and fewer sapwood rings, and much narrower range, the larger the mean ring width. Samples with an average of 1mm mean ring width would have about 25 years of sapwood, whereas a sample with an average of 4mm mean ring width would have an average of only 17 rings of sapwood.

The individual regional plots as shown in **Figure 5.12** demonstrated a remarkably good correlation with the exception of the 204 samples from Scotland, which tended to have fewer sapwood rings compared with the mean ring width.

5.2.5 Heartwood rings and mean ring width

Despite the good results shown above between the variables of tree age and mean ring width for the entire tree, in relation to the number of sapwood rings, it would not in practice be realistic to use these values. Whilst it may be possible to assess the number of missing rings to the centre in some cases, often some or all of the sapwood rings would be missing, hence one of the purposes of this research. Therefore, it would not be possible determine the actual total age of the tree, without the analysis being performed first, thus creating a circular argument. Similarly, the mean ring width as determined in using the sapwood combined with heartwood would, in practice, be unlikely to occur unless only a very few rings were missing to the bark edge.

Therefore, the analysis was repeated using only the values of the present heartwood rings for both age of tree and mean ring width. The resulting combined plots are shown in **Figure 5.12** and **Figure 5.13**.

As regards the age of tree, the plot using only the heartwood rings as shown in **Figure 5.12** shows a significantly shallower rise in the number of sapwood rings compared with the sharper trend using the total age of the tree in the combined plot shown in **Figure 5.10**.

Similarly, the mean ring width for the heartwood rings produced distributions in the plots which were slightly broader, as shown in **Figure 5.13**, compared with that in **Figure 5.11** which was calculated with the sapwood included. Both showed a similar relationship.

Both of these new plots generated using the heartwood ring data only were then studied for variation between geographical areas. Again, all of the regions followed the same basic trend, but with some shift in variation between regions. This is discussed under Chapter 5.2.4: *Geographic variability* below.

A third method of determining a more representative, yet practicably obtainable value for the mean ring width of the sample, is to use the last decade of heartwood, immediately before the heartwood/sapwood boundary. This is very similar to the method employed by Walder at Zurich, where the last 9 heartwood rings plus the first sapwood ring are used to determine the mean ring width for the sample. However, due to the sapwood often being missing entirely from the sample, the last 10 rings of heartwood preceding the heartwood/sapwood boundary has been used here, and for which a value has already been calculated in the relational database.

This plot, as shown in **Figure 5.14**, shows remarkable similarity to the other comparative plots with the mean ring width of the entire sample (**Figure 5.11**), and that of the mean ring width of the heartwood alone (**Figure 5.13**). When the last 10 years of heartwood are used to determine the mean ring width for the entire sample, the tail end of Scotland falls much more in line with the higher mean ring samples. However, these Scottish samples and the small number of samples from the north-east still had fewer sapwood rings than in the remaining regions.

5.2.6 Geographic variability in mainland Britain

Now that the two principal independent variables of age of tree and mean ring width had been confirmed as being consistently reliable indicators of the number of sapwood rings, the next question to be answered was how much variation there was geographically across mainland Britain. It has been known for some time that the number of sapwood rings varies across Europe from west to east (Baillie 1982). Also, an empirical study of sapwood ring counts suggested that there was a minor increase in the numbers of sapwood rings from south to north in England (Miles 1997). But was this a simply due to changes in the principal variables such as age of trees or mean rings width?

Concentrating on the data for mainland Britain, the regional plots generated for the total age of tree (**Figure 5.10**) showed the 42 samples from the Yorkshire region aligning at a slightly steeper trend than the others. Conversely, the data for Scotland seemed to show a slightly lower number of sapwood rings compared to the other regional plots, all of which seemed very consistent. The regional plots for the number of years as represented by the heartwood rings only (**Figure 5.12**) showed Yorkshire more in alignment with the other regions, but with the eastern region slightly reduced. Scotland however still seemed to have slightly fewer rings compared with the other regions.

Looking next at the relationship of mean ring widths compared to region, the plots for mean ring width based on both heartwood and sapwood (**Figure 5.11**) showed a good correlation between regional groups. However, the data for Wales showed a slightly higher number of sapwood rings at the bottom end of the mean ring width scale, whilst Scotland still showed a predominance for having slightly fewer sapwood rings, and narrower mean ring widths as well. When compared to the same group of samples using only the mean ring width of the heartwood (**Figure 5.13**), the same mis-alignment was noted for the north-east region. Wales also showed a slight broadening of the range as was noted in the plots based on the mean ring widths of the entire sample. Again, Scotland showed a lower number of sapwood rings compared to the other regional groups.

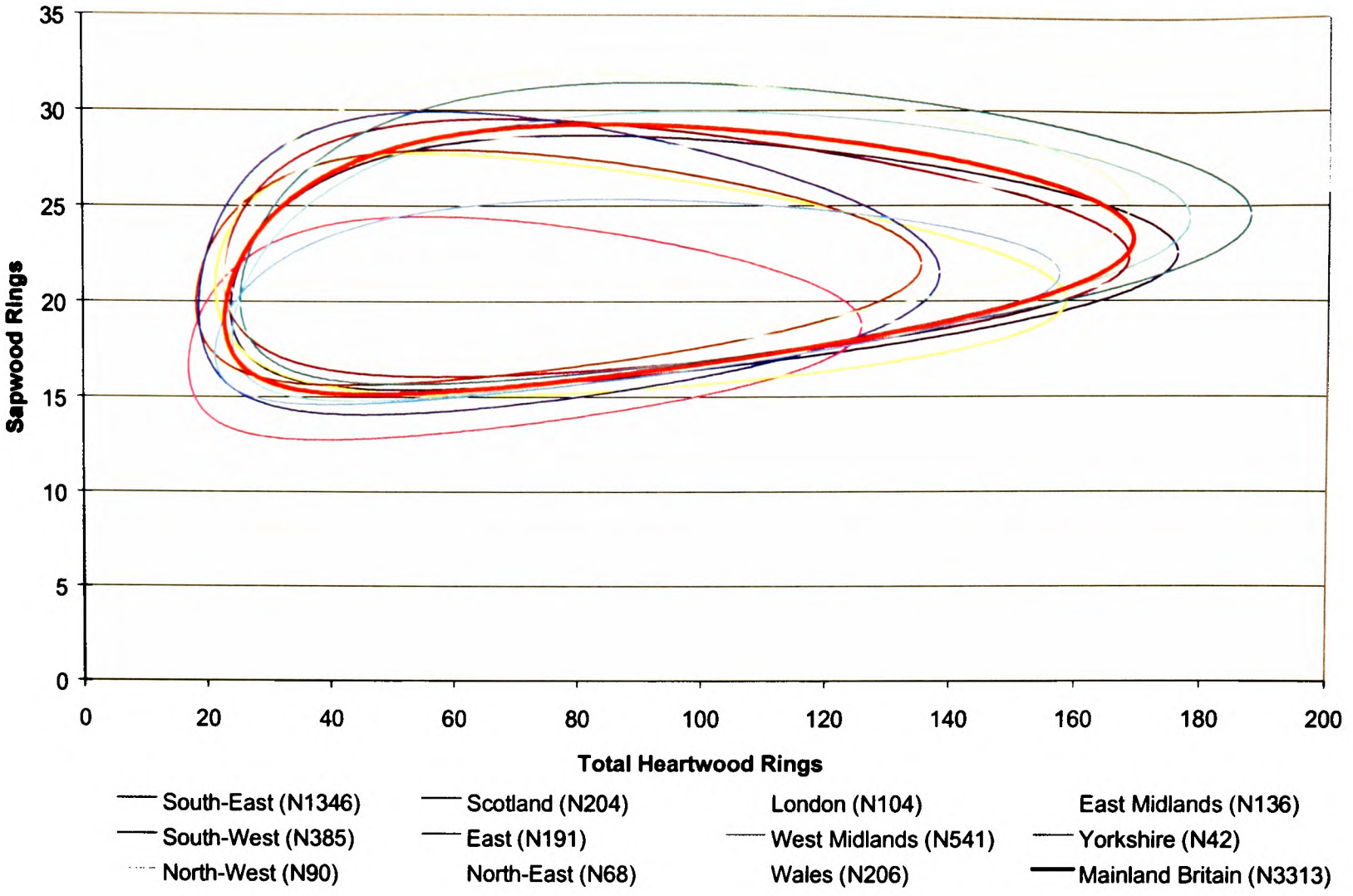


Figure 5.12: Distribution plot of heartwood rings vs. sapwood rings in 3313 mainland Britain samples

Figure 5.13: Distribution plot of heartwood mean ring width vs. sapwood rings in 3313 mainland Britain samples

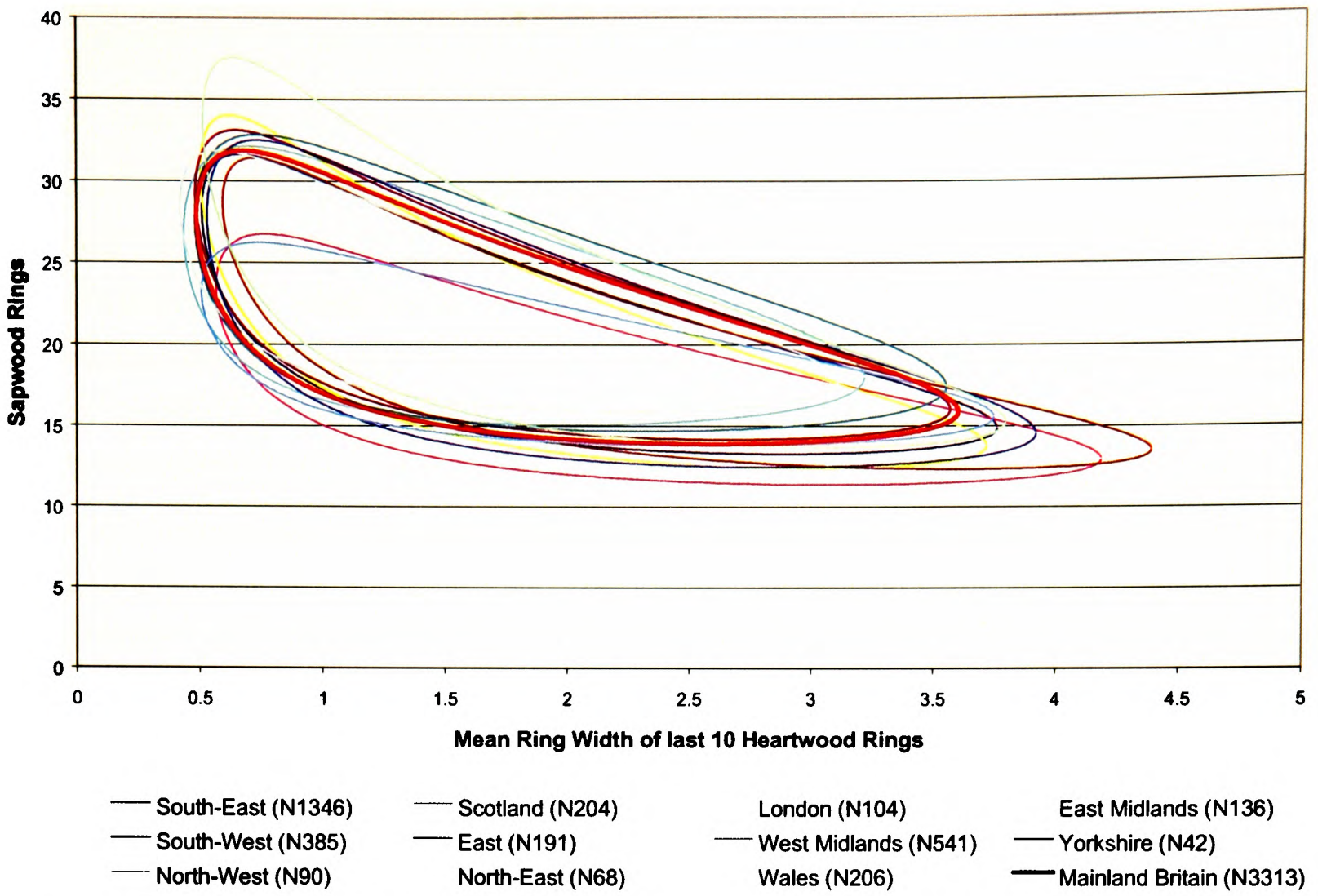


Figure 5.14: Distribution plot of the last decade of heartwood rings vs. sapwood rings in 3313 mainland Britain samples

Overall, the relationship of the various regions seemed to be broadly in line with each other, both in the relationships between total age and sapwood rings and total mean ring width and sapwood rings. Some of the northern regions produced slightly out-of-phase plots when using the heartwood data only, but in general these were not consistent. The only exception to this was the group of data from Scotland, which seemed to be consistently lower in sapwood rings than the norm.

One explanation as to why these regions should vary marginally may lie in the data from which they are made up. In Yorkshire, over half the samples are either Roman archaeological timbers or modern woodlands, both of which may have introduced a chronological bias (see Section 5.2.5 below). The material for the north-east, whilst virtually all medieval, only 8 out of 68 samples had any information to allow an estimated total age to be made. In Scotland, only 22 out of 204 samples were medieval, the remainder was either immature trees used in the construction of a Dark Age crannog, or from modern woodlands. Given the lack of conformity in the material from the more northern counties, together with small sample base, it would be unwise to put too much emphasis on this material.

These comparative plots demonstrate that in general, with the possible exception of Scotland, the various regions of mainland Britain are comparable both in relation to age of tree and mean ring width. That these variables can be used to predict sapwood rings throughout most of mainland Britain

should remove the need for confusing regional estimates. However, results for timbers lying on the geographical extremities should be treated with a certain degree of caution.

5.2.7 Geographic variability across Europe

In order to try and understand further the marginal differences in the Scottish data to the rest of the material from England and Wales, it was felt important to try and look at the wider European picture. For the purposes of this exercise, the material from England and Wales was grouped together, giving a sample depth of 3109, and Scotland was treated as a separate region. Eight other regions were included in the analysis: Ireland, the Channel Islands, France, Germany, Switzerland, Denmark, Poland, and Lithuania. As in the other plots, the total estimated rings were used rather than the heartwood rings only. The data from Switzerland was not included in the all Europe mean, as only the statistical values were obtained for this group of material. Nevertheless, the comparison with the Swiss data was particularly useful, given that all 2461 samples included the entire ring sequence from the pith to the bark edge.

Many of these regional datasets were not comparable, as discussed in *Section 5.1.1.* The material from Ireland and the Channel Islands were a mixture of medieval, post medieval, and modern woodlands, whereas that from Denmark was entirely modern woodland. The material from Germany was from the Neolithic lake dwellings of Lake Constance, the majority of which were immature oaks, whilst the extensive collection of Swiss data were from a variety of archaeological sites covering five millennia, again with a large proportion being immature trees. The large collection of Polish material was predominately medieval, as were the small number of French samples. The token Lithuanian samples were from Bronze Age lake dwellings, all immature oaks.

Looking at the plots of estimated tree age to sapwood rings (**Figure 5.15**), considerable variability was noticeable. With the exception of Lithuanian samples, most of the trends seemed to follow, more or less, that of England and Wales. However, they were very much out of phase with each other, with the Polish samples having the lowest number of rings in relation to tree age, followed by those for Denmark, the Channel Islands, and France. Ireland, followed by England and Wales seemed to have the highest number of sapwood rings. Switzerland and Germany both had similar, very tight clusters, at the lower end of the estimated tree age. The 12 Lithuanian samples lay at quite a different angle of trend, and given the small sample base, and the immature trees used, should be discounted.

The distribution plots of total mean ring width against sapwood rings, as shown in **Figure 5.16** demonstrate a much better correlation between populations, again with the exception of Lithuania. However, the narrow linear ranges of Polish and Danish trees were almost independent of the ranges of those for Ireland, the Channel Islands, and England and Wales.

Both of the plots have shown that there is substantial difference in data from the various regions of Europe, and setting aside other variables such as difference in absolute dates (see *Section 5.2.8*

below) and the age of trees themselves, it would appear that the basic relationship between age of tree and mean ring width is still valid for most regions of Europe.

5.2.8 Chronological variability

Another major fact to be investigated was whether samples dating from different chronological periods had an influence on the number of sapwood rings. To help understand what effect trees growing in different time periods had on the number of sapwood rings, it was necessary to compare a large body of data covering a wide chronological period from a small geographical area. Thus, the Swiss data provided ample material with which to work – over 2400 samples all with the complete sequence from pith to bark, and all from one narrow region.

The data were divided into 13 different chronological periods, the periods with the most samples being the century covering the period 3400 – 3300 BC (576 samples) and 2700 – 2500 BC (587 samples). Other periods had fewer but still reasonable sample counts, such as 3900 – 3600 BC (225 samples), 3300 – 3100 BC (217 samples), and 2900 – 2700 BC (217 samples). Sample depth later than 1700 BC to 1 BC was less than 100, and for the period 1 AD to present only 237 samples was available. Nevertheless, the data was spread over a significant period of time, and should show any diverging trends in the relationship with sapwood ring counts.

Figure 5.17 shows the comparisons between age of tree and sapwood rings, and clearly illustrates some radical changes in direction in the plots over time. Those samples dating from 3900 BC to 1 BC all showed a very steep trend with far fewer sapwood rings in relation to the age of tree, whilst those during the AD period showed a much more similar trend to those in mainland Britain where the number of sapwood rings are higher relatively for the same age of tree, but without such a marked change as the tree gets older as shown in the BC material.

Looking next at the relationship between mean-ring width and sapwood rings, the plots shown in **Figure 5.18** show a more consistent relationship between periods. No clear trend could be detected in the data over the course of time, and the plots reflect closely the trends noted in the mainland Britain material.

Nevertheless, the Swiss data has shown that there are some differences in data in relation to the age of tree variable, and this was then compared to the 3313 data points from mainland Britain. The data was again divided chronologically, but unlike the Swiss material, the AD material dramatically dominated the BC samples, of which only 32 dated between 4200 – 2000 BC and 25 samples between 1000 – 1 BC. The majority of the data were from the late medieval and post-medieval periods, with 672 samples dating from AD 1400 – 1500, 736 samples from AD 1500 – 1600, and 605 samples from AD 1600 – 1700.

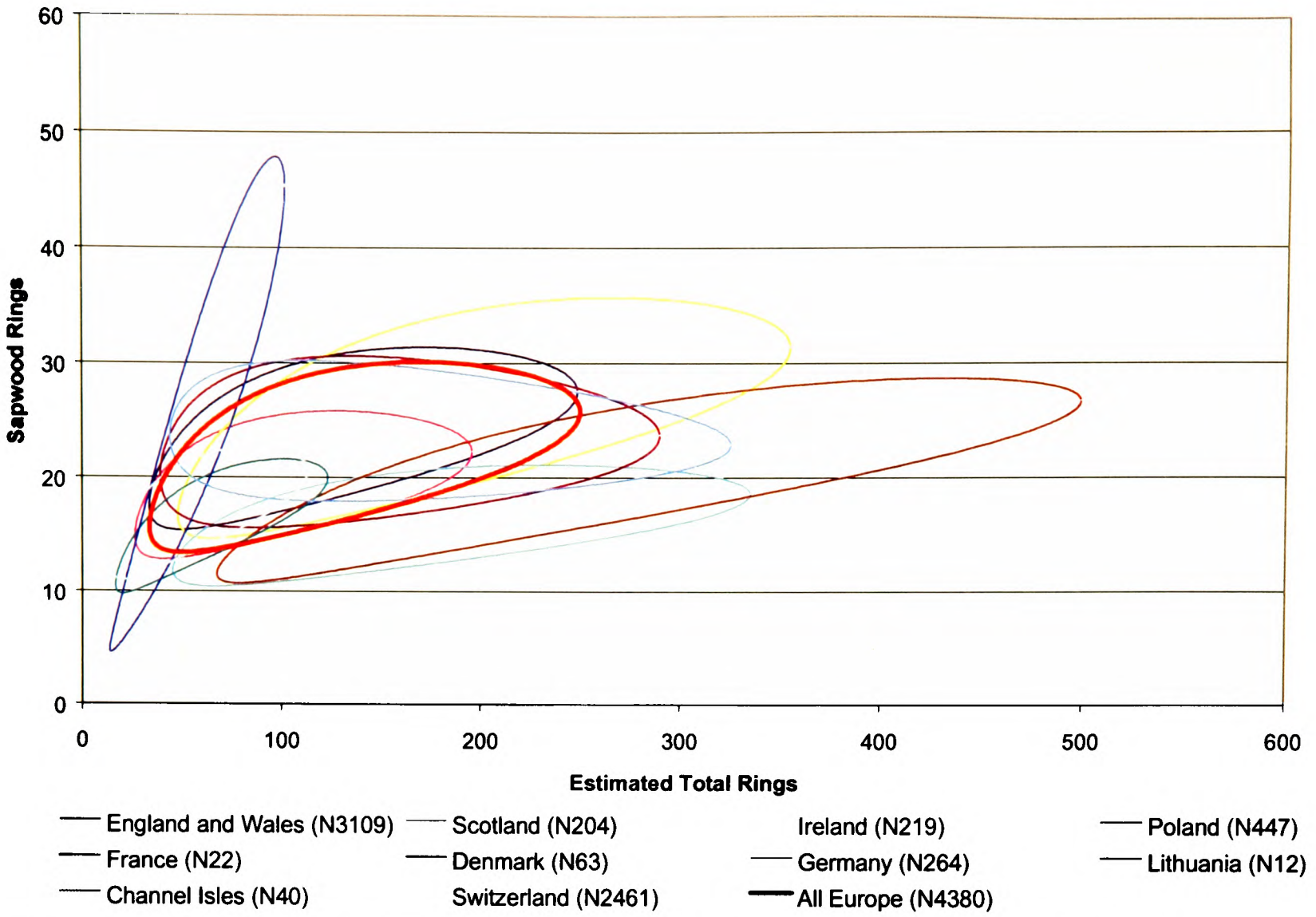


Figure 5.15: Distribution plot of estimated total rings vs. sapwood rings in 6841 European samples grouped by region

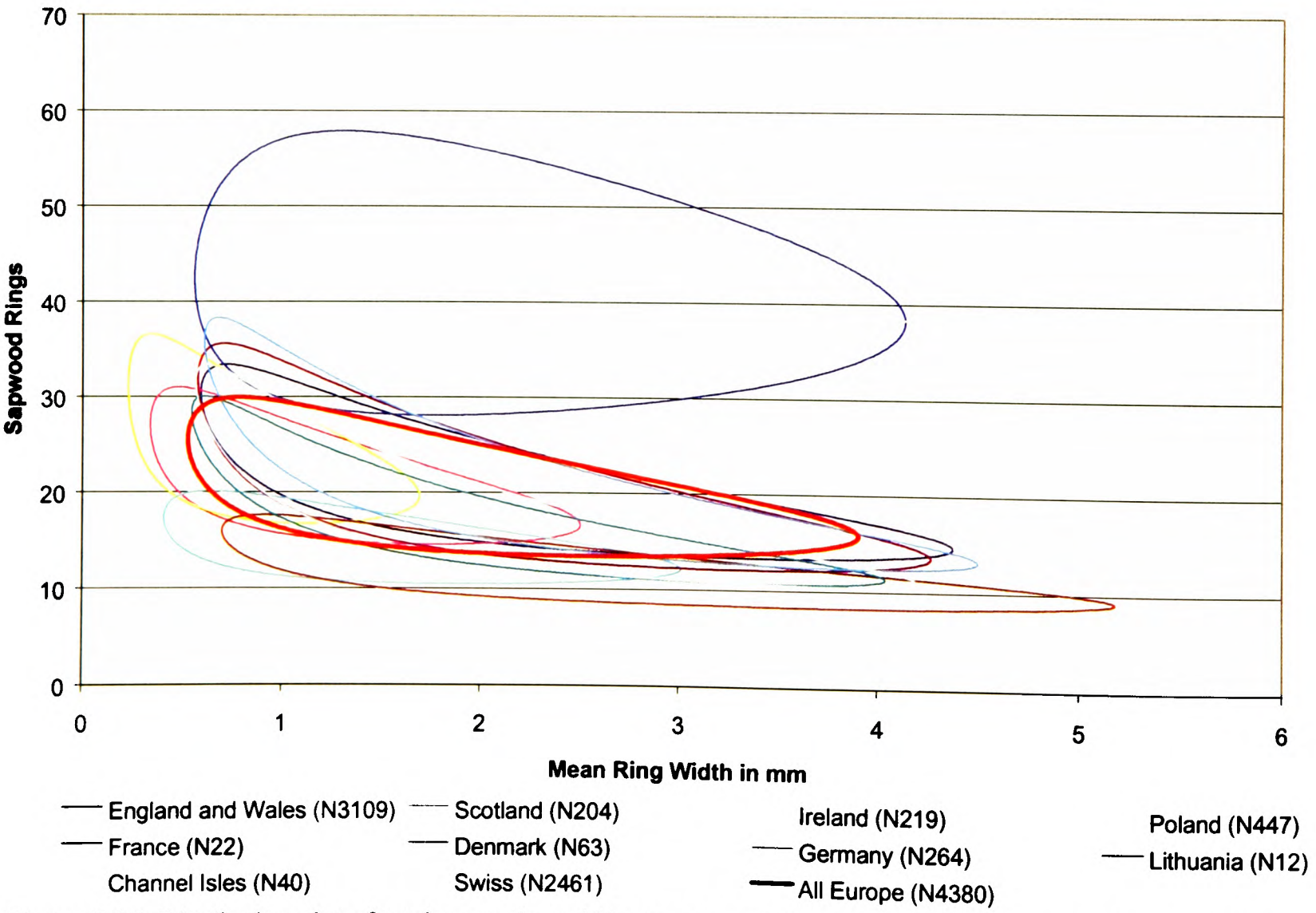


Figure 5.16: Distribution plot of total mean ring width vs. sapwood rings in 6841 European samples grouped by region

The plots of estimated age of tree compared to sapwood rings is shown in **Figure 5.19**. The degree of agreement between periods is not exceptional, although the trends are generally in the same direction. The plots from the majority of the periods seem to overlap, although the plots covering the periods 1000 BC to AD 1000 seem much tighter and at the lower end of tree age in relation to sapwood rings.

Conversely, the plots of mainland British trees comparing total mean ring width with sapwood rings (**Figure 5.20**) show a marked change between the small amount of BC material and the much larger AD population. Here both of the BC periods show a markedly different alignment in the plots with much higher sapwood rings compared with the mean ring width. All of the AD material appears to be fairly consistent, and matches fairly closely the Swiss plots for the same period.

5.2.9 Conclusions on analysis of data

The analysis carried out on the British and European data has shown that both the age of tree, as well as the mean ring width, are important independent variables in relation to the sapwood rings. It has been useful using the total estimated age of tree when comparing with other variables and groups of data, reflecting more accurately the true relationship between these variables. However, when just the heartwood is used for the age of tree, the correlation is reduced when compared to that of the mean ring width of the heartwood only. The reason for this diminishing in focus between groups of samples is that the inclusion of sapwood rings significantly increases the length of the sample sequence, and gives a more consistent ring pattern than is normally found in the first 25 or 50 years of the growth cycle of the tree.

Nevertheless, in collecting samples from historic buildings and structures in the field, the retention of sapwood is less likely, therefore it is suggested that only the number of heartwood rings and the outermost rings are most likely to be more consistent than the earlier years.

Comparisons between regions within mainland Britain show little change from the north to the south of the country, although the limited number of samples from the northern-most regions, coupled with the diversity of the data, has made this difficult to confirm. Given that a sample depth of about 250 is the optimum size of population to avoid bias in producing sapwood estimates, the northern regions of Yorkshire, the north-west and the north-east, all with less than 100 samples, suggest that one should not place too much emphasis on these findings. Similarly, the regions of Scotland, Wales, the east, and the east Midlands, with a sample depth of between 100 and 200, would be expected to show more natural variability. All this not withstanding, Scotland has consistently shown a slight shift to fewer sapwood rings when compared to other regions.

There does appear to be a noticeable shift in the plots over the European regions as well, with Denmark, Germany, Switzerland, and Poland showing similar trends. Ireland and the Channel Islands also suggested a trend for higher sapwood rings compared with England and Wales. Therefore, the comparative analysis suggests that the material from England and Wales is relatively homogeneous, but

any models constructed from this region might not be as applicable to Scotland, Ireland, or the rest of mainland Europe.

Although there was a limited amount of prehistoric material for Britain, the Swiss material did suggest a different trend between prehistoric (BC) and historic (AD) material. However, some caution needs to be exercised, as this material is from a very small region with some bias in collection or survival, and thus may not be representative of the total population. Nevertheless, this was supported by comparative material from England and Wales. This therefore suggests that any models produced by mainly historic material might not be representative for prehistoric samples.

To conclude, models to predict sapwood should include both the heartwood rings and the mean ring width of the heartwood despite the better correlation when including sapwood. Comparative tests should also be made using the last 10 rings of heartwood for the mean ring width, as this gave marginally better correlation to the sapwood rings than those using the mean ring widths from the heartwood only and the entire sample.

All of the data from England and Wales have shown through the comparative plots to be consistently homogeneous, but the question of whether to include Scotland is explored further below in *Chapter 8*. Chronologically, all historic data from the last 2000 years could be combined to construct the optimum model, but further data would be required to demonstrate whether this would be applicable to predicting prehistoric sapwood.

5.3 REJECTED VARIABLES

5.3.1 Standard deviation

All 3313 mainland Britain datasets were compared in order to examine for any relationship between the number of sapwood rings and the standard deviation of the sample, as shown in **Figure 5.21**. Although the distribution is somewhat similar to that of mean ring width, the clustering of the majority of the data points around the 20 to 25 sapwood ring mark makes this variable a much less useful as a predictive variable. No further research in using the standard deviation in determining sapwood ring counts was undertaken.

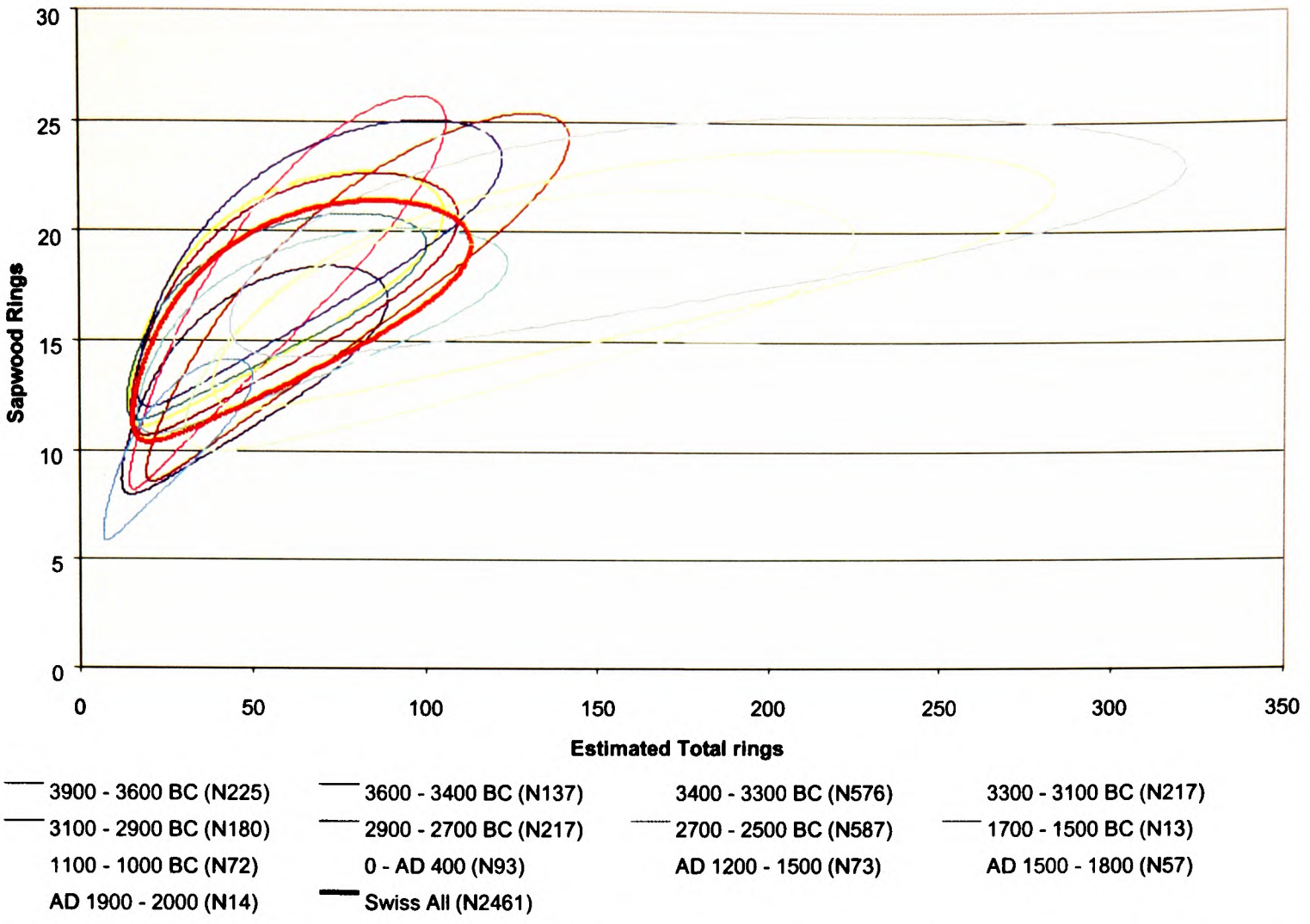


Figure 5.17: Distribution plot of total rings vs. sapwood rings in 2461 Swiss samples grouped by chronological period

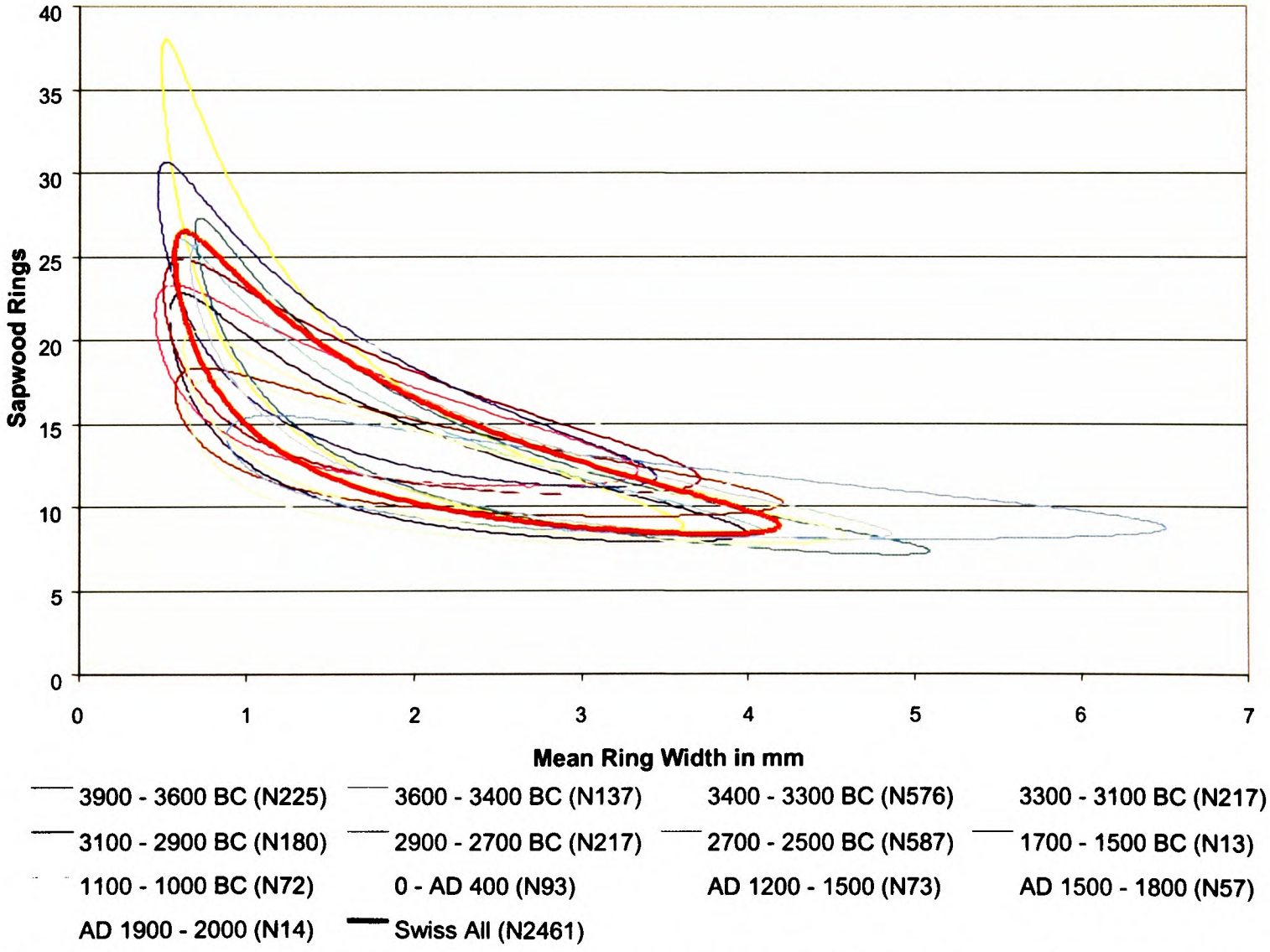


Figure 5.18: Distribution plot of mean ring width vs. sapwood rings in 2461 Swiss samples grouped by chronological period

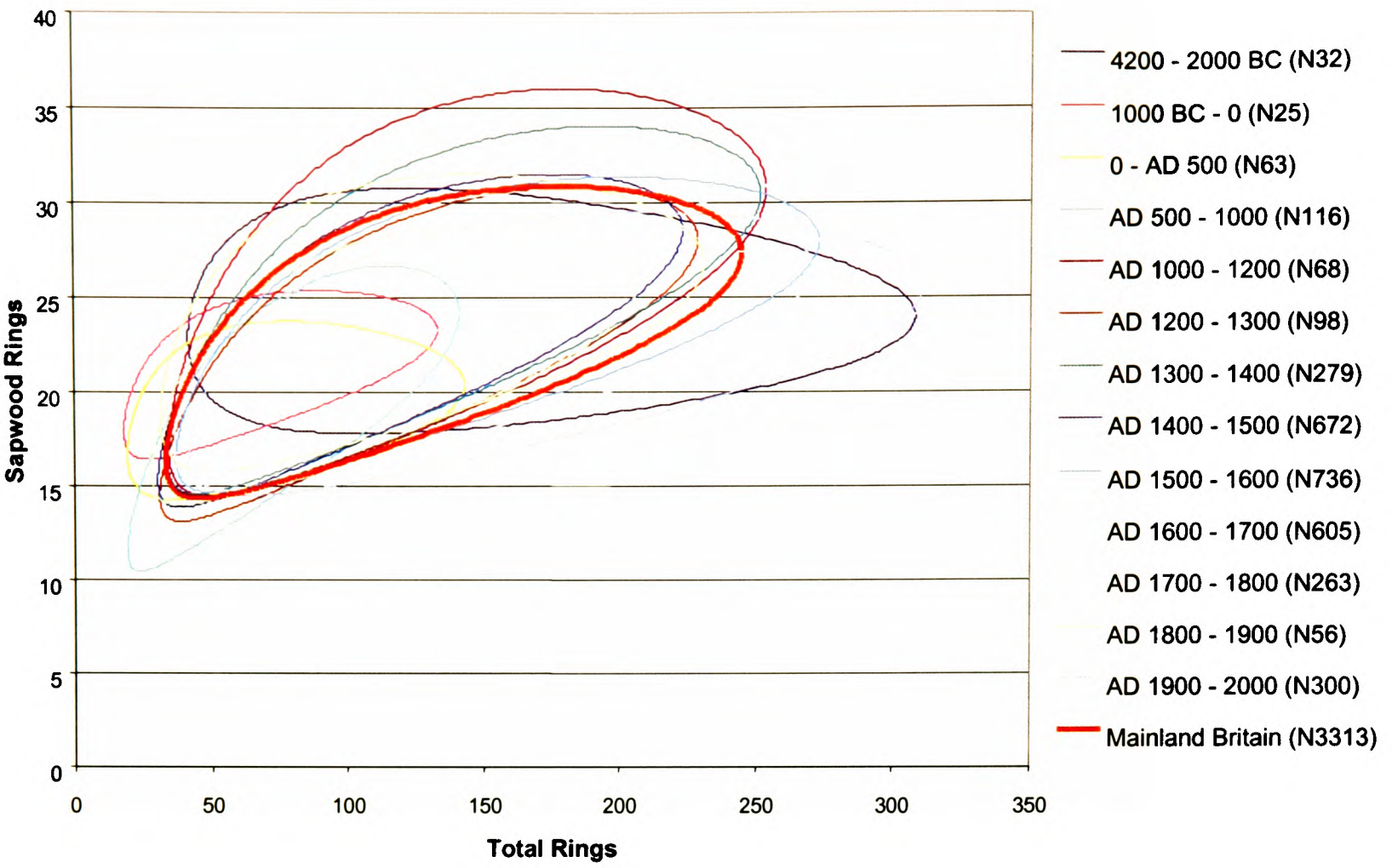


Figure 5.19: Distribution plot of estimated rings vs. sapwood rings in 3313 mainland Britain samples over chronological periods

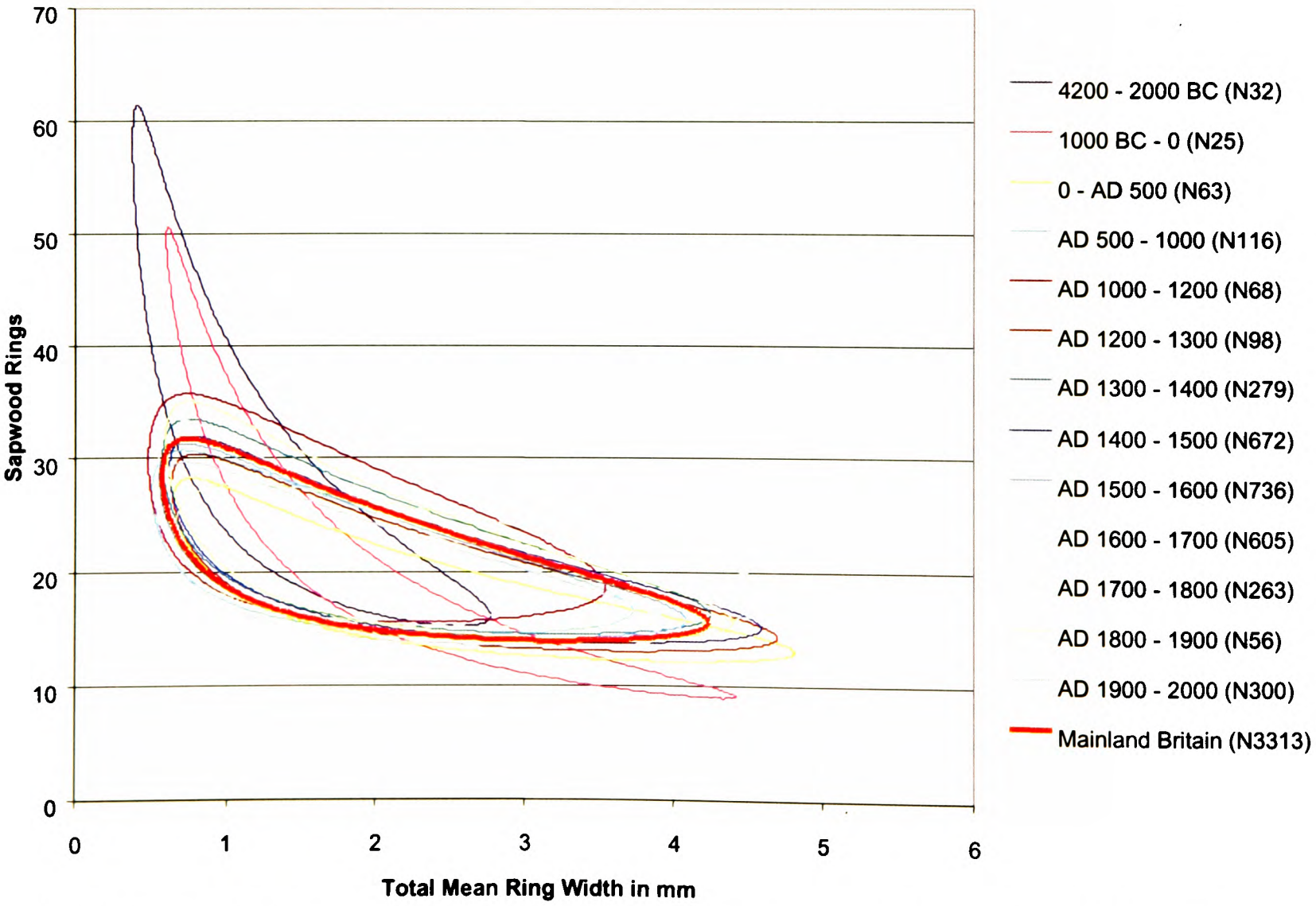


Figure 5.20: Distribution plot of total mean ring width vs. sapwood rings in 3313 mainland Britain samples over chronological periods

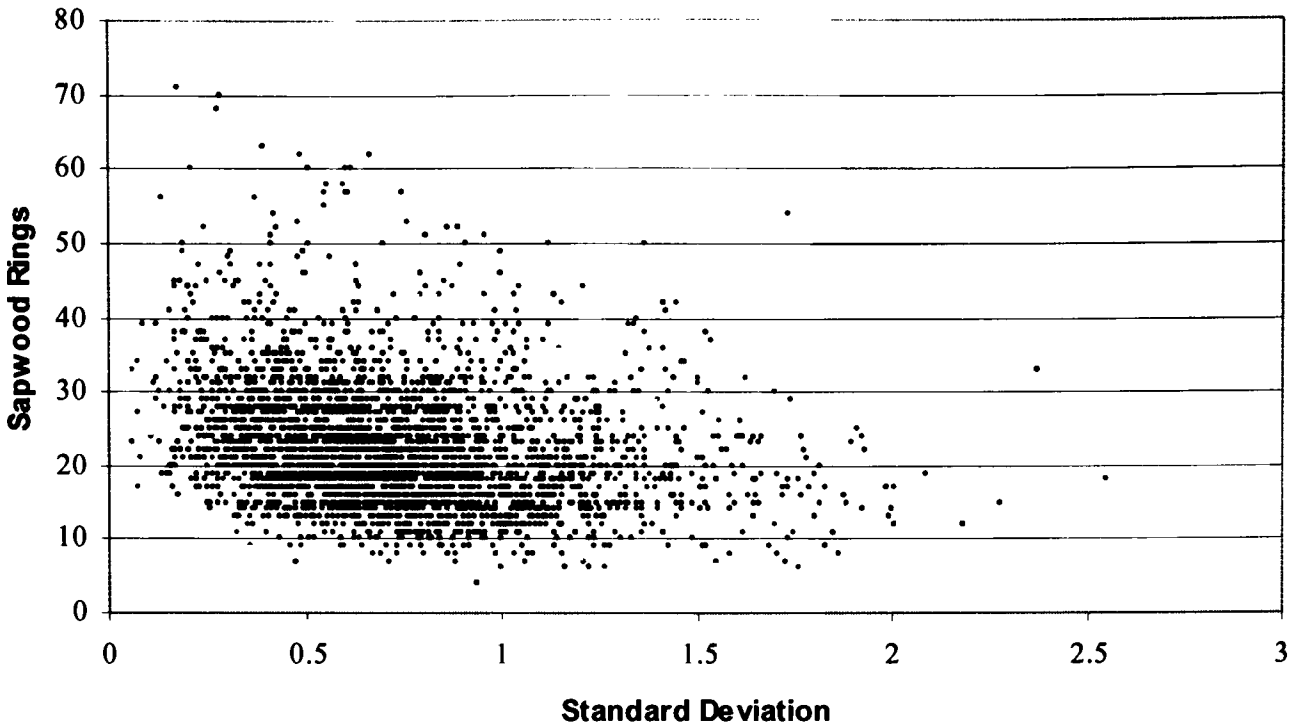


Figure 5.21: Scatter plot of 3313 sapwood rings against the standard deviation of sample

5.3.2 Mean sensitivity

Similarly, all 3313 data points were compared between sapwood rings and the mean sensitivity of the sample, and the results plotted on a scatter plot in **Figure 5.22**. Here the data seemed to cluster without any particular trend, making it of little value in estimating sapwood rings.

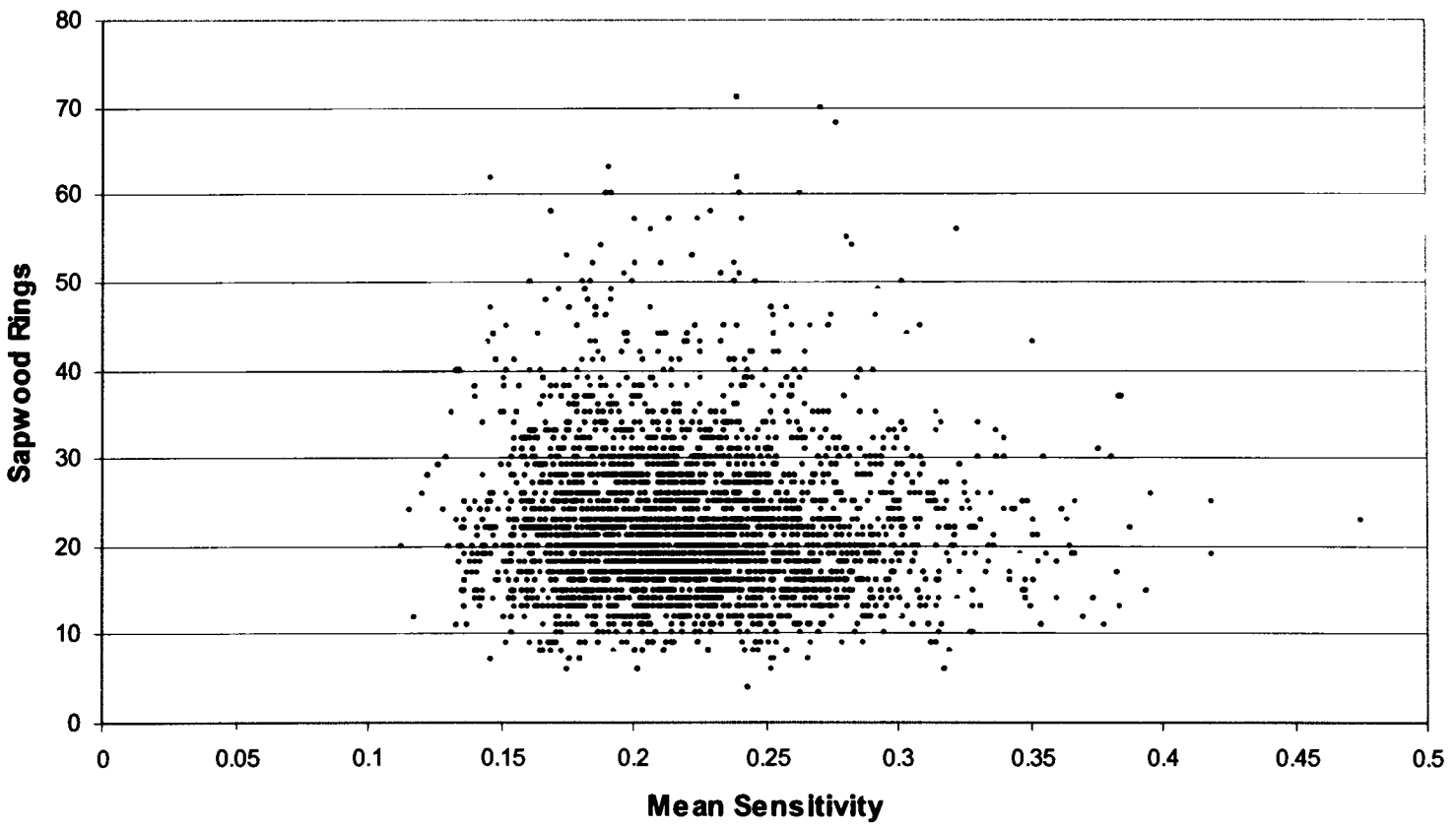


Figure 5.22: Scatter plot of 3313 sapwood rings against the mean sensitivity of the sample

5.3.3 Soil type and elevation

Consideration was given to exploring the relationship between the soil type of the tree location and the number of sapwood rings. However, a major difficulty is being able to determine just what sort of soil the tree would have originated from before being felled and incorporated into a standing building. Geology can vary greatly over the space of less than a mile, and no really firm conclusions can be made from questionable data. This problem is well illustrated with one example from the south-east corner of Oxfordshire where 73 samples from standing trees on the Mapledurham Estate and the neighbouring Hardwick Estate were studied. This collection of data was especially useful in that each tree could be firmly provenanced from three distinct geographical situations: the Thames river plain, the chalk escarpment, and the gravel uplands. All these three diverse soil types are all within a few square miles.

At Court Farm, Overton, in Hampshire, there stands a barn dating to 1496/7 and an adjacent farmhouse dating to 1505/6, both with surviving Bishop of Winchester building accounts. These show that the barn was constructed of 120 small-diameter oaks that were felled at Sapley and at Willersley, both about a mile away from Overton on the chalk downs. However, accounts for the house show that 30 larger oaks were felled at Ecchinswell, some six miles away, on the lower-lying clay (Miles and Haddon-Reece 1994). This illustrates perfectly the difficulty in trying to determine the growing conditions of timber for even fairly low-scale building operations without the aid of building accounts. This problem is greatly magnified on larger, higher-status projects such as cathedrals, where timber has been imported from far greater distances, such as at Salisbury, where timber was imported from Ireland (Miles 2002a). Where samples such as the Irish material discovered at Salisbury have been included in the database, they have been listed under their origin or source, not the location of the building. Baltic timber, which is only found in board form, has been excluded from the database.

Similar difficulties in accurately determining the precise location of where the trees grew also preclude the use of elevation in any detailed comparison across many parts of the country. Although dendro-provenancing can confirm that some trees used in the construction of standing buildings originated from a relatively small geographic region, often this region could extend to as much as much as 100 miles or more across (Bridge 2000). Nevertheless, most ordinary buildings would have used timber obtained locally, as logic and economics would dictate that any woodland owned by the landowner commissioning the building would be used in preference to other, more expensive timbers, brought in from further afield.

Major population centres however will always throw up certain logistical problems in the provenancing of the timber. Lack of standing timber will require that timbers be imported from much further afield, and the larger the town or city, the further afield the timber would have to be sourced. Should the town or city be situated on a river or the coast, then this opens up another potential for transport. London, for instance, would have drawn timber from far up the Thames, as a reference dated 1573 from the accounts of riverman Thomas West of Wallingford states: 'I find Master Browne and Master Shergent did cawes me to carry 20 loads of talle woode and 10 loades of billetes frome John

Melsaides of Mapledorme (Mapledurham) unto the 3 Cranes [Wharf] in London...' (Prior 1981, 87). It is known that timber markets operated in towns and cities during the medieval and post-medieval periods, and that timber would have been draw from a variety of sources, and similarly felled at differing times.

All of this evidence simply reinforces the conclusion that the geographical location does not necessarily identify the soil type and elevation of the trees used in the construction of a particular building, and is therefore not a viable component in any meaningful analysis.

5.3.4 Height of sample along the tree stem

Other variables could not be adequately investigated due to lack of available data. The height up the stem of the tree from which the sample was taken is one where some evidence suggested there might be a trend of more sapwood rings the higher up the tree as noted by Hughes *et al* at Liverpool (in *Section 2.2.3* above). However, apart from the living trees, which were all sampled at breast height, very few of the other samples could be accurately determined where in the tree the sample had actually be taken once the timber had been converted and used as a building timber.

Some types of structural members have some potential for determining approximately where along the length of the tree the sample might have been taken. These include the longer members such as tiebeams, rafters, plates, storey posts, and purlins, which are long enough to have been restricted to the bole of the tree. However, many other members would be impossible to provenance within the tree. This category would include studs, joists, rails, collars, girts, and other shorter timbers. Braces, if curved, can usually be determined to have originated from the upper parts of the tree. Therefore it was considered that this would not be a useful method for helping to determine sapwood rings.

5.3.5 Woodland environment

A similar problem was found with categorising the type of tree from which the sample originated. In the data obtained, only the living trees could be accurately provenanced, a total of 484 samples. Of these, 63 originated from Denmark, 77 from Scotland, and 90 from Ireland. Of the 35 sites providing these samples, only seven had any details available as to whether the trees sampled were from a typical woodland situation, from hedgerows, or from a parkland environment. The 73 trees sampled from the Mapledurham and neighbouring Hardwick estates, were particularly useful, with all three types of habitat being sampled.

The data grouped by type of woodland environment, with mean values produced for the estimated total age of tree, the number of sapwood rings, the mean ring width of the heartwood, sapwood, and the entire sequence, together with the mean standard deviation of the heartwood. However, no clear correlation was noted between the type of tree and any of these variables. Whilst the parkland oaks tended to have the highest mean ring width, the woodlands having the lowest, and hedgerow trees somewhere in-between, these values were not consistent with other woodlands (**Table**

5.3). For instance, the parkland oaks from Stoneleigh Abbey had a significantly lower mean ring width than all the other woodlands, as did those from Cobham Hall, save one. Given that the known variables for a sample could be influenced by a number of other unknown factors such as soil type and woodland management, it is concluded that the type of woodland environment would not be a suitable variable for predicting sapwood rings.

Woodland location & type:	*Type:*	*No:*	*Mean Est. Age*	*Mean Sapwood*	*Mean H/WdMRW*	*Mean S/WdMRW*	*Mean TotalMRW*	*Mean H/WdSD*
Bradfield, Essex	Woodland	17	52	14	2.980	3.366	3.098	0.929
Brasenose Wood, Oxford	Woodland	24	152	20	2.584	1.879	2.479	0.991
Wytham Wood, Oxford	Woodland	25	175	23	2.246	1.422	2.110	0.953
Hardwick Estate, Oxon	Woodland	19	181	23	1.845	1.590	1.800	0.702
Mapledurham Estate, Oxon	Woodland	16	152	22	2.222	1.709	2.132	1.078
Mapledurham Estate, Oxon	Hedgerow	31	130	20	2.748	2.214	2.640	1.085
Mapledurham Estate, Oxon	Parkland	7	137	19	3.463	2.639	3.317	1.217
Cobham Hall, Kent	Parkland	11	163	21	2.200	1.521	2.100	1.029
Stoneleigh Abbey, Warw	Parkland	22	173	23	1.713	1.477	1.674	0.794

Table 5.3: Comparative analysis of types of woodland environment reflected in living tree samples

5.3.6 Consistent width of sapwood

With the increased collection of sapwood data, it was possible to test the theory of Fletcher that the number of sapwood rings could be predicted through the mean ring width of the last 25mm of heartwood, based on the assumption that this would be was consistent with the mean ring width of sapwood (Fletcher and Tapper 1982). Of the data collected from mainland Britain, 3259 samples had 4mm or less mean ring width, and were grouped into six categories as shown in **Table 5.4**. This was calculated by taking the mean ring width of the last decade of heartwood. Altogether, some 44.3% fell outside the range predicted by Fletcher, supporting the 43% found by Hillam *et al* (1984).

Mean ring width of last decade of heartwood:	*Estimated years of sapwood:*	*Number of samples:*	*Number within range:*	*% agreement:*
< 0.8 mm	25 – 40	749	362	48.3%
0.8 mm to < 1.3 mm	20 – 32	822	499	60.7%
1.3 mm to < 1.8 mm	15 – 25	786	490	62.3%
1.8 mm to < 2.4 mm	12 – 20	547	288	52.7%
2.4 mm to < 3.0 mm	10 – 16	224	107	47.8%
3.0 mm to < 4.0 mm	8 – 15	131	68	51.9%
Totals:		3,259	1,814	55.7%

Table 5.4: Testing of sapwood estimates by mean ring width grouping after Fletcher and Tapper (1982)

6. VARIATION IN FELLING DATES AND SEASONS

Previous research has shown that structures were often constructed of timbers which had been felled one or more years earlier than when construction actually occurred (Miles 1997). Throughout this chapter, the term 'stock-piled' is used generically, and whilst it usually refers to timbers being cut and stored for future use, it could also refer to windfalls or seasoned oak. At this time (1997), some 46% of the phases under study had one or more timbers which had felling dates varying by one or more years. The question here is, with a much larger and wide-ranging database of material, can this figure be quantified and improved?

6.1 SELECTION OF DATASETS

To begin with, only the 3313 British samples from the database were studied for variation in felling dates. All of those samples with felling dates which are either estimated or associated were excluded, leaving only those which have been absolutely dated. Next, only phases or sites with two or more dendrochronologically-dated samples were selected. Finally, all archaeological sites where phasing might be confused or protracted were excluded, as well as the samples taken from living trees. This left a sample population of 1,760 samples from 389 sites and including 492 individual phases of construction.

Principal fields used in the analysis include the actual last ring date, latest actual ring date for the phase or group of associated timbers, and the location, type, and status of the building. Where samples were felled in the spring or summer, these incomplete annual rings were not measured. However, the actual felling date was entered in the database as the actual year of felling, not the last measured ring date. Hence, timbers with a last full measured ring date 1600, but were felled in the spring or summer of the following year, the date of 1601 would be entered in the database. Samples felled in the winter of 1600/01 would be entered as 1600.

Some of the data, particularly that from Nottingham University, did not differentiate between spring, summer, or winter felled, instead the ring was simply noted as complete. For the purposes of this analysis, these were taken as having been winter felled, unless noted differently in the archive report.

6.2 ANALYSIS OF FELLING DATE VARIATION

6.2.1 Preliminary analysis

First, all 1760 samples were analysed together. Of these, 1168 or 66.4% of the samples were found to have been felled within one calendar year of each other. This left 33.6% of the samples which were felled one or more years earlier than the latest year of felling, with 339 samples (19.3%) being felled one year apart, 107 samples (6.1%) felled two years apart, 50 samples (2.8%) felled three years

apart, and 23 samples (1.3%) felled four years apart. A further 50 samples were felled between five and ten years apart, with a small number of outliers with as many as 81, 84, and 161 years apart (**Table 6.1**).

Looking at the data in terms of phase rather than individual samples, 272 out of 492 phases studied, or 55.3%, had some evidence of stock-piling. This contrasts somewhat with earlier findings whereas 46% of the sites dated up to 1997 were felled one or more year apart (Miles 1997). This was based on a sample base of 188 phases, many of which were lower status vernacular buildings, whereas many of the phases included in the present study included higher-status buildings including cathedrals, which has undoubtedly skewed the results. Also, the previous study had predicted that with more samples, the percentage of sites exhibiting signs of stock-piling would increase.

The 55.3% of the phases showing evidence of stock-piling compared with the significantly lower 33.6% for individual samples is due to the samples with higher variation within phases being distributed over many phases and not grouped together as shown in **Table 6.1**.

All Periods	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*15*	*17*	*18*	*23*	*25*	*31*	*81*	*84*	*161*
Phases:	**492**	220	139	51	27	11	8	7	3	6	5	1	2	5	2	1	2	1	1			
		44.7	28.3	10.4	5.5	2.2	1.6	1.4	0.6	1.2	1.0	0.2	0.4	1.0	0.4	0.2	0.4	0.2	0.2			
% of dates of N or more variation:		**55.3**	27.0	16.7	11.2																	
Samples:	**1760**	1168	339	107	50	23	19	8	7	8	6	2	2	7	2	5	2	1	1	1	1	1
		66.4	19.3	6.1	2.8	1.3	1.1	0.5	0.4	0.5	0.3	0.1	0.1	0.4	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1
% of dates of N or more variation:		**33.6**	14.4	8.3	5.5																	

Table 6.1: Distribution of 492 phases and 1760 samples over years variation showing years variation in felling dates within phases

Because of the stock-piling effect evident in the larger groups of samples within the same phase, there is a risk of a date range being produced which is in fact too early when working with groups of two or three samples.

6.2.2 Chronological variation

The chronological date distribution of the material ranged from seven samples from 'Seahenge' at Holme-next-to-Sea, Norfolk, dating to 2048BC to three samples from the AD1824 rebuilding of the Old Library roof at Magdalen College, Oxford. The data were divided into periods, the earliest being pre-historic (2048BC to 148BC), Roman, Saxon and early medieval (AD609 to 1191), and then into centuries ranging from the thirteenth to the nineteenth. **Figure 5.5** shows the distribution of the data chronologically.

Very few prehistoric examples were found in the study: only three phases totalling 23 samples. The Roman period is less well represented with only two sites encompassing 21 samples. The medieval period is better represented, with I16 phases with 387 samples from the fifteenth century, and 137 phases including 461 samples from the sixteenth century.

Analysis was first carried out on the individual sample data divided into these chronological periods to see if there were any discernible trends in variation in felling dates over time. Comparative

results between these ten periods, together with their distribution are shown in **Figure 6.2**. Although sample depth in the earlier and later periods is much reduced, they nevertheless show less variation in felling dates than in the medieval period. The thirteenth century has produced the highest percentage of felling dates more than one year different: 57.5%, reducing to 42.6%, 37.5%, and 27.8% for the fourteenth, fifteenth, and sixteenth centuries respectively.

The maximum variation in years within each phase were then compared with the individual samples, again over the same ten chronological periods. As was noted in the overall distribution of phases and samples, the percentage showing evidence of stock-piling was generally higher, due to the distribution of samples within phases. The two major exceptions to this were the Roman and Saxon/Norman periods where both showed a much lower percentage of phases compared to individual samples (**Figure 6.2**). This effect is due primarily to the most of the timbers being felled in one year, with the exception of the Nendrum Tidal Mill in Ireland where a large group of timbers were felled over a three-year period.

6.2.3 Geographical variation

The data were then sorted by location. Each site was assessed to determine if it was situated in a rural or urban situation. The definition between these two categories is somewhat subjective, and basically the determining factor for a site being in an urban context was if the village was an old established settlement with a church and more than 50 houses grouped together at the time the building or phase was constructed. This divided the data into 1117 rural situations and 647 urban locations. It was found that rural buildings were less likely to have as much variation in felling dates as their urban neighbours, with 30.5% being felled more than one year earlier, compared with 38.9% for urban sites (**Figure 6.3**).

The same trend was found in analysing phases, with 52.8% of the phases from rural buildings showing evidence for stock-piling compared with 60.8% of the urban phases.

6.2.4 Typological variation

The type of building was then used to sort the data. The five categories are described more fully in the Glossary: commercial (15 samples), agricultural (174 samples), domestic (1220 samples), public (171 samples), and church (176 samples). Significant variation in the percentage of felling dates were noted between these categories, with the lowest variation being found in commercial buildings, with only 6.7% being felled more than one year apart, although the sample depth was very low, and included only four buildings. The highest was found in church buildings where 46.1% were found to exceed more than one year felling (**Table 6.4**).

2048 - 148 BC	*N:*	*0*	*1*	*2*	*Years variation*
Phases:	3	2		1	
		66.7		33.3	
% of dates of N or more variation:		**33.3**		33.3	
Samples:	23	17		6	
		73.9		26.1	
% of dates of N or more variation:		**26.1**		26.1	

AD 293 – 294	*N:*	*0*	*1*	*Years variation*
Phases:	2	1	1	
		50.0	50.0	
% of dates of N or more variation:		**50.0**		
Samples:	21	9	12	
		42.9	57.1	
% of dates of N or more variation:		**57.1**		

AD 609 – 1191	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*Years variation*
Phases:	12	10			1			1	
		83.3	0.0	0.0	8.3	0.0	0.0	8.3	
% of dates of N or more variation:		**16.7**	16.7	16.7	8.3				
Samples:	47	31	6	6	2		1	1	
		66.0	12.8	12.8	4.3	0.0	2.1	2.1	
% of dates of N or more variation:		**34.0**	21.3	8.5	4.3				

1202 – 1291	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*Years variation*
Phases:	19	4	7	2	2			1	1		2	
		21.1	36.8	10.5	10.5	0.0	0.0	5.3	5.3		10.5	
% of dates of N or more variation:		**78.9**	42.1	31.6	21.1							
Samples:	73	31	21	7	4	1	4	1	2		2	
		42.5	28.8	9.6	5.5	1.4	5.5	1.4	2.7		2.7	
% of dates of N or more variation:		**57.5**	28.8	19.2	13.7							

1300 – 1397	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*15*	*17*	*23*
Phases:	48	19	10	5	3	1	2			1		1	2	1	2	1
		39.6	20.8	10.4	6.3	2.1	4.2	0.0	0.0	2.1	0.0	2.1	4.2	2.1	4.2	2.1
% of dates of N or more variation:		**60.4**	39.6	29.2	22.9											
Samples:	162	93	32	7	8	3	4		3	3	1	2	2	1	2	1
		57.4	19.8	4.3	4.9	1.9	2.5	0.0	1.9	1.9	0.6	1.2	1.2	0.6	1.2	0.6
% of dates of N or more variation:		**42.6**	22.8	18.5	13.6											

1400 – 1499	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*Years variation*
Phases:	116	50	34	17	8	1	1	2		2	1	
		43.1	29.3	14.7	6.9	0.9	0.9	1.7	0.0	1.7	0.9	
% of dates of N or more variation:		**56.9**	27.6	12.9	6.0							
Samples:	387	242	94	30	10	1	4	3		2	1	
		62.5	24.3	7.8	2.6	0.3	1.0	0.8	0.0	0.5	0.3	
% of dates of N or more variation:		**37.5**	13.2	5.4	2.8							

Table 6.2 (Part 1): Distribution of phases and samples over chronological periods showing years variation in felling dates within phases

1500 – 1598	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*15*	*18*	*31*	
Phases:	137	64	39	13	7	5	3		1	1	1		1	1	1	
		46.7	28.5	9.5	5.1	3.6	2.2	0.0	0.7	0.7	0.7	0.0	0.7	0.7	0.7	
% of dates of N or more variation:		**53.3**	24.8	15.3	10.2											
Samples:	461	333	73	21	11	13	3		1	1	1		1	1	1	1
		72.2	15.8	4.6	2.4	2.8	0.7	0.0	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.2
% of dates of N or more variation:		**27.8**	11.9	7.4	5.0											

1601 – 1698	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*15*	*Years variation*		
Phases:	95	44	30	10	3	3	1	1		2			1			
		46.3	31.6	10.5	3.2	3.2	1.1	1.1	0.0	2.1	0.0	0.0	1.1			
% of dates of N or more variation:		**53.7**	22.1	11.6	8.4											
Samples:	369	259	68	23	9	3	1	1		2			1	1	1	
		70.2	18.4	6.2	2.4	0.8	0.3	0.3	0.0	0.5	0.0	0.0	0.3	0.3	0.3	
% of dates of N or more variation:		**29.8**	11.4	5.1	2.7											

1703 – 1796	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*15*	*18*	*23*	*25*
Phases:	48	20	14	2	3	1		2	1				2		1	1
		41.7	29.2	4.2	6.3	2.1	0.0	4.2	2.1	0.0	0.0	0.0	4.2	0.0	2.1	2.1
% of dates of N or more variation:		**58.3**	29.2	25.0	18.8											
Samples:	178	123	29	4	6	1	1	2	1		1		4	4	1	1
		69.1	16.3	2.2	3.4	0.6	0.6	1.1	0.6	0.0	0.6	0.0	2.2	2.2	0.6	0.6
% of dates of N or more variation:		**30.9**	14.6	12.4	9.0											

1801 – 1824	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*Years variation*
Phases:	12	6	4	1			1	
		50.0	33.3	8.3	0.0	0.0	8.3	
% of dates of N or more variation:		**50.0**	16.7	8.3	8.3			
Samples:	39	30	4	3		1	1	
		76.9	10.3	7.7	0.0	2.6	2.6	
% of dates of N or more variation:		**23.1**	12.8	5.1	5.1			

Table 6.2 (Part 2): Distribution of phases and samples over chronological periods showing years variation in felling dates within phases

Here the study of variation of samples within phases compared to individual samples showed that 25% of the commercial building (of only four phases of building) showed evidence for stock-piling, whilst church buildings showed 67.3% of the phases demonstrated stock-piling.

The documentary evidence for the phenomena of extended church building is further explored in *Section 7.1.5*. It should be remembered that ecclesiastical buildings were excessively costly due to the correspondingly high quality of the decoration. But unlike Royal building projects where substantial funds could often be made available for individual buildings, the Church had to rely on more drawn-out sources of income resulting in more protracted building periods.

PHASES SORTED BY LOCATION:																
Rural Locations:	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*15*	*18*	*23*	*25*	*31*
Phases:	338	160	96	37	16	6	6	4	2	2	3	3	1	1	1	1
		47.3	28.4	10.9	4.7	1.8	1.8	1.2	0.6	0.6	0.9	0.9	0.3	0.3	0.3	0.3
% of dates of N or more variation:		**52.7**	24.3	13.3	8.6											
Samples:	1168	805	212	76	26	13	12	4	2	2	3	5	5	1	1	1
		68.9	18.2	6.5	2.2	1.1	1.0	0.3	0.2	0.2	0.3	0.4	0.4	0.1	0.1	0.1
% of dates of N or more variation:		**31.1**	12.9	6.4	4.2											
Urban Locations:	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*15*	*17*	*23*
Phases:	154	60	43	14	11	5	2	3	1	4	2	1	2	2	2	1
		39.0	27.9	9.1	7.1	3.2	1.3	1.9	0.6	2.6	1.3	0.6	1.3	1.3	1.3	0.6
% of dates of N or more variation:		**61.0**	33.1	24.0	16.9											
Samples:	588	362	127	31	24	10	7	4	5	6	3	2	2	2	2	1
		61.6	21.6	5.3	4.1	1.7	1.2	0.7	0.9	1.0	0.5	0.3	0.3	0.3	0.3	0.2
% of dates of N or more variation:		**38.4**	16.8	11.6	7.5											

Table 6.3: Distribution of phases and samples between rural and urban situations showing years variation in felling dates within phases

6.2.5 Variation in status

Finally, the data were sorted by the status of the building, as defined in *Section 4.5*. These are low, middle, high, and Royal. This sort of classification is unavoidably subjective as many of the buildings have lost their original identity, builders, and owners, which would confer a certain status even though the buildings themselves are more vernacular in style. Nevertheless they give some idea of whether there are any significant differences in the variation of felling dates in relation to building status.

There was a sufficient sample base in most of the categories, with 551 samples for low, 555 samples for middle, and 613 for high status buildings. However, the Royal category had only 37 samples from 3 Royal buildings: a Royal hunting lodge at Odiham in Hampshire, a couple of phases of work at Windsor Castle, and seven phases from the Tower of London. The data showed a range of 31% of the low status buildings using timbers felled over one year, 31.7% of the middle status buildings, to 37.2% and 37.8% for high and Royal status buildings respectively (**Table 6.5**).

Again, the distribution of variation of samples within phases mirrored the trend set by the individual samples. All of the types of building status showed that at least half had evidence for stock-piling for low and middle class buildings, rising to 63.5% for high status buildings and 72.7% for Royal buildings.

PHASES SORTED BY TYPE:																		
Commercial:	*N:*	*0*	*1*	*Years variation*														
Phases:	4	3	1															
		75.0	25.0															
% of dates of N or more variation:		**25.0**																
Samples:	15	14	1															
		93.3	6.7															
% of dates of N or more variation:		**6.7**																
Agricultural:	*N:*	*0*	*1*	*2*	*3*	*Years variation*												
Phases:	46	25	17	3	1													
		54.3	37.0	6.5	2.2													
% of dates of N or more variation:		**45.7**	8.7	2.2														
Samples:	174	129	38	4	3													
		74.1	21.8	2.3	1.7													
% of dates of N or more variation:		**25.9**	4.0	1.7														
Domestic:	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*15*	*18*	*23*	*25*	*31*	
Phases:	357	162	96	40	16	9	8	5	2	6	5	1	3	1	1	1	1	
		45.4	26.9	11.2	4.5	2.5	2.2	1.4	0.6	1.7	1.4	0.3	0.8	0.3	0.3	0.3	0.3	
% of dates of N or more variation:		**54.6**	27.7	16.5	12.0													
Samples:	1220	826	220	77	29	18	16	6	2	7	5	1	5	5	1	1	1	
		67.7	18.0	6.3	2.4	1.5	1.3	0.5	0.2	0.6	0.4	0.1	0.4	0.4	0.1	0.1	0.1	
% of dates of N or more variation:		**32.3**	14.3	8.0	5.6													
Public:	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*17*	*Years variation*								
Phases:	36	14	11	5	3	1	1	1	1									
		38.9	30.6	13.9	8.3	2.8	2.8	2.8	7.1									
% of dates of N or more variation:		**61.1**	30.6	16.7	8.3													
Samples:	171	103	40	19	5	1	1	1	1									
		60.2	23.4	11.1	2.9	0.6	0.6	0.6	1.0									
% of dates of N or more variation:		**39.8**	16.4	5.3	2.3													
Church:	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*7*	*12*	*15*	*17*	*23*	*Years variation*					
Phases:	49	16	14	3	7	1	1	1	2	2	1	1						
		32.7	28.6	6.1	14.3	2.0	2.0	2.0	4.1	4.1	2.0	2.0						
% of dates of N or more variation:		**67.3**	38.8	32.7	18.4													
Samples:	176	95	40	7	13	4	2	5	1	1	1	2						
		54.0	22.7	4.0	7.4	2.3	1.1	2.8	0.6	0.6	0.6	1.1						
% of dates of N or more variation:		**46.0**	23.3	19.3	11.9													

Table 6.4: Distribution of phases and samples between building types showing years variation in felling dates within phases

6.3 VARIATION IN FELLING SEASONS

The average age of the oak used in a medieval building is between 25 and 100 years, and the general rule was to use as small a tree as possible to get out the structural member required. Often the tree will be just a little too small in diameter, resulting in the waney or bark edges being left in some corners, much to the delight of both dendrochronologists and building historians. Usually, some 300 trees would be required to construct a typical timber-framed farmhouse (Rackham 1976, 74-5). It is

unusual for large, slow-grown oaks to be used for smaller members, as conversion through sawing was required. Following the Dissolution of the monasteries, larger, slow-grown oaks are often found due to the Abbey woodlands being sold off for their timber value. Often these larger trees would be cut up into shorter members like joists or studs, or into boards.

During both the medieval and post-medieval period, timber was felled as and when it was required (Rackham 1976, 76). Woodlands during this period were often intensively managed, with trees selectively felled, allowing adjacent trees to remain. It was not until the eighteenth century that woodlands were clear felled and replanted as a plantation.

Tradition has it that the medieval woodcutter almost always felled oak during the winter months, before the sap has risen, on the belief that the timber would season faster (Charles 1984, 46). It was possible to explore this historical assumption through the study of the data collected.

PHASES SORTED BY STATUS:													
Low:	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*8*	*9*	*15*	*18*	*Years variation*
Phases:	163	82	43	14	9	4	3	2	1	3	1	1	
		50.3	26.4	8.6	5.5	2.5	1.8	1.2	0.6	1.8	0.6	0.6	
% of dates of N or more variation:		**49.7**	23.3	14.7	9.2								
Samples:	551	380	108	35	10	4	6	2	1	3	1	1	
		69.0	19.6	6.4	1.8	0.7	1.1	0.4	0.2	0.5	0.2	0.2	
% of dates of N or more variation:		**31.0**	11.4	5.1	3.3								
Middle:	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*8*	*9*	*15*	*Years variation*	
Phases:	171	81	46	19	8	5	2	2	5	1	1		
		47.4	26.9	11.1	4.7	2.9	1.2	1.2	2.9	0.6	0.6		
% of dates of N or more variation:		**52.6**	25.7	14.6	9.9								
Samples:	555	379	108	35	15	6	2	3	5	1	1		
		68.3	19.5	6.3	2.7	1.1	0.4	0.5	0.9	0.2	0.2		
% of dates of N or more variation:		**31.7**	12.3	5.9	3.2								
High:	*N:*	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*9*	*10*	*12*	*15*	*17*	18	23	25	31
Phases:	148	54	45	17	10	1	3	3	3	1	1	2	3	1	1	1	1	1
		36.5	30.4	11.5	6.8	0.7	2.0	2.0	2.0	0.7	0.7	1.4	2.0	0.7	1.9	2.2	5.9	10.0
% of dates of N or more variation:		**63.5**	33.1	21.6	14.9													
Samples:	613	385	112	36	25	12	11	3	7	2	2	2	5	1	4	2	1	1
		62.8	18.3	5.9	4.1	2.0	1.8	0.5	1.1	0.3	0.3	0.3	0.8	0.2	1.0	1.8	2.8	4.0
% of dates of N or more variation:		**37.2**	18.9	13.1	9.0													
Royal:	*N:*	*0*	*1*	*2*	*4*	*17*	*Years variation*											
Phases:	11	3	5	1	1	1												
		27.3	45.5	9.1	9.1	9.1												
% of dates of N or more variation:		**72.7**	27.3	18.2	9.1													
Samples:	37	23	11	1	1	1												
		62.2	29.7	2.7	2.7	2.7												
% of dates of N or more variation:		**37.8**	8.1	5.4	2.7													

Table 6.5: Distribution of phases and samples between building status showing years variation in felling dates within phases

One early reference dating to 1355/6 discussed below in *Section 6.4.3* refers to timbers being felled during the winter so that they could have the chance to dry during the summer months ready for the framing to start the following winter (Salzman 1967, 239).

Evelyn (1670, 163) states that trees were not usually felled '*....til about the end of April (at which season the bark* (sap) *does commonly rise freely) though the opinions and practice of men have been very different: Vitruvius is for an Autumnal fall; others advise December and January...Cato was of opinion trees should have first bourn their fruit, or at least, not till full ripe, which agrees with that of the Architect*'. He advocates felling in mid-winter as the oak neither '*..casts, rifts, not twines; because of the cold of the Winter does both dry, and consolidate; whiles in spring, and when pregnant, so much of the virtue goes into the leaves and branches...But the custom is, men have now time to fell their Woods, even from Mid-winter to the spring; but never any after the Summer Solstice.*'

Evelyn then goes into great detail on the position of the moon and direction of the wind, but concludes that '*...yet 'tis affirm'd upon unquestionable experience, that Timber cut at any season of the year, in the Old Moon, or last Quarter, when the Wind blows Westerly; proves as sound, and good as at any other period whatsoever; nay, all the whole summer long, as in any month of the year; which for that it may be of great use on some publike emergencies...*'

Neve (1726, 259) basically repeats Evelyn verbatim, and agrees that the felling of trees in the spring for the bark is detrimental to good seasoning and hopes that some replacement material for tanning might be found. Selby (1842, 280) states that in order to for the valuable bark in oak to be obtained, the tree must be felled in the spring when the sap is sufficiently up to allow easy debarking. He also considers the felling of trees in the spring to be of equal lasting quality as those felled in other seasons.

Cutting during the spring would help to maximise the profits during a time when nothing was wasted (Harvey 1975, 115). Forbes (1904, 184) confirms that the value of bark in the mid-nineteenth century was three to four times higher than at the beginning of the twentieth century due to the introduction of foreign tannin, barks, and chemicals. This has had the result that most Estate owners now prefer to cut their oak in the winter, to avoid damage to the underwood which would result from spring felling. By the middle of the twentieth century, Edlin (1949, 88) states that felling timber in the winter has little advantage over that felled in the summer months.

There were other practical reasons why trees would be felled during the winter. First, the absence of leaves from the surrounding underwood made it easier to work around the trees (Grenville 1997, 27), and second, the winter ground conditions might sometimes make it easier to pull out logs from the forest.

Looking at the data collected, some 2646 historic samples had the precise season of felling identified. The most common season of felling was found to be of the winter, with 46.3% being felled sometime between about October when the leaves fall, to about March the following year when the buds start to 'break' (open out). The next most common season for felling was found to be the spring, with 35.8% being felled during the months of March to May approximately. The least common season was

found to be summer, or summer/autumn, where only 17.8% were found to have been felled between June and October (Baillie 1982, 47).

However, the summer felling category is very subjective, and should be treated with some caution. Generally, some of the summer or late wood is formed, showing that the tree has developed beyond the formation of the spring band or early wood. However, it can often be very difficult to distinguish the small band of dense cells formed at the end of the growing season. What might have been recorded as summer growth may in fact be a small band of late wood indicating a poor growing season, and is therefore actually winter felled. Hence, unless there is only a very small amount of late wood present beyond the spring vessels which would indicate early to mid summer felling, summer bands could just as well have been felled in the autumn if not the early winter **(Figure 1.1)**

This relationship between felling seasons seems to be relatively consistent over time, with two significant exceptions **(Table 6.6)**. First, the first millennium AD shows that more trees were felled in the spring rather than the winter, with 66.5% for the Saxon and Norman period. During the Roman period, no trees were recorded as having been felled during the summer months. The second significant variation is during the first part of the nineteenth century, when almost 75% of the trees were felled in the winter, with only 5.7% having been felled during the summer. This undoubtedly relates to the greater understanding of woodland management and the understanding that the sap was down during the winter, making the timber easier to season. It is interesting to note that the majority of the trees felled in the spring were during the Roman, Saxon, and Norman periods.

Some 1806 samples had both seasons and status of buildings recorded. These were divided between low, middle, high, and Royal status. The distribution was basically the same as that for the chronological distribution. However, there was a slightly higher proportion of middle status building timbers being felled in the winter **(Table 6.7)**.

Samples:	*N:*	*Spring*	*%*	*Summer*	*%*	*Winter*	*%*
Prehistoric	137	42	30.7	49	35.8	46	33.6
Roman	50	26	52.0	0	0.0	24	48.0
AD 544-1193	212	141	66.5	13	6.1	58	27.4
1200-1293	98	38	38.8	17	17.3	43	43.9
1300-1397	217	79	36.4	38	17.5	100	46.1
1400-1499	586	197	33.6	117	20.0	272	46.4
1500-1599	613	197	32.1	120	19.6	296	48.3
1600-1698	533	164	30.8	92	17.3	277	52.0
1700-1796	165	57	34.5	24	14.5	84	50.9
1800-1839	35	7	20.0	2	5.7	26	74.3
Total samples:	**2646**	**948**	35.8	**472**	17.8	**1226**	46.3

Table 6.6: Distribution of felling seasons over chronological periods

Samples:	*N:*	*Spring*	*%*	*Summer*	*%*	*Winter*	*%*
Low	539	193	35.8	124	23	222	41.2
Middle	730	207	28.4	126	17.3	397	54.4
High	498	166	33.3	92	18.5	240	48.2
Royal	39	15	38.5	4	10.3	20	51.3
Total samples:	**1806**	**581**	32.2	**346**	19.2	**879**	48.7

Table 6.7: Distribution of felling seasons over status of buildings

To summarise, this evidence demonstrates that a substantial number of trees, almost a half, were felled in the winter, whilst about a third were felled in the spring, when the sap was either up or rising, especially during the medieval and post-medieval periods. This modifies the generally perceived theory that medieval woodsman always felled the trees during the winter months, and demonstrates the considerable effect of the tanning industry on the timber trade in Britain.

6.4 OTHER EVIDENCE

6.4.1 Documentary evidence for stock-piling

The evidence presented in *Section 6.2* for stock-piling has been unequivocal, with over half of the 492 phases of construction studied having at least one timber felled one or more years apart. Over a third of the 1760 individual timbers used in these 492 phases had been stock-piled. However, what documentary evidence is there which might explain in what circumstances timber would be retained?

Timber has always been considered a valuable commodity and not wasted. Any building project, either historically or during the late twentieth-century timber-framing revival, will inevitably result in a number of timbers left over on completion of any given frame. These may, if supplied initially by the owner of the building or the manor commissioning the work, be left on site. However, if the carpenter supplied the timber as part of his contract, then he would as a matter of course remove this from site and store it either at the framing ground or in his store for use in future projects. Generally, it would comprise the smaller, minor elements such as studs, joists, or rafters.

There are a number of references to Oxford carpenters supplying timber, as opposed to the owner or institution commissioning the building. At Lincoln College, at least two carpenters '*sold wood*' in 1477/8 and 1503 (Gee 1954, 149), while at Magdalen College carpenter Dionisius Lynche was paid for studs in 1498/9, whilst sawyer John Mery sold timber in 1506/7. When carpenter and mason John Fustyng died in 1508, he possessed '*tymbur unwrought and wrought*' which belonged to Godstow Abbey (Gee 1954, 155-6). At New College, it was clear that both joiners and carpenters supplied boards for fittings. In 1483-5 Peter Joyner supplied five planks for a house at Hayford, John London was paid 13*s.* in 1494 for timber bought at Deddington, and in 1496-1501 carpenter Thurlby supplied planks for various works (Gee 1954, 166). At Oriel College the carpenter Thomas Jenkyns was roofing a shop and was paid 3*s.* 4*d.* for a beam in 1514/15 (Gee 1954, 168). Whilst it is usual for such institutions as these to provide timber from their extensive estates, most of the examples illustrated above are for smaller projects, much of which needed to be seasoned. All of these examples suggest that carpenters

and joiners had their own stock, probably limited in size, of timber and boards which were probably partly or wholly seasoned.

Another source of documentary evidence for the carpenters or house builders owning some stock of timber is through the study of probate inventories. By perusing half a dozen good regional collections of inventories, taking into account the general lack of useful indexing, it would appear that few carpenters retained any appreciable timber, although this conclusion varied between researchers. One reason for this is probably due to the fact that the many carpenters were journeymen or itinerant workmen who would travel around the country employed on a number of varying projects where it would be impossible to have any sort of stock. Another problem with probate inventories is that by their very nature tended to relate to people at the end of their working careers when they might have disposed of their stock, but may have retained their own personal tools. Finally, carpenters, compared to other artisans, tended to be poor (Swanson, 1989, 84).

There are many inventories for people of varying occupations which make mention of wood and timber, generally of small to middling value. There is no reason to doubt that anyone might not have a few boards, or a pile of timber, in their possession. However, it is the use of stock-piled timber by carpenters in the course of their work that is of interest, therefore only these probate inventories have been included.

This raises the question of whether the meaning of the terms 'timber' and 'wood' have been correctly understood. This variety in terminology is demonstrated in the inventory of John Cadeby of Beverly from *circa* 1440. Although a mason rather than a carpenter, he had in his '*outer garden, all manner of wood, in faggots, trunks, and timber, and all his wood £6*' (Raine 1864, 99). Undoubtedly the best criteria for distinguishing a pile of firewood from a stock of joists or boards are through the value. For example, the inventory of farmer Thomas Drake of Chadlington, Oxon, taken on the 8th of November 1580, lists '*tymber and wood & bordes - £6 13s 4d*' (Havinden 1965, 122 [inv 77]). This value was equivalent to four plow bullocks, or almost the same value of all his household goods, and therefore hardly likely to be firewood. Care must also be taken not to confuse 'planks' or 'boards' with household furnishings such as tables.

Sometimes even small quantities of timber or wood can be interpreted to be stock if read in context of adjoining entries. The inventory of William Comber of Yetminster, 1592, showed '*all his Carpenters towles 11s. 8d; a lode of wood 6s. 8d.* (Machin 1976). In Lichfield, Thomas Harvie had in 1647 '*His tooles 5s; In timber £4. 10s*' (Vaisey 1969, 76-7 [inv 28]).

In Banbury, Oxfordshire, there are several references to small quantities of boards and timbers. In 1618, John Tredwell had '*certain bordes & transomes 13s.4d*' while in 1632 '*bords & tymber 5s*', were recorded, and in 1635 '*parcell of bords; parcell of tymber £1. 6s. 8d*' were noted (Brinkworth and Gibson 1976 and 1985 [invs.194, 328, and 371]).

Such small amounts of wood are not uncommon. In Essex, we have carpenter Laurance of Roxwell who died in 1688, and whose possessions included '*the tooles in the shope, £4. 18s. 3d*', and '*The wood in the yard, £1. 15s*' (Steer 1969, 191 [inv 150]). This equated to about 7% of his estate.

Boards are a common item of listed in inventories. In 1700, Samuel Holder had in his barn two stocks of boards valued at 15s., a very small percentage of his £162 estate. In Dawley, Shropshire, John Duddell had listed in his 1728 probate inventory '*His shop of tools £6; A small parcel of boards 10s*' (Trinder and Cox 1980 [inv 24]). In 1673/4 Edmund Smith of Alrewas, Staffs, had a '*parcell of boards and his workeinge tooles £3.0. 4d'* (Masters unpubl, inv 156).

However, boards usually relate to joinery, as the inventory of the Lichfield joiner Thomas Baggaley from 1666. Here he had '*In the yard: Timber sold to Edmond Alport, and shopp tooles £9. 3s; More timber remaining in the yard unsold £1. 10s; Other loggs of wood lieing in the street and one planke 4s.*' (Vaisey 1969, 153-4 [inv 80]). In 1687, the joiner George Plymer of Alrewas, Staffs had '*Timber of all sortes for the use of a Joyners trade £5; All other sortes of timber for other uses £1*' (Masters unpubl, inv 136). More substantial were the stocks of Edward Wittingham of Bewdley who, in 1750, had in the yard '*Inch oak boards £6 16s; Oak Boards Quarter Inch 16s; Ditto – half Inch £1 1s; Ceiling Boards £12s*' and in the Storehouse Chamber *'Half Inch Oake Dale and Walnutt Plank £2 2s*' (Hereford Record Office PV 229). Numerous other joiners' inventories list substantial quantities of boards (Trinder *pers comm*).

More useful are larger quantities of timber which must relate to carpenters who have died whilst still in their working life. In 1712, carpenter Michael Short of Iron Acton, Gloucestershire, died, leaving '*in the shop his working tools, working benches and other lumber £2; In Timber, boards and four wheels £5, in laths 10s*' (Moore 1976, 213 [inv 288]). His widow still had his tools and £4 worth of timber and boards etc. almost four years later (Moore 1976, 223 [inv 305]). While the value of this timber represented only a small proportion of Michael Short's £106 estate, the timber of William Linch of Hambrook, Winterbourne, made up a much more substantial two-fifths of his estate in 1693/4. Here he had timber valued at £10, and tools 10s., strongly suggesting that he was actively engaged in some sort of building work (Moore 1976, 150 [inv 195]). Interestingly, in 1729, Cheltenham carpenter William Ballinger left exactly the same value of '*stock of timber and working tools £10 10s*', which in his case represented over half of his total estate (Sale 1999, 168 [inv 449]).

In Alrewas, Staffs, John Yeld's inventory of 1691/2 showed '*In timber about the house Sawen and unsawen vallued and praised att £10; hurdles and an other parcell of Timber praised att £2*' (Masters unpubl, inv 180). Given that his carpenter's tools were valued at only £1, his timber stock was a significant part of his £73 estate.

Another example of a working carpenter is the interesting 1582 inventory of John Turbett of Bloxham, Oxon, which lists in '*The other places....his tooles at home £1; his tooles at Roosome* (Rousham) *and heiforde* (Heyford) *£1; The flower and timber over ye entrie the midle doore and tymber at ye streete doore £1. 10s; Timber in the yarde £3. 10s*' (Havinden 1965, 139-40 [inv 95]). This is significant, in that the total of his possessions came to just over £30, with timber comprising about 15% of his estate. The reference to timber at the street door probably relates to the practice of storing timber outside the house on the street in urban areas, probably for convenience in loading and

loading into carts. Following the 1478 'Great Fire' of Shipton-on-Stour, the keeping of '*heaps of timber in the streets*' was banned (Dyer 1992, 184).

Sometimes carpenters might store timber on land not necessarily belonging to him. In Gloucestershire, Joshua Bennett of Frampton Cotterell had, in 1734 had '*In the shop Tools and Blocks and Timber in the Common £6. 12s. 6d*' (Moore 1976, 255 [inv 372]).

6.4.2 Dendrochronological evidence for stock-piling

Generally timber would be supplied by the owner of the building under construction, who would retain any left-over stock. An excellent example of this practice being identified through dendrochronology is at Court Farm, Overton, Hampshire where both a barn and house were dated. The barn is at present a truncated structure of six bays; it may have originally contained nine bays with two wagon entrances. Overton Manor belonged to the Bishop of Winchester, and his accounts show that timber was being brought to the site in 1496-97, and that the barn was built in 1497-98. This is confirmed by an arcade post which was found to have been felled in the summer of 1496.

The farmhouse comprises two blocks forming a T-shaped plan. One block seems to have contained three bays and may have conformed to a standard service-hall-parlour plan. The other block (to the south of the first) is of four bays; each floor probably contained one or two large rooms. The bishopric accounts show that timber was felled in 1505-6 and the house built in 1506-7, which was confirmed through the dendrochronology with six timbers being felled in the spring of 1505. However, one floor joist was dated to spring 1496. It is most likely that this joist was a leftover from the previous building campaign for the barn. As the building timber was supplied by the Bishop, the leftover timber presumably was stored on site, and then utilised when the house was reconstructed a decade later (Miles and Haddon-Reece 1994).

An example of possible stock-piling is at Sker House, Porthcawl, Glamorgan. Here a group of rafters and collars from the hall roof produced two precise felling dates of winter 1623/4, and three others with a heartwood/sapwood boundary date of 1595 giving felling date ranges consistent with the 1623/4 felling dates. However, a second group of three samples did not retain any evidence of heartwood/sapwood boundaries, but the clustering of last measured heartwood ring dates of 1547, 1549, and 1553 suggests that these might have originated from a different felling period to those in the first group of timbers. Dendrochronology showed that these timbers probably originated from a different woodland source, as the match between the two groups was found to have a *t*-value of only 2.7.

Despite the lack of precise felling dates for the second group of timbers, or even a felling date range, a strong case for stock-piling can be made. One of the rafters had a face that was very heavily weathered, however, the end of the collar to which it was jointed was entirely *unweathered*. Thus, the rafter must have been exposed to the elements *before* having been framed into the present roof structure, probably by at least ten years. However, as none of the weathered timbers exhibited any evidence for

having been re-used, stock-piling in the open seems to be the only logical explanation (Miles and Worthington 2000, 113).

Deliberate stock-piling was often carried out by large institutions where long-term building projects could be planned years in advance. At Salisbury Cathedral, the present nave roof comprises 20 trusses more or less evenly distributed along the nave, except for a narrow bay between trusses 6 and 7, numbering from the west (Miles 2005). This roof had been reconstructed in three different phases ranging from the middle of the sixteenth to the early eighteenth centuries. The carpentry of the roof is similar in respect that each truss is 42 ft wide at the base, with a clear span of over 33 ft, rising 31 ft high, with principal rafters 37 ft long but these are made up of two timbers scarfed together.

In the first of the reconstruction phases, the tiebeam to truss 17 was felled in the winter of 1533/4, some eight years earlier than a principal rafter in the same truss, and a common rafter from bay 14, these being felled in the winter of 1541/2 and spring 1542 respectively.

The second of the reconstruction phases produced eight precise felling dates. Five of these dated to the winter of 1703/4 or spring 1704, and included queen and raking struts and a wall plate. Earlier felling dates ranged from winter 1697/8 for the tiebeam of truss 8, winter 1701/2 for a lower purlin in bay 9, and spring 1702 for a raking strut in truss 9. Significantly, the earliest felling date of 1697/8 was for a tiebeam, again one of the most difficult timbers to source. Given that the latest felling date is spring 1704, and that four others were felled the previous winter, a construction period commencing in 1704 is most likely for this phase.

The third reconstruction phase produced 17 precise felling dates ranging from winter 1710/11 to the spring of 1720, and are distributed as follows:

T1	N queen strut	Summer/autumn 1719
T1	N raking strut	Summer/autumn 1719
Bay 1	N lower purlin	Winter 1719/20
Bay 1	S lower purlin	Summer/autumn 1719
T2	N queen strut	Winter 1719/20
T2	Tiebeam	Winter 1710/11
T3	Tiebeam	Spring 1715
T3	S raking strut	Winter 1719/20
T3	N raking strut	(Winter 1719/20)
T4	N lower principal rafter	Winter 1713/14
T4	S raking strut	Spring 1720
T5	S raking strut	(Spring 1720)
T5	N lower principal rafter	Winter 1713/14
Bay 5	N lower purlin	Winter 1719/20
T6	N raking strut	Summer/autumn 1719
T6	S raking strut	Summer/autumn 1719
T6	Tiebeam	?Winter 1715/16

Table 6.8: Variation in felling dates over third reconstruction phase of the nave roof at Salisbury Cathedral, showing types of building members and felling dates

As can be seen in the distribution above, the latest felling dates of 1719 and 1720 are throughout all six trusses and bays. However, as was noted in the earlier phases discussed above, the

tiebeams particularly seem to have been stock-piled, with felling dates of winter 1710/11 for truss 2, spring 1715 for truss 3, and most likely winter 1715/16 for truss 6. The outer surface of this latter timber had been slightly abraded, and whilst the sapwood was complete at the point of sampling, this could not be determined with absolute confidence on the core. Stock-piling was also noted in two of the lower principal rafters, the second largest member used in the truss construction. These were both found to have been felled during the winter of 1713/14.

It was noted that in all three major phases of reconstruction, clear evidence of stock-piling, primarily of tiebeams, occurred between five and nine years prior to the latest felling dates. Given the excessive length of these timbers, obtaining them was clearly going to be difficult, and presumably the Cathedral purchased them, or brought them in from their own woodlands, as and when they became available. It is significant that all of the tiebeams which produced precise felling dates were found to have been stock-piled. Five other tiebeams without complete sapwood were also dated – again the fact that the sapwood was in a poorer condition than the other timbers used in the construction of the roof suggest that these too may have been stock-piled in the open.

Another possible explanation for variation in felling dates is the use of old timber from windfalls. Sometimes, during exceptional gales which occur every decade or so, a certain number of trees in natural woodlands as well as plantations are blown down. Certainly during the past century, they have sometimes remained in the woods for several years or more before being recovered and used. An early reference to windfalls dating from 1615 states in part '*...that every Justice seat of the forest, the number of trees, that have beene given away by good warrant or otherwise, and also the windfals, must bee presented*' (Manwood 1615, 60 verso), and there is no reason to suppose that windfalls were not used in the medieval period as well. However, the time they were allowed to lie might have been reduced if a rigorous woodland management regime was in operation. Dendrochronology cannot easily distinguish between windfalls and stock-piled timber, although visual observation may reveal that windfalls may begin to decay before conversion.

Finally, there are records of debarking of trees for use in tanning which could account for some variation. Sometimes trees would have their bark removed whilst still standing, and it might be a year or two before the tree itself, now dead, would be felled. Selby mentions this practice in the mid-nineteenth century whereby oak '*...cut down in the full run of sap, is equally as durable as that felled in winter, or in the decline of the year, as well as of trees that have been barked and allowed to stand a year or two in that state previously to being cut down*' (Selby 1842, 280).

6.4.3 Seasoning

Historically, timber was not seasoned, but was generally used green, which made it more workable. Often, medieval buildings would have timber felled immediately before the commencement of the building programme, usually from the woodlands belonging to the owner. This is confirmed by many documentary accounts of timber being felled immediately prior to construction, as at Christ Church, Oxford, where timber was felled and carted in 1525, with part of the building being ready for occupation by the end of the following year (Munby 1992, 295). Other examples of the close relationship between felling and working can be found in *Chapter 7*.

However, some oak was seasoned, although this was not usual for structural timber frames. Seasoned oak is far more difficult to work, and was much more expensive due to the length of time required to season after converting. Timber left in the round with bark, i.e. not cut or squared up, will remain green far longer than timber which has been converted. A rule of thumb states that one year of air seasoning is required for every inch in thickness for oak after conversion (Ashurst 1988, 22). Therefore, oak six inches in thickness would require six years of natural air seasoning, a substantial investment in capital.

Nevertheless, historical evidence exists that some oak timbers were seasoned in a variety of ways. The most common method was air seasoning. John Evelyn (1670, 178) says to '*...Lay up your timber very dry, in an airy place (yet out of the Wind or sun) and not standing upright, but laying along one piece upon another, interposing some short blocks between them, to preserve them from a certain mouldinesse which they usually contract while they sweat, and which frequently produces a kind of fungus, especially if there be any sappy parts remaining*'.

Another more unusual historical method of seasoning was through immersion in running water. This was the method whereby freshly sawn oak would be submerged in running water for a period of time to flush the sap out of the pores, thus allowing it to dry out during the subsequent air seasoning much more satisfactorily. Although this method is no longer used, there are several historic references to this practice. There earliest is by Evelyn who states: '*Some there are yet, who keep their Timber as moist as they can, by submerging it in Water, where they let it imbibe to hinder the cleaving; and this is good in Fir, both for the better stripping and seasoning; yea, and not onely in Fir, but other Timber: lay therefore your Boards a Fortnight in the Water, and then setting them up-right in the Sun and Wind, so as it may freely passe through them, (especially during the heats of Summer, which is the time of finishing Buildings) turn them daily; and thus treated, even newly sawn Boards, will Floor far better than a many years dry Seasoning as they call it*' (Evelyn 1670, 178).

Richard Neve in 1726 refers to Evelyn and adds '*Others advise to lay Boards, Planks, &c. In some Pool, or Running stream for a few days, to extract the Sap from 'em, and afterwards to dry 'em in the Sun, or Air; for by so doing, (say they) they will neither chap, cast, nor cleave: (Mr. Evelin particularly commends this way of Seasoning of Fir) against shrinking there is no Remedy*' (Neve 1726, 260).

This method is still advocated in 1840 by Thomas Tredgold who, again quoting Evelyn, writes: '*on account of the time required to season timber in the natural way, various methods have been tried to effect the same purpose in a shorter time. Perhaps the best of these is to immerse the timber in water as soon as it is cut down; and after it has remained about a fortnight in water, but no more, to take it out, and dry it in an airy situation*' (Tredgold 1840). He also refers to Duhamel, who '*made many experiments on this important subject, states, that timber for the joiner's use is best put in water for some time, and afterwards dried; as it renders the timber less liable to warp and crack in drying*', but he adds, '*where strength is required it ought not to be put in water*'.

He found, from numerous experiments, the timber which had remained some time in fresh water lost more of its weight in drying than that which was dried under cover; and he observed, '*that green timber that had been steeped in water for some time was always covered with a gelatinous substance*'.

Five samples recovered from the millpond at Home Farm, Stowe Landscape Gardens, were found to have originated from the same tree and dated from about 1900. What is significant about the discovery of these planks is that they had been pit-sawn, proving that this method of conversion was still in use up to the end of the nineteenth century at Stowe, and that the use of water seasoning, or steeping, was employed. Given these historic references to the practice of water seasoning, this would suggest that the Stowe estate were converting large oaks by pit-sawing, and carefully seasoning the planks for use in better-quality work. This is especially interesting given the availability of the sawmill at Home Farm, presumably water-powered from the millpond. Apart from one of the planks which was nearly 30 mm thick, the others were thin boards about 12 mm thick, and might have been used for panels. The boards recovered from the millpond were at least 3 or 4 metres long, and presumably become lost in the silt, and therefore abandoned (Miles 2003c).

Some building contracts exist, albeit rarely, which clearly specify that the oak timber is to be seasoned. Salzman (1967) quotes nearly a dozen examples, but on close inspection it is only the internal fittings, joinery, or boards which are being seasoned, not the structural frame. As these are only one or two inches thick, a year or two seasoning would not be an unreasonable investment in relation to the labour expended on it, and their importance in the overall scheme of the building.

However, there is one interesting early reference to timbers being cut, and then left to air dry over a year found in a letter written to the Archbishop of York in January 1355/6 stating '*...all the timber as yet obtained, which it was supposed would be sufficient for quite a long time, is in the hands of the carpenters, preparing for setting up, if God will, in the near future; and unless new timber is cut during the winter season, so that it may dry off (exsiccari) during the summer, the carpenters and our other workman employed on the building of the said work will, for lack of timber, stand absolutely idle throughout the next winter season. Be so kind, therefore, as to order the delivery of suitable timber, which consists more of bent trees than of those of greater price and value which grow straight up, to be cut during this present winter-time*' (Salzman 1967, 239).

This reference suggests two things. Firstly the surface of timber is being allowed to dry during the summer months, although in practice the interior of the timbers will still be as green as when they

were felled. Secondly, the timber itself would have less moisture when felled in the winter as the sap would not be rising.

There is one building agreement which does specifically require that the structural timberwork is to be seasoned. The Radcliffe Camera, part of the Bodleian Library, was begun in 1737 to the designs of James Gibbs, which included a stone dome. Work on the lower part of the stone drum had begun, but by February 1741 work was abandoned as the span was considered too ambitious. On 22nd March 1742 an agreement was signed to complete the dome, including the leadwork, by the 25th of March 1743. This suggests a construction period of one year to frame and erect the dome, with the timberwork ready for the plumbers by the 1st of November 1742. Interestingly, the agreement specifies that the structural oak timber be '*cut Square, free from Sap, well season'd, and wrought after the best manner*', and that the circular curved purlins '*...to be also out of the best season'd Timber*' (Gillam 1958, 22-3).

This raises two very interesting points. One is that if work did not commence until the end of March 1742, and was to be completed by the end of October of the same year, this would allow only seven months to frame and erect, an impressive achievement for such a complex structure. Is it possible that some of the work had already been started a year earlier, when the stone dome was abandoned? It seems unlikely that this was the case, given that the second model had yet to be approved by the University. The second point relates to the seasoning of the timber. Allowing for the rule of thumb rate of seasoning for oak of one inch per year in thickness, and given that the thinnest scantling of the structural timber is 5 inches, and 4 inches for the curved purlins, the oak would have had to been felled no later than spring 1738, and probably five years earlier for most of the structural timbers. Six timbers sampled which produced precise felling dates included the curved principal rafters, struts, and curved purlins, and all were felled during the winter of 1740/41, i.e. between October 1740 and April 1741. Thus the timber would only have had one year to season before the agreement of March 1742 was signed, and if work actually commenced a year earlier, then the oak would have been freshly felled. In point of fact, the timber would have been felled and converted for this project, as it is highly unlikely there were any large timber-yards with rotating stock of air-seasoning timber in operation during the 18th century, especially with compass timbers. Therefore the most likely scenario is that the timber was felled specifically for the dome, possibly on spec, but certainly with no more than one year before final conversion and fabrication.

Thus most, if not all, of the historical references to oak timber being seasoned relates to boards or panels, or oak being used for internal fittings or doors, etc. Rarely would it refer to structural timbers, due primarily to practical considerations. Once the oak had seasoned, it is much more difficult to work, increasing labour costs. Furthermore, the cost of tying up capital in timber which has been set aside for four or five years at least is substantial, even if enough forward planning existed. In fact, an oak timber frame constructed out of unseasoned oak, will actually twist and deform whilst drying out, thus tensioning the frame, and tightening the joints. Although this would be detrimental for compass or radius timbers, the accounts for the Radcliffe Camera, despite specifically requiring seasoned oak, show that even here unseasoned oak was actually used.

However, one exception to the general trend has been noted. As discussed in *Chapter* 3, Shapwick House had only one roof timber which produced a precise felling date of 1489. Regrettably, all the other timbers had been recently defrassed. However, close visual inspection of the timbers showed that many of the collars had been cut to size and seasoned *before* the joints were cut. It is significant that Shapwick was a grange of Glastonbury Abbey and suggests some advance planning in their building programmes with the stock-piling of building materials (Miles 1997).

Further discussion of the length of time between felling and construction of timber-framed structures is contained in *Chapter 7.*

6.4.4 Re-used or second-hand timber

Timber being the valuable commodity that it was, was often re-used, either incorporated in a new building on the site of the old, or re-erected elsewhere in its original configuration.

Dendrochronological evidence proves that timbers are sometimes re-used, even though the physical evidence is not conclusive. Usually, disused mortises, grooves, peg holes, and other features demonstrate that a timber element within a frame has been recycled. There are many examples of timbers that were not obvious at the time of sampling as being re-used, but which following the dendrochronological analysis subsequently proved to be second-hand. Most of these examples dated from the seventeenth century when oak timber was becoming scarcer. Further examples are given in the following section.

These include some principal rafters at Old Hall Farm, All Stretton, Shropshire. Here the hall and parlour block was constructed in 1630, but a date of 1532 was obtained from one of the principal rafters (Miles and Haddon-Reece 1996, *VA* **27**, list 73). Another building in Clunbury, Shropshire had a pair of principal rafter s which were felled in 1595/6, but were erected in a building constructed in 1675 (Bridge *pers comm*).

Hillside, East Hendred, Oxfordshire, is a three-unit complex running north-south. The oldest section is the centre part and produced two felling dates - the northern pair of crucks were felled in the spring of 1553, the southern pair in the spring of 1556. The northern block is a two-storey box-framed structure of three unequal bays terminating in a gable-end jetty, the framing and carpentry suggesting a seventeenth century date. Very few suitable tree-ring samples were available due to most timbers being of elm, and most of the oak being re-used. Four of these re-used timbers were successfully dated, although none retained complete sapwood. A stud and a girt produced felling date ranges of 1497-1517 and 1538-52, whilst a window sill produced a felling date range of 1521-50. These dates probably relate to the cruck-framed building adjacent to which this range is attached (Miles and Worthington 2002, *VA* **33**, list 126).

Broomhill, Cove, Hampshire, is a large house of lobby-entry plan, with a three-bay parlour cross-wing. The plan and framing suggest a seventeenth-century date, and the tiebeam in a gable wall dating to 1658-59 is integral with the other members of the cross frame and with both wall plates.

However, an axial beam in the hall dated to 1560/61 and a transverse beam with final ring 1558 were both clearly re-used, which was the case with much of the timber in the house (Miles and Worthington 2000, *VA* **31**, list 108). Another example of principal beams being re-used is at Tudor Cottage, Odiham, Hampshire. This is a four-bay continuously-jettied house of hearth-passage plan, whose timbers dated to 1540, except for a transverse beam in the main part of the house which produced a felling date of 1493 (Miles and Haddon-Reece 1996, *VA* **27**, list 72).

Across the street from Tudor Cottage, No. 1 King Street, Odiham stands on the corner of the town's High Street, and dates to 1447. However, two staves from an infill panel gave felling dates of 1317/8 and 1337/8, and were thus obviously re-used from an earlier building (Miles and Haddon-Reece 1996, *VA* **27**, list 72).

The barn at Southwick, Hampshire, is composed of two separate building frames. The larger and earlier building is a barn of five bays with a central threshing floor, dated to 1514. Southwick Barn appears to have been a rectorial or tithe barn, in the hands of the Prior and convent of Southwick until the Dissolution in 1538 (*VCH Hants,* iii, p. 165). In 1512, the spire of the Priory church was struck by lightning and the bulk of the building was destroyed. It appears likely that the predecessor of the present barn was destroyed in the same fire. The other framed building in this complex is an attached stable with granary above, probably eighteenth or nineteenth century in date, from which samples could not be dated. The floor joists, however, are chamfered and clearly re-used from a demolished, jettied, domestic building, shown to have been built originally in 1494. Two houses held by the rectory in Southwick were reported in 1494 to have been blown down in high winds. Thus, these joists could be remnants of the rebuilding of these houses (Miles and Worthington 1998, *VA* **29**, list 91).

Earlier still, even Royal buildings were not adverse to re-using older timbers. The Round Tower at Windsor was essentially reconstructed in 1354/5 and consists of four ranges around a central courtyard. One joist however produced a date of 1225, may well have related to the work carried out on the 'Great Tower' in 1224-5 which was damaged during the siege of 1216 (St John Hope 1913, 60; Miles and Haddon-Reece 2003).

Cathedrals too sometimes re-used second-hand timbers. At Salisbury, a rafter used over the cross-wall between the north nave triforium and the north porch/parvis room dated to summer 1236, whilst the roof into which it was inserted dated to 1251/2. This was only noticed to have been re-used when it was fully exposed during re-roofing works during 2000. Presumably, either it formed part of some temporary works, or was surplus or a reject from a larger roof (Miles 2002a). During the seventeenth and eighteenth centuries most of the roofs of the cathedral were reconstructed, with virtually all of the common rafters being re-used in the new roofs as common purlins.

Often entire buildings were bought with the intention of demolishing them and re-erecting them, either wholesale, or using the materials in a new building. An example was recently discovered in the Bishop of Winchester's pipe rolls for 1452-53, clearly describing a building being dismantled and re-erected on a new site, with new timber replacing those requiring renewal such as the ground sills

(**Appendix 1C**). An alternative interpretation is that a new configuration would require new sills and wall plates, whilst much of the wall framing could be re-used. This nevertheless is indicative of the challenges of sampling historic timber-frame buildings, where timbers of different periods are well integrated within one structure. Salzman also quotes numerous examples of contracts and accounts for buildings being purchased during the medieval period and re-erected (Salzman 1967, 198-200).

These detailed examples are supported by less detailed accounts for other buildings. For instance, in 1387-8 at Southwark, two watermills were to be rebuilt by three carpenters, involving the pulling down of two adjacent houses and re-using the timber in the construction of the new mill-house. The frames were to be ready to be erected by the 1st of August, less then 7 months of the contract being signed, and the whole work completed within a fortnight of Michaelmas (29th September). This again illustrates how often re-used timbers were used in lower-quality buildings (Salzman 1952, 467).

6.5 DISCUSSION

Analysis of the data has shown conclusively that there is some variation in felling dates for timbers used within a single phase of building. Whether this is due to using trees which were windfalls, stock-piled, or simply the occasional left-overs from the carpenter or framers, it is often unclear. However, regardless of the reasoning of why some timbers were felled one or more years in advance of others used in the phase of construction, it is clear that some 33.6% of the trees used on historic building works are felled one or more years before the latest ones used. Furthermore, over half of the phases of building studied (55.3%) include some timbers which have been stock-piled. This is an important factor in interpreting felling dates, as more than half of the buildings or phases under study are likely to have one or more timbers felled more than one year prior. The results from **Table 6.1** relating to individual samples therefore needed to be quantified.

The data analysed were plotted with the percentage of the population relating to the number of years difference as shown in **Figure 6.1**. Both the scale of years difference as well as the percentage were graphed with logarithmic scales, and the results showed a clear power-law dependency.

Despite a small number of examples, the type of building most commonly utilising stock-piled timbers are the large, high status churches and cathedrals, often constructed over prolonged periods. Even repairs to these cathedrals, as demonstrated by the reconstruction of the nave roof at Salisbury (see *Chapter 6.4.1* above) clearly show that the larger and more unusual timbers such as tiebeams were stock-piled. It is the extended construction period of these large projects, together with the ability to procure material well in advance of their being required, that explains why over three quarters of these high-status, urban churches showed signs of stock-piled timbers, with some timbers having been stock-piled for as long as 23 years.

Conversely, the low-status rural agricultural buildings showed the least evidence for stock-piling, with only a third showing signs of timbers being stock-piled for more than one year, but with none having timbers felled over more than two years. Again, the 18 phases included in this category is

small, but nevertheless is representative of the opposite end of the scale. This would therefore suggest that unlike the larger, higher-status projects, small agricultural buildings would be constructed in rural areas where timber would be plentiful, and owned by the either the manor, or the farmer for whom the building was to be constructed. It would therefore be logical that the trees would be felled specifically for the project in hand, thus limiting the time between felling and construction.

Despite a small sample base for both the prehistoric, and the period from the eighteenth century onwards, the majority of periods showed more than 50% of the phases showed signs of stock-piling. The main exceptions to this are the prehistoric and the Saxon/Norman periods where the percentage is substantially less than 50%.

Analysis between rural and urban locations did not show a major discrepancy between the two, but the urban sites did have an 8% to 9% higher tendency for stock-piled timber. Typological variation was much more pronounced, with the commercial buildings having the lowest rate, of which only one out of the four building phases studied showing signs of stock-piling. Church buildings on the other hand had 66.7% of the phases containing some stock-piled timbers. There was little variation in samples and building phases when analysed by status. The lower status buildings showed about 10% less variation in felling dates than the high and Royal status buildings.

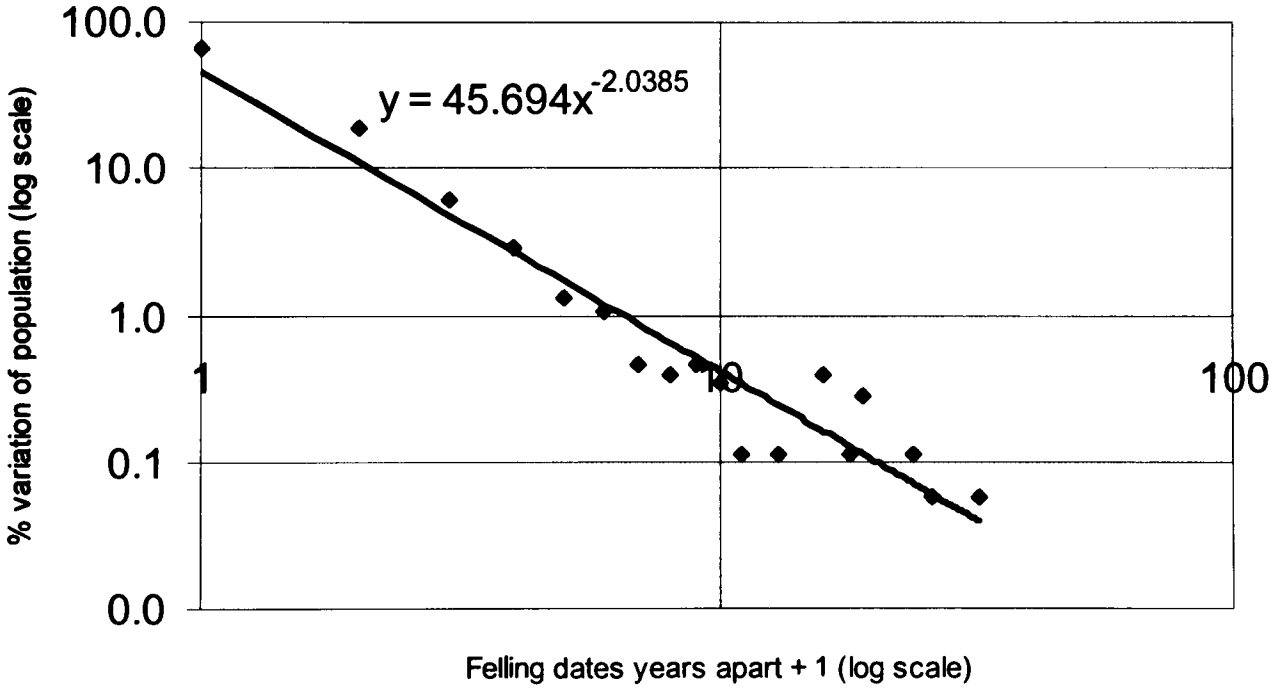


Figure 6.1: Distribution of variation in felling dates for 1760 samples fitting power law trend.

The distribution of felling seasons between spring, summer, and winter showed that overall, almost half were felled during the winter season, whilst a little more than a third were felled during the spring. During the medieval period, the winter-felled trees remains at a fairly constant percentage, but rises significantly during the early nineteenth century, although this last period is based on a small data set of 35 samples.

Other evidence for stock-piling illustrates how the larger-scale projects such as churches and cathedrals needed to collect larger, difficult to source, timber well in advance of planned repairs. Other examples showed how there were often left-over timbers which were valuable, and were used wherever possible.

Historic examples of accounts suggesting seasoning have been shown to relate primarily to boards and thinner-sectioned timber for higher-quality internal fittings. Even one account specifying seasoned timber to be used for structural work has been disproved by the dendrochronology.

Re-used timbers became more prolific during the seventeenth century and later, when larger-sectioned members were re-used without re-sectioning. Even during the medieval period, entire buildings were dismantled and re-erected, often substantial distances away. However, re-used timbers would normally have originated from buildings significantly older than the building being constructed, and if these were not identified through physical characteristics, they would be through dendrochronology.

All of these findings prove that many of the timbers found within timber-framed structures during the last thousand years or more were stock-piled for a number of reasons. Therefore, due allowance must be made in interpreting felling date ranges to allow for the stock-piling of timbers, which can be quantified as generally at least one, and sometimes two years variation.

7. RELATING FELLING DATES WITH BUILDING ACCOUNTS

7.1 THE BUILDING PROCESS

Before any serious consideration can be given to correlating felling dates with documentary or other independent dating evidence, we first need to understand how the building process works, and the length of time required to erect various timber-framed buildings and structures. Although exceptionally rare, a few good detailed building accounts can be compared with dendrochronologically-dated standing buildings to allow an analysis of the materials and time needed to prepare a timber frame and erect it. To better understand the entire building process, it is necessary to go beyond the basic analysis of the structural timber components, and to consider other processes and material quantities. Four key case studies have been examined in detail in this section, together with an analysis of other documentary references.

At the outset of this research, one building for which good documentary material was thought to exist was Priory Cottages, Steventon, Oxon (Currie 1992, 181-95; Miles and Worthington 2002). However, sampling of additional ranges of the building during 2003 proved that the initial identification of the building as the manor or priory house of Steventon was erroneous (Miles *et al* 2004, 100). Thus, one site which was expected to provide a good case study had to be excluded.

7.1.1 General building procedures

During the medieval and post-medieval period up to the middle of the nineteenth century, the first stage in fabricating any type of timber-framed building is to select and fell the trees. As was demonstrated in *Section 6.3*, trees were often felled in the winter, although spring felling was common as well, and summer/autumn felling not unknown. Trees were generally selected to suit the various structural members, and on felling, they were usually converted within the woods to the required cross-sectional dimension. Most trees would be squared up using the side axe, and then pit-sawn if required to convert into two or more members (Miles and Russell 1995).

The squared timbers would then be carted to the framing ground, which might be at the site of the building, or somewhere else altogether. Here the timber frame would be prefabricated, with the joints marked with corresponding assembly marks. Occasionally, some roof frames would be jointed at roof level, and these would not usually have assembly marks, for instance the early thirteenth-century roof at Wistanstow Church, Shropshire (Miles 1998). Usually, 75% to 85% of the carpentry of the structural timber frame is carried out off site, the remainder being taken up in erecting the frame on site.

Whilst the timber frame was being prefabricated, the site would be prepared and the foundations laid, on which the building would be set up. If the walls were of mass masonry, the floors would generally comprise either individual joists, or entire floor frames jointed together and inserted once the masonry walls had reached the required height. In the case of larger mansions and multi-storied buildings, there could be a number of separate floor frames plus of course the roof frame.

Cruck framed buildings were erected differently from the usual mass-walled buildings. Here, the crucks were usually set up on pad-stones, or at a very early date, were earth-fast (Alcock 1981). In later examples crucks sit on sill beams with pad-stones below the crucks, bay by bay. The walls would then either be timber-framed or masonry which would be constructed around the crucks. Larger, high-status buildings might be of raised cruck construction, where the masonry walls would be built up part way, the cruck blades set on wooden pads, and then the walling continued up to wall plate level, such as at Stokesay Castle, Shropshire.

Once the timber frame was in position, together with the rafters comprising the roof frame, other trades would then be able to commence work on the building. These would include the tiler, slater, or thatcher, who would cover the roof and thus allow the interior to be dry. At the same time daubers would insert the wattle-and-daub panels, and the plasterer would finish off the interior once the roof was completed and the lathers had provided the substrate on which to work. Finally, the carpenters would carry out basic joinery items such as floors, doors, windows, and staircases. In more elaborate, high-status structures, joiners would provide such items as panelling, carved woodwork, and other high-quality finishes. Other trades restricted to the larger, high-status buildings would include the work of the glazier and the decorator.

The working day during the medieval period was generally from dawn to sunset, with at least an hour for dinner at mid-day. The working week included Saturdays when half or three-quarters of the day was worked (Salzman 1967, 61). As more work was accomplished in the summer months than in the winter, a higher rate was generally paid to reflect this increased productivity. Summer generally was considered to start at Easter, and finish at Michaelmas. However, the month of August was harvest time and, as labour was scarce, higher wages were often paid during this short period (Salzman 1967, 78). This apart, wages generally increased by between 25% and 33% during the summer, although there are instances when no reductions were made for winter work (Salzman 1967, 77). Winter working was unusual especially for masonry work, due to the difficulty of executing lime work in frosts. Documentary references to carpenters work being curtailed for the winter season of 1325 in Tonbridge '*on account of the winter season*' (Salzman 1967, 59) illustrate that weather would certainly reduce the number of productive working hours during the winter months.

7.1.2 Lodge Farm, Odiham, Hampshire

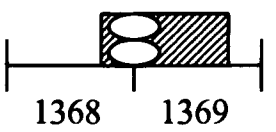


Figure 7.1: Chronological relationship of felling dates (ovals) to documented building construction period (hatched area) for Lodge Farm, Odiham

Lodge Farm, Odiham is a hall with a two-bay cross-wing. The walls of the 1375 hall have been rebuilt in brick and the original, smoke-blackened roof timbers have been re-used to create a side-purlin roof, possibly in 1446/7, although there may have been a second reconstruction later. The slightly earlier cross-wing of 1368/9 is substantially intact, with a crown-post hipped roof, and containing a solar over a divided service. It is exceptionally fortunate that detailed accounts for the rebuilding of the Lodge survive in the form of the Exchequer accounts which survive from 1365-1373 showing that Edward III was rebuilding the lodge in the royal park of Odiham between these dates (**Appendix 1A**; Miles and Haddon-Reece 1994; Miles, 1995).

Clearly from the dendrochronology, the lodge had been rebuilt in two phases, firstly the cross-wing in 1368/9, with the hall being rebuilt a few years afterward in 1374/5. Whilst the account rolls covering the period of 1373-1377 (PRO E101/479/2) do not differentiate the work on the lodge from that being carried on at the castle, the rolls of particulars covering the period 1366-1370 (PRO E101/478/28) do itemise clearly the work on the lodge cross-wing. It is this first phase of rebuilding which will be looked at in more detail to understand fully the timing of the building process.

The accounts list 19 entries which can be divided into two main categories: materials and labour. The materials are listed and both quantity and value are given, and the labour identifies individual trades with a daily wage recorded for each with the exception of the tiler and plasterer, which had obviously agreed fixed prices for their work. It is interesting to compare these figures with the quantities as derived from the standing building, and compare the rates with values from contemporary accounts.

Taking the entries in their probable order of work, the first relevant one is '*..for taking down the old tiles there - 20d*'. Presumably the roof to the cross-wing was in bad condition and required stripping to save any sound tiles. At Woodstock, tilers were earning 4*d*. per day in 1365 and labourers 3*d*. (Salzman 1967, 74). As it does not require wholly skilled labour to strip a roof of tiles, it would not be unreasonable to assume that the tiler would have two labourers with him, making a daily wage of 10*d*., or two days work all told. A present-day tiler would estimate about six man-days to strip such a roof, which works out nicely for these rates.

The present cross-wing had a roof area of about 8500 square feet, and it is unlikely that the previously existing wing was any larger. This area would require approximately 4,500 tiles, and as another entry reads '*and for 2500 plain tiles bought for the same works - 10s.*', this would imply that 2000 tiles were salvaged. Either the roof was in a very bad state indeed, or the old cross-wing was significantly smaller. It is known that medieval tiles were of poorer quality (Salzman 1967, 230) and a wastage figure approaching 50% on a derelict building is not unreasonable. The new tiles worked out at 4*s*. per 1000, which is the same rate as they were paying for plain tiles from Nettlebed in Oxfordshire in 1365 (Salzman 1967, 231). In addition, there was an entry '*...for 100 hip tiles (heppetille) and crest tiles (crestes) bought for the said works, 3s. 8d.*' To roof the 1369 cross-wing, about 180 bonnet hips would be required, along with about 15 ridge tiles. As these quantities are about double what was purchased, it would appear that there was a similar salvage rate for tiles from the old roof. Although the number of ridges as opposed to hips was not stated, the costs seem to be in line for those '*crestes and hypetyl*' bought in 1363 at Clarendon for 2*s*. 6*d*. per 100, and for '*crestes and hupetill*' bought for Wallingford in 1365 for 4*s*. per 100.

Laths would be the next item required for the roof works. Here we do not have any quantities, but '*..for the wages of three lathers working and making laths there for nine days between them all, each taking 5d. a day, 3s. 9d.*' To try and ascertain the number of laths which these three men would have produced, we have to look at contemporary accounts and try and deduce the number of laths produced per man per day. Whilst this information is not clearly stated in other accounts, we do know that in 1366, lath makers were being paid 5*s*. per 1000 laths made of heartwood, but only 2*s*. 6*d*. for those made of sapwood. As the cost of making the laths should be the same for both heartwood and sapwood, it stands to reason that the difference in price between the two, of 2*s*. 6*d*., is the material cost of producing heartwood 1000 laths, the sapwood having little value. In the same year at Sheppey, the labour differential between heartwood and sapwood laths is 1*s*. 8*d*. per 1000. Laths in the medieval period were generally five feet in length, therefore we can assume that for the Windsor rates, the Odiham lath makers would have produced 1,500 laths or 7,500 feet. (Salzman 1967, 240-41) At the Sheppey rates however, the Odiham lathers would have produced 2,500 laths or 11,250 feet.

So, we would have between 7,500 and 11,250 feet of laths produced for the lodge by the accounts. However, the roof would only have accounted for about 2,500 feet laths, leaving between 5,000 and 8,750 feet of laths unaccounted for. In parallel with this, it must be considered that an entry '*..for 2000 lath-nails bought, 2s. 8d.*' Each lath would lay across four rafters, and to allow one nail per rafter, this would calculate out at 4 nails per lath multiplied by 500 laths (of 2,500 feet), which would equal 2,000 nails. This leaves between 5,000 and 8,750 laths with no means of fixing them.

Again, the building has provided the evidence needed to resolve this. At the rear, a corner post was noted with a lath groove measuring one half inch deep by one quarter inch wide set back one inch from the outside face of the post. The braces are similarly set back. Clearly, the infill panels used riven laths instead of wattles, and that these were woven around the staves and tucked into the lath grooves on the vertical members. By measuring the wall areas, including the partition between the divided service,

an area of approximately 1,023 square feet (not deducting for window and door openings) is arrived at for the wall panels. Allowing the laths to be 1½ inch in width, the number of laths required for this area would be about 8,000 feet, not out of line to the surplus left over from the roof.

The roof would then be tiled, '*...and for the tiler of the said building paid according to an agreement - 8s. 8d.*' As we know that tilers were commanding about 4*d.* per day, and labourers 3*d.*, it would seem that for a team of three men, ten days were spent in tiling the roof. Today, a similar team of men would tile a roof in about half that time, but we must bear in mind that the tiler would presumably have had to make or supply his own wooden tile-pegs, and supply the lime mortar torching and bedding on the ridges and hip tiles.

Returning to ironmongery, we have '*..300 plank-nails bought...5s. 3d.*' and '*..200 board-nails bought wholesale, 11d.*' Plank nails would most likely have been used for the floorboards for the upstairs floor. This area is about 27 feet long and each board would lay over 11 joists, including the side girts. Assuming that each board averaged 12 inch in width, and used one nail per joist, this would work out to be 297 nails. As it is unlikely that the boards would have been much wider, it would seem that the boards were nailed in an alternating pattern of side to side fixing. The 200 board-nails would most likely have been used for making new doors and shutters.

We also have '*..three iron bands bought for said works, 16d..*' and '*..four pairs of twists and hooks bought, 3s. 8d.*' Bands in this context refer to strap hinges and, as there were three bought, it would infer a very heavy door which would require three hinges. It is likely that there were two windows in the upstairs chamber which would have required two shutters each or four in total. Presumably this is what the four pairs of '*twists*' (hinges) and hooks were needed for. From contemporary accounts, the prices of these pieces of ironmongery were about double the price of other examples, suggesting that they were either overly large in size, or in elaboration, or both (Salzman 1952, 296-7).

For the roof tiles and limewashing the building inside and out, there was '*..seven quarters, six bushels of lime bought wholesale, 6s. 3d.*' It would seem that this amount would only be sufficient to bed the tiles, as well as making lime mortar for the foundation plinths. It is very unlikely that any was used in the daub for the panels; here a clay-based daub was probably used.

Apart from the daubing and plastering, it is significant that there are no other accounts for the wet trades, particular masonry. One would have thought that a mason would have been engaged to build the plinth walls, and there is of course the problem of the upstairs fireplace for which the roof had been trimmed. To deal with the latter, of course it is just possible that a timber-framed smokehood had been contrived, with laths and daub. Still, one would have expected to have found some reference to a brick or stone hearth. Nevertheless, there had been allowed '*..for plastering/whitewashing the said building according to an agreement, 15s. 2d.*' Assuming that a plasterer earned about 4*d.* per day, one would have say four men working for about two weeks, which is not an unreasonable time to have daubed and whitewashed the whole building.

The remaining seven entries refer to the number of each type of tradesman, how many days they worked between them, and their rate per day. One aspect of the accounts worth looking at is the timing of the work, and how each trade related to each other. Following on from this, it would be of interest to know the time of year in which the work took place. This is possible to make an educated guess by comparing the tree-ring dates with the date span of the Pipe Roll, as well as the daily rates.

First of all, when did the work begin? The roll (PRO E101/ 478/28) began on 13th May 1366 and ran up to 30th September 1370, in the 44th year of Edward III. To narrow this four-and-a-half year span down, we have the two felling dates for a rafter and a wall-brace, both of which were felled between about October 1368 and March 1369. Obviously, no work would have begun on the building until this time. A clue as to whether the work started at the beginning of the winter or the end can be had in the *rates* being paid. These in general seem to be slightly higher than those for comparable workmen at the time (Salzman 1967, 68-72), therefore we can conclude that the work was carried out during the summer months.

The average working week was generally five-and-a-half days, and by dividing the total number of days worked collectively for each trade by this figure, we get, more often than not, a number of whole or complete weeks. Thus it would appear that each workman was contracted to work on the building by the week. By analysing these figures, we can make a reasonable interpretation of a medieval work flow chart (**Figure 7.2**). The key to the setting out of the chart is the master carpenter. By dividing 77 days by 5.5, we get 14 weeks precisely. This man was the kingpin of the whole building operation, and he would have acted as a modern-day site agent throughout the duration of the building works with perhaps the exception of the tilers and daubers. This would have started with the work of the sawyers. His instructions to them as regards the dimensions to which each scantling would need to be finished to would be vital for the next operation, that of framing. It is likely that the trees were brought from the surrounding park to the site of the lodge where they were converted, for not only do we have sawyers working by the day but also lathers.

As the timbers were being sectioned, the carpenters would begin to set out the frame and to cut the various joints. They would have become more in number as the sawyers finished and the various main frames began to come together on the ground. On completion of the frame, we would have seen the dauber and tiler come in at the end of the work, probably at the same time. It is interesting to see that during the height of the framing work, we would have had nine carpenters working on the site, but with only one labourer in addition, making ten men in total.

Whilst most workmen including all of the carpenters were engaged on a weekly basis, both the tiler and the plasterer worked on a more independent basis, with separate agreements for the work on a fixed price basis, although they did not supply the main materials such as tiles, laths, nails or lime. We have through the analysis of the ironmongery accounts deduced that the quantities of nails were carefully calculated, and through this were able to ascertain that the floorboards were nailed sparingly with only one nail per board per joist. On the other hand, it would appear that the hinges were of substantial size and quality, perhaps befitting the status of the building as a Royal lodge. By comparing

the lathers' accounts with other contemporary accounts, we were able to discover that the laths were used not only for the roof, but also for walls. Here they were used within the panels, woven between the staves like wattles.

The summer rates generally began after Easter, which in 1369 was the 1st of April (Cheney 1948). If, for the sake of simplicity, we can consider that the trees had been just felled, we might say that the sawyers had begun work on about the 1st of April. Given the master carpenter had fourteen weeks, plus another two or three at the most for the tilers, then we would have completion of the work by about the end of August. This would fit nicely within the summer months, for after Michaelmas the daily wages would have dropped again for the winter months.

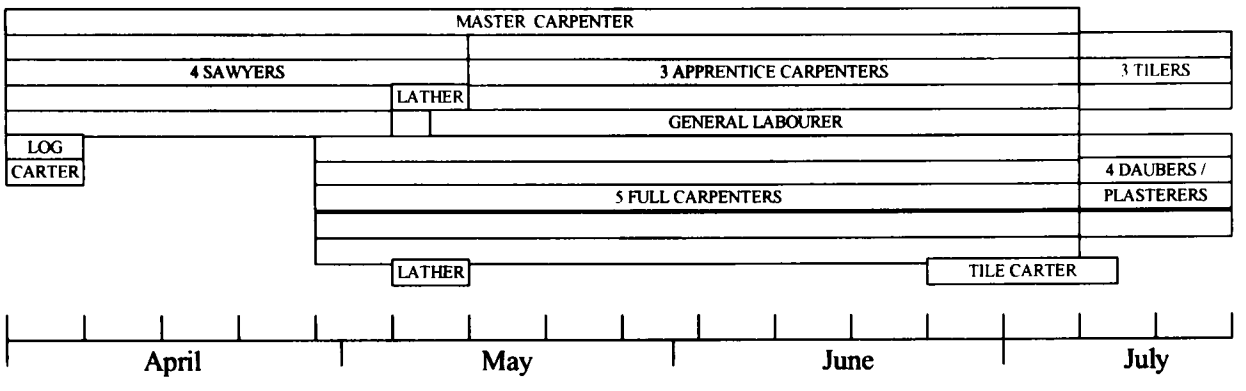


Figure 7.2: Reconstructed work program for the cross-wing at Lodge Farm, Odiham

Of course, it is just possible that the work may have been carried out during the summer of *1370* rather than *1369*. This, however, would require the timber to remain felled but unworked for a year, and the complete works to be wholly accounted for by Michaelmas 1370 when the cut off point of the Pipe roll occurred. As timber was generally converted green, i.e. freshly felled, it is more likely that the building would have been erected during the summer of 1369 rather than the summer of the following year.

Whilst these accounts may not be as detailed as some in the Winchester bishopric accounts, systematic study of those for Lodge Farm have, together with the remaining evidence of the standing building, some details of structure and timing have been able to be deduced for all of the various trades. It is concluded that the building was most likely to have been constructed during an intense construction programme from April to August 1369, a period of only five months. Being a Royal project, more resources could be deployed than might normally be found in any other building project.

7.1.3 Manor Barn, Old Burghclere, Hampshire

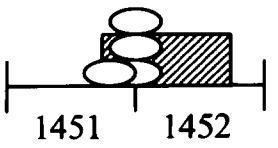


Figure 7.3: Chronological relationship of felling dates (ovals) to documented building construction period (hatched area) for Manor Farm, Old Burghclere

Manor Barn, Old Burghclere is an 8-bay, aisled barn with two porches. Opposite the porches were winnowing doors but no entrance wide enough for a wagon. It originally had one set of purlins that have apparently failed and have been replaced with two tiers of roughly-lodged purlins. The barn was gabled at both ends and each truss had queen struts to collars. Documentary sources (HRO 11M59/B1/188) record payment to a carpenter to build a barn of 8 bays and two porches at Old Burghclere in 1451/52 (**Appendix 1B**). This compares well to a precise felling date of autumn 1451 and felling dates of winter 1451/2. (Miles and Worthington 1999)

Assuming the Bishop of Winchester provided all materials, we have several payments made to the carpenter: £14. 13*s*. 4*d*. to '*newly make a new barn containing 8 bays, in full* payment', plus 26*s*. 8*d*. for '*2 porches for the said barn this year; 60s*' [sic] and 53*s*. 4*d*. to '*newly board the said barn completely*'. This totals £18. 13*s*. 4*d*. or 4,480 pence. The common denominator for all three payments is 5, suggesting a five-day week, which is unusual given that a 5½-day week was the norm. Divided by 5*d*. per day, and taking an average of six carpenters working on the project, approximately 30 weeks would be needed to prefabricate and erect the building. If some lower-rated labour was used, then it is likely another month would have been required, bringing the total up to about 35 weeks total. Of course, fewer or more men working on the project would affect the number of weeks accordingly.

Two sawyers were employed, ostensibly sawing 200 ft of eavesboards, for 2*s*., or 12*d*. each. At a rate of 6*d*. per day for a sawyer, it would appear that 4 man-days of sawing were needed. The quantity of boards cut in this time would seem to be higher than what is required for 200 ft of eaves or any other board, yet it is too short a time to saw the quantity of external weatherboards required for the building.

The barn was roofed by a tiler who had agreed a price of 26*s*. 3*d*. for the job. Assuming four tilers were engaged on the job, at a rate of 5*d*. per day, the job would have taken about a month to complete. The rate of 9*d*. per 1000 coincides with the 35,000 tiles bought at 5*s*. per 1000. However, 11,000 tile lathes were also purchased, which works out to be about only 3.18 tiles per lath, suggesting twice as many lathes were purchased than required.

A lime burner was paid 20*s*. 4*d*. to burn lime for the roof and foundations, at 4*d*. per day this would work out at about 12 weeks for this operation. Associated with this, a mason was employed for 33*s*. 4*d*. to construct the foundation walls. At 5*d*. per day, this amounted to some 16 weeks, although two masons would be more likely, thus reducing the time to 8 weeks total.

Cost for carting materials is also given. A day-rate of 16*d.* for '*hiring a cart to carry burr lime from the lord's wall to the barn*' is given, whilst a rate of 6*d.* per journey is charged to cart freestone from Sydmonton, about six miles distant, the rate assuming that three loads could be made per day. A lower rate of 4*d.* per journey was charged to cart the lime '*from the lime pit to the manor*' which presumably must have been even closer. However, the tiles must have come '*from diverse places*' which are further afield, as 14*d.* per journey was charged.

Assuming the mason's work was carried out at the same time as the barn frame was being prefabricated, then it is mainly the carpenter's 30 to 35 weeks plus the tiler's 4 – 5 weeks, would suggest a period of about 8 months required to complete the erection and roofing of the barn.

Although it was not possible to tie up the documentary accounts with the standing building as well as at Lodge Farm, Odiham, they nevertheless show that the entire building operation was completed in one calendar year.

However, a problem in interpretation arises with a set of accounts for the following year (HRO 11M59/B1/189; **Appendix 1B**) which covers the period 29th September 1452 to 29th September 1453. This refers to the building of two porches and for roofing them with 5000 shingles (*shyngelis*). The quantity of these is approximately correct to roof two sizeable porches. However, there is also a reference to 16000 tiles (*tegul*), 8000 of which were bought, and the other 8000 given by the farmer.

Also, there is an entry for the labour in putting on the tiles, of 16*s.*, which is about 3*d.* per 1000 dearer than the rate given to roof the main roof of the barn the previous year. Why should the cost of tiling be a third more expensive the following year, and why should the barn need tiling anyway when it had already been tiled less than 12 months previously? The accounts specifically state the tiles were bought for the 'great barn', and the 35,000 tiles used last year were sufficient for the size of the building. Also, the barn already erected already included two porches. Further in-depth examination of the standing building will be necessary to resolve this, but one explanation might be that the new barn was erected next to, and thus extending, an existing barn for which the porches and roofing detailed in the following year's accounts actually refer.

7.1.4 Sinai Park, Staffordshire

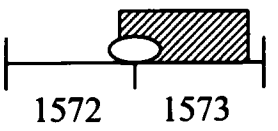


Figure 7.4: Chronological relationship of felling dates (ovals) to documented building construction period (hatched area) for Sinai Park, Staffordshire

The large and complex mansion at Sinai Park, Burton upon Trent, Staffordshire, has been extensively studied. The south-west wing (Building F) has been stylistically dated to the late sixteenth century, but has been constructed with many re-used medieval timbers (Morris 1995 – 'Sinai Park Branston nr. Burton-on-Trent Staffordshire: and Outline Survey & Analysis' unpubl report). One timber relating to the present structure of the south range, a wall plate, produced a precise felling date of winter 1572/3 (Tyers 1997). Building accounts transcribed by Bob and Jean Meeson from 1573 detail the felling, transporting, and erecting of this timber frame. The accounts also detail tiling and masonry work in constructing chimneys. However, very little plastering / daubing is detailed, although this might be listed using the term '*beating*' the plaster for daubing. Accounts transcribed by Bob and Jean Meeson (**Appendix 1D**).

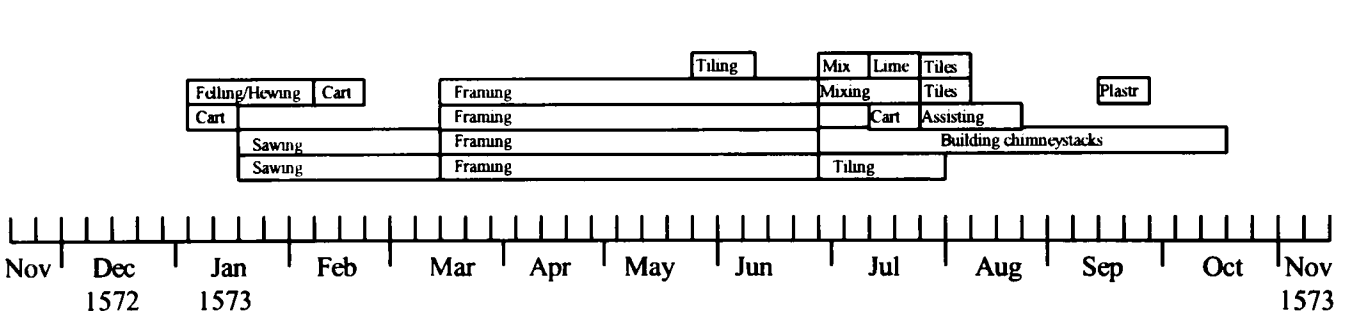


Figure 7.5: Reconstructed work program for the south-west wing of Sinai Park during 1573

Unlike the accounts analysed earlier, the Sinai Park accounts give in many instances rates of pay for various trades on daywork or by the week. However, the principal account for the framing is represented by a single figure, so some interpretation is needed to understand this element.

The accounts are for the period covering the 15th year of Elizabeth I (17th November 1572 to 16th Nov 1573). The first item concerning the works is an entry for 22*s*. 6*d*. '*payed for the fallinge of 18 trees in the cancke wood for Burton for brekynge squareinge and making pyttes*'. This would be for a woodman to fell the trees, hew into square bulks, and to dig the saw-pits. It is not stated to who the payment was made, or how much per day the daywork rate would have been, but given that carpenters often did this work when not actually making the frame, the average wage of 10*d*. a day for short days, given the time of year the trees were felled, works out at exactly 27 days. This would equate to approximately five weeks. As dendrochronology has shown that one of the trees was felled in the winter 1572/3, this would suggest felling sometime from November 1572 to March 1573. By taking the middle of this period for the felling of the timber, January would be the most likely time for the trees to be felled. In addition to the 18 trees felled in Canke Wood, 16 trees are recorded at Bromley, 30 trees in

the '*out wooddes*', and 32 '*p/foales*' [parcels?] bought at Greseley, which would total between 64 and nearly 100 trees which, assuming their were of sufficient size, would be sufficient for converting into the required quantity to augment the salvaged timber to construct the four bay two-storey range.

Coupled with the felling of the 18 trees, the accounts allow for about 4 weeks for carting the trees to the saw pits, and the carting of the boards once sawn. Allowing a rate of 12*d.* a day for sawing, this would equate to 75 days, or about 8 weeks, as sawyers usually worked in pairs (Salzman 1952, 32). Sawing could have started in the middle of January and would have been ready in the middle of March. The framing was contracted to Thomas Wryght who was paid £14 for '*fallinge framynge and Peesynge up the newe frame at Burton*'. At 1*s.* a day, this would equate to 280 days. Clearly he would not have undertaken the work on his own, but would have employed at least another carpenter as well as a couple of apprentices or labourers which would have been charged out at half the rate, i.e. 6*d.* a day. Thus the construction of the framing and erection on site upon new foundations would probably have been completed by about the end of June.

The mason Thomas Edge was paid £4 to making 3 chimneys in the '*new bildynges and mendynge my lordes chymneye*'. This mason was also engaged on rebuilding the washing house at 10*d.* per day, thus at the same rate £4 would have equated to 96 days or 16 weeks including Saturdays. Although labourers were provided to assist the mason for at least one month, it would appear that the work on the chimneys would have taken three months, not including repairs to the existing chimney. This would have commenced immediately the frame was erected, thus would have been completed by about the middle of October, the effective end of the building season for wet trades. At the same time as the chimneys were being raised, the roof would have been tiled. Christopher Robynson was paid 26*s.* 8*d.* for tiling the new lodgings. Although the various entries for him in the accounts all divide equally by 8 for both plastering and tiling, it is more likely that he would have been paid 12*d.*, the same as a mason or carpenter. Therefore, the tiling would have equated to about 5 weeks, with help being provided for at least 4 of these weeks. At the same time as the tiling, the lime mortar or plaster would have been mixed; at least 8 man-weeks being accounted for this. Another 2½ weeks was paid for both burning lime and tiling. All told, the tiling would have been completed by the end of August.

Only eight days at 12*d.* each are recorded for the plasterer Francies Waddames for actual plastering, although he was also paid for one week working on the foundations. However, some 42 days are paid to three different labourers for '*beatynge*' plaster, an excessive time for mixing, but might well refer to daubing the closed studded wall panels. A further 22 [or 17] days are recorded assisting '*the mason*' which again might relate to Francies Waddames whilst plastering. Certainly the works must have been relatively well completed by November as £7 had been paid to John Bankes for glazing.

To conclude, the accounts for the south range at Sinai Park show that even an extensive building project could be completed within a calendar year so long as the timbers had been felled during the winter months. The sawing and framing would have taken about six months, whilst a further three or four months would have been needed to complete the chimneystacks and the tiling.

7.1.5 New Building, Magdalen College, Oxford

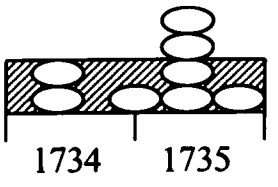


Figure 7.6: Chronological relationship of felling dates (ovals) to documented building construction period (hatched area) for the New Building, Magdalen College

The New Building at Magdalen College has exceptionally full building accounts covering the period 1733 to 1743 (**Appendix 1E**). Work started on the foundations during 1733, and by the end of the year the masonry seems to have been to the full height of the basement. During this year a number of proposals were received from Edward Smith for the carpentry of the New Building, the main ones dating to 19th May 1733.

Evidently timber was being sourced and stock-piled as early as 1731, with oaks being obtained from college estate woodlands at Tubney Wood, Collier Coppice, and Magdalen Wood. One account dated 7th March 1734/5 detailed notes of quantities of timber needed to complete the floors and roof timbers for the New Building. Trees were continued to be felled through 1735 (Magd Coll archives MC:FA14). There are bills dating from 1731-1733 showing that timber was being sawn and prepared in Magdalen Grove in advance of the building of the masonry walls. By January 1734 sash windows were being supplied, suggesting that the walls were rising above ground-floor level (Magd Coll archives MC:FA14/2/5F/36-51).

As early as October 1733 slates are being acquired, these continue through November 1735 (Magd Coll archives MC:FA14/2/4F/1-24). The shell of the building is thought to have been completed and roofed by the end of 1736, although construction probably continued through to the end of the decade, as evidenced by bills for plastering and slating from July 1735 to April 1740 (Magd Coll archives MC:FA14/2/17F/1-11). Most of the finishing work would have been done at the expense of the fellows who were to occupy the rooms (Ferdinand *pers comm*).

Felling dates for eight timbers ranging from spring 1734 through the summer of 1735 were all from the roof timbers, and were clearly the last phase of the structural carpentry to be fabricated. It is likely that the roof was framed and completed during 1736. Given the protracted period of construction of the New Building, it is difficult to make any further interpretation of the building without accessing the lower floor timbers. Nevertheless, this is a good example of where the dendrochronology and the documentary evidence compliment each other, and illustrate how some timbers have been stock-piled on a long-running building project.

7.1.6 Other documentary evidence

Looking from the perspective of length of time required to construct a building, some valuable information can be gleaned from contemporary building accounts and contracts. Building accounts from 1442 in Ipswich show that a typical three-bay building used as a shire-house was constructed, employing 160 man-days for three masons, although the maths suggest this should be four masons, 2 carpenters for 83 days and 7 others for 43 days, five tilers for 12 days each, and five daubers for 20 days each. Assuming the masons work would be run in parallel with the prefabrication of the frame, and that the tiling work could also be done independently of the daubing, a construction period of just over 20 weeks, or under five months, was required to erect this building, including the internal fittings. The total cost of the building was £63. 6*s*. (Salzman 1967, 208-9).

Salzman (1967) published in Appendix B some 123 building contracts dating from the Norman period up to 1540. Of these, 57 stipulated the time frame in which the building was to be constructed. Some included substantial penalties of overruns which even included excommunication in the case of a house in York dating from 1335 which only allowed 3 months for the erection of a 100ft frame. Of these 57 contracts, 31 of these were with carpenters, and generally included the prefabrication and erection of the timber frame, with the foundations and other trades to be carried out separately. Nevertheless, it is significant that 8 substantial houses were set up in 4 months or less, and another 20 building phases were completed within one year. Of the three buildings exceeding 12 months, one was a new roof to the dormitory to Stamford Priory where in 1445 as many of the old roof timbers as possible were to be re-used in the new roof, for which 20 months was allowed. In 1369 in London 20 shops were reconstructed during 30 months, and during 1380 in Hertford a new chapel and other buildings were constructed over a three-year period (**Table 7.1**).

Often work would be complicated, involving the re-use of existing buildings and specialised trades. For instance, in 1387-8 at Southwark, two watermills were to be rebuilt by three carpenters, involving the pulling down of two adjacent houses and reusing the timber in the construction of the new mill-house. The frames were to be ready to be erected by the 1st of August, less then 7 months of the contract being signed, and the whole work completed within a fortnight of Michaelmas (29th September). This illustrates how often re-used timbers were used in lower-quality buildings, and with a building period of less than 9 months (Salzman 1952, 467).

The remaining 26 building contracts were with masons and showed some equally fast construction, with 10 buildings being constructed under one year (**Table 7.2**). Indeed, it is interesting to note a number of these were buildings of two stories with thick masonry walls. Holywell Manor in Oxford was constructed in 1516 in just four months. Other substantial heights were achieved in even more impressive building campaigns such as the 60 foot high dormitory walls being constructed at Durham Cathedral Priory in three years commencing in 1398, and the 100ft church tower at Dunster Church, Somerset, again achieved in three years commencing in 1442.

No:	*Cost:*	*Date:*	*Location:*	*Mths*	*Building description:*
33	£440	1380	Hertford	36	New chapel and buildings in castle
21	£300	1369	London	30	20 shops
75b	7 marks	1445	Stamford Priory	20	New roof of dormitory, using as much of old timber as possible
24	£120	1373	Southwark	12	11 shops, 2 stables, and gatehouse
26	£100	1374	Cambridge, Trinity Hall	12	Range of chambers
49	£46 13*s.*	1405	London, Bucklersbury	12	Group of buildings including 2 shops, hall & warehouse on prepared foundations & to be ready for tiling & daubing
51	£45	1410	London, Friday St	12	Erect 3 houses including fittings
56	£50	1418	Alresford, Hants	12	New building the Angel
67	50 marks	1437	Chartham, Kent	12	New fulling-mill, of beech
91	£6	1479	Nottingham	12	New house
113		1516	Cambridge, St John's College	12	New choirstalls and rood-loft, gates, doors, desks, etc.
55	£22	1415	Hartley Wintney Priory, Hants	10	New flat roof for church, including 1 week for 6 men on site erecting the roof
41	£45	1387-8	Southwark	9	Rebuilding two water-mills including pulling down two houses & reusing timbers
73	£20	1444	Salisbury, the Blue Boar	8	New inn
75a	46*s.*	1445	Stamford Priory	8	New floor and roof to chapter house
68	£47 6*s.*	1438	Canterbury	7	New guildhall
98B	£43 6*s.*	1491	Great Chesterfield, Essex	7	8 chambers including floors, roofs, stairs, doors, and 18 bay-windows
101	£20	1497	Canterbury	7	Four houses
3		1308	London	6	hall, chamber, solars + stable, kitchens & other offices
28	£10 13*s.*	1374	Rye, Sussex	6	Pulling down timber-framed house and re-erecting ready for thatching
86	£11 13*s.*	1467	Midhurst, Sussex	6	New mill, actual site time to be 5 weeks
96	£40	1485/6	Newark, Notts	6	New bridge
120	£120	1532	Tower of London	5	Roof to St Thomas's Tower + house
4	33 marks	1310	London - St Michael in the Cornmarket	4	Range of 3 shops, carpenter to have any timber of the old house not fir for re-use
65	9.5 marks	1434	Tivetshall, Norfolk	4	New windmill
99	£8 13*s.*	1492/3	St Martin's in the Fields, Middx	4	New brewhouse
118	£110	1530	London	4	3 galleries, summer house, plastering, windows
14	62 marks	1335	York	3	Row of houses 100ft x 18ft max, time limit 'under pain of excommunication '
92	£14	1483	Gloucester	3	New house
2	6 marks	1300	Englefield, Berks	2	40ft x 24.5ft room + 20ft x 14ft wardrobe
104	£10	1510	London	2	New house

Table 7.1: Summary of times in months to construct timber frames as stated in building contracts summarised in Salzman 1967 (Appendix B)

No:	*Cost:*	*Date:*	*Location:*	*Mths*	*Building description:*
8	200 marks	1315	Lacock Abbey	144	Lady Chapel with lead roof
97		1487/8	Helmingham Church, Suffolk	120	New church - only worked on between Whitsun and 8th Sept
52	23.5 marks	1412	Hereford Cathedral	72	Building 3 sides of cloister
25	£120	1373	Boxley Abbey, Kent	60	Rebuilding the cloister & other alterations
59	260 marks	1421/2	Catterick Bridge, Yorks	42	New bridge
23	£30 50*s.*	1372	Arlingham, Glos	36	masonry bell tower, 12 ft height each year
46		1398	Durham Cathedral Priory	36	Rebuilding the dormitory with 60ft high walls
53	160 marks	1412	Catterick Church	36	Rebuilding new church
71	£65	1442	Dunster Church, Somerset	36	100ft church tower
109	£1,200	1512/13	Cambridge, King's College Chapel	36	Vaulting to 12 bays
47		1401/2	Durham Cathedral Priory	33	Completing extension to dormitory
106	£326	1511	Windsor Castle, St George's Chapel	33	Stone vaults for lady chapel
102	£800	1506	Windsor Castle, St George's Chapel	30	Stonework to chapel choir & aisles
10	35 marks	1321	Hamsey, Sussex	18	Hall with buttery, pantry & kitchen
61		1430/1	Cambridge, Peterhouse	18	New library
6	25 marks	1313	Lapworth, Warw	12	40ft x 18ft gatehouse with walls 3.5ft thick
34	110 marks	1380	Dunstaborough Castle	12	Wall around keep 20ft high x 4ft thick
45		1395	Westminster Hall	12	Preparatory works for new roof
111		1513	Cambridge, King's College Chapel	10	Vaulting to 2 porches and 16 chapels, etc. with 60 masons
62	£53 6*s.*	1432	Norwich, Conesford	9	Rebuild city quay
50	51.5 marks	1409/10	Hornby Church, Yorks	8	Building of south aisle including roof
105	£10	1511	Great Sherston, Wilts	7	Church house
98C	23 marks	1491	Great Chesterfield, Essex	6	tiling and ceiling 8 chambers
83	11.5 marks	1459	Cambridge, Corpus Christi College	4	New bakehouse
112	£29	1516	Holywell, Oxford	4	New farmhouse with 3ft thick walls on GF, 2.5ft thick upstairs
108	£140	1512/13	Cambridge, King's College Chapel	3	21 buttresses and tower, to have 60 masons employed

Table 7.2: Summary of times in months to construct masonry buildings as stated in building contracts summarised in Salzman 1967 (Appendix B)

All this evidence illustrates that the medieval building process was quicker than has generally be believed, and that most buildings, if not exceptional in size, would have had a construction period of one building season.

However, the building contracts do show one exception, and that is in relation to the building of churches. At Boxley Abbey in Kent, 5 years were taken to rebuild the cloister and other minor alterations in 1373, whilst the at Hereford Cathedral three sides of the cloisters took 6 years to complete in 1412. Helmingham Church in Suffolk took 10 years to complete commencing in 1487/8, but worming only during the summer months, and 12 years were spent building the Lady Chapel at Lacock Abbey in Wiltshire commencing in 1315. Certainly part of the reason why churches had such an extended construction period is the degree of finish and ornamentation associated with them, and delays may have been encountered in raising sufficient funds to allow a large workforce to speed up the work. Certainly this was not the case with Royal and other high-status public buildings, where money could be thrown at a project. In 1512/13, 60 masons were employed at King's College Chapel in Cambridge, spending £140 on buttresses and a tower in just three months, and the following year the same 60 masons were employed on the vaulting to the porches and chapels in just 10 months.

7.2 RELATIONSHIP BETWEEN TREE-RING AND DOCUMENTARY DATES

Some 106 building phases from which precise felling dates were obtained also had independent dating evidence in the form of documentary accounts or date inscriptions. These have been summarised in detail and included in **Appendix 2**. For each entry, a simple chronological diagram has been included showing the relationship between the number and distribution of the various precise felling dates and the building period suggested through the independent dating evidence. As discussed in *Section 6.2* above, the variation in these felling dates can be very wide-ranging between the earliest and latest felling date from the same phase. For the purposes of this analysis however, it is the number of years variance between the latest felling date, referred to as the phase date, and the documentary or inscribed date, which is used. Where the latest felling date falls within part of one season before the start of an inscribed or documentary date period, this would be recorded as having one year's variation. The Gazetteer has been grouped by the following four categories and arranged in chronological order. Not all of the sites represented in **Appendix 2** are included in the principal database summarised in **Appendix 4**.

At this point it is worth reviewing the history of the calendar during the medieval and post-medieval periods. Although the measurement of days, months, and years is now relatively straightforward, this was not always the case. The Roman Julian calendar had been used for about 1500 years, and inserted an intercalary day every four years, known as 'leap years', to try and keep the calendar in agreement with the seasons. However, this method of reckoning lost 11 minutes 14 seconds per year, which by 1582 had amounted to an error of about ten days. At this point the Gregorian calendar was introduced by Pope Gregory XIII, still employing a leap year every four years, but omitting

centennial leap years unless they were divisible by 400. To bring the calendar back in line with the seasonal equinoxes, ten days were omitted between the 5th and the 15th of October 1582, when most of Europe adopted the new method of reckoning. However, protestant Britain saw this as Papal interference, and continued to use the Julian calendar until 1752 when the Gregorian system was finally adopted, at which point 11 days were lost between the 2nd and 14th of September. This became known as the New Style calendar. Other countries were even slower to adopt the New Style calendar, with Greece finally giving in as late as 1923. Until this time, one could easily find oneself losing or adding 10 or more days to one's calendar when crossing certain political borders.

To confuse the situation even further, the calendar, or church, year did not always start on the 1st of January. Up until the fourteenth century, New Year's Day fell on the 25th of December. Then, from the fourteenth century to 1752 when the New Style calendar was adopted, the 25th of March was accepted as New Year's Day. After 1752, the current use of the 1st of January was adopted as New Year's Day. This has an important bearing on interpreting inscribed dates, as the 10th of March 1720 would actually come *later* than the 10th of December 1720 within the same *calendar* year. Such dates are usually styled as 10th March 1720/21. Therefore, an *inscribed* date of 1720 could conceivably have a *tree-ring* felling date as late as spring 1721 if the church calendar was used. Otherwise, the church calendar was primarily used for recording births, marriages, and deaths, although it might also occur in ecclesiastical building accounts.

If this is not complicated enough, some mention must be made of *regnal* years. Many documents have dates calculated from the date of the accession of the relevant monarch. For instance, the date of 10th March 1720/21 would be styled as 6 George I in *regnal* years. An exception to this is during the Commonwealth period (30 Jan 1649 to 29th May 1660) when ordinary dating was used. However, the regnal years for Charles II started counting from the death of Charles I on the 29th of January 1649. For the correct conversion of regnal years to ordinary years, it is best to consult a list of regnal years (Richardson 1974, 124-9).

Confusion, however, does not stop there, for there is one final calendar, the *exchequer* or *farming year*. Used primarily by landowners in their estate accounts, the year started at Michaelmas, the 29th of September. This reflected the natural cycle of sowing, growing, and harvest, and the sale of the produce following the harvest. Thus many of the estate accounts would be recorded in this manner, including the Bishop of Winchester's accounts, as well as Royal accounts, both of which are some of the England's prime sources for building accounts.

7.2.1 Documentary dates

Of the phases detailed in the Gazetteer, 61 have independent documentary dates ascribed (**Appendix 2A**). 70% of these were all felled within the same year as the documentary reference. 13% varied by one year, just under 7% varied by two years and the same for three years, and 2% varied by four years. One example, that from the eastern chapels of Salisbury Cathedral was excluded as the 1222

felling dates were in between the documented 1220 foundation stone laying, and the 1225 dedication service.

Documentary dates include licences to crenellate, documentary establishments of institutions such as almshouses and hospitals, foundation stone laying and dedication ceremonies, reports or letters discussing areas requiring repair, accounts of damage sustained through storms or fire, and renewal of leases specifying new building. Pipe or fabric rolls often give accounts relating to building or repairs. These include the purchase or granting of trees for a certain building project, specifications, actual payments made to carpenters, masons or other trades, and dated drawings or portraits.

Some projects were constructed over an extended period of time, with timber purchased in advance. No other building can boast of greater precision as to just when construction started than the Fellows' Quad at Merton College, Oxford, where on the 13th of September 1608 '*between the hours of eight and nine in the morning, the first and lowest foundation was laid of the new building*' (Bott 2004). Whilst some trees were felled in the autumn of 1608, others were felled a year earlier, and some as late as the following spring of 1609. College accounts show that construction continued for another two years.

Although dates relating to cathedrals exhibited considerable variation between individual samples, the variance between the latest felling date and the documentary date is no more extended than those relating to the larger country houses.

Whilst the majority of felling dates preceded the documentary dates, a small number actually post-dated the relevant documentary reference. Boarstall Tower in Buckinghamshire had a licence to crenellate dating from 1312, whilst the single felling date for a ground-floor ceiling joist dated to the winter of 1312/13. Similarly, the Round Tower at Windsor Castle had documentary accounts of timbers being purchased in 1354, whilst the earliest felling dates were from the winter of 1354/5. A similar delay was evident in the subsequent repairs to the Round Tower where a report by the Clerk of Works in 1577 was not acted upon until 1578, as evidenced by timbers being felled in the spring of that year (Miles and Worthington 2003).

Natural and man-made disasters also inevitably produced a substantial delay before the trees were felled. At Stowmarket Church, Suffolk, the spire collapsed in the great storm of January 1362, yet the felling dates of winter 1362/3 and winter 1363/4 show that some time elapsed before the spire was reconstructed (Simpson 1995). Similar delays were found in the collapse of the spire at Lincoln Cathedral in 1548. Whilst a number of timbers felled as early as 1542/3 were found and obviously came from materials stock-piled within the Cathedral, a later felling date of winter 1549/50 more closely represents the actual start of the repairs to the adjacent roofs. The great fire of Marlborough on the 28th of April 1653 destroyed much of the High Street, but it was not until summer 1656 when the latest felling date was found which showed three years had elapsed between the fire and the rebuilding of one of the buildings (Miles and Haddon-Reece 1995, 65-8).

Most often we find that timbers were felled in the winter immediately preceding a documentary construction date – nearly a third of all phases studied exhibited this relationship.

7.2.2 Timber date inscriptions

This category and the next category includes dates which have been carved or inscribed into the structure itself. A fundamental problem in interpreting these dates is just what do they commemorate? Some datestones will probably have nothing to do with the construction of a building, but might only relate to a marriage or purchase of the building. Other dates might relate to when the building was conceived, foundations were dug, or cornerstone laid. Alternatively, the date may relate to when the roof was complete, or when the interior was fitted out with panelling or plasterwork. Such dates would always use the *calendar* or *church* year which started on the 10th of March.

This category includes all dates applied to timber, generally carved or inscribed, but occasionally, as at Bretby Hall in Derbyshire, where the dates 1809 and 1813 are written in red crayon on the roof kingposts. Some 14 examples of inscribed dates on oak were recorded, with 36% of these occurring within the same year as the latest felling date. Dates varying by one year represented 14% of the sample population, as were samples varying by three years. One dates varying by two years, and another by four years made up 7% of the phases each, as did one each from 8, 9, and 14 years **(Appendix 2B)**.

Of the examples studied, five were dates carved on the exterior of the buildings, often with initials or an inscription, as at Cherrington Manor, Shropshire, dated to 1635. The remaining examples are divided between those hidden in roofs, belfries or in barns (one each), and those on public display. These latter examples include three examples of dates incorporated in panelling, and three others on or over door cases. There is no identifiable trend between types of inscriptions and the variation between tree-ring dates and inscribed dates. There are three extreme outliers, the first is a structural purlin dating 9 years earlier than the inscribed date of 1661 at 1 Soar Lane, Sutton Bonington, Nottinghamshire. This is probably represented by a later change in ownership or perhaps a marriage. Two other examples relate to later internal finishing works. The now-demolished Staunton Harold Church, Leicestershire, had a date inscription of 1653, yet the box pews produced five precise felling dates of winter 1661/2, suggesting the pews were a later addition to the church. And the inscribed date of 1577 on an internal door at 19-20 High Street, Kinver, Staffordshire, is 14 years later than the felling date for a structural timber. Again, an explanation probably lies in the internal finishes being completed some time after the structure was initially erected.

Otherwise, most of the other inscribed dates are later than the actual felling dates for the timbers. One notable exception is the Oak Room at Combermere Abbey, Cheshire, where a date plaque of 1563 is almost one year earlier than four precise felling dates for structural floor joists.

7.2.3 Datestones and other inscriptions in plasterwork, lead and iron

Here 20 examples were found with datestones or date inscriptions in materials other than oak. Like the timber date inscriptions, the calendar or church year would be used. Some 11 samples making up 55% of the examples were found to coincide within the same year as the latest precise felling date, whilst 25% were found to vary by only one year. Dates varying by two years as well as six years represented 10% of the sample population, and two examples varying by four years made up 10% of the total (**Appendix 2C**).

Eleven of the 20 dates are from datestones which are set in the external walls of buildings. These had variations ranging from perfect correlation to being four years out. The later examples are from sites with single precise felling dates, and some of these may have come from stock-piled timbers.

Two sites included dated plasterwork. This is particularly useful, in that the plasterwork is inevitably the last operation to be complete in a major building, giving a *terminus ante quem* for the building operations. At Plas Mawr in Conwy, the north range produced a latest felling date of summer 1576, and the plasterwork was completed in 1577, showing that only about one year elapsed between then the tree was growing in the woods to when it was covered by decorative plaster. The hall range at Plas Mawr showed slightly more time elapsing between the 1580 dated plaster, and the summer 1578 latest felling date. Mapledurham House in Oxfordshire shows a much more extended building period, with the major felling periods for timbers of spring 1608 and winter 1608/9 and spring 1609 for 13 of the main structural floor and ceiling timbers. This is a full three years earlier than the dated plaster ceiling of 1612. Interestingly, one stud from the long gallery is dated spring 1611, which suggests that the main structure of the house was completed perhaps in 1609 or 1610, but that a short delay of a couple of years allowed for minor internal alterations and for the large, deep ceiling joists to season before the application of the plaster.

One example in cast iron was noted, at Gunns Mills in Mitcheldean, Gloucestershire, where unusually the date is given as 1682-3, suggesting that the work was carried out over two years. Felling dates of winter 1681/2 suggest that some preparatory stock-piling of timber was carried out.

Inscribed rainwater hoppers are often found on later buildings. Two examples of these are correlated with precise felling dates. At Chastleton House, Oxfordshire, the 1795 dated hoppers are six years later than the felling dates of the roof timbers, suggesting that some stock-piling was in evidence. Chicksands Priory, Bedfordshire, has some hoppers dated 1814, which relate much more closely to felling dates between one and two years prior.

7.2.4 Inheritances, deeds, and other changes of ownership

A small number of 11 examples of documented changes in ownership relating to new leases, inheritances, and other changes in ownership which do not specifically mention building a new house were studied. Some 45% of these were found to relate to the same year as dated change of ownership,

whilst another 45% were found to vary by no more than one year after the documentary date. The remaining 10%, represented by a single example, had a felling date two years later. **(Appendix 2D)**.

Generally, these documents tended to correlate quite well, but of course only those documents which proved a relationship with the felling dates were included. Many more which had nothing to do with a building, or repairing of a building, were rejected. Where there was a correlation, the dates generally tended to be *earlier* than the precise felling dates obtained, unlike the other documentary dates discussed above. An exception to this is Tankerdale Farm, Steep, Hampshire, where the property was inherited in 1623, yet the three felling dates were from the winter of 1621/2 and spring 1622.

7.3 DISCUSSION

The analysis of five detailed building accounts has confirmed previous indications that the building process was carried out generally during the summer months, with the winter and spring being used to cut and prepare the oak timbers ready for framing. Usually, the majority of the work would be completed during the summer and autumn, where there was no risk from frosts upsetting the lime mortar and plaster. Study of a large number of transcribed building accounts from Salzman (1967) confirmed that building periods were often as short as a few months for simple timber-framed structures, although further allowance needs to be made for other trades such as plasters and tilers to complete the timber frame.

Study of building contracts for masonry buildings is equally enlightening, in that it would appear that 20 or even 30-foot high walls would be constructed in one building season. Conversely, it is the projects with more decorative stonework which would be extended for several or more years, none more obvious that the great cathedrals and monasteries.

Examples of comparing precise felling dates with building accounts as well as date stones show that construction usually commenced within twelve months of the latest date of felling, rarely extending to more than two years. Of 106 specific examples, 60% of these were found to correlate to the same year as the independent documented date, with 19% varying by no more than one year, and a further 7% varying by two years. The remaining 14% had felling dates ranging from three years to as much as 25 years earlier than the documentary date or date inscription. This demonstrates the importance in obtaining sufficient precise felling dates to correctly identify the latest date of felling to give the best interpretation in proposing likely construction dates.

The analysis of documented dates showed that date inscriptions tended to have the most variance with the actual precise dates, with little more than a third of the examples studied coinciding precisely. Much more reliable are actual documents relating to building operations, of which almost three-quarters related precisely to the latest felling date. Here, unlike the degree of variation between felling dates, there was no appreciable difference between cathedrals and other types of buildings.

8. DEVELOPMENT OF SAPWOOD ESTIMATION PROGRAM

The analysis performed in *Chapter 5* has shown that there is a strong correlation between the number of sapwood rings and the mean ring width, and to a lesser degree the age of tree. This relationship needed to be further examined to allow a predictive model to be constructed which would produce more accurate sapwood estimates. Therefore, a program was formulated to construct a model producing a set of parameters from any given set of sapwood data. A second program was developed to produce sapwood estimates from the model, and to graphically present the ranges for both individual samples as well as for a combination of samples making up a phase of building. In addition, a factor to account for stock-piling of timber was introduced into the program to allow a more representative estimation of the construction date for the particular building under study.

8.1 PRODUCING SAPWOOD MODELS

8.1.1 OxCal Sapwood Tool V4.1

Through the analysis conducted in Chapter 5, it was determined that both the mean ring width (M) and the age of tree (R) were useful independent variables in determining the number of sapwood rings (S). The data seemed to exhibit a power law dependency, therefore the data were compared as logarithms. This resulted in the formula:

$$s = [3.329 - 0.642\ m + 0.023\ r] \pm 0.2725$$

for which:
$s = \mathrm{Ln}(S)$
$m = \mathrm{Ln}(M)$
$r = \mathrm{Ln}(R)$

This equation was then used by Christopher Bronk Ramsey to construct a 'OxCal Sapwood Tool V1.4' routine in HTML format to determine the parameters of any given group of data which would include the sapwood complete to the bark edge (**Figure 8.1**). The data used in this example are from a group of eight samples from the New Building, Magdalen College, Oxford, all with complete sapwood (**Table 8.1**). This is a typical site with varying sapwood counts, with sample **mco51** having more than average, and **mco58** having less.

Sample	*H/S date*	*H/W rings (R)*	*HW MRW (M)*	*Felling date*	*Total rings*	*Sapwood (S)*
mco51	1695	114	1.142	1734	153	39
mco52	1711	49	2.491	1734	72	23
mco54	1711	119	1.105	1734	142	23
mco55	1714	87	1.131	1733	106	19
mco56	1712	67	1.652	1734	89	22
mco57	1707	82	1.158	1733	108	26
mco58	1719	126	1.296	1734	141	15
mco59	1708	75	1.15	1734	101	26

Table 8.1: Test data from the New Building, Magdalen College, Oxford

The tool performs the linear regression with s as the dependent variable, and m and r as the independent variables. It also calculates ranges (as described later in *Section 8.3.5*) and so can be used to test whole datasets.

The three variables of number of rings (R), mean ring width (M), and sapwood rings (S) would then be entered into the left hand 'Dataset' window in a tab-delineated form. This can be copied and pasted directly out of a spreadsheet. There is a limit of 5000 datasets which can be inserted at one time. Once all the data were entered, they were fitted, generating a series of parameters which are displayed in the right hand 'Parameters' window (**Figure 8.1**). Once the fitting is complete, a series of parameters, means, and equations are displayed (**Figure 8.2**).

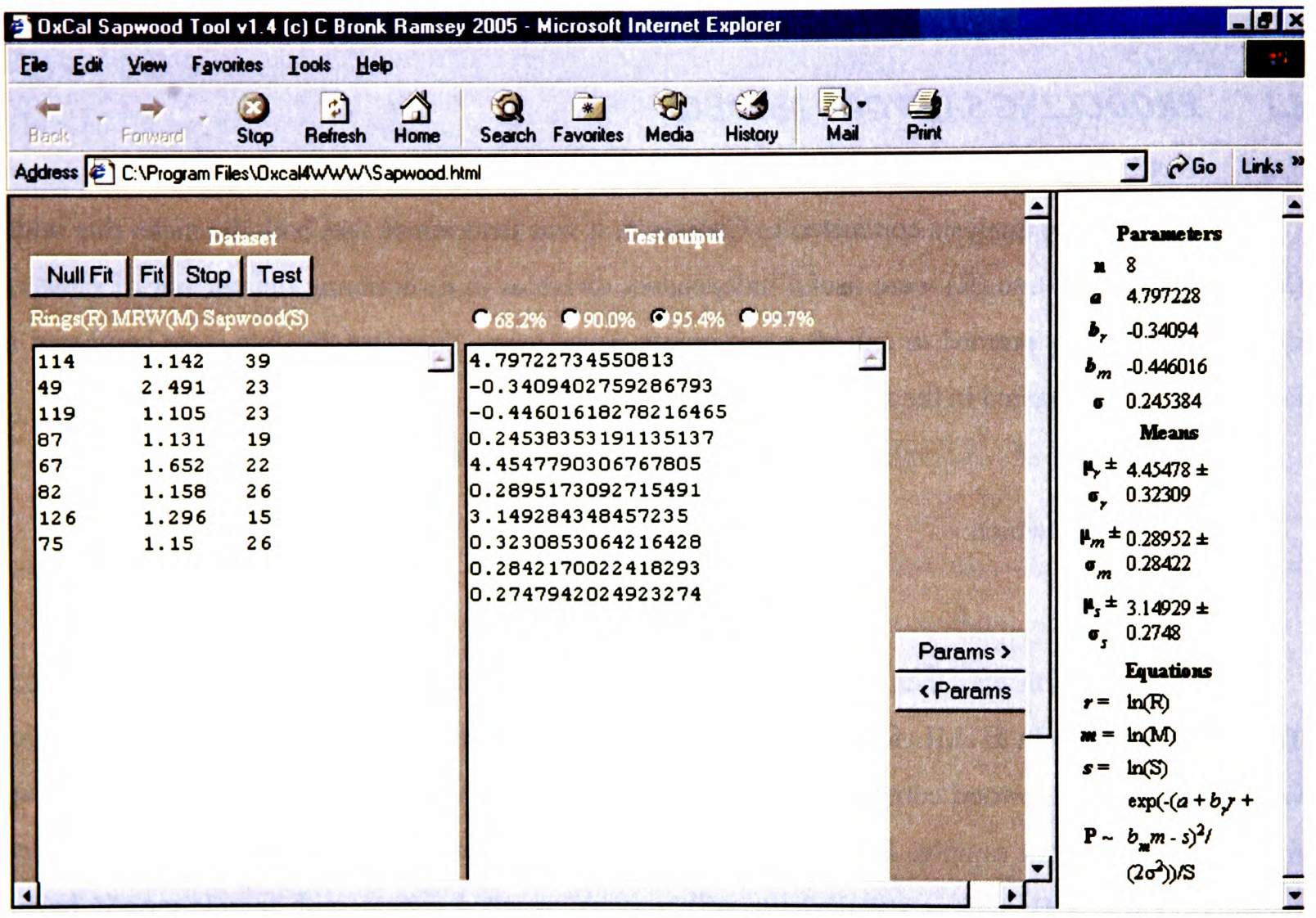


Figure 8.1: Testing form of OxCal Sapwood Tool (Bronk Ramsey 2005) showing data and parameters produced using demonstration data from the New Building, Magdalen College, Oxford.

The data are then tested against the parameters produced, and the data in the middle 'Test output' window are replaced by the beginning and end range predicted by the relevant model, together with the number of samples, the % of samples falling within the range predicted, and the mean of the 8 ranges produced (**Table 8.2**). There are also four options as to the confidence level to which the data can be tested: 68.2%, 90%, 95.4%, and 99.7%. Using the Magdalen College demonstration data, the test has shown that 7 out of 8 samples have fallen within the selected 95.4% range, and that the mean range is 23.5 years. The actual mean of the sapwood rings from these 8 samples is 24.1 years. The second part of **Table 8.2** shows the Magdalen College data tested against a model comprised of 3052

samples from England and Wales excluding all material dating before 1 AD (henceforth referred to as 'England and Wales AD'. Here the mean range has increased to 30.3 years, and all 8 samples have fallen within their respective ranges.

	Parameters
n	8
a	4.79602
b_r	-0.340708
b_m	-0.445386
σ	0.245422
	Means
$\mu_r \pm \sigma_r$	4.45478 ± 0.32309
$\mu_m \pm \sigma_m$	0.28954 ± 0.2843
$\mu_s \pm \sigma_s$	3.14929 ± 0.2748
	Equations
$r =$	$\ln(R)$
$m =$	$\ln(M)$
$s =$	$\ln(S)$
$P \sim$	$\exp(-(a + b_r r + b_m m - s)^2/(2\sigma^2))/S$

Figure 8.2: Parameters produced by OxCal Sapwood Tool (Bronk Ramsey 2005) using demonstration data from the New Building, Magdalen College, Oxford

number = 8
within range = 87.5%
mean range = 23.5yr

from	*true*	*to*
12	39	35
11	23	33
12	23	35
14	19	39
13	22	36
14	26	39
11	15	32
14	26	40

Tested against itself

number = 8
within range = 100%
mean range = 30.3yr

from	*true*	*to*
12	39	44
8	23	32
12	23	45
11	19	43
10	22	38
11	26	42
11	15	42
11	26	42

Tested against 3052 England & Wales samples

Table 8.2: Testing output of OxCal Sapwood Tool (Bronk Ramsey 2005 *in prep*) showing results using demonstration data from the New Building, Magdalen College, Oxford

This program can also be used to test other groups of data against a set of parameters making up a regional model, by pasting in the requisite datasets and the 10 parameters. The output of the testing can also be pasted back into the Excel spreadsheet and used for additional analysis.

8.1.2 Construction of models

Three models were constructed for testing.

The first model (**A**) comprised 3313 samples from mainland Britain, and covering the prehistoric, historic, and modern periods. Using the methodology outlined above, the following variables were entered: the number of heartwood rings, the mean ring width of the heartwood, and the number of sapwood rings. Although the distribution plots illustrated in **Figures 5.9** and **5.10** showed poorer correlation with the Scottish material, as well as the prehistoric data as shown in **Figure 5.20**, it was decided for comparative purposes to include all of this material into one model.

Parameters for 3313 samples with Heartwood MRW:		
a	1.7385238	*Data tested with Model A*
b_r	0.3137823	
b_m	-0.1706052	(68.2%) 74.2% within range
σ	0.2943089	12.8 years mean range
μ_r	4.4522722	
μ_m	0.5215984	(95.4%) 96.3% within range
μ_s	3.0465807	26.1 years mean range
σ_r	0.4524269	
σ_m	0.4504325	(99.7%) 99.5% within range
σ_s	0.3520268	41.3 years mean range

Table 8.3: Parameters and test results for Model A, consisting of 3313 samples from mainland Britain covering all chronological periods

The second model (**B**) again used all 3313 samples from mainland Britain from all periods, but this time only the mean ring width of the last 10 heartwood rings was used, as illustrated in **Figure 5.14**. This takes further the methodology used Ruoff and Walder in Switzerland (see *Section 2.1.2*). This model would be essential to test if the last decade of heartwood was more representative of the sapwood than the entire heartwood.

Parameters for 3052 samples from England & Wales AD with last heartwood decade MRW:		
a	2.829786	*Data tested with Model B*
b_r	0.073701	
b_m	-0.292419	(68.2%) 74.5% within range
σ	0.3021206	13.1 years mean range
μ_r	4.1553692	
μ_m	0.3087293	(95.4%) 96.3% within range
μ_s	3.0457626	26.7 years mean range
σ_r	0.5473667	
σ_m	0.5141343	(99.7%) 99.4% within range
σ_s	0.3485959	42.4 years mean range

Table 8.4: Parameters and test results for Model B, consisting of 3052 samples from England and Wales excluding prehistoric materials and using mean ring width of last decade of heartwood

The third model (**C**) excluded the Scottish samples as well as the prehistoric samples, leaving 3052 samples included in the model.

Parameters for 3052 samples from England & Wales AD with heartwood rings & MRW:		
a	2.877146	*Data tested with Model C*
b_r	0.0838962	
b_m	-0.3208009	(68.2%) 74.2% within range
σ	0.3095663	13.3 years mean range
μ_r	4.1553692	
μ_m	0.5611053	(95.4%) 96% within range
μ_s	3.0457626	27.3 years mean range
σ_r	0.5473667	
σ_m	0.4094178	(99.7%) 99.6% within range
σ_s	0.3485959	43.6 years mean range

Table 8.5: Parameters and test results for Model C, consisting of 3052 samples from England and Wales excluding prehistoric material

Once the models were constructed, the data used were tested against the various models at the three standard confidence levels of 68.2%, 95.4%, and 99.7%. All the models exceeded the 68.2% confidence level with between 74.2% and 74.5% of the samples coming within range. All models also exceeded the 95.4% confidence level, but by a very small margin, the values being between 96% and 96.3% of the samples within range. None of the models quite reached the 99.7% confidence level, with between 99.4% to 99.6% of the samples being within range. All three models have performed virtually identically, but Model C, that for the 3052 samples from England and Wales AD, had come marginally closest at all three confidence levels. All three models would be tested against the raw data, both individually as well as in phases in Chapter 9 to determine which was the most appropriate model to use.

8.2 PRODUCING FELLING DATE RANGES

8.2.1 Bayesian methodology for producing sapwood estimates

Although the Sapwood Tool routine discussed above can generate the necessary parameters needed to construct a model from which a sapwood range for any given individual sample can be predicted; a method of presenting these results in a more user-friendly manner was sought. Additionally, a method of producing a reduced combined felling date range for a group of contemporary samples was needed. The program OxCal (Bronk Ramsey 1995) developed for the calibration of radiocarbon dates has a very useful function of graphically plotting the probability distribution of the results at various confidence levels. This also had the very attractive feature of combining the various felling date ranges for a series of individual samples into a single combined date range, employing Bayesian statistics. Using the results of this research, a new version of OxCal is presently being developed by Christopher Bronk Ramsey incorporating a dendrochronology function which would

calculate and present felling date ranges within the existing OxCal graphics framework (Bronk Ramsey *in prep*).

Bayesian probability statistics were initially proposed by Thomas Bayes, a mid-eighteenth century English theologian and mathematician. He was the first to use probability assessments inductively, which means to calculate the probability of a new event on the basis of earlier probability estimates which have been derived from empiric data. Bayes set down his ideas on probability in his *Essay Towards Solving a Problem in the Doctrine of Chances* (1763, published posthumously). That work became the basis of a statistical technique, now called Bayesian statistics (Abelard 2002).

A key feature of Bayesian methods is the notion of using an empirically derived probability distribution for a population parameter. The Bayesian approach permits the use of objective data or subjective opinion in specifying a prior distribution. With the Bayesian approach, different individuals might specify different prior distributions. Classical statisticians argue that, for this reason, Bayesian methods suffer from a lack of objectivity. However, Bayesian proponents correctly argue that the classical methods of statistical inference have built-in subjectivity through the choice of a sampling plan and the assumption of 'randomness' of distributions, and that an advantage of the Bayesian approach is that the subjectivity is made explicit. However, a prior distribution cannot easily be argued to be strongly 'subjective' (Abelard 2002).

OxCal uses the basic equation which is a continuous probability distribution proportional to:

$$\exp\left(-(a+b_r r + b_m m - s)^2 / (2\sigma^2)\right)/S$$

This is very similar to that used by Millard (2002), which outlines the equation used to define the probability density of sapwood rings given by a lognormal distribution as:

$$p(n \mid \lambda,\delta) = \int_{n-½}^{n+½} \frac{1}{x\delta\sqrt{2\pi}} \exp\left[-\frac{(\ln x - \lambda)^2}{2\delta^2}\right] dx$$

And in our notation, the following is very similar except that it is integrated into discrete years:

$$p(n \mid \mu, \sigma) = \int_{n-½}^{n+½} \frac{1}{S\mu\sqrt{2\pi}} \exp\left[-\frac{(\mu - \ln(S))^2}{2\sigma^2}\right] ds$$

This is the probability for a specific number of sapwood rings. In OxCal the probability distribution is treated as continuous rather than in terms of individual years (though for the purposes of this work the resolution in OxCal is set to one year). This means that strictly speaking this is the time in years between formation of the heartwood/sapwood boundary and the felling of the tree (which may include a fraction of a year).

And thus: $p(S \mid \mu, \sigma) \propto \exp(-(\mu - \ln(S))^2/(2\sigma^2))/S$ for a given μ.

The model derived above gives: $\mu = a + b_r r + b_m m$

and the above equation becomes: $p(S) \propto \exp(-(a + b_r r + b_m m - s)^2/(2\sigma^2))/S$

This distribution can be numerically normalised to give probabilities and thereby determine the highest probability density nearest to 95.4% (Millard 2002).

Thus, for those timbers with no sapwood rings remaining, but where a clear heartwood/sapwood boundary survives, Millard (2002) gives the following equation, with H_i representing the last heartwood ring date:

As suggested by Millard, when sapwood rings are present:

$$P \propto \begin{cases} \exp(S - S_m \mid \lambda, \delta) & \text{for } S \geq S_m \\ 0 & \text{for } S < S_m \text{ (number of sapwood present)} \end{cases}$$

For determining a *terminus post quem* for those samples with no surviving evidence of the heartwood/sapwood boundary (for which an unknown number of heartwood rings may have been removed), the following formula is given:

$$l(\theta ; H_i) \begin{cases} 1 & \text{for } H_i < \theta, \\ 0 & \text{for } H_i \geq \theta, \end{cases}$$

Finally, by taking a vague prior in which no one year is preferred over another initially, the combined posterior for producing combined felling date ranges is defined by (Millard 2002):

$$p(\theta \mid \mathbf{H},\mathbf{a}) \propto \prod_i l(\theta ; H_i, a_i).$$

Using Bayesian statistics, OxCal plots the area of highest probability for any selected confidence level, producing the range, rounded to the nearest year, and plotting this graphically (**Figure 8.3**). What is extremely useful is the function of producing a combined date range for a group of presumably coeval samples. An additional function, using the above equations, has been added in a developmental version to produce probability distributions of dates based on sapwood estimates (Bronk Ramsey 2005 *in prep*).

8.2.2 Applying a stock-piling factor

Chapter 6 clearly concluded that in phases consisting of two or more samples, over one third of all samples were found to have been felled over more than one year (**Table 6.1**). Of the 1760 samples included in the 492 phases analysed, 19.3% of samples were found to vary by two years, 6.1% were found to vary by three years, and 2.8% of the samples varied by four years. Further years showed a

reduction of variation which exhibited a power-law dependency (**Figure 6.1**). Experiments to factor in an allowance for stock-piling based on this method proved unsatisfactory due to the problem of where to cut the power law off at the bottom end.

Therefore an empirical distribution, based on the data analysed, was added to the felling date ranges (**Table 8.6**). This was not included in the model itself, but was used to adjust the outer limits of the felling date range produced for each sample individually. Generally this had the effect of adding about one year to the outer end of the range, depending on the variables.

Years	*%*	*Years*	*%*	*Years*	*%*	*Years*	*%*
-2	0	7	0.004	16	0	25	0.0006
-1	0	8	0.0045	17	0.0011	26	0
0	0.664	9	0.0034	18	0.0028	27	0
1	0.193	10	0.0011	19	0	28	0
2	0.061	11	0	20	0	29	0
3	0.028	12	0.0011	21	0	30	0
4	0.013	13	0	22	0	31	0.0006
5	0.011	14	0	23	0.0011	32	0
6	0.0046	15	0.004	24	0	33	0

Table 8.6: Empirical distribution of variation in felling dates for each year difference

8.3 PLOTTING AND UNDERSTANDING RESULTS

Data from a site are formatted through an interface with OxCal Input (Bronk Ramsey *in prep*). The demonstration data from Magdalen College are therefore arranged in the following format:

```
Options()
{
 Resolution=1;
};
Plot()
{
 Sapwood_Model("England & Wales AD",
       2.877146, 0.0838962, -0.3208009, 0.3095663);
 Combine("MAGDALEN3")
 {
  Sapwood("mco51", 1695, 114, 0, 1.142192982);
  Sapwood("mco52", 1711, 49, 0, 2.491428571);
  Sapwood("mco54", 1711, 119, 0, 1.104705882);
  Sapwood("mco55", 1714, 87, 0, 1.131149425);
  Sapwood("mco56", 1712, 67, 0, 1.65238806);
  Sapwood("mco57", 1707, 82, 0, 1.15804878);
  Sapwood("mco58", 1719, 126, 0, 1.295555556);
  Sapwood("mco59", 1708, 75, 0, 1.15);
 };
};
```

Table 8.7: Demonstration data from the New Building, Magdalen College, after formatting

Using the methodology outlined above, data were then run through various parts of the OxCal Plot program to examine how the resulting estimated ranges performed. Using the model for England and Wales AD, and the sample data from the New Building, Magdalen College, the various plotting functions were explored.

8.3.1 Samples with heartwood/sapwood boundaries only

This category looks at samples which, whilst retaining no sapwood, still showed clear evidence for a heartwood/sapwood boundary. This is the worst-case scenario for sapwood estimation, with perhaps those samples with no heartwood/sapwood boundaries at all, for there is no scope for reducing the ranges with surviving sapwood.

The data from Magdalen first had all of their sapwood rings removed and were then entered into the OxCal Plot program, the results of which were incorporated in the following table:

Sample	*Felling date*	*Estimated date range*	*Range (years)*	*Min. range*	*Max. range*	*Sapwood (S)*	*H/S date*	*H/W rings (R)*	*HW MRW (M)*
mco51	1734	1707-1739	32	12	44	39	1695	114	1.142
mco52	1734	1720-1743	23	9	32	23	1711	49	2.491
mco54	1734	1723-1756	33	12	45	23	1711	119	1.105
mco55	1733	1726-1757	31	12	43	19	1714	87	1.131
mco56	1734	1722-1750	28	10	38	22	1712	67	1.652
mco57	1733	1719-1750	31	12	43	26	1707	82	1.158
mco58	1734	1731-1762	31	12	43	15	1719	126	1.296
mco59	1734	1720-1751	31	12	43	26	1708	75	1.15

Table 8.8: Test data from the New Building, Magdalen College, Oxford with 95.4% felling date ranges for samples with heartwood/sapwood boundaries surviving but no sapwood

The results show that, as expected, the range of sapwood varied between 28 to 33 years, compared with the empirical range of 32 for southern England produced in 1997 (Miles 1997). However, the mean of the estimated ranges is 30, compared with the actual mean 24 years for the 8 samples. Nevertheless, it can be seen that each sample has had an individual felling date range calculated, with different minimum and maximum ranges, and that these ranges are calculated on the variable mean ring width of the heartwood and the number of existing heartwood rings. For instance, sample **mco52** has few rings and wider mean ring width, consequently the 23-year range is significantly narrower than the sample **mco54** which has a range of 33 years with more heartwood rings but narrower mean ring width. Hence, each range is more appropriate for the age of tree and mean ring width of the individual sample than the empirical blanket range.

OxCal Plot also plots out the distribution of each sample as shown in **Figure 8.3**. The distribution is graphically shown with the 95.4% highest probability density bracketed beneath. The graphs can also show 68% and 99.7% probabilities. What is especially appealing with this type of graph is that it shows broadly where in the range the most likely felling period is, without resorting to the danger of estimated precise felling dates.

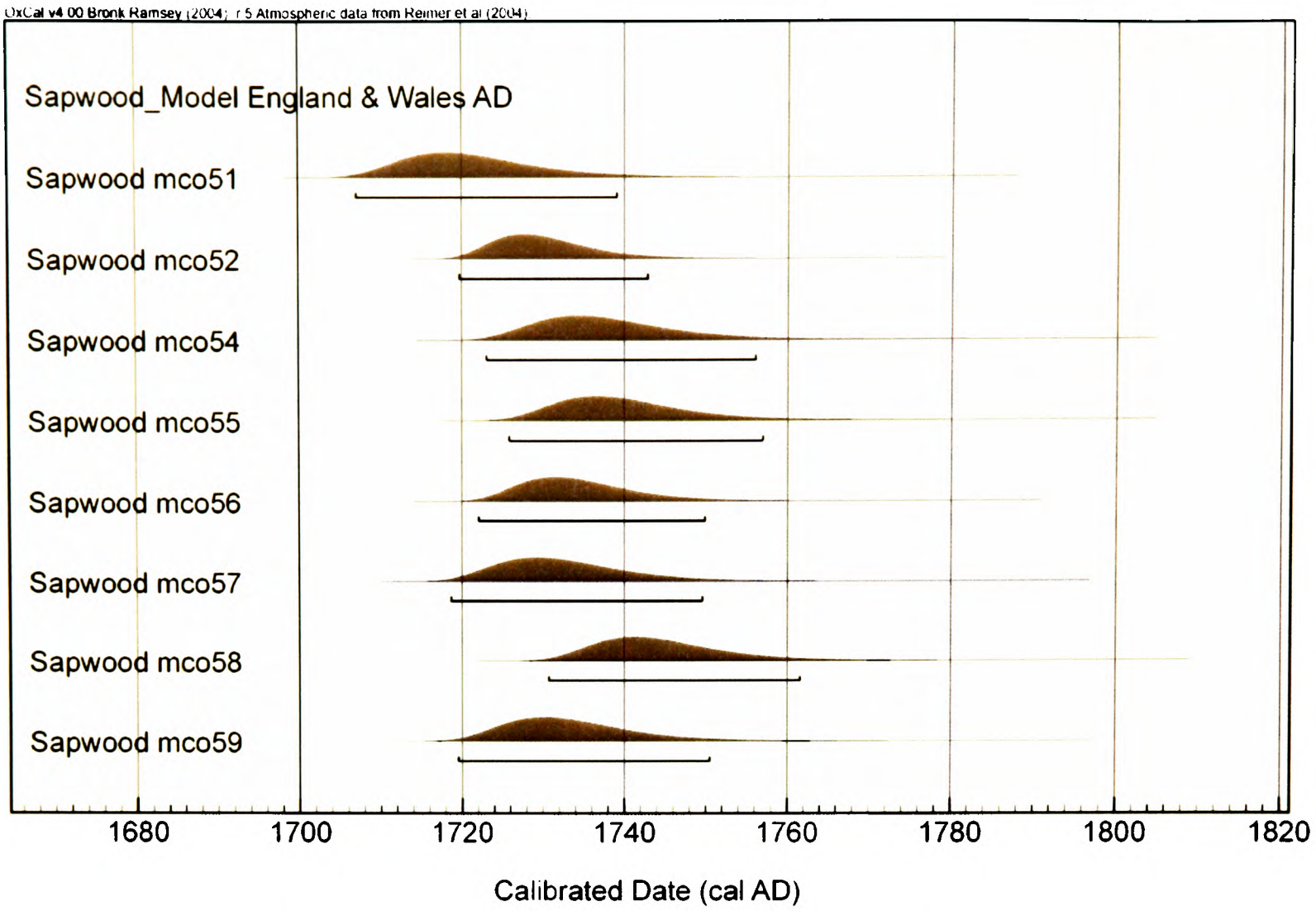


Figure 8.3: OxCal Plot of 95.4% probability distributions for individual samples without sapwood from the New Building, Magdalen College, Oxford

8.3.2 Samples with no heartwood/sapwood boundaries - TPQs

Samples without any heartwood/sapwood boundaries can only produce a *terminus post quem*, or *tpq*. This category represents the worst possible case for interpreting a felling date, as only the early part of the range can be used, i.e. the sample could not have been felled any earlier than a certain date.

Like the samples with partial sapwood discussed in *Section 8.3.3* below, the formula for determining *tpq*s operates in the same way as proposed by Millard (2002). This is a conservative method which does not make any allowance for possible missing heartwood rings, but simply truncates the distribution of the lower end of the range. Normally these would not be plotted unless they formed part of a group of samples where it affected the early part of the combined felling date range, as discussed in *Section 8.3.6*. In formatting the data for plotting in OxCal, the sample entry

```
Sapwood("mco58", 1719, 126, 0, 1.295555556);
```

is replaced by

```
After("mco58"){Date(1731);};
```

with the heartwood/sapwood boundary date of 1719 being replaced with the early end range date, which in this particular example is 1731. To determine this date, it is necessary to first run the sample for which a *tpq* is required in OxCal as though it had a heartwood/sapwood boundary, and then change the coding as shown above.

8.3.3 Samples with some sapwood surviving

This category of felling date range is that where some, but not all, of the sapwood still survives on the sample, or some note was made of rings lost during the sampling process. Taking the same set of data, each sample has had a number of sapwood rings entered as being present in five-year intervals, and the results shown in **Table 8.9**.

A number of trends were noticed through this analysis. First, when adding five or ten rings of sapwood, there was no change to the results until the sapwood added exceeded the minimum range predicted by the sample with no sapwood. These were then plotted as shown in **Table 8.9**. Once the lower end of the range was surpassed by the added sapwood, then the minimum range was correspondingly adjusted. However, the outer end of the range was first reduced by as much as a year. As the sapwood continued to be added in five-year increments, the outer range increased. Once the actual number of sapwood rings was reached, the outer limit would be as much as ten years later. This was most noticeable on those samples with the highest sapwood ring count. The mean outer end of the range had thus changed from 41 to 44 years over the 8 samples.

The estimated mean of the eight ranges of 30 years had reduced to a mean of 20.75 once the full sapwood compliment was added to each sample.

So why should this trend for expanding the outer limits of the felling date range, after a slight momentary reduction occur? The reason is due to the method of taking the highest probability density which is slightly skewed to the earlier years. When the range is reduced at the earlier end by just a few years, the area of 95.4% probability is shifted slightly earlier. When the lower end of the range is further reduced, then the area of highest probability density is shifted the other way, extending the outer end of the range.

As in **Figure 8.3**, OxCal Plot graphically plots out the distribution of each sample with the felling date ranges truncate and re-adjusted, as shown in **Figure 8.4**. The samples used in this example have all had 20 rings of sapwood added to the samples, except where they have a total sapwood compliment lower than 20 years. The bracketed range now starts at the lower end of the range, which can clearly be seen to be truncated. Comparison of the plots with those in **Figure 8.3** shows the slightly extended outer end of the ranges. Again, the graphs can also show 68% and 99.7% probabilities.

Sample +(sap)	*Felling date*	*Estimated date range*	*Range (years)*	*Min. range*	*Max. Range*	*Sapwood (S)*	*H/S date*	*H/W rings (R)*	*HW MRW (M)*
mco51	**1734**	**1707-1739**	**32**	**12**	**44**	**39**	**1695**	**114**	**1.142**
(15)		1710-1738	28	15	43				
(20)		1715-1739	24	20	44				
(25)		1720-1742	22	25	47				
(30)		1725-1745	20	30	50				
(35)		1730-1749	19	35	54				
(39)		1730-1749	19	35	54				
mco52	**1734**	**1720-1743**	**23**	**9**	**32**	**23**	**1711**	**49**	**2.491**
(10)		1721-1742	21	10	31				
(15)		1726-1743	17	15	32				
(20)		1731-1746	15	20	35				
(23)		1734-1749	15	23	38				
mco54	**1734**	**1723-1756**	**33**	**12**	**45**	**23**	**1711**	**119**	**1.105**
(15)		1726-1755	29	15	44				
(20)		1731-1756	25	20	45				
(23)		1734-1757	23	23	46				
mco55	**1733**	**1726-1757**	**31**	**12**	**43**	**19**	**1714**	**87**	**1.131**
(15)		1729-1756	27	15	42				
(19)		1733-1756	23	19	42				
mco56	**1734**	**1722-1750**	**28**	**10**	**38**	**22**	**1712**	**67**	**1.652**
(10)		1722-1749	27	10	37				
(15)		1727-1749	22	15	37				
(20)		1732-1751	19	20	39				
(22)		1734-1752	18	22	40				
mco57	**1733**	**1719-1750**	**31**	**12**	**43**	**26**	**1707**	**82**	**1.158**
(15)		1722-1749	27	15	42				
(20)		1727-1750	23	20	43				
(25)		1732-1753	21	25	46				
(26)		1733-1754	21	26	47				
mco58	**1734**	**1731-1762**	**31**	**12**	**43**	**15**	**1719**	**126**	**1.296**
(15)		1734-1761	27	15	42				
mco59	**1734**	**1720-1751**	**31**	**12**	**43**	**26**	**1708**	**75**	**1.15**
(10)		1720-1751	31	12	43				
(15)		1723-1750	27	15	42				
(20)		1728-1751	23	20	43				
(25)		1733-1754	21	25	46				
(26)		1734-1754	20	26	46				

Table 8.9: Test data from the New Building, Magdalen College, Oxford with 95.4% felling date ranges produced for samples with some sapwood remaining

8.3.4 Adding a factor for stock-piling

Examination of the variation in felling dates within phases of construction has shown that a certain percentage would have been felled over the course of one year or more. By applying a factor for stock-piling as set out in *Section 8.2.2* to the test data from Magdalen College, the results are shown in **Table 8.10**

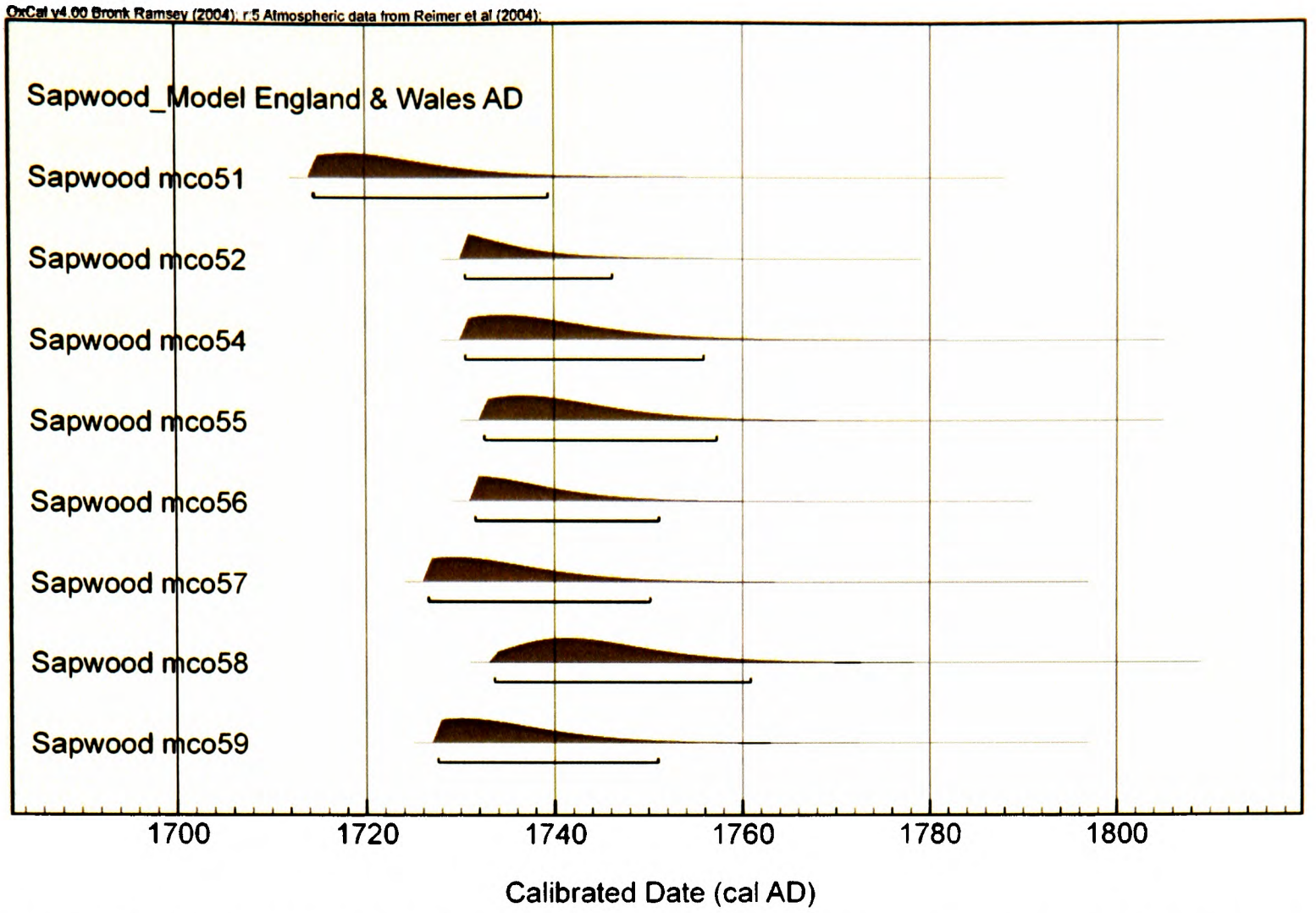


Figure 8.4: OxCal Plot 95.4% probability distributions for individual samples with up to 20 rings of sapwood from the New Building, Magdalen College, Oxford

Sample	*Felling date*	*Estimated date range*	*Range (years)*	*Min. range*	*Max. range*	*Sapwood (S)*	*H/S date*	*H/W rings (R)*	*HW MRW (M)*
mco51	**1734**	**1707-1739**	**32**	**12**	**44**	**39**	**1695**	**114**	**1.142**
+ *Stock-piled*		1707-1741	34	12	46				
mco52	**1734**	**1720-1743**	**23**	**9**	**32**	**23**	**1711**	**49**	**2.491**
+ *Stock-piled*		1720-1745	25	9	34				
mco54	**1734**	**1723-1756**	**33**	**12**	**45**	**23**	**1711**	**119**	**1.105**
+ *Stock-piled*		1724-1757	33	13	46				
mco55	**1733**	**1726-1757**	**31**	**12**	**43**	**19**	**1714**	**87**	**1.131**
+ *Stock-piled*		1726-1759	33	12	45				
mco56	**1734**	**1722-1750**	**28**	**10**	**38**	**22**	**1712**	**67**	**1.652**
+ *Stock-piled*		1723-1751	28	11	39				
mco57	**1733**	**1719-1750**	**31**	**12**	**43**	**26**	**1707**	**82**	**1.158**
+ *Stock-piled*		1719-1751	32	12	44				
mco58	**1734**	**1731-1762**	**31**	**12**	**43**	**15**	**1719**	**126**	**1.296**
+ *Stock-piled*		1731-1763	32	12	44				
mco59	**1734**	**1720-1751**	**31**	**12**	**43**	**26**	**1708**	**75**	**1.15**
+ *Stock-piled*		1720-1752	32	12	44				

Table 8.10: Test data from the New Building, Magdalen College, Oxford with 95.4% felling date ranges for samples with heartwood/sapwood boundaries surviving but no sapwood

The analysis of the data with a stock-piling factor has shown that generally the range in years has increased by one or two years at most, with the mean range increasing from 30 to 31 years. The minimum range has remained the same with only two exceptions where it has increased by one year. The maximum range however has increased by at least one year for all of the samples, with three of them being increased by two years.

The graphical representation in OxCalPlot now shows two plots for each sample – one with the stock-piling factor added, the other with the sample before stock-piling (**Figure 8.5**).

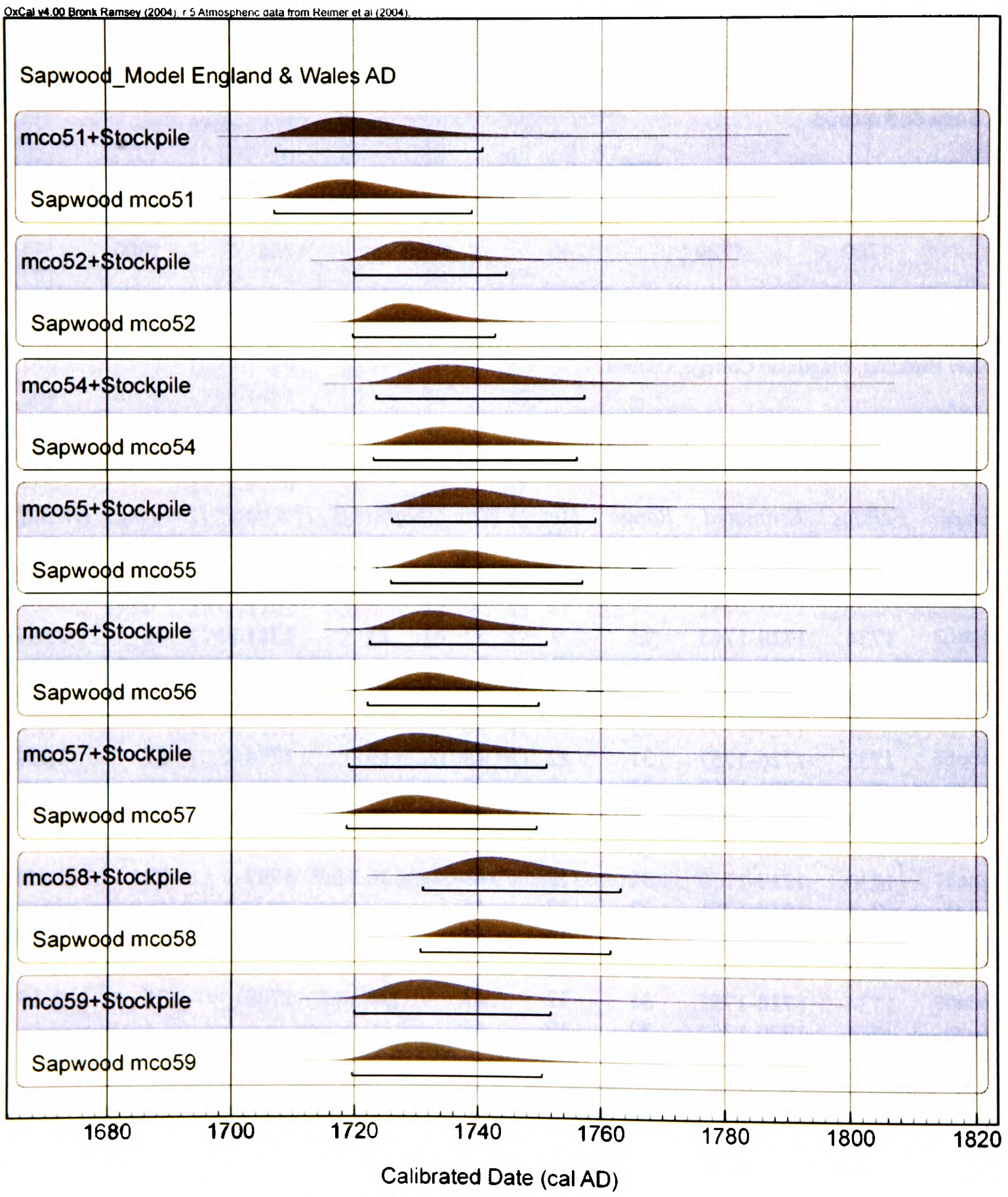


Figure 8.5: OxCal Plot of 95.4% probability distributions for individual samples without sapwood from the New Building, Magdalen College, Oxford, showing ranges with and without stock-piling factor

8.3.5 Ranges for combined phases

The next stage of the estimation of felling date ranges is the combination of estimated ranges from a group of individual timbers which represent one building phase or period. Most historic buildings are constructed in easily-discernible sections that were generally fabricated and erected in one, or at most, two years. Thus, timbers would have been either felled, or bought in, for that particular phase of building. Of course certain exceptionally large high-status buildings would often involve extended building periods and stock-piled timbers, as discussed in Chapter 6, but the majority of buildings can be broken down into separate phases of building.

Using the demonstration data from the New Building, Magdalen College, the data are entered under the 'Combine' function. This can be plotted as shown in **Figure 8.3**, showing the various probability distribution plots for each sample. But in addition, the OxCalPlot program will overlay the shaded combined felling date range over each sample plot, in addition to showing one for the combined phase on its own at the top, as shown in **Figure 8.6**. Thus, for the group of 8 samples, a combined felling date range at 95.4% for the phase is 1729-1739. The ability to effect such a dramatic reduction in range is of exceptional importance.

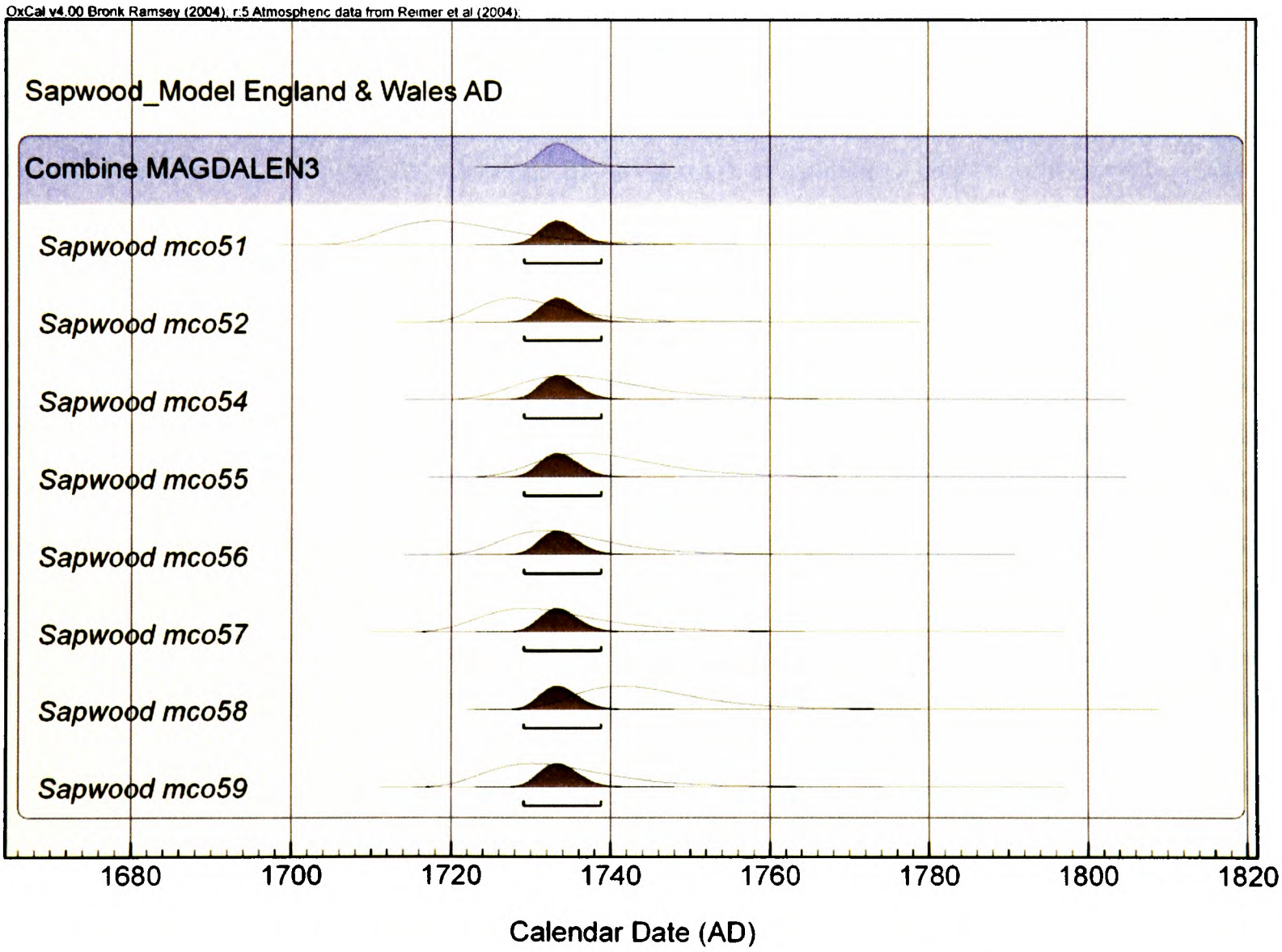


Figure 8.6: OxCal Plot of 95.4% combined probability distribution for samples without sapwood from the New Building, Magdalen College, Oxford, giving a combined felling date range of 1729-1739 for the group

However, the level of agreement between all samples included in the combined phase should be at least 60 (Bronk Ramsey 1995). This uses a form of overlap integral. **Table 8.11** shows the agreement for each individual sample to the others, as well as one for the combined phase. This agreement level for the combined phase will vary, depending on the number of samples included in the phase, for instance 2 samples should have an agreement of at least 50, 3 samples $\geq$ 40.8, 4 $\geq$ 35.4, 5 $\geq$ 31.6, 6 $\geq$ 28.9, 7 $\geq$ 26.7, and 8 $\geq$ 25. The output table from OxCalPlot clearly shows if this agreement is below acceptable levels, as it is shown in red. If the level of agreement is exceptionally low for the phase, i.e. lower than 25% of the minimum level, then it will be considered to have failed, and a warning to that effect will be displayed.

The results for the demonstration data are shown in **Table 8.11**, and sample **mco51** can be seen to have an agreement level lower than 60. In order to see the effect of removing those samples with poor agreement, sample **mco51** was removed and the combined felling date range re-calculated, this time producing a range of 1730-1740. The one year shift forwards was due to the removal of **mco51**, which weighted the distribution to the earlier part of the range. Now, all of the agreement indices for the seven-year combined phase are $\geq$ 60.

However, by continuing to remove one sample at a time from the group, the ranges gradually expanded, so that by the time only two samples were left, the range was 1730-1750, twice as wide as the 10-year range of the 8-sample phase (**Table 8.10**). This demonstrates the effect that having more samples included in a phase dramatically reduces the combined felling date range.

Sample:	*Ag:*	***Ag & combined felling date ranges:***						
mco51	37.0	**86.8 1729 - 39**						
mco52	89.9	80.9	**123.8 1730 - 40**					
mco54	136.9	137.1	134.8	**135.0 1730 - 42**				
mco55	131.1	128.5	132	131	**119.3 1730 - 42**			
mco56	60.1	125.6	116.7	114.4	114.8	**105.5 1729 - 43**		
mco57	126.2	113.5	104.2	102.3	103.6	93.3	**93.7 1729 - 46**	
mco58	123.2	72	86.8	88.7	85.1	95.9	106.9	**91.4 1730 - 50**
mco59	120.2	120.1	111.1	109.2	110.1	99.8	82.3	
Range:	**10**	**10**	**12**	**12**	**14**	**14**	**20** *years in width*	

Table 8.11: Combined felling date ranges and resulting agreement with the phase from the New Building, Magdalen College, illustrating the increase in range width in relation to the reduction the number of samples included in phase

By adding the stock-piling factor to the group of eight samples, the combined range is increased from 1729-1739 to 1730-1739. By removing sample **mco51**, which has poor agreement with the other seven samples, the combined range is increased from 1730-1740 to 1730-1741. This shows an initial shift of one year at the lower end of the range for all eight samples, but then it is the outer end of the range which shifts one year later when the seven samples which are all in agreement are used.

This method of using such an agreement level is controversial however, as one should expect that one in 20 to lie below the acceptable agreement values by chance, and technically should not require removing from the group of samples. Ideally, the overall agreement of the phase should be above the requisite threshold, but caution should be used in using the combined phase date when the agreement level is substantially lower. Where the level of agreement is so poor as to have failed the agreement test, this phase should be rejected.

8.3.6 Ranges for combined phases including TPQs

Whilst samples with no evidence of a heartwood/sapwood transition are of little value in either plotting results or the overall interpretation of a phase of building, there are exceptions when *tpq*s need to be considered. The first is when a sample with no sapwood has a last measured ring date later than other heartwood/sapwood boundary dates within a phase, which would alter the earlier end of the combined phase date range. The second is when none of the samples in a phase have evidence of a heartwood/sapwood transition.

Taking the demonstration dataset from Magdalen College, it will be noted that sample **mco58** has a heartwood/sapwood boundary of 1719, significantly later than the other samples (**Table 8.1**). The combined felling date range for the phase including all the samples as shown in **Figure 8.6** gives a combined felling date range of 1729-1739. For demonstration purposes only, let us assume that the heartwood/sapwood boundary date of 1719 on sample **mco58** is actually a last measured ring date with no evidence of sapwood. First, the early end of the range is calculated as shown in *Section 8.3.2* above, giving a *tpq* date of 1731. The OxCal data input is thus changed to

```
After("mco58"){Date(1731);};
```

within the phase. The formatted data is then run through OxCalPlot, which produces the plot in **Figure 8.7**, producing a reduced combined felling date range of 1731-1738 for the phase. The outer end of the combined range has shifted by one year due to the removal of the outer end of sample **mco58**. Again, the stock-piling factor can be used, with the sample input of

```
After("mco58"){Date(1719)+Prior("Stock-pile");};
```

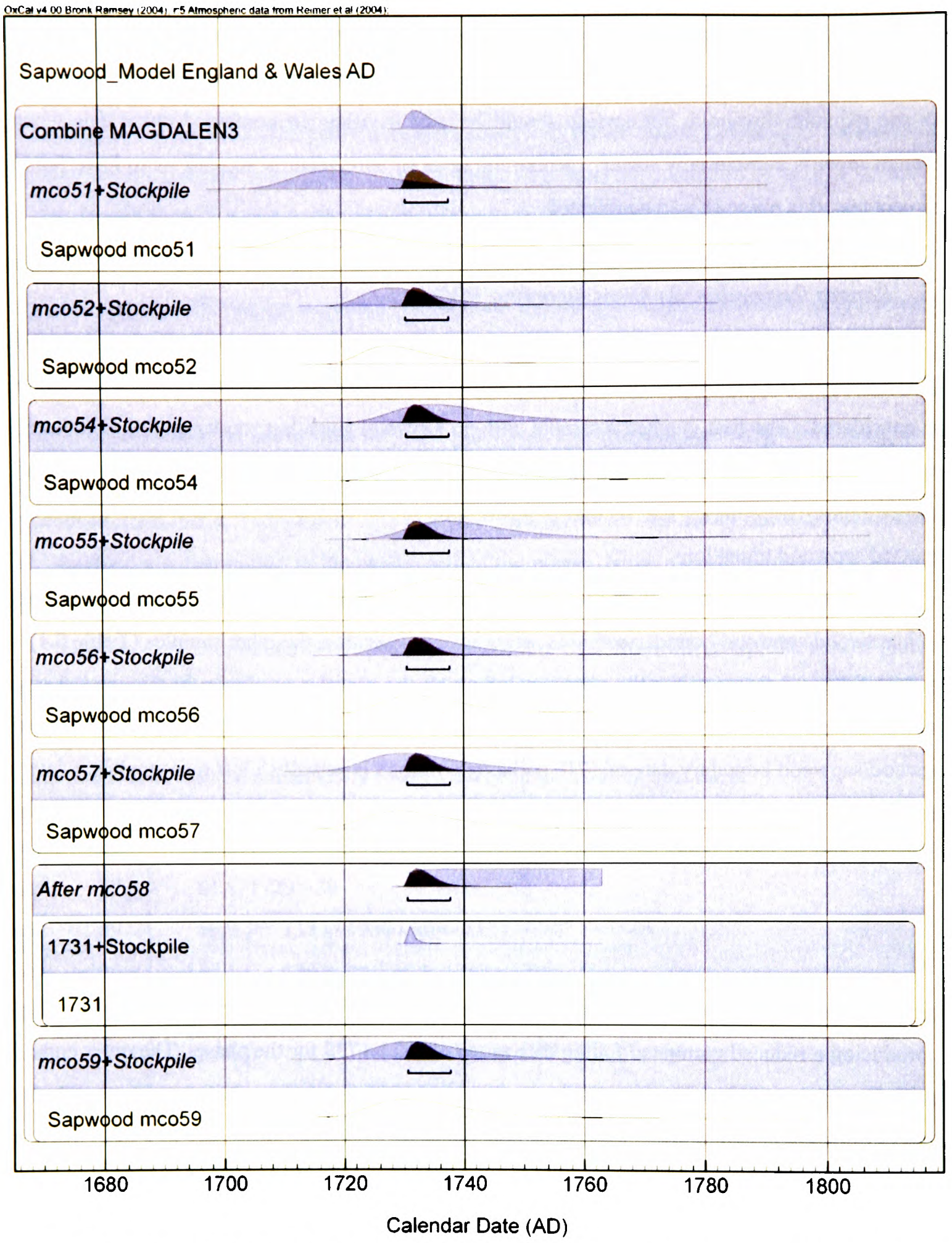


Figure 8.7: OxCal Plot of 95.4% probability distributions for individual samples without sapwood from the New Building, Magdalen College, Oxford, showing ranges with and without stock-piling factor, and plotting the combined felling date range of 1731-1738, taking into account a *tpq* for sample **mco58**

8.3.7 Interpreting groups of TPQs

Individual samples without any evidence of a heartwood/sapwood boundary can only be given a *terminus post quem*; similarly if there are only a few such samples with varying end dates, again these can only be presented as a series of *termini post quem* dates. However, if a large enough assemblage of such samples without heartwood/sapwood boundaries are cross-matched together, and found to have

comparable last heartwood ring dates, then some approximate estimate of the missing rings might be made. In France, Lambert *et al* (1997, 229-33) have made some basic observations regarding the number of missing rings of heartwood, and estimates up to 10 rings would be removed on trees up to 150 years old, and up to 50 rings on trees over this age.

Samples from building timbers are less likely to show suitable consistency without 25 or more samples than riven panels or boards. The example shown in **Figure 8.8** is from a group of Irish roof timbers from the eastern chapels at Salisbury Cathedral. A few felling dates indicate the felling date of 1222, and the chapels were consecrated in 1225, so construction of the roofs would probably have commenced during 1223. Whilst the heartwood/sapwood dates are very consistent, those without any evidence of heartwood/sapwood boundaries vary by almost a century or more (Miles 2002a). Nevertheless, the ten timbers with no evidence of sapwood showed a cluster not much before the earliest heartwood/sapwood boundary.

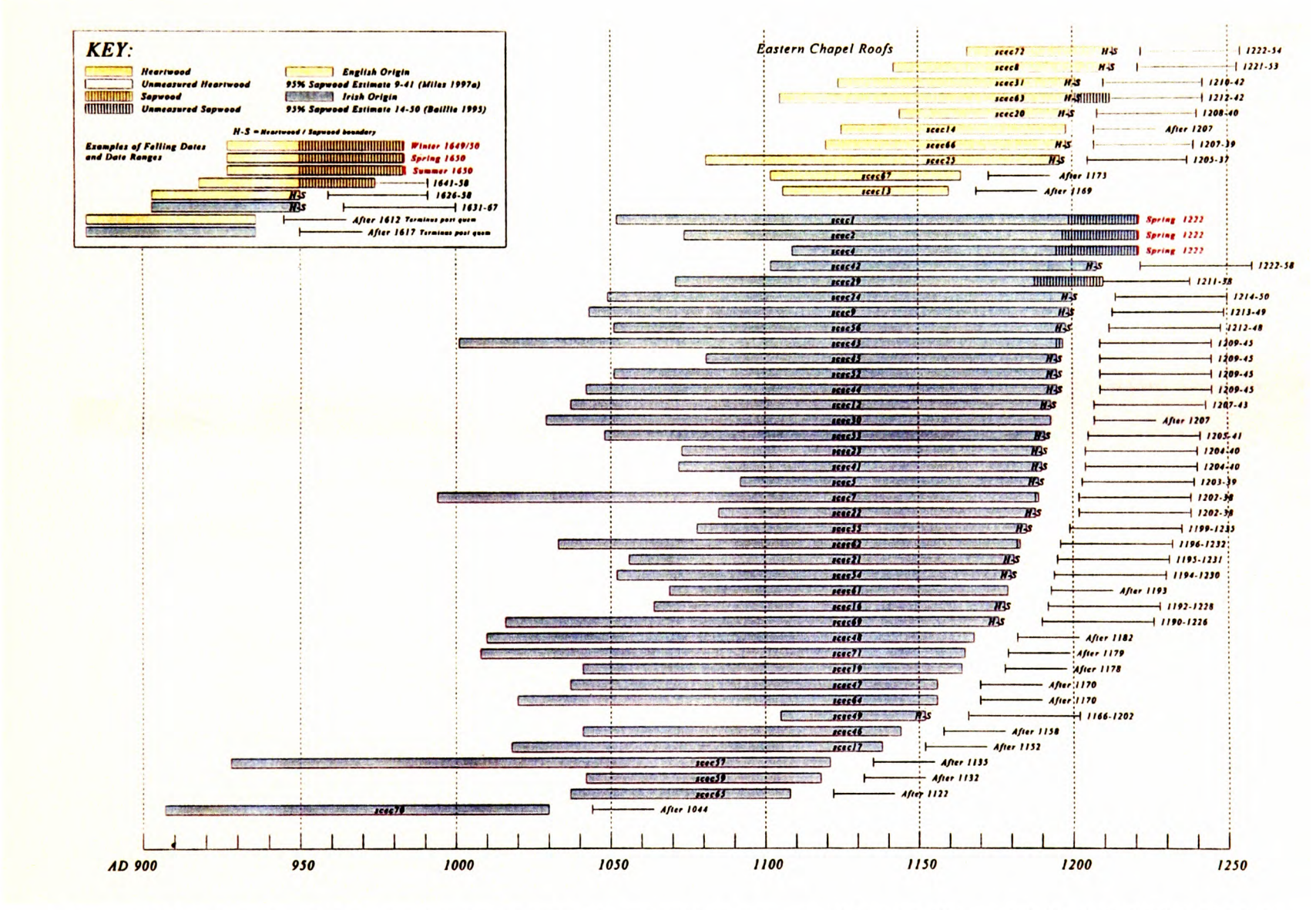


Figure 8.8: Samples of Irish structural timber with and without sapwood from Salisbury Cathedral (Miles 2002a)

Panels or boards on the other hand which have been riven as opposed to flat-sawn are more likely to have had the minimum number of heartwood rings removed with the sapwood, as shown on this comparative bar diagram (**Figure 8.9**) of boards making up a number of medieval doors from Westminster Abbey (Miles and Bridge 2005).

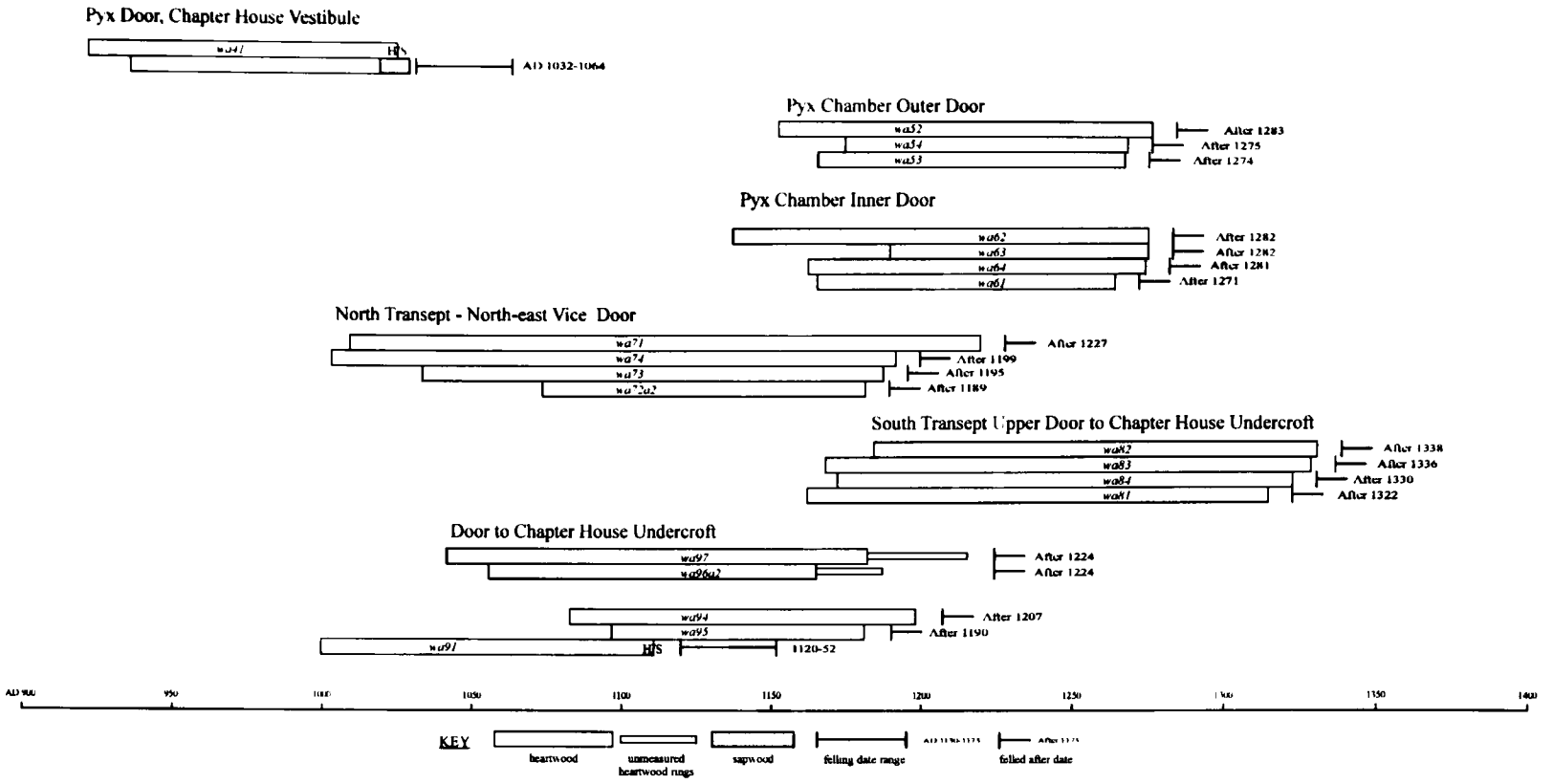


Figure 8.9: Examples of boards without sapwood from Westminster Abbey (Miles and Bridge 2005)

This effect is better demonstrated with the group of boards from Winchester College, some of which had some sapwood remaining (**Figure 8.10**). Again, the latest measured ring dates on the majority of the samples finish shortly before those with heartwood/sapwood boundaries.

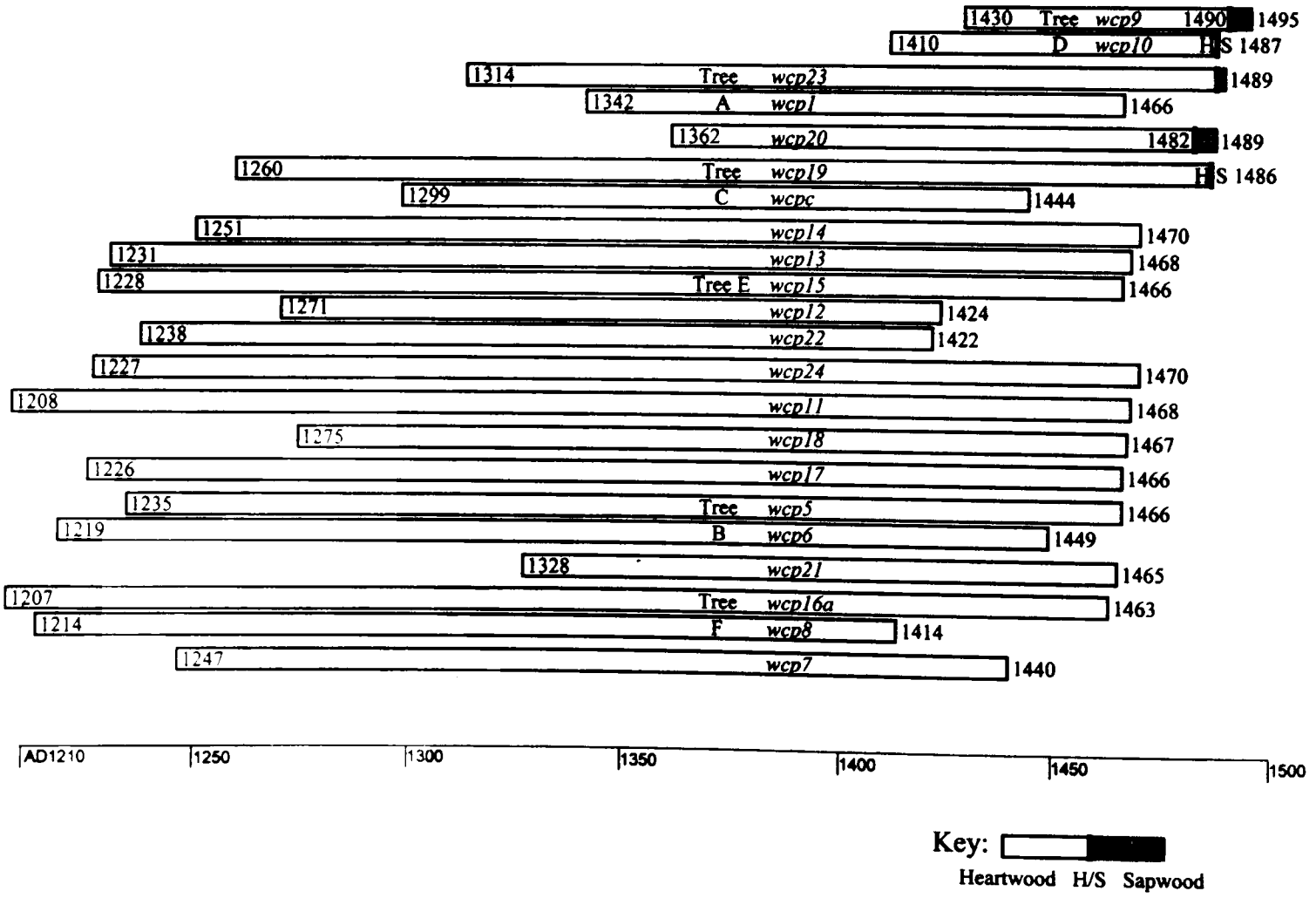


Figure 8.10: Examples of boards with and without sapwood from Winchester College (Miles 1997)

It is only through considering examples of boards that are securely dated through other evidence and which have also been dendrochronologically dated that some idea of how much material has been removed from the likely construction date. A number of such examples are included in **Appendix 3**, of which some are more relevant than others (**Table 8.12**).

Site:	*Date:*	*Origin:*	*No. of trees:*	*Range of rings removed:*
Barton on Humber coffins	*c*1100	English	2-6	21-87
Chapter House undercroft door, Westminster Abbey	*c*1250	English	4	35-69
N-E vice door, north transept, Westminster Abbey	*c*1250	German	4	31-69
North nave triforium Parvis door, Salisbury Cathedral	1251	English	2	17-22
North nave triforium roof boards, Salisbury Cathedral	1254	Irish	33	24-114
Pyx Chamber treasury doors, Westminster Abby	*c*1303	Baltic	7	28-40
Bell tower door, New College, Oxford	1397	Baltic	4	37-50
East St Helens Street, Abingdon	1431	Baltic	6	15-39
Bowhill, Exeter	*c*1498	Baltic	54	15-178
Warden's Hall, Winchester College	*c*1500	Baltic	13	30-60
Duke Humfrey's Library, Bodleian Library	1600	English	20	30-54

Table 8.12: Comparisons between groups of samples without heartwood/sapwood boundaries

Here we have almost a dozen examples where boards or varying origins have been felled between 15 and 178 years earlier. Some of the earliest fellings probably represent boards which came from the inner part of a large tree; some of the examples from Salisbury were over 300 years in age. However, these results demonstrate that all of the examples had between 20 and 40 years removed along with the sapwood. Should a large enough collection of timbers be dated without any sapwood evidence, and the last measured ring dates fall in a reasonably close period, then some assumptions on the missing heartwood can be made.

One approach is to extrapolate a value of missing heartwood rings from the mean ring width of a group of samples with similar last measured ring dates. First it is necessary to determine whether a group of samples have sufficiently consistent last measured ring dates. This might be quantified using the sample with the latest heartwood date, and then counting the total number of other samples with similar last measured dates which vary in range by no more than the number of samples. Single samples, or several with last measured rings varying by more years, would not give a reliable indication as to whether it represented the latest heartwood date for the phase under study. Next an estimate of how many heartwood rings are missing to the heartwood/sapwood boundary needs to be made. Generally, medieval woodworkers would have trimmed off only the minimum amount of heartwood along with the sapwood when preparing boards and planks. This would normally vary between ½ inch and 1 inch (13mm to 25mm). By extrapolation using the mean ring width for the group of samples in the phase, an estimate of how many rings are missing to the heartwood/sapwood boundary can be made.

For example, the door to the bell tower at New College, Oxford, had four samples of Baltic oak boards which dated, with last measured ring dates of 1347, 1357, 1357 and 1360. Thus, the last three dates vary by no more than three years, therefore 1360 would be considered to be the representative last

measured ring date for the group. This is not to be confused as the heartwood/sapwood boundary date. Next, the amount of missing heartwood rings are then calculated by determining the number of rings would be needed to make up 13mm and 25mm. In the New College example, the average of the three mean ring widths for the group of boards is 0.6mm. This works out to be between 22 and 42 years of missing heartwood to the heartwood/sapwood boundary, giving a range of 1382 to 1402. Given the documented construction date of 1397 for this door, this would leave up to 15 rings of sapwood to be lost, which is within the 8-24 empirical sapwood range for Baltic imported timber (Tyers 2000).

Another example is taken from the Pyx Chamber doors at Westminster Abbey, with a documented construction date of 1303 or shortly thereafter. Here, four boards dated to within four years of the last measured ring date of 1275. By taking the mean ring width of all of the boards of 1.34mm, this gives between 10 and 19 years, giving an estimated heartwood/sapwood boundary date range of 1285 to 1294. This leaves between 9 and 18 rings of sapwood to the estimated construction date of 1303, again consistent with the 8-24 sapwood range for Baltic oak.

A third example is from the group of panels from Winchester College. Ten boards have last measured rings ranging between 1463 and 1470. Using a mean ring width of 1.14mm, a heartwood/sapwood boundary range of 1481 to 1492 is predicted. Here we have five other boards with some sapwood surviving, the average of which is 1486, which sits comfortably in the centre of the predicted range.

In comparing English boards using this methodology to the Baltic imports, the large group of samples from the painted ceiling panels in Duke Humfrey's, Bodleian Library, Oxford gives a useful contrast. Here 17 samples have last measured ring dates falling between 1560 and 1570, giving an excellent cluster. Interestingly, the boards here are not riven, but are tangentially sawn. By taking the 1.44 mm mean ring width for the group of panels, we get an estimated range of between 9 and 17 rings lost to the heartwood/sapwood boundary, or 1579-1587. This would then give between 13 and 21 rings of sapwood lost to the known documented completion date of 1600, which is easily within range.

Thus, a number of examples of boards with no evidence of heartwood sapwood boundaries have been analysed, and a method of estimating the number of heartwood rings missing to the beginning of the sapwood has been proposed. This naturally cannot be estimated any more precisely than to give a range for this heartwood/sapwood boundary, depending on whether 13mm or 25mm of material was lost in conversion. The next step is to estimate the number of sapwood rings. The best procedure is to determine a felling date range, using the appropriate model, or empirical range, depending on the origin of the timber. This would be calculated using the mean ring width for the group, as well as the number of rings in the group, and by taking the earlier of the estimated heartwood/sapwood boundary dates. The felling date range thus produced would then be extended by the number of years calculated for the heartwood/sapwood boundary range. This results in a wider than average felling date range, but is nevertheless better than simply quoting a *terminus post quem*.

The method proposed here is most applicable for boards, where the minimum of heartwood rings would have been removed. In practice, structural timbers would probably have a wider range in

last measured ring dates. However, this is balanced by the fact that most structural timbers would have at least a small amount of heartwood/sapwood transition surviving at some point, thus eliminating the need to use this procedure.

8.3.8 Ranges for combined phases with some surviving sapwood

When there are some sapwood rings present on the samples, the lower end of the combined range is adjusted when the number of sapwood rings exceeds the minimum number of rings of the range. Hence, by adding between 1 and 10 rings of sapwood to each of the samples detailed in **Table 8.1**, no change is made to the 1729-1739 felling date range from Magdalen College. Then as one year is added, the felling dates change by almost a corresponding amount, although for a few years the outer range reduces by one year to 1738, then returns to 1739 when 14 rings are added. By the time the maximum number of actual sapwood rings is added to the sample with the lowest sapwood complement (**mco58**) the range remains constant at 1734-1739 (**Table 8.13**).

Sapwood present:	*Combined range:*
1-10 rings	1729 - 39
11	1730 - 38
12	1731 - 38
13	1732 - 38
14	1733 - 39
15 +	1734 - 39

Table 8.13: Variation in combined felling date ranges for eight-sample phase from the New Building, Magdalen College, Oxford, with the increase in added sapwood

Clearly the addition of sapwood to the equation does not have the same effect on the combined felling date ranges as it does for individual samples as illustrated in **Figure 8.11**. Note that the latest truncated felling date range for sample **mco58** is used for the combined range for phase.

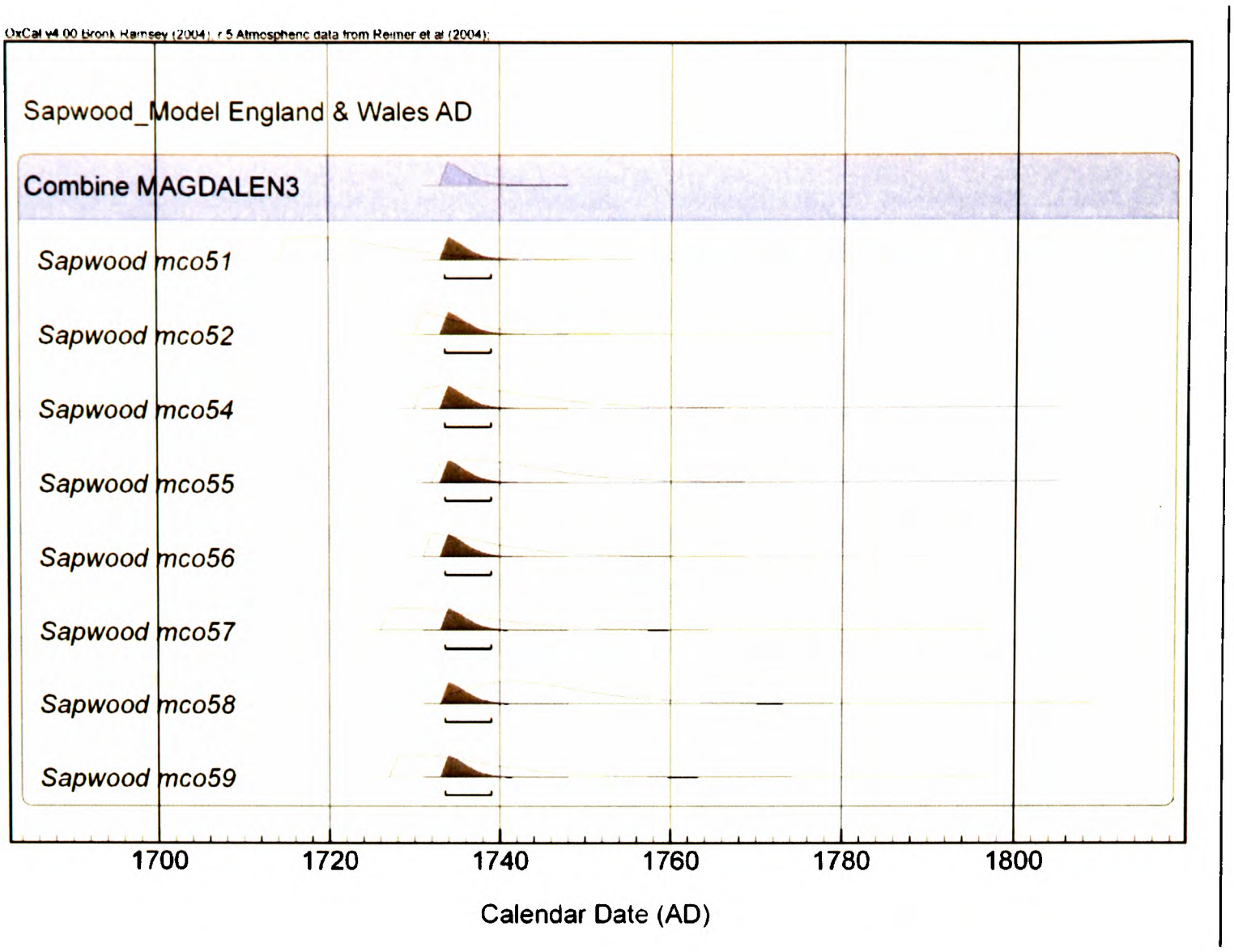


Figure 8.11: OxCalPlot 95.4% combined probability distribution for the phase for samples including up to 20 rings of sapwood from the New Building, Magdalen College, Oxford, giving a combined felling date range to 1734-1739

8.4 DISCUSSION

It has been possible to develop a series of programs with which sapwood estimates for individual samples, as well as combined felling date ranges for phases, can be produced based on replicable Bayesian statistics. A simple method of producing sapwood models for any given group of samples which retain complete sapwood has proved successful (Ramsey *pers comm*), and through which a number of models for mainland Britain have been produced.

Using the methodology set out by Millard (2002), Bayesian statistical models have been used to produce individual sapwood estimates for samples using the number of heartwood rings and the mean ring width to predict sapwood rings. Using the suite of calculation and graphical plotting functions in OxCalInput and OxCalPlot (Bronk Ramsey *in prep*), the area of highest probability density for each sample can be graphically displayed to any of three confidence levels. The addition of surviving sapwood to the equation narrows the felling date range for each sample, although the outer end of the range shifts slightly later, more noticeably on those samples with higher sapwood counts. An empirically-derived stock-piling factor added to the ranges produced also helps to make the estimated felling date ranges more representative for the actual latest common felling date, from which a construction date can then be extrapolated.

A particularly useful feature of OxCalPlot is the ability of producing combined felling date ranges for a group of samples comprising a single phase of building. Here, two samples combined can reduce the individual felling date ranges from about 30 to about 20 years. By including more samples within the combined phase, this 20-year range can be reduced to half or even less, depending on the number of samples in the phase. Thus felling date ranges for combined building phases have the potential to being reduced by has much as a two-thirds or even three-quarters of the individual empirically-derived felling date ranges in use up to the present time.

Samples with no evidence for heartwood/sapwood boundaries, which can only produce *tpq*s, are not suitable for this method of analysis, however. The tendency for them to produce wider sapwood estimates have proved less useful than the empirical method of determining *tpq*s, and as a consequence it is suggested that they be excluded from the analysis. Where the inclusion of such samples are relevant to the interpretation of a site, then the *tpq* can be manually inserted into the input datafile to calculate a combined felling date range.

Sometimes groups of samples are encountered with no evidence of sapwood, but with consistent last measured ring dates. Although not immediately suitable for OxCal analysis, a method has been proposed which extrapolates a range for the number heartwood rings removed during conversion. From this a broader sapwood estimate can be determined.

Finally, a method of adding a stock-piling factor to account for the variation in felling dates found in stock-piling of timber has been proposed. This produces a slightly wider felling date range which more closely represents what is found in datesets observed in actual historic buildings.

9. VALIDATION OF COMPUTER PROGRAM

Now that a method of constructing models from sets of data with complete sapwood complements had been developed, and a number of models produced, they were tested against the primary data from which they were constructed to determine which performed best. To achieve this, the datasets first had the sapwood rings truncated to represent the scenario where only the heartwood/sapwood boundary survived. Felling date ranges were then calculated using the dendrochronology functions in the new version of OxCalPlot presently being developed (Bronk Ramsey *in prep*) and compared with the recorded number of sapwood rings for each sample to determine the percentage falling within range. The production of combined felling date ranges for all sites with two or more samples with complete sapwood were similarly blind tested, using the latest felling date to represent the phase as a whole. On the conclusion of this testing, the most appropriate model was selected, and the limitations discussed.

Next, new independent data was obtained and tested using the model which performed the best for England and Wales. Combined felling date ranges for 123 phases were also calculated and the success rate compared with the results produced by the primary data.

9.1 TESTING EXISTING PRIMARY DATA (APPENDIX 5)

9.1.1 Individual samples

Three models were used for testing, as described in *Section 8.1.2*. Model A was based on 3313 samples from mainland Britain covering all chronological periods and used the number of heartwood rings and their mean ring (**Table 8.3**). Model B consisted of the same samples and heartwood rings, but instead used the mean ring width of the last decade of heartwood (**Table 8.4**). And Model C, like Model A, used both the heartwood rings and the total heartwood mean-ring width, but excluded samples from Scotland as well as from the prehistoric period. Therefore this model comprised only 3052 samples (**Table 8.5**).

All three models were tested with the data from which they were constructed, and all performed well, with the 95.4% range resulting in 96.3% of the samples from Models A and B coming within range, whilst Model C had the slightly closer result of 96% of the samples coming within range.

At 95.4%, the predicted mean range for Model A was 26.1 years and for Model B, 26.7 years, compared with the empirical range of between 30 and 36 years (Miles 1997; Tyers 2000). Model C however produced a slightly higher predicted mean range of 27.3 years.

Model A was then tested with the 3052 samples from England and Wales, with the Scottish and prehistoric material excluded. Interestingly, this performed less well, with only 91.2% of the samples falling within range, compared with 96.3% for all of the entire 3313 datasets. Similarly, when Model B was compared with the entire 3313 datasets, it showed a decrease from 96.3% compared with 94.3% for the larger dataset. The mean range for the reduced data set when tested with Model A was 23.8 years,

compared with 26.1 years, and Model B produced a mean range of 26.7 years, compared with 24.8 years when tested against the entire 3313 data set. This illustrates how the inclusion of the Scottish and prehistoric material, even though it made up less than 10% of the sample base, had a significant effect on the build-up of the model, and the models performed best when compared with the same material from which they were constructed.

Model:	*Samples included:*	*N = 3313*		*N=3052*	
		Range:	*% in range:*	*Range:*	*% in range:*
Model A: *All Mainland Britain*	3313	26.1	96.3%	23.8	91.2%
Model B: *England and Wales with last decade of heartwood MRW*	3052	24.8	94.2%	26.7	96.3%
Model C: *England and Wales with entire heartwood MRW*	3052	-	-	27.3	96%

Table 9.1: Comparative table of test results for various models

Next, a smaller sub-set of the data from which the models were constructed was selected for testing against the models. Essentially, this was randomly selected, in that data were chosen from only those sites where at least two or more samples were included in the same sites or phases of building. This allowed the testing of the predicted felling date ranges from a combination of samples representing a single phase, as detailed in *Section 9.1.2*, and ensured there was an unbiased geographical and chronological distribution of data. This included 1645 samples from England and Wales during all periods, 79 samples from Ireland, 14 samples from Scotland, and 2 samples from Guernsey in the Channel Islands.

The question of whether the addition of a stock-piling factor improved the results was then addressed. To understand this, the reduced 1645 sample data set was first compared with Model A, and then with Model A plus the factor for stock-piling (Model A+S) as outlined in *Section 8.3.4* above. The comparative results are set out in **Table 9.2**. As expected, the results showed a slightly higher percentage of samples in agreement from 96.3% to 97%. Both the estimated mean range, as well as the outer end of the predicted range, were slightly extended by one or at most two years. This suggested that the overall success rate was improved with the use of the stock-piling factor. The effect of adding a stock-piling factor on combined phases is also investigated in *Section 9.1.2* below.

Models B and C were also analysed using the stock-piling factor, and the 1645 samples produced similar results. Model B plus the stock-piling factor (Model B+S) produced a total of 95.7% within range, and Model C plus stock-piling (Model C+S) produced a success rate of 96.8%.

Model:			A	A+S	B+S	C+S
Total number of samples tested:			1645	1645	1645	1645
Individual samples outside range:			61	50	71	52
Percentage of total samples within range:			**96.3**	**97**	**95.7**	**96.8**
Actual range:	56	Est. ranges:	27	28	25	31
Low:	62	Low:	45	47	43	50
High:	6	High:	18	19	18	19
Mean range:	23	Est. range mean:	28	29	26	29
Max. outside inner end of range:			-4	-4	-4	-5
Max. outside outer end of range:			-22	-20	-24	-20
Average inner end of 95.4% range:			16	17	14	17
Average outer end of 95.4% range:			13	12	13	12

Table 9.2: Comparative results of 1645 individual samples against various models

9.1.2 Combined felling date ranges for phases

All of the 1645 samples from England and Wales combined to form 464 individual phases which included two or more samples each. Two methods of producing a combined felling date range are explored. The first is to simply group in OxCal all of the samples within the phases, regardless of the level of agreement between samples, to derive a common felling date range. The second is to remove all samples with an agreement of less than 60, and repeat the analysis in one or more subsequent stages.

Both methods require careful interpretation of the samples with the phases to ensure all are contemporary. A major problem in attempting to derive a combined felling date range for a phase of building is that not all samples would actually have been felled in the same year. As discussed in *Section 6*, felling dates between samples might vary by a number of years due to windfalls, stock-piling, etc. Therefore it is important that the analysis of samples within phases address this problem. For this exercise, the date assigned for the construction phase is taken to be the latest in the group of samples.

As with the individual samples, four variations of three models were used: Model A, Model A+S, Model B+S, and Model C+S, the latter three models including the stock-piling factor. As was found with the individual samples, the addition of the stock-piling factor was shown in the results between Model A which produced 90.7% of the phases within agreement, to an improved 93.8% with Model A+S.

Model B+S performed the poorest, with 53 out of 464 phases falling outside the latest felling date, giving only an 88.6% success rate. However, Model C+S performed the best, with only 28 of the phases falling outside the estimated range, giving 94%.

Nevertheless, the results were not quite up to the ideal 95.4% confidence level. To try and improve the results, all 22 phases relating to cathedrals were excluded, leaving 442 phases. Cathedrals

were selected as they have demonstrated that a significantly higher percentage of the timbers used in their construction have been stock-piled. Of the 22 samples excluded, between 5 and 7 phases fell outside their estimated ranges, resulting between 22.7% and 31.8% of the phases failing depending on the model used. Therefore the range of felling dates within buildings of this nature are not sufficiently consistent to allow combined felling date ranges for phases to be reliably predicted, using the general stock-piling distribution. However, a specific stock-piling distribution for cathedrals alone might address this problem.

The results were noticeably improved, with Model A producing 91.6% success rate, increased to 94.6% for Model A+S. Model B+S was still the lowest with only 89.6%, but the best by a small margin was Model C+S with 94.8% of the phases falling within the predicted range (**Table 9.3**). Significantly, 6% of the phases are out of agreement compared with the expected 5% given the way the agreement index has been formulated (Bronk Ramsey 1995).

Model:	**A**	**A+S**	**B+S**	**C+S**
Total number of phases:	464	464	464	464
Total number of phases out of range:	43	29	53	28
Number of phases with low agreement:	42	35	52	36
Percentage with low agreement indices:	9.1	7.5	11.2	7.8
Percentage of total phases within range:	**90.7**	**93.8**	**88.6**	**94**
Number of phases excluding 22 cathedrals:	442	442	442	442
Number of phases of cathedrals out of range:	6	5	7	5
Reduced number of phases out of range:	37	24	46	23
Percentage of phases within range excluding cathedrals:	**91.6**	**94.6**	**89.6**	**94.8**
Number of remaining phases with low agreement:	42	35	52	36
Percentage with low agreement indices:	9.5	7.9	11.8	8.1
Number of phases with failed agreement:	---	---	---	30
Number of phases excluding cathedrals and failed agreement:	---	---	---	412
Reduced number of phases out of range:	---	---	---	22
Percentage of phases within range after excluding cathedrals and failed agreement:	---	---	---	**94.7**

Table 9.3: Comparative results of 464 combined phases against various models

The second method of producing combined felling date ranges is through the removal of all samples within each phase with an agreement of less than 60. The problem with this method is that there is no statistically correct method of determining what an acceptable method is, and is not entirely compatible with Bayesian analysis. Nevertheless, for the sake of comparison, it was considered desirable to go through this method. The results of this analysis are shown in **Table 9.4**.

First, all phases previously tested through OxCal had, depending on the model used, between 35 and 52 phases were out of agreement for phases. To try and improve the overall agreement levels, all individual samples with poor agreement of less than 60 were removed from the phase and a second stage of analysis in OxCal was performed, removing between 146 and 180 samples depending on the

model used. The removal of these individual samples resulted in all phases having acceptable combined agreement levels. However, this also had the effect of allowing the agreement level of between 9 and 13 new samples to fall below 60. These were then removed in a third stage of analysis, with only 2 samples becoming out of agreement for Models A, A+S, and C+S. These were then removed during a fourth stage of analysis in OxCal.

Further analysis on between 30 and 38 phases was impossible due to less than two samples remaining in agreement. Of these, only between 3 and 6 of these phases fell outside the range. When excluding these phases from the total 464 phases analysed, 94% of the phases with Model A came within range, which improved to the optimum 95.4% with Model A+S. Models B+S and C+S also improved with 90.4% and 94.6% of the phases falling within range.

When all 22 phases relating to cathedrals as well as those with poor phase agreements were excluded, the results were improved further. Model A produced 94.8% agreement, Model A+S 96.5%, Model B+S 91%, and Model C+S 95.5%. This last result was exceptionally close to the 95.4% aimed for.

Model:	**A**	**A+S**	**B+S**	**C+S**
Number of phases out of range at start of OxCal:	43	29	53	28
% of total phases within range:	**90.7**	**93.8**	**88.6**	**94**
Phases out of agreement:	42	35	52	36
Number of samples out of agreement 1st stage:	161	146	180	151
Number of samples out of agreement 2nd stage:	9	10	9	13
Number of samples out of agreement 3rd stage:	2	2	0	2
Number of phases out of range at end:	29	24	47	26
% of phases within range at end:	**93.3**	**94.5**	**88.7**	**94.1**
Phases failing test due to < 2 in agreement:	33	30	38	35
Phases failed both < 2 in agreement & out of range:	3	4	6	3
% of phases within range excluding < 2 Agreement:	**94**	**95.4**	**90.4**	**94.6**
Number of phases out of range for cathedrals & out of Ag:	8	8	13	8
% of phases within range excluding cathedrals & < 2 Ag:	**94.8**	**96.5**	**91**	**95.5**

Table 9.4: Comparative results of 464 combined phases against various models following removal of samples with poor agreement and cathedrals

9.1.3 Conclusions with existing data

Testing between Model A and Model A+S has shown that better results were achieved with all permutations when the stock-piling factor was added. Although the success rate of 97% for individual samples with Model A+S is only a 0.7% increase from Model A (**Table 9.2**), the first stage of the OxCal analysis for combined phases showed a much better increase from 90.7% to 93.8%. When phases relating to cathedrals were excluded, the results were equally improved from 91.6% to 94.6% for Model A+S (**Table 9.3**). When further stages of OxCal were performed after removing individual samples

with poor agreement, the resulting increase showed slightly less improvement between Models A and A+S (**Table 9.4**). Nevertheless, the testing has demonstrated that the addition of the stock-piling factor to be a more appropriate procedure, especially when calculating combined ranges for phases.

Model B+S, which used just the last decade of the heartwood rings for calculating the mean ring width, has proved to be the poorest model tested. Although individual samples produced a success rate of 95.7%, when applied to combined phases, only 88.6% of the phases came within range, 89.6% when cathedrals were excluded. This was slightly improved to 90.4% when further stages of OxCal analysis removed phases with poor agreement, and 91% when both cathedrals and phases out of agreement were excluded. However, this is considerably short of the 95.4% target.

Model C+S, which used the total heartwood for the mean ring width, but with only with the data from England and Wales, excluding prehistoric material, performed the best. Although the success rate of 96.8% for individual samples is slightly higher than the 95.4% target, the combined sample phases has proved to be nearer the mark. Without performing any additional stages of OxCal analysis, 94% of the phases tested came within range, which increased to 94.8% with the exclusion of phases relating to cathedrals. When performing three additional stages of OxCal calculations to exclude samples with poor agreement, the increase was marginal, from 94% to 94.1%. When all of the phases with had less than 2 samples in agreement were excluded, the success rate rose to 94.6%. It is only when the phases relating to cathedrals were also excluded did the success rate rise to 95.5%, which is almost perfectly on target.

The testing of various models against the data, with or without the inclusion of the Scottish and prehistoric material has shown that there is really very little difference between the models and that the method is basically very robust. Differences between Model A+S representing the whole of mainland Britain has produced ranges at most one year different from that of Model C+S for the reduced data set from England and Wales only.

Model A+S produced good results, but given that Model C+S is more representative for the data from England and Wales, it is recommended that it is the most appropriate model for this group of material. Certainly all phases relating to cathedrals should be excluded, given that as much as one third of the phases fell outside the predicted range for a combined phase of samples. Although statistically the 94.8% of the samples excluding cathedrals is not as close to the target as the 95.5% achieved by excluding samples and phases with poor agreement, it is a more valid method statistically. It would stand to reason that one in 20 of the samples would naturally fall outside the predicted range, and it would be statistically incorrect to remove them simply due to the fact that they did not entirely agree with the other samples within the phase. Their removal could be construed to be arbitrary, and might actually produce a combined felling date range which is actually worse. Therefore, despite the temptation to perform the extra stages of OxCal analysis to improve the results, it is recommended that this not be adopted as a preferred method of calculating dates for phases. The difference between 94.8% and 95.4% is not considered to be significant.

Finally, the various models were tested on the 79 Irish samples. The percentage of samples coming within range varied from 94.9% for Model B+S to 97.5% for model C+S. The mean range also varied from 37 to 42 years respectively. Although Model C+S is comprised of material from England and Wales only, it has performed better with the Irish samples than it did with its own constituent parts.

The Irish data also include 20 phases of construction, of which five failed when tested against Model B+S, giving a 75% success rate. Model C+S on the other hand performed best again, with 90% falling within range. Although this is lower than the 94% achieved by the Model C+S being compared to it composite material, it does nevertheless show that Model C+S is the most appropriate model for the testing of Irish material. However, a model constructed of a large population of Irish data would be more appropriate for testing Irish data, and would probably produce reduced date ranges.

Model:	**A**	**A+S**	**B+S**	**C+S**
Samples				
Number:	79	79	79	79
Out of range:	3	3	4	2
% correct:	**96.2**	**96.2**	**94.9**	**97.5**
Mean range:	39	40	37	42
Phases				
Number:	20	20	20	20
Out of range:	4	4	5	2
% correct:	**80**	**80**	**75**	**90**
Mean range:	21	21	20	22

Table 9.5: Comparative results of Irish samples and phases against various models

9.2 TESTING NEW DATA (APPENDIX 6)

The C+S Model comprising data from England and Wales was chosen as being the most appropriate model to test new material from the same geographic area. A total of 579 samples with complete sapwood was obtained. The majority of the material was produced by the author at the Oxford Dendrochronology Laboratory during 2004 and 2005, and smaller amounts were obtained from the Sheffield, Nottingham, and UCL dendrochronology laboratories. Other data were obtained from the ODL archives between the years 1988 to 1994.

The data originated from a total of 123 different phases of building, 53 of these originating from Shropshire and Wales. The reason for the predominance of this region was due to the material from the Shropshire dendrochronology project from 1992 to 1994, as well as a substantial number of buildings samples in Wales during 2004 and 2005. Other data centred around Oxfordshire and Buckinghamshire, where work was concentrated between 1988 and 1991. Some sites from the north and the east of the country was obtained from the other laboratories. All of the data cover the medieval and post-medieval period.

First the individual samples were tested against the C+S Model, and 96% of these fell within range, slightly lower than the 96.8% from the primary data. The mean range of the estimated sapwood range was 28, again slightly lower then the 30 years produced by the primary data. The average inner and outer ends of the predicted 95.4% range were 12 and 16 years, which was very similar to the 12 and 17 years produced by the primary data. The mean number of sapwood rings was 22 years, compared with 23 years from the primary data.

Of the new test samples, eight fell later than the outer end of the predicted range by as much as ten years, compared with five years found in the primary data. Some 15 samples dated too early, by as much as 18 years, slightly less than the 20 years from the primary material. However, these extreme values were generally due to distorted ring sequences in the samples.

Next, the 123 phases of building were tested with the C+S Model. Of these, 11 phases fell outside the predicted range, giving a 91.1% success rate. This was somewhat lower than the 94% achieved from the testing of the primary data (**Table 9.6**). Therefore, the 11 failed phases were looked at carefully to ascertain why there should be such a significant difference.

Model C+S:	**Primary**	**New**
Total number of phases:	464	123
Total number of phases out of range:	28	11
Number of phases with low agreement:	36	5
Percentage with low agreement indices:	7.8%	4.1%
Percentage of total phases within range:	**94**	**91.1**
Number of phases excluding 22 cathedrals / 2 distorted phases:	442	121
Number of phases of cathedrals / distorted phases out of range:	5	2
Reduced number of phases out of range:	23	6
Percentage of phases within range after excluding cathedrals / distorted phases:	**94.8**	**95**
Number of remaining phases with low agreement:	36	2
Percentage with low agreement indices:	8.1%	1.7%
Number of phases with failed agreement:	30	0
Number of phases excluding cathedrals / distorted phases:	412	121
Reduced number of phases out of range:	22	6
Percentage of phases within range after excluding cathedrals / distorted samples:	**94.7**	**95**

Table 9.6: Comparative results of primary and new data against Model C+S

Three of the phases had all samples falling within range, six phases had one sample out of range, and the remaining two phases had two samples out. First the phases with poor overall agreement were looked at more carefully. Altogether, five phases had poor agreement, but none had actually failed the test, unlike the primary data, where 30 out of 36 had actually failed the test. However, of the five phases from the new data with poor agreement, only two related to phases which were out of range. Both phases were from the same site, Nantclwyd House in Ruthin, Denbighshire. The first phase was from a porch chamber where one sample was out of range, and the second phase was from a rear

extension which had two samples out of range. The failed sample from the first phase, **nhrd1**, was found to have only 20 rings of heartwood, the timber being a small sectioned stud from the outer part of the tree, and thus not very representative of the entire sequence. Of the two samples from the second phase from Nantclwyd House, **nhrf3b** and **nhrf7**, the second one exhibited a sudden drop in mean ring width towards the end, suggesting a sudden change in growth rate (**Figure 9.1**). This timber actually had 61 rings of very slow-grown sapwood, but again this was not represented by the heartwood rings present. Sample **nhrf3b** was probably from the same parent tree, as it had 56 rings of sapwood, although this would not have been known had the sapwood been missing. However, it was decided to omit sample **nhrd1** from the first phase, and sample **nhrf7** from the second phase, and run the tests again. As the first phase only had one timber remaining, it was no longer possible to do a combined phase test, but two timbers remained from the second phase, giving a revised date range of 1597-1613, still five years too early, but an improvement on the first test which was nine years too early.

The other nine phases whose predicted ranges fell outside the actual latest felling date all had acceptable agreement. The individual samples comprising these phases were then scrutinised to determine whether any exhibited similar radical changes in mean ring width, or had excessively short surviving heartwood rings. Four of these phases each had a sample which should be omitted on one or both of these criteria. The Old House at Egryn Abbey, Llanaber, Merioneth had sample **egr11** omitted from the phase due to a sudden decline in growth for the 25 rings. However, like the first phase at Nantclwyd House, this left only one sample in the phase, precluding any further combined analysis.

At Blaen-y-cwm, Pennant Melangell, Montgomeryshire, the second phase had one sample, **byc1156**, made up of three timbers originating from the same tree, omitted due to the same reasons as at Egryn Abbey where the last 60 rings of heartwood were extremely narrow. This left three samples in the phase which was then recalculated, giving a new combined felling date range of 1630-1648, now two years within range of the actual 1646 felling date, an improvement from being one year out before.

Although the first phase at Blaen-y-cwm had correctly produced a combined felling date range of 1580-1592 which was within range of the 1588 latest felling date, sample **byc123**, again comprised of three timbers from the same tree, was omitted due to distressed ring sequences to over half the sample sequence. The remaining three samples left in this phase were recalculated, giving a revised combined felling date range of 1581-1595.

The final two phases were located in south Shropshire, the first at Plowden Hall. The first phase here comprised of four samples, one of which (**plow4b**) had very poor agreement level of 37, compared with the other three. This sample had less then 40 rings of heartwood, but was very slow grown, and was therefore omitted. The recalculated combined range of 1286-1302 was one year within range of the 1301 felling date, an improvement over the two years too early with the first estimated range of 1285-1299. At Golding Hall, Cound, the first phase produced a combined felling date range of 1638-1655, four years earlier than the 1659 phase date. By omitting sample **g2** due to areas of extremely distressed rings, the recalculated felling date range of 1639-61 came two years within range.

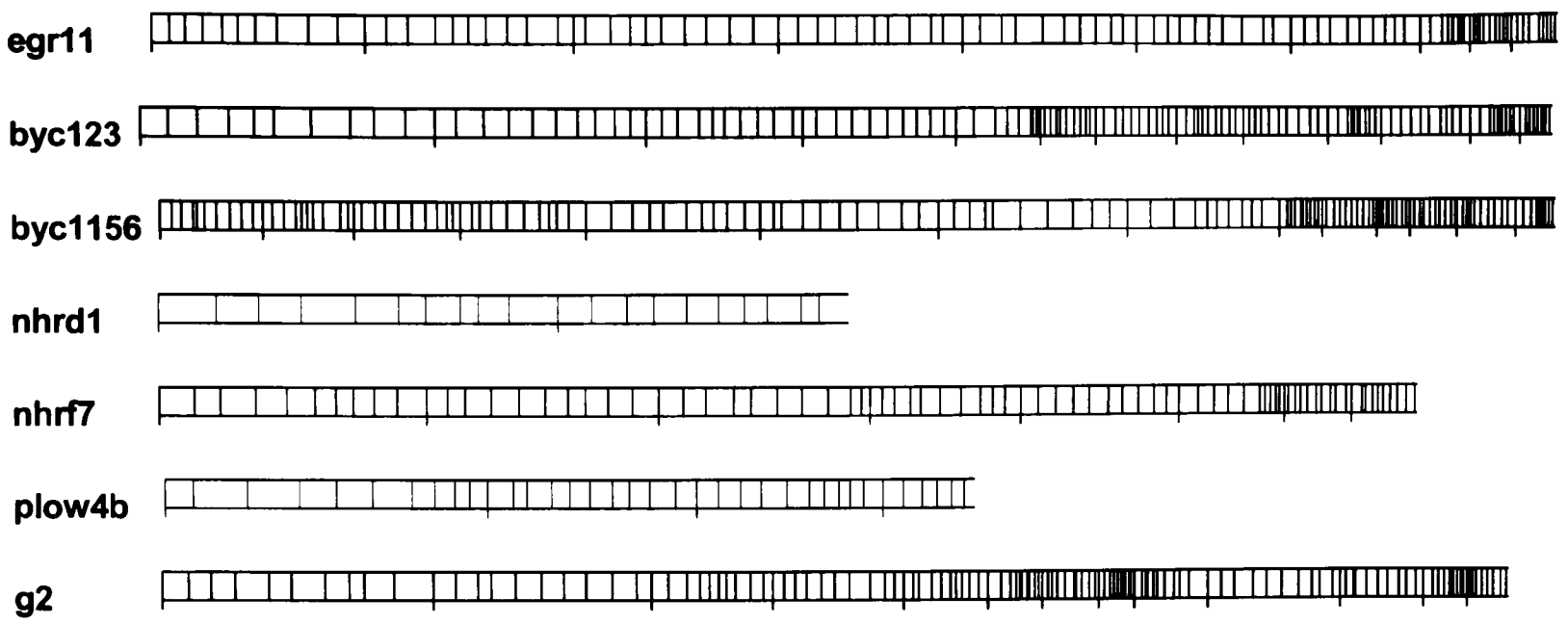


Figure 9.1: Graphic representations of samples omitted from combined phase analysis due to distorted ring sequences or abnormally low heartwood rings

Thus, by critically analysing the individual samples making up the 11 phases which had failed, six samples were omitted from the phases. Two of these were not proceeded with any further as only one sample was left in each phase precluding any further analysis, one still fell out of range, but three which had previously been out of range were now successfully within. This then left 121 workable phases on which to test the data, of which a total of six fell outside the range. This improved the percentage success rate from 91.1% to 95%, slightly higher than the 94.7% achieved with the primary data after the omission of phases relating to cathedrals and failed phase agreement.

Despite the limited amount of material available for independent testing, and the predominance of sites from the hills of north-west Wales, the analysis has concluded that Model C+S constructed for England and Wales as detailed in *Chapter 8* successfully predicted the range of sapwood rings on independent data to the required 95% confidence level. It has also been demonstrated that critical examination of samples with excessively distorted rings sequences or only extended a limited depth into the heartwood are likely to produce erroneous sapwood ranges, and therefore should be excluded from the analysis. This is likely to improve marginally the already satisfactory success rate of the primary data.

9.3 DISCUSSION

9.3.1 Felling date ranges for individual samples

Previous empirical estimates for sapwood in England and Wales ranged from 30 for Wales and the border counties to 33 years for the north (Miles 1997) or one for all of England and Wales of 36 years (Tyers 2000). The method of estimation using the known variables of mean ring width and number of heartwood rings present has proved to be an improvement, with an average of between 28 for the test data and 30 years for the primary data. This represents an average reduction of between 10% and 22% between the mean ranges.

However, the major difference here is that individual sapwood ranges are calculated for each sample on their own individual characteristics, resulting in a higher degree of accuracy. Compared with the 36-year global range proposed by Tyers (2000) for England and Wales, and using the 3313 dataset of samples from mainland Britain with Model C, 3119 or 94.1% of the samples produced felling date ranges which were less than 36 years. Some 45 samples or 1.4% of the samples produced a range of 36 years, and 149 samples produced ranges exceeding 36 years. Thus 94.1% of the samples showed an improvement in reducing felling date ranges over the empirical method, whilst 4.5% of the samples actually produced a *wider* felling date range than the 36-year empirical range. However, analysis of the felling date ranges in error showed a similar distribution, with 95.6% of the ranges in error relating to the reduced felling date ranges, and 3.7% to those higher than 36 (**Figure 9.2**). Of the 3313 samples tested using this model, only 4.1% produced ranges that were in error.

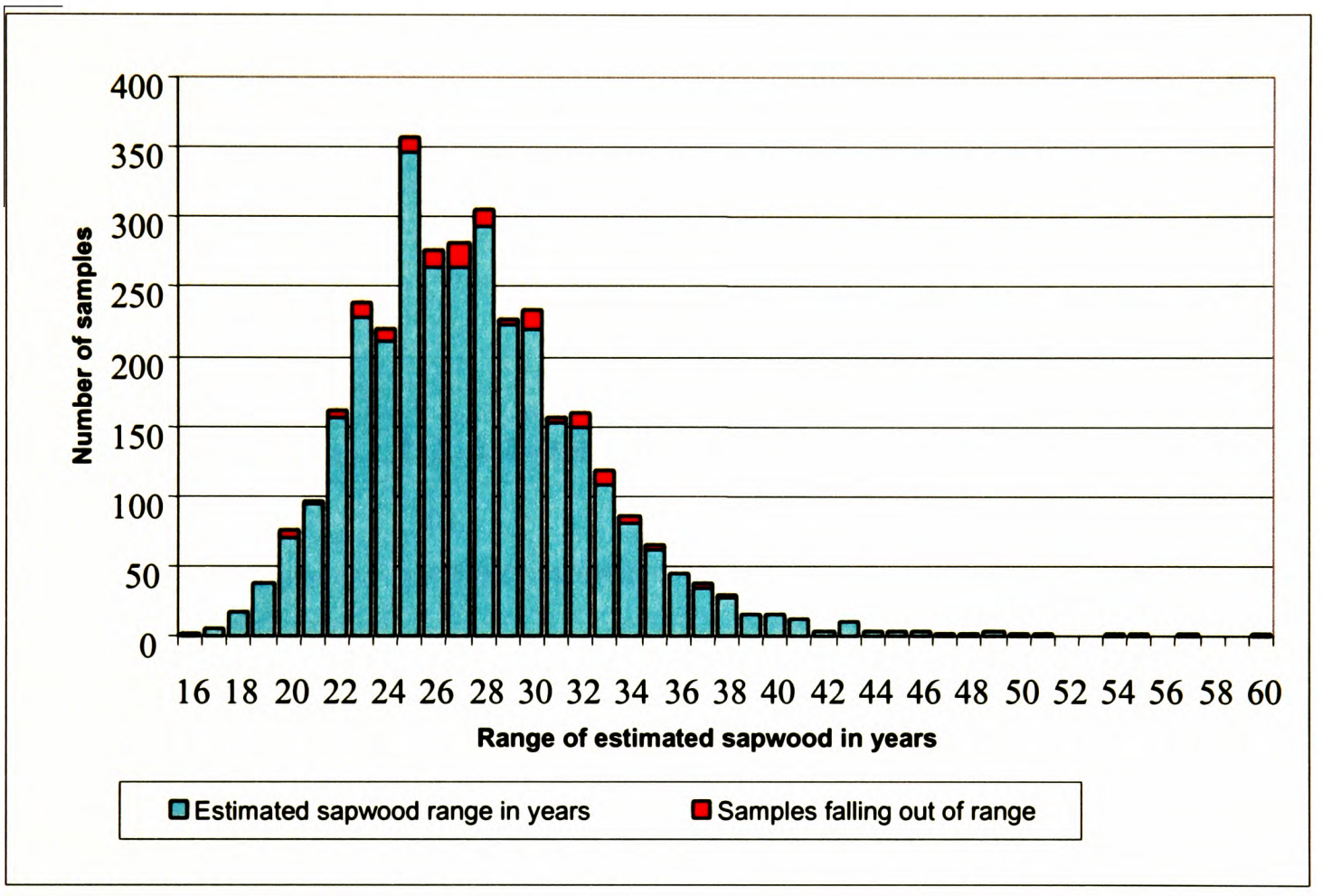


Figure 9.2: Distribution of sapwood ranges produced from 3313 mainland Britain samples using Model C

9.3.2 Reductions of combined felling date ranges

The use of Bayesian statistical analysis in OxCal has proved to be extremely effective in producing a reduced felling date range for a phase of combined samples. Phases of building which would have previously produced ranges as wide as 30 or more years have now through this methodology been reduced to 7 years or less. Out of 464 historic building phases and using Model C+S, 94.8% had correctly predicted a range which encompassed the latest felling date. Further testing with 121 sites using new independent data produced a success rate of precisely 95%.

The width of the estimated 95.4% range for combined samples is directly related to the number of samples included in each phase. Looking at just historic building phases, the lowest number of samples which can be combined into a phase is two, and these produced ranges between 14 and 25 years (**Table 9.3**). Ten samples combined in a phase produced ranges between 7 and 9 years, whilst groups of 15 timbers reduced the felling date range down to seven years. This lowest seven-year range could be achieved in some instances with as few as nine samples.

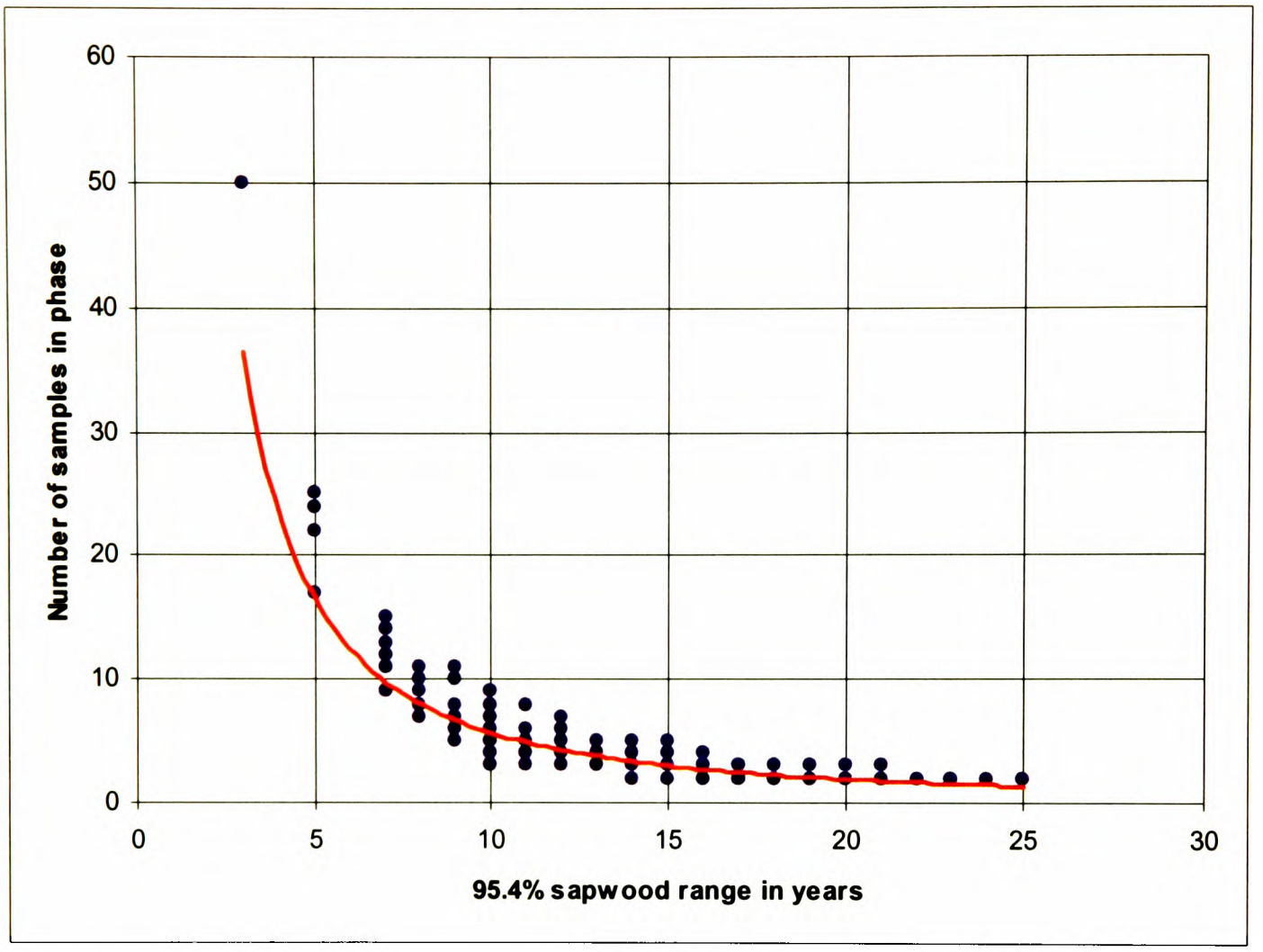


Figure 9.3: Comparison of estimated sapwood range for phases compared with number of samples within each phase, for 464 historical sites in England and Wales as well as 7 modern woodland sites from mainland Britain

To try and understand how far the reduction in years could be achieved using increasingly larger sets of data, groups of woodlands were analysed. Some seven woodlands were used as they had larger collection of samples than historic building phases, ranging from 11 to 50 samples. Groups of between 17 and 25 samples produced a felling date range of five years, and one group of 50 samples from the woodlands of Mapledurham, Oxfordshire, actually fell within the three-year range produced.

The number of phases made up of two or three samples represented more than half the 477 phases from the British Isles as shown in **Figure 9.4**. The three phases with 24, 25, and 50 samples from modern woodlands are not shown in this histogram. This limitation required the data to be converted to percentages per years of range width to allow better comparison to be made of the rate of success for the predicted ranges.

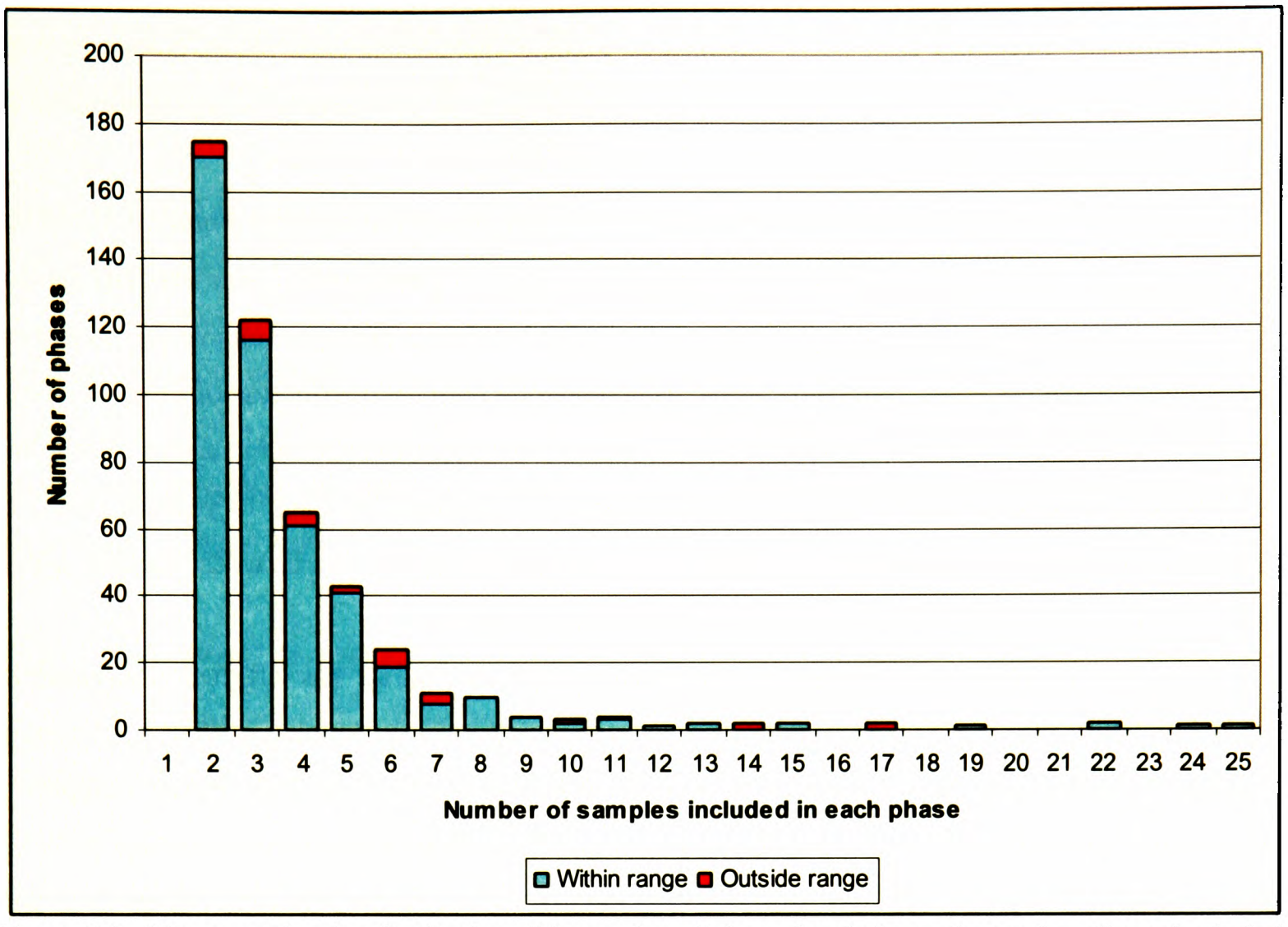


Figure 9.4: Histogram showing distribution of the number of phases in relation to the number of samples included in each phase for 477 historical and modern woodland sites in the British Isles

This shows the percentage of phases which fell within the predicted range for each year's width of range. Although the results were mixed, there did seem to be a predominance for the wider ranges being more likely to fall within range. For instance, ranges 22 to 25 years in width, which included 27 phases, all came within range, whilst 49 phases ranging between 5 to 9 years in width had between 17% and 32% of the phases falling outside the range, with an average of 29%.

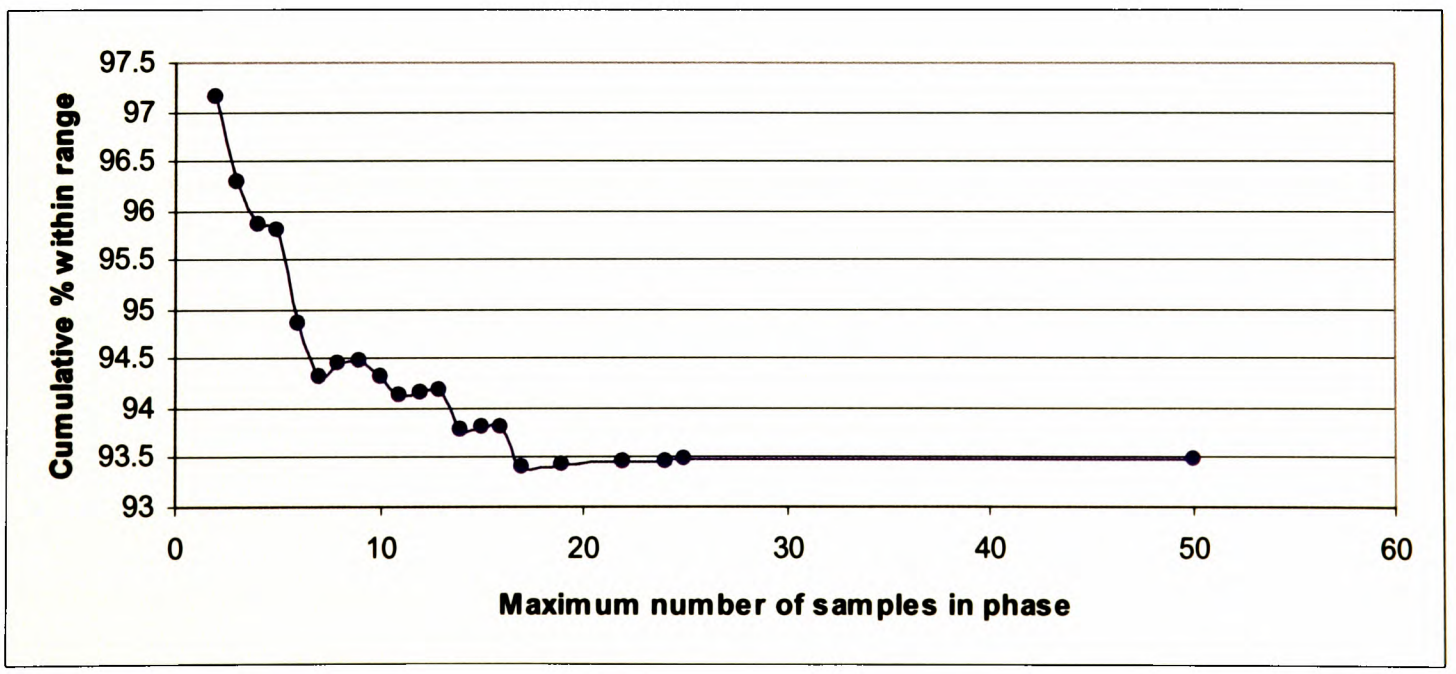


Figure 9.5: Relationship between maximum number of samples in a phase and proportion of phases falling out of range, for 477 historical and modern woodland sites in the British Isles

Conversely, the lower the number of samples comprising a phase, the higher the percentage of the combined phase felling date ranges encompassing the known latest felling or phase date. Given the weighting of phase examples with fewer numbers of samples included in each phase, compared with those at the upper end of the range, there is still a subtle trend to higher numbers samples included in phases to come outside the range.

Despite weighting of phases comprising only 2 or 3 samples as illustrated in **Figure 9.4**, and the uneven distribution of the phases falling outside range as shown in **Figures 9.5**, some conclusions can be made as the optimum number of samples to be combined within a phase to achieve the narrowest range whilst keeping the good confidence levels. By comparing both the distribution of samples within certain phase ranges, and the likelihood of error in the narrower ranges, the optimum number of samples to analyse in a phase is between 5 and 9, which will produce ranges between 7 and 15 years in width. If 10 samples are included in a phase of building, the width of the range will be between 7 and 9, which will have about a 30% chance of being outside the predicted range.

The use of Bayesian methodology, as incorporated in OxCal, has effected a substantial reduction of felling date ranges for groups of samples comprising a phase of building. This is extremely significant, in that felling date ranges can be reduced to half or a quarter of their previous empirical estimates, with the potential for a 90% reduction. Where individual phases of construction are built within a short space of time, this methodology can be of immense value in identifying and understanding complex building histories.

10. CONCLUSIONS

Over the past two decades almost half of the buildings dated through dendrochronology have failed to produce a precise felling date, making the interpretation of these dates difficult. Until now, the estimation of missing sapwood rings in Britain has been on an empirical basis with current ranges as wide as 36 years for the whole of England and Wales. Other methods in use have slightly lower ranges of between 30 and 33 years, but are dependent on geographical regions.

This study has, through the collection of over 3300 English and Welsh tree-ring datasets with complete sapwood, identified a number of variables having a relationship with the number of sapwood rings. These are the mean ring width of the heartwood, and to a lesser extent, the number of heartwood rings present. This has resulted in a formula which individually predicts the number of sapwood rings for any given sample based on theses variables.

10.1 INDIVIDUAL FELLING DATE RANGES

A number of models have been produced and blind tested with the known sapwood rings removed. The one that performed the best was Model C, composed of data from England and Wales, excluding prehistoric material. This achieved a success rate of 96% when tested against the primary data from which the model was constructed. Comparative plots between various regions have shown that there is little variation between them, and it has been concluded that one model is applicable over all of England and Wales. This has the considerable advantage of dispensing with the problem of using different models for different geographical regions.

This new method of predicting sapwood ranges has resulted in over 94% of the samples tested producing felling date ranges narrower than the 36-year empirical estimate currently used. About a quarter of the samples tested showed an improvement with a range of 24 years or less. Conversely, some 4.5% of the samples tested produced a range larger than the empirical range, but again these ranges were more representative of the actual sapwood found.

However, it has been found that some unusual samples do not fit the model well. These include samples which have exceptional or sudden variation in mean ring width, such as might be found in pollarded or managed timber. Sometimes a tree will exhibit a sudden drop in mean ring width toward the end of its life, resulting in more sapwood rings being present then might be suggested in the faster-grown heartwood. Additionally, samples which have come from small timbers converted from larger, slow-grown trees would have a much larger number of heartwood rings then were actually present in the sample. Some examples of heartwood ring counts of 25 years or less with a narrow mean ring width are good indicators of this situation, as were observations made during sampling. Samples with these characteristics should be excluded from the analysis.

There are a number of aspects of this study which would benefit from further research. First, more data should be collected from Scotland and Ireland, and models specific to these geographical regions constructed. Whilst Model C+S, comprising data from England and Wales with a stock-piling factor, has proved useful in predicting sapwood from Scottish and Irish samples, it is anticipated that new models with data from these regions would produce more accurate results. Similarly, more prehistoric data should be collected to enable models appropriate for these chronological periods to be constructed. Consideration should also be given to producing a model restricted to samples encompassing the entire tree-ring sequence back to the pith. This might produce tighter felling date ranges for samples with similar characteristics.

Further research could also be undertaken on the climatic and geographical factors which might influence sapwood estimation across Europe, and again sapwood models could be constructed and tested against regional data. The methodology employed by Ruoff and Walder in Switzerland, using the last decade of heartwood to determine the mean ring width, should be tested in this respect. Although experiments with data from England and Wales showed this approach to be slightly less effective in predicting British sapwood, the more steady and even growth of the eastern European oak may prove more effectual.

10.2 COMBINED FELLING DATE RANGES

Study of the variations in felling dates within a phase of building has allowed this phenomenon to be quantified, and applied as a factor in determining felling date ranges which better reflect the *construction* date of a building, rather than the felling date of a particular timber. Testing Model C+S has produced a success rate of 96.8% with the primary data, and 96% with independent test data.

The use of Bayesian statistics in the OxCal calculating program has provided an ideal base upon which to incorporate a sapwood estimation function, and the plotting functions of the program have provided an ideal method of graphically presenting felling date ranges (**Figure 10.1**). More importantly, the OxCal method of combining a number of felling date ranges from a single phase of building has resulted in dramatically reduced felling date ranges. Whilst phases with no surviving sapwood, or bark edge, previously produced ranges of between 30 and 36 years, this new method can reliably reduce these to ten years, or less, for a phase of building. It has been demonstrated that combining more samples in the analysis reduced the combined felling date range, with one example with 50 samples correctly calculating a range of three years. This method of producing reduced combined felling date ranges for a group of samples has been tested to a 95% success rate with new independent data.

Larger groups of samples with complete sapwood should be tested to determine the limitations of this method of calculating combined felling date ranges. At present, there were no sites available with more than 25 dated samples retaining complete sapwood, with the exception of living woodland trees.

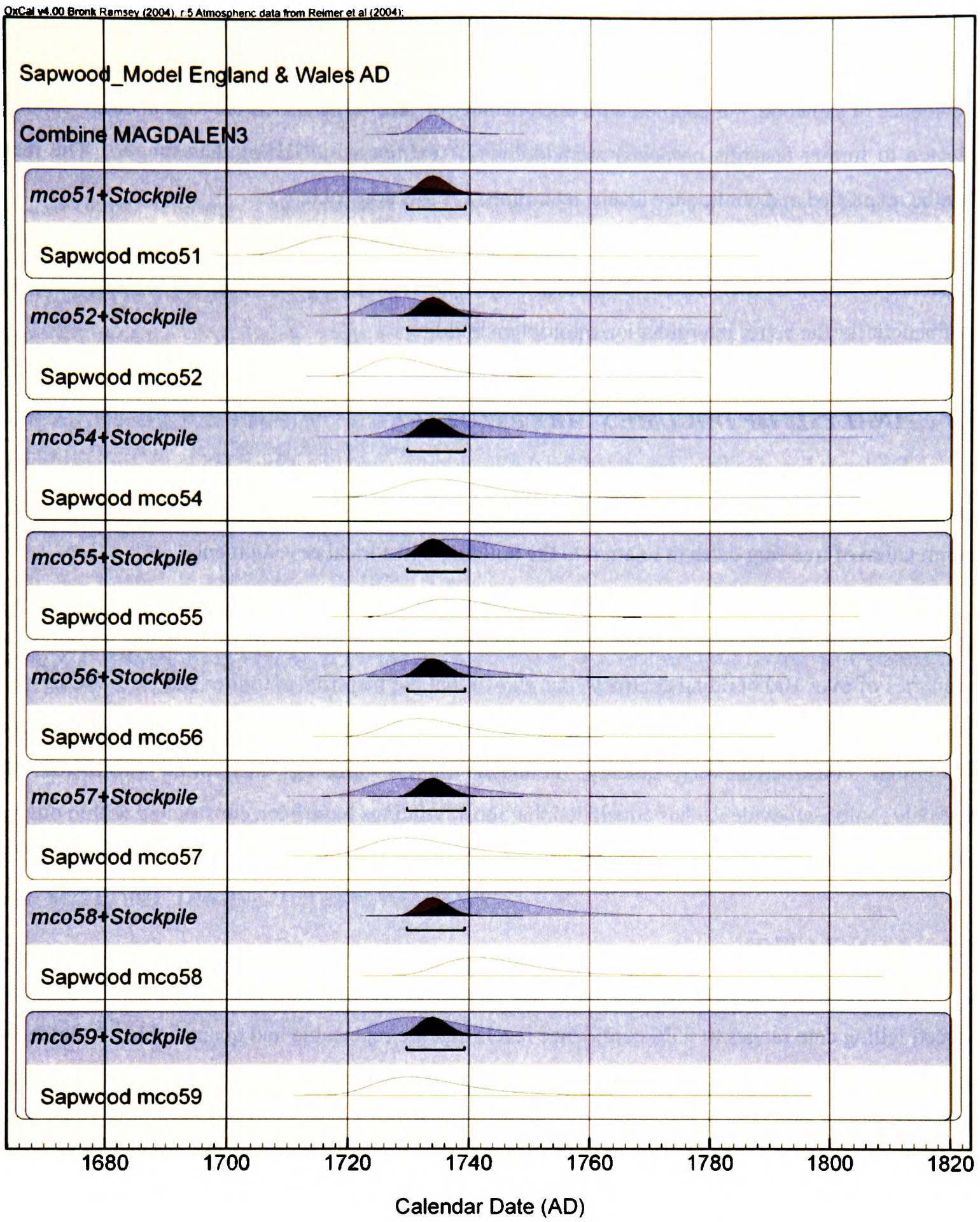


Figure 10.1: OxCal Plot of 95.4% probability distributions for individual samples without sapwood from the New Building, Magdalen College, Oxford, showing individual ranges with and without stock-piling factor, and plotting the combined felling date range with stock-piling of 1730-1739

10.3 GROUPS WITH ONLY TERMINI POST QUEM

The study of groups of timbers with no surviving sapwood or heartwood/sapwood boundaries, but with independent dating evidence, has demonstrated that the minimum of heartwood rings are usually removed along with the sapwood during conversion, particularly in relation to boards. A possible method of quantifying the number of heartwood years lost during this process has been proposed, and with the handful of examples where documented construction dates are known, the

method has been proved successful. It should now be possible to offer an extended felling date range to what has previously been a collection of *termini post quem*. However, similar groups of samples with no evidence of sapwood, but coupled with documentary or precise dendrochronological dates, should be collected to further test this proposed methodology of extrapolating felling date ranges. The results could be quantified and confidence levels determined for this approach.

The small numbers of examples in this thesis are not large enough to allow any meaningful confidence levels to be ascertained. Examples of groups of samples from structural timbers would also be of benefit for the better interpretation of problem buildings.

10.4 ANALYSIS OF DOCUMENTARY EVIDENCE

Evidence has also been presented for the stock-piling and occasional evidence for seasoning of timber, as well as the re-use of timber. Correct identification of these practices is vital in the successful interpretation of tree-ring dates in relation to the building's historical development.

In addition, a detailed analysis of associated documentary evidence has greatly enhanced the understanding of dendrochronological dates. Detailed study of a handful of building accounts, and summaries of over 100 building contracts, has shown that the majority of timber-framed buildings were constructed in about half a year, and rarely extended beyond one year. Even large masonry buildings were often constructed very quickly, although church building was often protracted. The dendrochronological evidence has concluded that most buildings have been constructed within one year of the latest felling date, and rarely extended to more than two years.

10.5 CONCLUSION

The research contained in this thesis has resulted in the development of a method of predicting reduced felling date ranges to 95% confidence levels that are repeatable and quantifiable. A function in OxCal has also been developed which will produce, to similar confidence levels, dramatically reduced combined felling date ranges for groups of timbers comprising a single phase of building. The results can be plotted, giving the end user of dendrochronology a better idea of the probability and distribution of the felling date ranges calculated. These programs will be integrated into a new version of OxCal, which will be publicly accessible on the RLAHA web-site. This, together with the evidence found through the analysis of contemporary documentary and other building evidence, has resulted in a better understanding of precise felling dates in relation to the construction of historic buildings and structures, and should be of use to both the dendrochronological, architectural, and archaeological community as a whole.

BIBLIOGRAPHY

Abelard, 2002 (Summary of Bayesian Statistics) www.abelard.org/briefs/bayes.htm

Alcock, N W, 1981 *Cruck Construction: An Introduction and Catalogue*, CBA Res Rep, **42**

Alcock, N W, 1993 *People at Home: Living in a Warwickshire Village, 1500-1800*, Phillimore, Chichester

Andrews, D, Robby, T, Ryan, P, and Tyers, I, 1994 'The Granary at Cressing Temple' *Essex Archaeology and History* ***25***, 79-106

Arnold, A J, Howard, R, Laxton, R R, and Litton, C D, 2002 *The Urban Development of Newark-on-Trent: A Dendrochronological Approach*, Centre for Archaeol Rep, **95/2002**

Arnold, A J, Howard, R, Laxton, R R, and Litton, C D, 2003 *Tree-Ring Analysis of Timbers from Cobham Hall, Cobham, Kent*, Centre for Archaeol Rep, **50/2003**

Arnold, A J, Howard, R, and Litton, C D, 2003a *Tree-Ring Analysis of Timbers from Dilston Castle, Dilston Hall, Corbridge, Northumberland*, Centre for Archaeol Rep, **88/2003**

Arnold, A J, Howard, R, and Litton, C D, 2003b *Tree-Ring Analysis of Timbers from the De Grey Mausoleum, St John the Baptist Church, Flitton, Bedfordshire*, Centre for Archaeol Rep, **48/2003**

Arnold, A J, Howard, R, and Litton, C D, 2003c *Tree-Ring Analysis of Timbers from the Roof of the Keep or "Little Castle", Bolsover Castle, Derbyshire*, Centre for Archaeol Rep, **15/2003**

Arnold, A J, Howard, R, and Litton, C D, 2003d *Tree-Ring Analysis of Timbers from the Bell Frame and Tower Roof of St Margaret's Church, Wetton, Staffordshire*, Centre for Archaeol Rep, **22/2003**

Ashurst, J & N, 1988 *Practical Building Conservation – English Heritage Technical Handbook*, **5**, *Wood, Glass & Resins*, Aldershot, Gower

Baillie, M G L, 1982 *Tree-Ring Dating and Archaeology*, London

Baillie, M G L, 1995 *A slice through time - dendrochronology and precision dating*, London

Baillie, M G L, and Pilcher, J R, 1973 A simple cross-dating program for tree-ring research, *Tree-Ring Bulletin*, **33**, 7-14

Baillie, M G L, Hillam, J, Briffa, K, and Brown, D M, 1985 Re-dating the English art-historical tree-ring chronologies, *Nature*, **315**, 317-19

Bayes, T, 1763 (published posthumously) *Essay Towards Solving a Problem in the Doctrine of Chances*

Bott, A, 2004 Lost, Little Known, and Unbuilt Merton (Fellows' Quadrangle), *Postmaster and The Merton Record*, 88-95

Bråthen, A, 1982 Debdrokronologisk serie från västra Sverige 831-1975, RAÄ **1**, (Stockholm), 19

Bridge, M C, 1983 The use of tree-ring widths as a means of dating timbers from historical sites, unpubl PhD thesis, CNAA

Bridge, M C, 1999 *Tree-ring analysis of timbers from the Isaac Lord Complex, Ipswich, Suffolk,* Anc Mon Lab Rep, **49/1999**

Bridge, M C, 2000 Can dendrochronology be used to indicate the source of oak within Britain?, *Vernacular Architecture*, **31**, 67-72

Bridge, M C, 2001 *Tree-ring analysis of timbers from Hengrave Hall, Hengrave, Suffolk,* Centre for Archaeol Rep, **111/2001**

Bridge, M C, 2002 *Tree-ring analysis of timbers from Muchelney Abbey, Muchelney, near Langport, Somerset*, Centre for Archaeol Rep, **114/2002**

Bridge, M C, and Miles, D H, 2003 The tree-ring dating of the north door, St Botolph's Church, Hadstock, Essex, ODL unpubl rep **2003/30**

Brinkworth, E R C, and Gibson, J C (eds), 1976; 1985 *Banbury Wills & Inventories 1591-1650*, Banbury History Society, 2 vols

Bronk Ramsey, C, 1995 Radiocarbon calibration and stratigraphy: the OxCal program, *Radiocarbon*, **37**, 425-30

Charles, F W B, 1984 *Conservation of Timber Buildings*, London

Chattaway, M M, 1949 The Development of Tyloses and Secretion of Gum in Heartwood Formation, in *Aust J Sci Res*, **B2** (3), 227-40

Chattaway, M M, 1952 The Sapwood/Heartwood Transition, *Aust Forestry*, **XVI**, 1, 25-34

Cheney, C R (ed), 1948 *Handbook of Dates for Students of English History*, Royal Hist Soc, London

Committee on Nomenclature of the International Association of Wood Anatomists, 1933 *Tropical Woods*, **36**, 1-12

Cooke, A H, 1925 *The Early History of Mapledurham*, OUP

Courtenay, L T, 1997 Scale and Scantling: Technological Issues in Large-Scale Timberwork of the High Middle Ages, in *Technology and Resource Use in Medieval Europe: Cathedrals, Mills, and Mines* (ed E Bradford Smith and M Wolfe), 42-75, Ashgate, Aldershot

Crone, A, 2000 *The History of a Scottish Lowland Crannog: Excavations at Buiston, Ayrshire 1989-90*, Hist Scot Mono, **4**

Crone, A, 2002 Dendrochronological analysis of timbers from the roof of the Great Hall, Edinburgh Castle, unpubl rep for Centre for Field Archaeology

Crone, A, and Mills, C M, 2004 Dendrochronologically Dated Buildings from Scotland, *Vernacular Architecture*, **34**, 84-89

Currie, C R J, 1992 Larger medieval houses in the Vale of the White Horse, *Oxoniensia*, **LVH**

Desch, H E, 1948 *Timber - Its Structure and Properties*, 2nd ed, London

Durham, B, 1991, Hospital of St. John the Baptist at Oxford, *Oxoniensia*, **LVI**, 17-75

Dyer, C, 1992 The Great Fire of Shipston on Stour, in *Warwickshire History*, **8**, No **6**, (winter 1992/2)

Edlin, H L, 1949 *Woodland Crafts in Britain: An Account of the Traditional Uses of Trees and Timbers in the British Countryside*, Batsford, London

English Heritage, 1998 *Dendrochronology: Guidelines on producing and interpreting dendrochronological dates*, London

Evelyn, J, 1670 *Sylva, or a Discourse of Forest-Trees and the Propagation of Timber in His Majesties Dominions. As it was Deliver'd in the Royal Society the 15th of October, 1662..*, 2nd ed, London

Fletcher, J M, 1978 Tree-ring Analysis of Panel Paintings, in *Dendrochronology in Europe* (ed J M Fletcher), BAR, **51**, 303, Oxford

Fletcher, J M, 1980 List 3 - Tree-ring dates, *Vernacular Architecture*, **11**, 32-8

Fletcher, J M, 1982 The Waterfront of Londinium: the date of the quays at the Custom House site reassessed, *Trans London & Middlesex Archaeol Soc*, **33**, 79-84

Fletcher, J M, and Tapper, M, 1982 List 8 - Tree-ring dates, *Vernacular Architecture*, **13**, 49

Forbes, A C, 1904 *English Estate Forestry*, Edward Arnold, London

Fritts, H C, 1976 *Tree Rings and Climate*, Academic Press, London

Gee, E A, 1954 Oxford Carpenters, 1370-1530, *Oxoniensia* **XVII/XVIII**, 112-84

Gerry, E, 1914 Tyloses: their occurrence and practical significance in some American woods, *J Agric Res*, **1**, 445-69

Gillam, S, 1958 Building Accounts of the Radcliffe Camera, *Oxford History Society* ns **XIII**

Gillam, S, 1988 *The Divinity School and Duke Humfrey's Library at Oxford*, Clarendon Press, Oxford

Gordienko, M I and Poritskii, G A, *et al,* 1974 The Sapwood/heartwood ratio in Oak trees, *Nauch tr Ukr s-kh akad*, **132**, 14-17

Grenville, J, 1997 *Medieval Housing*, Leicester Univ Press, London

Groves, C, 2002 *Dendrochronological Analysis of Bowhill, Exeter*, Centre for Archaeol Rep, **23/2002**

Groves, C, and Hillam, J, 1993 *Tree-ring analysis of oak timbers from South Yarde, Rose Ash, Devon, 1992*, Anc Mon Lab Rep, **36/93**

Grynaeus, A, 1998 Sapwood Analysis on Archaeological Remains in Hungary, in *Proceedings of the International Conference Dendrochronology and Environmental Trends 17-21 June, 1998, Kaunas, Lithuania*, (eds V Stravinskiene and R Juknys), 18-21, Kaunas

Grynaeus, A, 2005 Changes in the number of sapwood rings on oak in Hungary, in *Abstract Book of Eurodendro 2005 International Conference of Dendrochronology September 28th – October 2nd Viterbo, Italy*, (eds M Sarlatto, A Di Filippo, G Piovesan and M Romagnoli), 51-2, Viterbo

Gürsu, I, and Bernhart, A, 1964 Forstw Centralblatt, **83**, 222-47

Haddon-Reece, D, Miles, D, Tapper, M C, and the late Fletcher, J M, 1987 List 22 - Tree-ring dates, *Vernacular Architecture*, **18**, 54-5

Haddon-Reece, D, Miles, D, and Munby, J T, 1988 List 23 - Tree-ring dates from the Ancient Monuments Laboratory, HBMCE, *Vernacular Architecture*, **19**, 43-4

Haddon-Reece, D, Miles, D H, and Munby, J T, 1989 List 32 - Tree-ring dates, *Vernacular Architecture*, **20**, 46-9

Haddon-Reece, D, Miles, D H, and Munby, J T, 1990 List 38 - Tree-ring dates, *Vernacular Architecture*, **21**, 46-50

Haddon-Reece, D, and Miles, D H, 1992 List 43 - Tree-ring dates, *Vernacular Architecture*, **23**, 48-51

Harris, J M , 1954 Heartwood formation in *Pinus radiata* D Don, *New Phytologist*, **53**, 517-24

Harvey, J, 1975 *Medieval Craftsmen*, London, Batsford

Havinden, M A, 1965 Household *and Farm Inventories in Oxfordshire, 1550 – 1590*, Historical Manuscripts Commission, London, HMSO

Heywood, J, 1546 *A Dialogue containing the number in effect of all the Proverbs in the English Tongue*

Hillam, J, 1990 *Tree-ring dating of oak piles from Wilton House, Wilton, Wiltshire*, Anc Mon Lab Rep, **47/90**

Hillam, J, and Groves, C, 1991 *Tree-ring dating of oak timbers from Aydon Castle, Corbridge, Northumberland*, Anc Mon Rep, **42/91**

Hillam, J, Morgan, R A, and Tyers, I, 1984 Dendrochronology and Roman London, *Trans of the London and Middlesex Archaeol Soc*, **35**, 1-4

Hillam, J, Morgan, R A, and Tyers, I, 1987 Sapwood estimates and the dating of short ring sequences, in *Applications of tree-ring studies: current research in dendrochronology and related areas* (ed R G W Ward), BAR, **333**, 165-85, Oxford

Hillis, W E, 1987 *Heartwood and Tree Exudates*, Springer-Verlag, 7-21, Berlin Heidelberg

Hoffsummer, P, 2002 *Les charpentes du xie au xixe siècle, Typologie et évolution en France du Nord et en Belgique*, Centre des monuments nationeaux; Editions du patromoine, Paris

Hollstein, E, 1965 Jahrringchronologische von Eichenholzern ohne Walkande, Bonner Jahrb, **165**, 12-27

Hollstein, E, 1978 Wood technology and the dating of oak: West German chronologies for oak and beech, in *Dendrochronology in Europe* (ed J M Fletcher), BAR, **51**, 33-9, Oxford

Hollstein, E, 1980 *Mitteleuropäische Eichenchronologie*, Mainz: Zabern, 273

Howard, R E, Laxton, R R, Litton, C D, and Simpson, W G, 1991 List 39 - Tree-ring dates, *Vernacular Architecture*, **22**, 40-43

Howard, R, Litton, C D, and Laxton, R R, 1998 *Tree-Ring Analysis of Timbers from Chicksands Priory, Chicksands, Bedfordshire*, Anc Mon Lab Rep, **30/98**

Howard, R, Litton, C D, and Laxton, R R, 1999a *Tree-Ring Analysis of Timbers from Bretby Hall, Bretby, Derbyshire*, Anc Mon Lab Rep, **43/99**

Howard, R, Litton, C D, and Laxton, R R, 1999b *Tree-Ring Analysis of Timbers from St. Mary Magdalene Church, Cowden, Kent*, Anc Mon Lab Rep, **44/99**

Howard, R, Laxton, R R, and Litton, C D, 2000a *Tree-Ring Analysis of Timbers from the Buildings and Living trees at Stoneleigh Abbey, Stoneleigh, Warwickshire*, Anc Mon Lab Rep, **80/2000**

Howard, R, Laxton, R R, and Litton, C D, 2000b *Tree-Ring Analysis of Timbers from Worcester Cathedral, Worcester*, Centre for Archaeol Rep, **42/2000**

Howard, R, Laxton, R R, and Litton, C D, 2001a *Tree-Ring Analysis of Timbers from Exeter Cathedral, Exeter, Devon, Part 1*, Centre for Archaeol Rep, **47/2001**

Howard, R, Laxton, R R, and Litton, C D, 2001b *Tree-Ring Analysis of Timbers from Astley Hospital, Church Road, Astley, Manchester*, Centre for Archaeol Rep, **66/2001**

Howard, R, Laxton, R R, and Litton, C D, 2001c *Tree-Ring Analysis of Timbers from Gunns Mills, Spout Lane, Abenhall, Near Mitcheldean, Gloucestershire*, Centre for Archaeol Rep, **25/2001**

Howard, R, Laxton, R R, and Litton, C D, 2002a *Tree-Ring Analysis of Timbers from the Rigging Loft and Chapel Undercroft, Trinity House, Broad Chare, Newcastle upon Tyne, Tyne and Wear*, Centre for Archaeol Rep, **63/2002**

Howard, R, Laxton, R R, and Litton, C D, 2003 *Tree-Ring Analysis of Oak Timbers from Combermere Abbey, Whitchurch, Cheshire*, Centre for Archaeol Rep, **83/2003**

Howard, R, Laxton, R R, Litton, C D, and Simpson, W G, 1985 List 15 - Tree-ring dates, *Vernacular Architecture*, **16**, 39-40

Howard, R E, Laxton, R R, Litton, C D, R Thornes, and Hook, R, 1992 List 47 - Tree-ring dates (Truncated Principal Trusses Project), *Vernacular Architecture*, **23**, 43-4

Howard, R E, Laxton, R R, Litton, C D, and Hook, R, 1993a List 50 - Tree-ring dates (RCHME Joint Northern Medieval Roofs) , *Vernacular Architecture*, **24**, 45-6

Howard, R E, Laxton, R R, Litton, C D, and Simpson, W G, 1993b List 48 - Tree-ring dates, *Vernacular Architecture*, **24**, 40-42

Howard, R E, Laxton, R R, Litton, C D, and Morrison, A, Sewell, J, and Hook, R, 1994 List 58 - Tree-ring dates (Peak Park and RCHME Dendrochronological Survey, 1992-93) , *Vernacular Architecture*, **25**, 41-3

Howard, R E, Laxton, R R, Litton, C D, and Simpson, W G, 1995 List 60 - Tree-ring dates, *Vernacular Architecture*, **26**, 47-53

Howard, R E, Laxton, R R, Litton, C D, and Simpson, W G, 1996a List 65 - Tree-ring dates, *Vernacular Architecture*, **27**, 78-81

Howard, R E, Laxton, R R, Litton, C D, and Morrison, A, Sewell, J, and Hook, R, 1996b List 66 - Tree-ring dates (Peak Park and RCHME Dendrochronological Survey, 1995-96) , *Vernacular Architecture*, **27**, 81-4

Howard, R E, Laxton, R R, Litton, C D, and Morrison, A, Sewell, J, and Hook, R, 1997a List 76 - Tree-ring dates (Peak Park and RCHME Dendrochronological Survey) , *Vernacular Architecture*, **28**, 128-9

Howard, R E, Laxton, R R, Litton, C D, 1997b List 77 - Tree-ring dates (Dendrochronological dating for English Heritage) , *Vernacular Architecture*, **28**, 130-32

Howard, R E, Laxton, R R, Litton, C D, and Jennings, N, 1999 List 97: Cumbria Mud-walled Buildings Dendrochronology Project, *Vernacular Architecture* **30**, 90-91

Huber, B, 1967 Seeberg, Burgäschisee-Süd - Dendrochronologie, *Acta Bernensia*, 145-56

Hughes, M K, Leggett, P, Milsom, S J, and Hibbert, F A, 1978 Dendrochronology in oak in North Wales, *Tree-ring Bulletin* **38**, 15-23

Hughes, M K, Milsom, S J, and Leggett, P A, 1981 Sapwood Estimates in the Interpretation of Tree-ring Dates, *J Archaeol Sci*, **8**, 381-390

Jones, M, Meirion-Jones, G I, Guibal, F, and Pilcher, J R, 1989 The seigneurial domestic buildings of Brittany: a provisional assessment, *Antiq J*, **69**, part I, p 100

Kato, H, and Kishima, T, 1965 Some Morphological Observations of Tyloses, *Wood Research*, **36**, 55-60

Kuniholm, P I, and Striker, C L, 1987 Dendrochronological Investigations in the Aegean and Neighboring Regions, 1983-1986, *J Field Archaeol*, **14** (4), 385-98

Lambert, G, Lavier, C, Guibal, F, and Salvèque, J, 1997 Dating by Dendrochronology – summary of work 1988-1990, in P G Grandchamp, M Jones, G Meirion-Jones, and J Salvèque *La ville de Cluny et ses maisons, XIe-XVe siècles*, Picard, Paris

Larson, G, 1986 *The Far Side Gallery 2*, Andrews, McMeel & Parker, Kansas City

Laxton, R R, 1997 A Thirteenth-Century Crises in the Royal Forest of Sherwood in Nottinghamshire, *Trans Thoroton Soc Nottinghamshire*, **101**, 73-98

Laxton, R R, and Litton, C D, 1988 *An East Midlands Master Tree-Ring Chronology and its use for dating Vernacular Buildings,* Univ Nottingham, Dept of Classical and Archaeol Studies, Monograph Ser, **3**

Laxton, R R, and Litton, C D, 1989 Construction of a Kent Master Chronological Sequence for Oak, 1158-1540 AD, *Medieval Archaeol*, **33**, 90-8; also Nottingham Statistics Group, Technical Report, 09-88 (Dept. of Mathematics, University of Nottingham) 187-94

Laxton, R R, Litton, C D, and Howard, R E, 1995 Nottinghamshire Houses dated by Dendrochronology, *Trans Thoroton Soc Nottinghamshire*, **99**, 45-54

Laxton, R R, Litton, C D, and Howard, R E, 2001 *Dendrochronology of Roof Timbers at Lincoln Cathedral*, English Heritage Research Transactions **7**

Laxton, R R, Litton, C D, Simpson, W G, and Whitley, P J, 1979 Dendrochronology in the East Midlands, in *Trans Thoroton Soc of Notts*, **83**, 23-34

Leggett, P A, Hughes, M K, and Hibbert, F A, 1978 A Modern Oak Chronology from North Wales and its Interpretation, in *Dendrochronology in Europe* (ed J M Fletcher), BAR, **51**, 187-94, Oxford

Litton, C D, Howard, R E, and Laxton, R R, 2000 *Tree-Ring Analysis of Timbers from Headstone Manor Tythe Barn, Pinner View, Harrow, London*, Anc Mon Lab Rep, **61/2000**

McGinnis, E A, and Shigo, A L, 1975 A note on the effect of wounds on heartwood formation in white oak (*Quercus alba*), *Wood and Fibre*, **6**, 327-331

Machin, R (ed), 1976 *The Probate Inventories and Manorial Excepts of Chetnole, Leigh and Yetminster*, Univ of Bristol Dept of Extra-mural Studies, excepts no. 7

Manwood, J, 1615 *A Treatise of the Lawes of the Forest*, London

Martinelli, N, 2005 Sapwood estimates on archaeological oak woods from Northern Italy, in *Abstract Book of Eurodendro 2005 International Conference of Dendrochronology September 28th – October 2nd Viterbo, Italy*, (eds M Sarlatto, A Di Filippo, G Piovesan and M Romagnoli), 29-30, Viterbo

Masters, J, (no date) Alrewas inventories transcribed by June Masters, originals are in the Lichfield Record Office

Miles, D H, 1995a The Building Accounts and the Existing Building, in E Roberts Edward III's Lodge at Odiham, Hampshire, *Med Archaeol*, **39**, 91-106

Miles, D H, 1995b Analysis of Timberwork, in E Lewis, A Sixteenth Century Painted Ceiling from Winchester College, in *Proceedings Hampshire Field Club Archaeol Soc*, **51**, 142-6

Miles, D H, 1996 *The tree-ring dating of Mottisfont Abbey, Romsey, Hampshire*, Anc Mon Lab Rep, **23/96**

Miles, D H, 1997 The interpretation, presentation, and use of tree-ring dates, *Vernacular Architecture*, **28**, 40-56

Miles, D, H, 1998 *The tree-ring dating the north transept, Holy Trinity Church, Wistanstow, Shropshire,* Anc Mon Lab Rep, **60/98**

Miles, D H, 2002a *The Tree-Ring Dating of the Roof Carpentry of the Eastern Chapels, North Nave Triforium, and North Porch, Salisbury Cathedral, Wiltshire*, Centre for Archaeol Rep, **94/02**

Miles, D H, 2002b *The Tree-Ring Dating of the Thirteenth-Century Nave Doors at Salisbury Cathedral, Wiltshire*, Centre for Archaeol Rep, **101/2002**

Miles, D H, 2003a Dating Buildings and Dendrochronology in Hampshire, in *Hampshire Houses 1250 - 1700: Their Dating and Development* (ed E Roberts), 220-6, Southampton (Hampshire County Council)

Miles, D H, 2003b The Shropshire Dendrochronology Project, in *Vernacular Buildings of Shropshire* (M Moran), 531-8, Logaston Press

Miles, D H, 2003c The Tree-Ring Dating of Timbers from the Haymanger Dam and the Mill Pond, Home Farm, Stowe Landscape Gardens, Buckinghamshire, ODL unpubl rep, **2003/5**

Miles, D H, 2005 *The Tree-Ring Dating of the Nave Roof at Salisbury Cathedral, Wiltshire*, Centre for Archaeol Rep, **58/2005**

Miles, D H, and Bridge, M C, 2005 *The Tree-Ring Dating of the Early Medieval Doors at Westminster Abbey, London*, Centre for Archaeol Rep, **38/2005**

Miles, D H, and Haddon-Reece, D, 1993 List 54 - Tree-ring dates, *Vernacular Architecture*, **24**, 54-60

Miles, D H, and Haddon-Reece, D, 1994 List 56 - Tree-ring dates, *Vernacular Architecture*, **25**, 28-36

Miles, D H, and Haddon-Reece, D, 1995 List 64 - Tree-ring dates, *Vernacular Architecture*, **26**, 60-74

Miles, D H, and Haddon-Reece, D, 1996 List 72 - Tree-ring dates, *Vernacular Architecture*, **27**, 97-102

Miles, D H, and Haddon-Reece, D 2003 *The Tree-Ring Dating of the Round Tower, Windsor Castle, Berkshire*, Centre for Archaeol Rep, **53/2003**

Miles, D H, and Russell, H, 1995 Plumb and Level Marks, *Vernacular Architecture*, **26**, 33-8

Miles, D H, and Worthington, M J, 1997 Tree-ring dates, *Vernacular Architecture*, **28**, 159-81

Miles, D H, and Worthington, M J, 1998 Tree-ring dates, *Vernacular Architecture*, **29**, 111-29

Miles, D H, and Worthington, M J, 1999 Tree-ring dates, *Vernacular Architecture*, **30**, 98-113

Miles, D H, and Worthington, M J, 2000 Tree-ring dates, *Vernacular Architecture*, **31**, 90-113

Miles, D H, and Worthington, M J, 2001 Tree-ring dates, *Vernacular Architecture*, **32**, 74-86

Miles, D H, and Worthington, M J, 2002 Tree-ring dates, *Vernacular Architecture*, **33**, 81-102

Miles, D H, Worthington, M J, and Bridge, M C, 2003 Tree-ring dates, *Vernacular Architecture*, **34**, 109-121

Miles, D H, Worthington, M J, and Bridge, M C, 2004 Tree-ring dates, *Vernacular Architecture*, **35**, 95-114

Miles, D H, Worthington, M J, and Grady, A A, 2002 Development of Standard Tree-Ring Chronologies for Dating Historic Structures in Eastern Massachusetts Phase II, ODL unpubl rep, **2002/6**

Miles, D H, Worthington, M J, and Grady, A A, 2003 Development of Standard Tree-Ring Chronologies for Dating Historic Structures in Eastern Massachusetts Phase III, ODL unpubl rep, **2003/9**

Miles, D H, Howard, R E, and Simpson, W G, 2004 *The Tree-Ring Dating of the Tower and Spire at Salisbury Cathedral, Wiltshire*, Centre for Archaeol Rep, **44/2004**

Miles, D H, Worthington, M J, and Grady, A A, 2005a Development of Standard Tree-Ring Chronologies for Dating Historic Structures in Eastern Massachusetts Phase IV, ODL unpubl rep, **2005/9**

Miles, D H, Worthington, M J, and Foley, R P, 2005b Development of Standard Tree-Ring Chronologies for Dating Historic Structures in Newport, Rhode Island - Phase I Pilot Study, ODL unpubl rep, **2005/3**

Millard, A, 2002 A Bayesian approach to sapwood estimates and felling dates in dendrochronology, *Archaeometry*, **44** (1), 137-143

Milsom, S, 1979 Within and Between Tree Variation in Certain Properties of Annual Rings of Sessile Oaks, unpubl PhD thesis, Liverpool Polytechnic, 72

Moore, J (ed), 1976 *Goods & Chattels of our Forefathers*, Chichester

Morgan, R, 1975 The selection and Sampling of Timber from Archaeological Sites for Identification and Tree-ring Analysis, *J Archaeol Sci*, **2**, 221-30

Munby, J, 1993 Manorial Building in Timber in Central and Southern England, 1200-1500, in *Manorial Domestic Buildings in England and Northern France* (eds G Meirion-Jones and M Jones), Soc Antiq Occ Paper, **15**, 49-64

Munby, J, with Ashdown, J, Durham, B, Haddon-Reece, D, Henig, M, and Jeuckens, C, 1992, Zacharias's: a 14th Century Oxford New Inn and the Origins of the Medieval Urban Inn, *Oxonensia*, **LVII**, 245-309

Munby, J, and Miles, D, 2001 The Bodleian Library Oxford: The Roof Carpentry of Duke Humfrey's Library, unpubl rep by OAU

Munro, M A R, 1984 An improved algorithm for cross tree-dating, *Tree Ring Bulletin*, **44**, 17-27

Neve, R, 1726 *The City and Country Purchaser, and Builder's Dictionary: or, the Compleat Builders Guide*, 2nd ed, London

Pearson, E S, 1990 *'Student' A statistical Biography of William Sealy Gosset*, Clarendon Press, Oxford

Pearson, S, 1994 *The Medieval Houses of Kent: An Historical Analysis*, HMSO

Pilcher J R, 1987 A 700 Year Dating Chronology for Northern France, in *Applications of tree-ring studies: current research in dendrochronology and related areas* (ed R G W Ward), BAR, **333**, 129-30, Oxford

Pilcher, J R, Hillam, J, Baillie, M G L, and Pearson, G W, 1977 A long sub-fossil oak tree-ring chronology from the North of Ireland, *New Phytologist*, **79**, 713-29

Pilz, S, 1907 Einiges über die Verkernung der Kiefer, *Allg. Forst und Jagdz*, **83**

Prior, M, 1981 The Accounts of Thomas West of Wallingford, a Sixteenth-Century Trader on the Thames, *Oxonensia*, **46**, 73-93

Pukiene, R, and Ozalas, E, 2005 Medieval oak chronology from the Vilnius Lower Castle, in *Abstract Book of Eurodendro 2005 International Conference of Dendrochronology September 28th – October 2nd Viterbo, Italy*, (eds M Sarlatto, A Di Filippo, G Piovesan and M Romagnoli), 35, Viterbo

Puritch, G S, 1977 Distribution and phenolic composition of sapwood and heartwood in *Abies grandis* and the effects of the balsam woolly aphid, *Canadian J of Forest Res*, **7**(1), 54-62

Rackham, O, 1976 *Trees and Woodland in the British Landscape*, J M Dent, London

Raine, J (ed), 1864 *Testamenta Eboracensia* 3, Surtees Soc, **45**, 99

Richardson, J, 1974 *The Local Historian's Encyclopaedia*, New Barnet, Herts

Roberts, E, 1993 A prior's mansion at Michelmersh, *Proc Hampshire Field Club*, **48**, 117

Robinson, J A, 1911 *The Abbot's House at Westminster*, Cambridge

Ruoff, U, 1995 Neues von der Dendrochronologie, in *Zürcher Denkmalpflege*, 117-6, Bericht 1993/94

St John Hope, W H, 1913 *Windsor Castle: An Architectural History*, **I**, 145-9, **H**, 501-4, Country Life

Sale, A J H (ed), 1999 Cheltenham Probate Records 1660-1740, *Gloucestershire Record Series*, **12** (Bristol and Glos Archaeol Soc)

Salzman, L F, 1967 *Building in England Down to 1540: A Documentary History*, 2nd ed, Oxford

Savill, P S, Kanowski, P J, Gourlay, I D, and Jarvis, A R, 1993 Short Note: Genetic and Intra-Tree Variation in the Number of Sapwood Rings in *Quercus robur* and *Q. petraea*, *Silvae Genetica*, **42**, 6, 371-5

Schweingruber, F H, 1988 *Tree Rings: Basics and Applications of Dendrochronology*, Kluwer, Dordrecht

Schweingruber, F H, 1990 *Microscopic Wood Anatomy - Structural variability of stems and twigs and subfossil woods from Central Europe*, Swiss Federal Institute for Forest, Snow and Landscape Research, 3rd ed

Selby, P J, 1842 *A History of Forest-Trees, Indigenous and Introduced*, John Van Voorst, London

Simpson, G, 1995 SS Peter and Mary Church, Stowmarket, Suffolk - Report on a Survey and Dendrochronology of the Timbers of the Spire and Belfry, unpubl rep, Historic Buildings Research Institute and the Tree-Ring Dating Laboratory, Univ of Nottingham

Steer, F W, 1969 *Farm and Cottage Inventories of Mid Essex 1635-1749*, Phillimore, Chichester, 2nd ed
Suggett, R, 2003 Dendrochronology: progress and prospects, in *Towards a Research Agenda for Welsh Archaeology*, (ed C S Briggs), BAR, **343**, 153-69, Oxford

Swanson, H, 1989 *Medieval Artisans: An Urban Class in late Medieval England*, Blackwell, Oxford

Tredgold, T, 1840 *Elementary Principles of Carpentry*, 3rd ed, London

Trendelenburg, R, and Mayer-Wegelin, H, 1955 *Das Holz als Rohstoff*, Carl Hanser, München

Trinder, B, and Cox, J (eds), 1980 *Yeomen and Colliers in Telford*, Phillimore, Chichester

Tyers, I, 1997 *Tree-Ring Dating of Sinai Park, Staffordshire*, Anc Mon Lab Rep, **80/97**

Tyers, I, 1998 *Tree-ring analysis of the roof of the Samwell Wing at Felbrigg Hall, Felbrigg, Norfolk,* Anc Mon Lab Rep, **65/98**

Tyers, I, 1999 Dendro for Windows Program Guide 2nd ed, unpubl ARCUS Rep, **500**

Tyers, I, 2000 Tree-ring analysis and wood identification of timbers excavated on the Magistrates Court Site, Kingston upon Hull, East Yorkshire, unpubl ARCUS Rep, **410**

Tyers, I, 2001 *Tree-ring analysis of coffin timbers excavated at the Church of St Peter, Barton on Humber, North Lincolnshire,* Centre for Archaeol Rep, **48/2001**

Tyers, I, 2004a *Tree-ring analysis of oak timbers from Holy Cross Church, Crediton, Devon*, Centre for Archaeol Rep, **32/2004)**

Tyers, I, 2004b 'Tree-ring analysis of oak timbers from Welltown Manor, near Boscastle, Cornwall', CfA report **29/2004)**

Tyers, I, and Hibberd, H, 1993 List 53 - Tree-ring dates from Museum of London Archaeology Service, *Vernacular Architecture,* **24,** 50-4

Tyers, I, Groves, C, Hillam, J, and Boswijk, G, 1997 List 80 - Tree-ring dates, *Vernacular Architecture*, **28**, 138-58

Tyers, I, and Groves, C, 2000 Tree-ring dates from the University of Sheffield Dendrochronology Laboratory, *Vernacular Architecture* **31**

Vaisey, D G (ed), 1969 *Probate Inventories of Lichfield & District 1568-1680*, Collections for a History of Staffordshire 4th series, **5**

Wazny, T, 1990 Aufbau und Anwendung der Dendrochronologie für Eichenholz in Polen, unpubl PhD thesis, Univ Hamburg

Wazny, T, and Eckstein, D, 1991 The Dendrochronological Signal of Oak (Quercus spp.) in Poland, *Dendrochronologia*, **9**, 35-49

Williams, E H D, and Gilson, R G, 1979 Base Crucks in Somerset: II, Doulting Abbey Farm..., *Somerset Archaeol and Nat Hist*, **123**, 27-53

APPENDIX 1: BUILDING ACCOUNTS

A. Lodge Farm, Odiham

An account rendered by Richard Bernard, clerk of works at Odiham Castle, of building expenses incurred between May 1366 and September 1370 (PRO E101 / 478 / 28). Transcription by Edward Roberts.

The account deals with the work on several chambers within the castle for which timber was cut in Odiham Park. It also deals with various oubuildings and the park lodge. This last section only has been translated.

Cost of the building called the Lodge (*la loge*) within the Park.

The same (i.e. Richard Bernard) accounts for 300 plank-nails (*planchenaill*) bought to repair the same building, 5*s*. 8*d*.

And in 200 board-nails (*bordnaill*) bought wholesale (*in grosso*), 11*d*.

And for 2000 lath-nails (*lathnaill*) bought, 2*s*. 8*d*.

And for three iron bands bought for the said works, 16*d*.

And for 2500 flat tiles (*pleyntill*) bought, 10*s*.

And for 100 hip tiles (*heppetille*) and crest tiles (*crestes*) bought for the said works, 3*s*. 8*d*.

And for seven quarters, six bushels of lime bought wholesale (*in grosso*), 6*s*. 3*d*.

And for four pairs of twists and hooks (*twistes & hokes*) bought, 3*s*. 8*d*.

And for the tiler of the said building paid according to an agreement, 8*s*. 8*d*.

And for plastering / whitewashing (*in daubacione*) the said building according to an agreement, 15*s*. 2*d*.

And for taking down the old tiles there according to an agreement, 20*d*.

And for the wages of one carpenter working there for 77 days, at 8*d*. a day 51*s*. 4*d*.

And for the wages of five carpenters working there on the said work for 275 days between them all, each taking 6*d*. a day, £6 17*s*. 6*d*.

And for the wages of three carpenters working there on the said works for 133 days between them all, each taking 5½*d*. a day, 60*s*. 11½*d*.

And for the wages of four sawyers sawing timber there on the said works for 122 days between them all, each taking 5*d*. a day, 50*s*. 10*d*.

And for the wages of three lath-makers working and making laths there for nine dayss between them all, each taking 5*d*. a day, 3*s*. 9*d*.

And for the wages of eleven carters carrying timber there for one day, each taking 12*d*. a day, 11*s*.

And for the wages of thirteen carters carrying tiles, lime, and various other items there for one day each, eacch taking 8*d*. a day, 8*s*. 8*d*.

And for the wages of 46 labourers working there for one day each, each taking 3*d*. a day, 11*s*. 6*d*.

Sum total, £19 11*s*. 9½*d*.

B. Burghclere Manor Barn

BURGHCLERE 1451-52 [HRO 11M59/B1/188] [Richard Gorewey farmer] Transcription by Edward Roberts

Cust' novi edific' [Cost of new building]

Et in solut' uni' carpent' de novo fac' unam novam grangiam cont' viij spac' in plenam soluti'em; xiiij li xiij s iiij d
And in paying a carpenter to newly make a new barn containing 8 bays, in full payment; £14 13*s.* 4*d.*

Cum xxvj s viij d pro ij portic' dicte grangie hoc anno; lx s. [sic]
With 26s 8d for 2 porches for the said barn this year; 60*s.*

In convenc' f'ta' cum predicto carpent' de novo bordant' dictam grangiam in grosso ad tascham; liij s iiij d.
For making a contract with the said carpenter to newly board the said barn completely, for the task; 53*s.* 4*d.*

In vj ml bordenaylle ad idem empt'; xxx s.
For buying 6,000 board nails for the same; 30*s.*

In xxxv ml tegul' planis empt' ad coopertur' dicte grangie dand' pro ml v s; viij li xv s.
For 35,000 plain tiles bought to roof the said barn, giving per 1,000 5s; £8 15*s.*

In carect' conduct' car' dict' tegul' de diversis locis dand' pro car' xiiij d; xl s x [d].
For cart[s] hired to carry the said tiles from diverse places, giving per cartload 14*d.*; 40*s.* 10[*d*].

In cxxv tegul' concavis empt', vij s vj d. [sic]
For 125 valley tiles bought; 7*s.* 6*d.*

In cxxv crestis ad idem empt'; vij s vj s. [sic]
For 125 ridge tiles bought for the same; 7*s.* 6*d.*

In j quart' iiij bz. cavill' empt'; x s.
For 1 quarter and 4 bushels of tile-pegs bought; 10*s.*

In stipend' ij sarr' sarrant' cc ped' pro ovesbordis inde habend'; ij s.
For the wages of 2 sawyers sawing 200 feet for making eavesboards with them; 2*s.*

In solut' uni' homin' cremant' lx quart' calcis tam pro coopertur' dicte grangie quam pro pynnynge eiusdem cum xx quart' calc' lib' usque manerium de alta clere dand' pro quart' iiij d; xx s.
For paying a man to burn 60 quarters of lime both for roofing the said barn and for underpinning the same with 20 quarters of chalk delivered as far as the manor of Highclere, giving per quarter 4*d.*; 20*s.*

In solut' pro car' xl quart' calc' de puteo calceti usque manerium, dand' pro car' iiij d; xiij s iiij d.
For paying for carting 40 quarters of lime from the lime pit to the manor, giving per cartload 4*d.*: 13*s.* 4*d.*

In solut' pro cariag' xij carect' zabuli una cum lucr'one eiusdem, dand' pro cariag' vj d; vj s.
For paying for the carriage of 12 cartloads of sand together with the digging out the same, giving for a carriage 6*d.*; 6*s.*

In solut' uni' coopertori petrarum cooperient' dictam grangiam dand' pro ml ix d ad tascham; xxvj s iij d.
For paying a stone tiler roofing the said barn, giving per 1,000, 9*d.* for the task; 26*s.* 3*d.*

In xj ml latheis empt' xlj s iij d dand' pro ml iij s ix d.
For 11,000 laths bought 41*s.* 3*d.*, giving per 1,000 3*s.* 9*d.*

In solut' uni' cement' de novo pynnant' subtus grunsull' et les postes ad tascham; xxxiij s iiij d.
For paying a mason to newly underpin the ground sill and the posts, for the task; 33*s.* 4*d.*

Et in una carect' conduct' car' viij cariag' de libr' petris de Sydmanton usque in manerium dand' pro car' vj d; iiij s.

And for hiring a cart to carry 8 cartloads of freestone from Sydmonton to the manor, giving 6*d.* per cartload, 4*s.*

Et in una carect' conduct' car' burr' calc' de mur' d'ni usque in grangiam per ij dies; ij s viij d.
And for hiring a cart to carry burr lime from the lord's wall to the barn for 2 days; 2*s.* 8*d.*

Total £28 7*s.* 4*d.*

[Deduct £1 14*s.* 4*d.* for other works = £26 13*s.* 0d. for the barn]

BURGHCLERE 1452-53 [HRO 11M59/B1/189]

Farm of the demesne land £10 per annum for meadow and pasture plus numerous qualifications and provisions.

Cust' novi edificii
Cost of new building

Et de v ml shyngelis empt' ad coopertur' ij porticu' magne grangie una cum latheis et opere coopertur' ad tascham cum supervis'; lvj s viij d.
And 5,000 shingles bought to roof two porches of the great barn together with laths and the work of roofing, for the task with the overseer; 56*s.* 8*d.*

In ml ml [l]athnail ad idem; iij s.
For 2,000 lath nails for the same; 3*s.*

In ovesbordis ad idem; xx d.
For eaves boards for the same; 20*d.*

In solutis pro cariag' dict' Shyngull de Erleston et Sandelford per v vices; iij s iiij d.
In payment for the carriage of the said shingles from Earlstone and Sandford [in Kingsclere] on 5 occasions; 3*s.* 4*d.*

In viij ml tegul' plan' empt' ad coopertur' magne grangie ibidem ultra viij ml tegul' empt' et dat' per firmar'; xl s.
For 8,000 plain tiles bought to roof the great barn beyond the 8,000 tiles bought and given by the farmer; 40*s.*

In solut' pro car' dict' tegularum de Wydehay usque manerium; xviij s viij d, dand' per car' xiiij d.
For payment for the carriage of the said tiles from East Woodhay to the manor; 18*s.* 8*d.*, giving per carriage 14*d.*

In solut' j homi' ponent' dict' xvj ml tegul' super grangiam predict' dand' pro ml xij d; xvj s.
For payment of 1 man putting the said 16,000 tiles on the said barn, giving 12*d.* per 1,000; 16*s.*

In j quart' cavill' empt'; vj s viij d.
For buying 1 quarter of tile-pegs; 6*s.* 8*d.*

In vij quart' calc' ad idem empt' prec' quart' xvj d; ix s iiij d.
For buying 7 quarters of lime for the same, price 16*d.* the quarter; 9*s.* 4*d.*

In solutis car' dict' calc' de Wydehay; xiiij d.
For payment for carriage of the said lime from East Woodhay; 14*d.*

In c bordnayl; vj d.
For 100 board nails; 6*d.*

In solutis j carpentario de novo fac' les wyndborges eiusdem grangie; xx d.
For paying a carpenter to make anew the barge boards of the same barn; 20*d.*

In ij nov' serur' cum clavibus empt' ad hostea dicte grangie cum stapul' ad idem; xiiij d.

For buying 2 new locks with keys for the doors of the said barn with staples for the same; 14*d.*

In solutis uni' carpent' de novo fac' xxvij stallis pro bobis in bovar' d'ni ac fac' rackes ac mangia pro xx equis in eadem domo una cum car' merem' ad idem; xxxvj s viij d.
For paying a carpenter to make anew 27 stalls for oxen in the lord's oxhouse and to make racks and mangers for 20 horses in the same building together with the carriage of timber for the same; 36*s.* 8*d.*

In vj carect' zabular' empt' pro coopertur' magn' grangie; iij s.
For 6 cartloads of sand bought to roof the great barn; 3*s.*

In viij hokes et iiij twystes ferr' empt' ad hostio d'te bovar'; ij s vj d.
For 8 hooks and 4 twists of iron bought for the doors of the said oxhouse; 2*s.* 6*d.*

In clavis ad idem empt'; ij s.
For keys bought for the same; 2*s.*

C. *Unidentified Building re-erected at Burghclere Manor*

Often entire buildings were bought with the intention of demolishing them and re-erecting them, either wholesale, or using the materials in a new building. This example was recently discovered in the Bishop of Winchester's account rolls for 1452-53 [HRO 11M59/B1/189]. Transcriptions and translations by Edward Roberts; Caroline Edwards is thanked for her advice on certain points:

In una veter' aula ii cameris altis et una al' domo cum camera tegul' coopert' empt' apud Whitechurche per supervis' et balliv'; vj li.
For an old hall, two high chambers and another building with a chamber roofed with tiles, bought at Whitchurch by the overseer and bailiff; £6.

In xxxiij carectat' veteris meremij et xv carect' tegular' de Whitechurche usque maner' dand' pro pro [sic] carect' xvj d; lxiiij s.
For 33 cartloads of old timber and 15 cartloads of tiles from Whitchurch to the manor, giving for a cartload 16*d*.; 64*s*.

In solut' diversis hominibus conductis deponentis tegulas muros[?] eiusdem domus ad tascham; vij s.
For payment to several men hired to take down tiles and walls from the same building, for the task; 7*s*.

In convent' f'ta per supervis' cum uno carpentario deponenti vet' merem' dcit' domor' ac super maneriu' de novo sublevant' et fac' ad tascham; xlvj s viij d.
For an agreement made by the overseer with a carpenter to take down the old timber of the said houses and to newly erect and make it at the manor, for the task; 46*s*. 8*d*.

In viij ml [?tegulis – word missing] empt' ad copertur' dict'aule et camere prec' ml v s; xl s.
For 8,000 [tiles] bought to roof the said hall and chamber, price the 1,000 5*s*.; 40*s*.

In j quart' cavillar' empt' pro aula prec' ml x d; vj s viij d.
For 1 quarter of tile-pegs bought for the hall, price the 1,000 10 d; 6*s*. 8*d*.

In solut' divers' carpent' de novo grunsill' waplat' aule et camere ib'm ac de novo fac' v nov' posts et novos justes in camera austral' ad tascham; xxiiij s.
For payment to several carpenters to newly [make the] ground sill [and] wall plates of the hall and chamber there and to newly make 5 new posts and new joists in the south chamber, for the task; 24*s*.

In ij ml pedibus meremij sarrand' dand' pro centena xij d; xx s
For sawing 2,000 feet of timber, giving for a hundred 12*d*.; 20*s*.

In xxx carect' merem' de Echen' usque maneriu' car' pro carect' viij d. xx s.
For 30 cartloads of timber carried from Ecchins[well] to the manor, for the cartload 8*d*.; 20*s*.

In ccc spykenayll pro tignos affirmand' et bordenayll ad idem; x s.
For 300 spike nails for securing timber and board nails for the same; 10*s*.

In expens' sen'l et supervis' n'l hoc anno.
For the expenses of the steward and overseer, nothing this year

In solut' pro car' viij ml tegular' de Wydehay usque maneriu' dand' pro ml xiiij d; x s viij d.
For payment for the carriage of 8,000 tiles from East Woodhay to the manor, 14*d*. a 1,000; 10*s*. 8*d*.

In ij serur' emptis cum clavibus; x d.
For buying 2 locks with keys; 10*d*.

Summa; xxviiij li xiiij s ij d.
Total; £29 14*s*. 2*d*.

D. Sinai Park – South-West Wing

The following accounts have been transcribed by Jean and Bob Meeson, the originals are in the Staffordshire County Record Office.

The xvth yeare of the Raiyne of
our Soveraiyne ladye Elyzabeth

f.4v	Payed to Thomas Wryght for fallinge framynge and Peesynge up the newe frame at burton	xiiij li	
	payed to Thomas mason for takynge downe the tyles and plastere and carryinge awaye	vij s	
	Payed to Thomas Edge for makynge of iij chymneyes in the newe bildynges and mendynge my lordes chymneye	iiij li	
	Payed to John Priethe for carryinge awaye Rubbeyes and levelynge groundes in the newe buildes	vj s	
	Payed to the [Roper] for ij dozen of ..... and one greate [Rope] for the buildynge	v s iiij d	
	Payed to Thomas mathews and Francies Waddames for workeinge in the foundation of the newe buildynge one wycke	xij s	
	Payed to four labourers that carryed stonne and paved them	vj s	
	Payed to Thomas mason for makynge the Rest of the foundation and ground fillinge the newe buildynge	v s vj d	
	Payed to four labourers that helped them that wycke	vj s	
	Payed to John Sparkes for castynge the trench for the frame vj dayes	iij s	
	Payed to Allen of lychefyld and John marston for xij thousand of brycke	iiij li xvj s	
	payed for the carryage of those xij thousand bryckes	iij li	
	payed to the sayed allen and marston for vij thousand and a halfe of tyle	lviij s vj d	
	Payed for one loade of gutter tyles and crestes	xix s x d	
	Payed for carryage of those xiiij loades from lychefelde	xxviij s	
	Payed for l/tyme spent uppon the newe buildynge garner washeinge house and other necessarye places	iiij li xj s	
	Suma	**xxxviij li iiij s ij d**	
f.5	Payed to bryarley for carryinge xxx loade of sand and claye	x s	
	Payed for xij loade of plaster at ij s viij d the loade	xxxij s	
	Payed for the carryinge of four loades of tymber from bromley at iiij s the loade	xvi s	
	geven to vj g waynes that went to bromley to fetche tymber	ij s viij d	
	Payed to John Robynson for carryinge of stonnexij dayes	vj s vj d	
	Payed to Thomas cooke for beinge at burtonvij wyckes		xxj s
	Payed to Jaxson for xxij dayes beatynge plaster	xj s	
	Payed to Wetton for xij dayes beatynge plaster	vj s	

	Payed to Gylbert to serve the mason xvij dayes		xj s
	Payed to parkes to beate plaster viij dayes		iiij s
	Payed to Thomas mason for makynge harthes and [h/wall] plates/place vj dayes		vj s
	Payed to Thomas pyerson and his fellowe for paynge Entryes and mendynge his pyckes and other necessaryes xij dayes		xj s x d
	Payed to John Jaxson for Servynge hym xij dayes at the same tyme		vj s
	Payed more to waddames for plasterynge viij dayes		viij s
	Payed to Robert Robynson and his boye for plasterynge and tylynge xij dayes at xviij pens the daye		xiiij s iiij d
	Payed to William chrysterfor for burninge plaster and tylynge xviij dayes		xj s viij d
	Payed to Christopher Robynson for tylynge the newe loddgynges		xxvj s viij d
	Bordes and plankes from the cancke wood bromye to yoxhall xvj loades bestowed on them in bred cheese and drynke		x s
			xli li xiiij s viij d
f.5v	payed for the fallinge of xviij trees in the cancke wood for burton for brekynge squareinge and makynge pyttes		xxij s vj d
	Payed for sawinge lvj hundred at xviij d the hundred		iij li xv s
	Payed for the draweinge of those tress to the pyttes and for carryinge of those bordes to Rydgeley and shutburrowe to be carryed to burton		xij s
	Payed to the Joyner for makynge A portall in the gallerye		iiij s
	Payed for hynges and latches for the same portall		xx d
	Payed to John bankes for glasynge at burton this yeare		vij li
vj li viij s	- xxxij p/foales bought at greseley the pryce	vj li xiij s	
	xvj trees at bromley		
	xxx in the out wooddes		
	xviij trees fallen in the cancke wood for shingles laythes plankes and bordes		xij li xviij s
		Summa	**lxj li xviij s**
	For mendynge the garner		
	Payed to Rychard Ottye for makynge xj thousand layethes		xv s viij d
	Payed to Ottye for shynglynge at burton vj dayes for his man and himselfe to ethre of them iiiij s vi d the wycke		ix s
	payed to Otteye for makynge v thousand shyngles at vj s viij d the thousand		xxxiij s iiij s
	payed to chrystopher Robynson for plasterynge and tylynge the garner		xxiiii s
	payed for a locke for the garner Doore		xvj d
	payed to Jhon godwayne of bromleye for makynge casementes		xij s
		Summa	**iiii li xv s iiii d**
f.6	the washeinge house		

Payed to William hipkyns for xij wyckes beinge at burton in buildynge the washynge house plankeinge the stable noggynge the walles and mendynge other necessaryes about the house at iiij s vj d the wycke	liiij s
Payed to thomas Edge for makynge the chymney in the washeinge house	xxx s
Payed more to Thomas Edge for makynge the Syncke and harthe and pavynge the washeinge house x dayes	vij s viij d
Payed to William Peyerson for v dayes at x d the daye	iiij s ii d
Payed to gilbart for viij dayes at vj d the daye	iiij s
Payed to John Sparkes for viij dayes at vi d the daye	iiij s
Payed to chtopher Robynson for plaste rynge the washeinge house	xiij s iiij d
Payed to the Same man for tylynge the washinge house	xviij s
Payed for ij lockes and ij keyes for the washeinge house doores	xvj d
Payed to Thomas Edge for makynge of an oven and Settynge of A leade v dayes at x d the daye	iiij s ii d
Payed to Jhon Parkes for v dayes	ij s vj d
Payed to the same Thomas Edge for pavynge the stable ij dayes	xx d
Payed to the labourer that served him ij dayes	xij d
Summa	**vij li v s x d**

For mendynge the longe table in the hall

[Item] Payed to betson and his man for mendynge the long table in the hall at xvj d the daye	x s viij d
Payed for [glesse]	vj d
Payed to William Beddall for carryinge Awaye the olde oven in the washinge house	iiij s
Payed to Thomas Wryghtes man for helpinge the carpenter in buildynge the washeinge house xij dayes	viij s
Summa	**xxiij s ij d**

f.6v

Payed to the widdowe moore for nayles spent in the newe buildynges at burton as appereth by her bill	lvj s ij d
Payed to Edward the smythe for makynge barres for wyndowes stable lockes and mendynge other necessaryes as apperethe by his bill	xix s viij d
Payed for v lockes at Darbye	v s iiij d
Payed for ij joyned bedstyddes at xij s the peece	xxiiij s
Payed for iij joyned cupbordes at iij s iiij d the peece	x s
Payed for skorynge dyches in Lythen hurste haye	ij s iiij d
Payed to betson for A square table tha	

standes in master ensores camber	iij s
Payed more to the Same betson and his man	
for other of them iiij dayes for makynge	
Shilves in my lordes closset and in my ladyes	
closet and for mendynge necessarye About	
the house	v s iiii d
payed to thomas wryght and his man for certayne	
workes done Aboute the mannor as apperethe by his bill	xxxij s
Summa	**vij li xvij s x d**

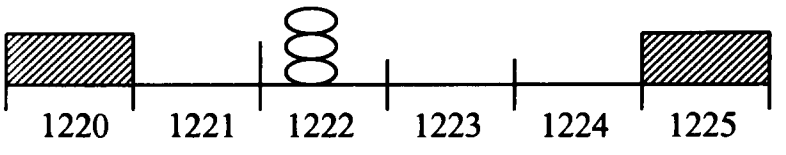
APPENDIX 2:
TREE-RING DATED BUILDINGS WITH INDEPENDENT DATES

This section contains short summaries of buildings which have been dated through dendrochronology, but also have other independent dating evidence. These are arranged chronologically and grouped by the type of dating evidence: documentary, timber inscriptions, date stones and other inscriptions in plaster, lead, and iron, and inheritances, deeds, and other changes in ownership.

Each entry is accompanied by a visual representation of the chronological relationship of the documented date, which is shown as hatched, and the actual precise felling dates, shown as ovals. Many of the sites dated by Nottingham are recorded as simply complete sapwood – these have been shown as winter felled. However, there may actually be some spring or early summer growth on some of these samples which would push the felling dates forward by a small amount.

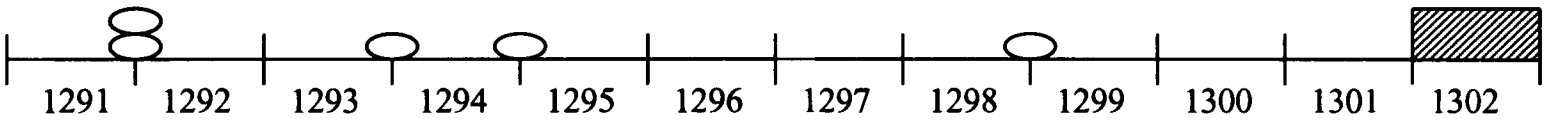
A. Documentary:

Salisbury Cathedral, Wilts: Eastern Chapels



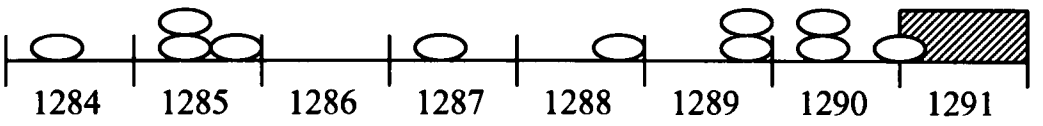
Salisbury Cathedral, like many of the major building projects of the medieval period, was constructed over an extended period of time. At Salisbury, the foundation stones to the eastern chapels were laid in the spring of 1220, and the western end of the cathedral was completed by 1258. The first section of the cathedral to be completed were the eastern chapels, which were dedicated at Michaelmas 1225. Three precise felling dates of spring 1222 for imported Irish timbers indicate that a couple of years elapsed before the fabrication of the roofs began (Miles 2002a).

Exeter Cathedral: Presbytery roof



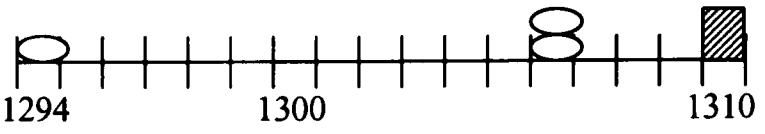
The earliest part of Exeter Cathedral with a documented construction date correlating with dendro dates is the presbytery roof. The Fabric Rolls state that the vaults were in place, bosses painted, and windows glazed in 1302. Tree-ring felling dates of 1291, 1293, 1294, and 1298 have been obtained from a number of timbers in this roof. Stock-piling of upwards of a decade is indicated for some of the timbers (Howard *et al* 2001a).

Stokesay Castle, Shropshire



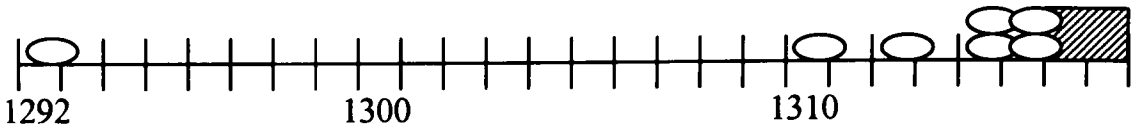
Stokesay Castle, Shropshire, was enlarged and improved by Laurence de Ludlow who received a Licence to crenellate in 1291. Eleven dated primary phase timbers from the Hall, Solar, and North Tower produced a wide span of dates ranging from spring 1284 to spring 1290, indicating a fair amount of stock-piling (Miles and Worthington 1997).

Exeter Cathedral: Choir roof



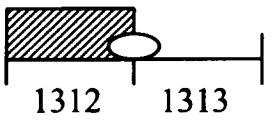
The choir is thought to have been completed by 1310 when it is recorded that the choir stalls were installed. The two felling dates of 1306 and one of 1294 show that timber was felled between 4 and 16 years before the choir was completed with the installation of the choir stalls (Howard *et al* 2001a).

Exeter Cathedral: Crossing roof



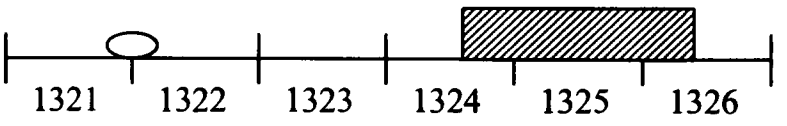
References in 1316-17 for payments for painting the vault bosses suggest that the crossing was completed at this time. Felling dates of timbers ranging from 1292 to 1315 show that timber had been stock-piled at least 23 years before being incorporated into the roof trusses. Conversely, one of the rafters was felled during the late autumn 1315 to the winter of 1315/16. This suggests that the actual erection of the roof trusses through to the completion of the decoration was actually in the space of little more than a year or two (Howard et al 2001a).

Boarstall Tower, Buckinghamshire



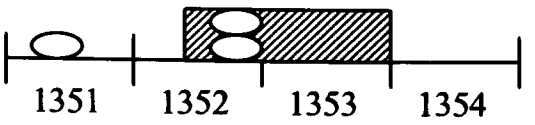
The tower and the moat at Boarstall are all that remains of a moated manor house complex dating from the early 14th century. One of the ceiling joists at ground floor level gave a felling date of winter 1312/13. This ties in precisely with a licence to crenellate the manor at Boarstall awarded in 1312 (Miles and Worthington 1999).

Manor Farm, Michelmersh, Hampshire



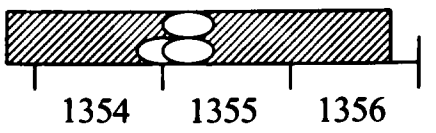
Manor Farm, Michelmersh is a country residence of the prior of St Swithun's, Winchester. The south range is a stone-built chamber block comprising a large solar, whose barrel vault retains nails for a lath-and-plaster ceiling, and a small inner room that may have been a garderobe. The ground floor has a large chamber whose window reveals have remnants of scrolled red paintwork. The single felling date of winter 1321/2 (Miles and Worthington 2002) may relate to entries in priory account rolls recording the fetching of stone from Westwood near Bath between 1324 and 1326 (Roberts 1993), which would indicate a degree of stock-piling.

Windsor Castle, Berks: Canon's Cloister



The Canon's Cloister at Windsor Castle has documented construction dates of between June 1352 and March 1353 (St John Hope, 1913). St John Hope mentions the work cost £107 6*s*. 8*d*. for 'the carpentry of twenty-three chambers, of (i.e. using) the King's timber', and that by December 1352 work was sufficiently well advanced to allow the purchase of 20,000 laths for the wattle and daub panels, and that between October 1353 and January 1354 the lead was being laid top the roofs. One felling date of spring 1351 and two of the summer of 1352 accord well with the documented dates (Miles and Worthington 2003).

Windsor Castle, Berks: Round Tower



The documentary evidence for the Round Tower is confused partly by the accounts for three years (August 1351 to December 1354) being presented together on the Pipe Roll of Michaelmas 1354 (28 Edward III), and also by the work running in parallel and series with that on the Canons' lodgings and other buildings (see entry above). According to the enrolled accounts some 3004 oaks from Cagham, 105 from John of Buckhurst, and 10 from John of Sunninghill were apparently expended on the Canons' Lodgings and the clock in the high (round) tower (3019 oaks), the remainder (500) being delivered to the king's works in Westminster. In the detailed particulars, the work on the clock and lodgings in the tower was underway from March 1354, with purchases of timber in June (200 scappled timbers for the hall in the tower, with 1200 boards); in July laths and 100 oaks for the hall and chambers in the high tower; in August 1354 boards and five oak beams for the hall; in October five (enrolled as 100) oaks for the hall and chambers in the tower; in December lead was being applied to the roof of the hall and chambers (this appears only to be a minor operation). The fact that John Prat was paid for guarding timber for a year at Okle, most likely Oakley Green some two miles west of Windsor, may suggest that the framing was undertaken there.

This building campaign utilised a proportion of oaks from *Cagham* (some of which were still being converted in the last quarter of 1354), 200 timbers of unknown source acquired in June 1354, and 105 (100 + 5) oaks from John of Buckhurst acquired in July and ?August, and converted in the last quarter of the 1354 (i.e. accounted for in the fourth account on PR 28 Edward III, that for September to December 1354). Therefore, timbers felled during the 'winter 1354/5' would generally mean anytime between October 1354 and March 1355, and could be from either *Cagham* or from Buckhurst (Berks) if felled before the end of 1354.

Accounts for 1354 to 1355

The works from 29 December 1354 to September 1355 are recorded on the Pipe Roll of 29 Edward III, i.e. the accounting year ending in Michaelmas 1355. A total of 670 oaks include 100 from Thomas Crouchfield (i.e. the 111 carts brought from Crouchfield in Hertfordshire), 170 from John atte Hale (probably the 180 carts brought from Sandhurst in Berkshire), and 400 from Henry Stormy (probably the 300 carts brought from *Cagham*). If this seems straightforward, it must be said that the enrolment and particulars give the same cash total for 670 and 570 oaks respectively, and that other timber was purchased for the Canons' horsemill, while the Clerk of Works rode to *Ashurst* (?Sussex) about felling oaks.

The Particulars are unhelpful on the location of workmen, though the houses and chambers in the high tower are mentioned (Hope is wrong in saying that the Pipe Roll implies most men were not working on the tower, but perhaps he means the Particulars). The timber stock account states that 620 of the 670 oaks were expended on the 'houses and chambers in the high tower and repairs of other houses'. The timber with a winter 1354/5 felling date could thus derive from Crouchfield (Hertfordshire), Sandhurst (Berkshire), as well as from *Cagham*, if felled early in 1355.

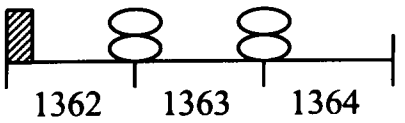
Accounts for 1355 to 1356

The works of the next accounting year, September 1355 to October 1356, survive only as enrolled accounts, and would suggest that much of the previous year was spent in framing the timber rather than building, for it is only now that the masons are involved in getting stone for 'foundations of divers houses in the high tower'. But rapid construction is implied by the purchase of laths for the walls, varnish for the timber, and lead for the roof. While 50 oaks remained from the previous account, 247 were bought along with 337 pieces of scappled timber. But of this total of 634 timbers, only 32 oaks were expended on 'the hall and chamber in the high tower', and 602 items remained unused. The 247 oaks cannot all be sourced, for although bark and lop of 247 oaks was accounted for, only 127 are detailed: 87 bought from William of Saundreden at Hedgerley (Buckinghamshire) and 40 from John atte Halle of Sandhurst. The scappled timber came from *Elnetham*, either Eltham (thus Hope) or more likely Elvetham (Hampshire). Timber was carted from Sandhurst (74 carts), *Elnetham* (87 carts) and

Hedgerley (32 carts). Two timbers felled in the spring of 1355 would have come from one of these sources (J Munby in Miles and Haddon-Reece 2003).

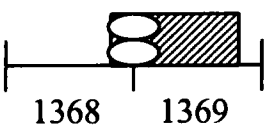
If the hall range had been constructed in previous years, it is most likely that the work of this year comprised the erection of the other three ranges, in which case the 32 oaks were most likely expended on the roof or fittings of the building.

Stowmarket Church, Suffolk: Spire repair phase 1



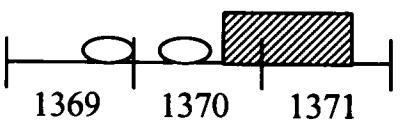
The spire at the Church of SS Peter and Mary in Stowmarket has a spire that has several documented phases of repair. The initial spire was rebuilt, following the 'Great Storm' of January 1362, and felling dates of winter 1362/3 and winter 1363/4 relate to the reconstruction following this storm (Simpson 1995).

Lodge Farm, Odiham, Hants: Cross-wing



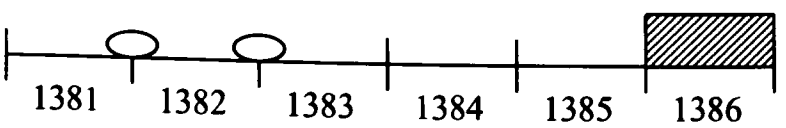
Lodge Farm, Odiham is a hall with a two-bay cross wing. The walls of the 1375 hall have been rebuilt in brick and the original, smoke-blackened roof timbers have been re-used to create a side-purlin roof, possibly in 1446/7 although there may have been a second reconstruction later. The slightly earlier cross wing of 1368/9 is substantially intact, with a crown-post hipped roof, and containing a solar over a divided service. A chimney inserted just within the hall heats one service room but the cross-wing roof had originally been framed for what appears to have been a chimney stack backing on to it within the wing. While the existing stack still retains the shadow of the original hall roof line much lower down, the beam to the present fireplace serving the cross wing has been dated to 1544-9. Building accounts, which survive from 1365-1373, show that Edward III was rebuilding the lodge in the royal park of Odiham between those dates (Miles and Haddon-Reece 1994; Miles 1995a). See also *Section 7.1.2* above.

Westminster Abbey: Jerusalem Chamber undercroft



There are some documentary references to the construction of the Jerusalem Chamber at Westminster Abbey. Although the rolls for 1369-70 is missing when work might have begun on the undercroft, the roll for 1370-71 shows some £42 expended on the Abbot's 'novi edificii apud Westm'. The following year's accounts are the largest, with £118 being spent on the works, including canvas for the windows of 'my lord's new *camera*', which clearly must refer to the Jerusalem Chamber. The accounts for 1372-3 and 1373-4 are for £80 and £41 respectively, indicating that extensive works are still being undertaken. In the account of Walter Warfield submitted 1375-6, mentions £69 being expended on carpentry and joinery involving the use of 'estrichebord' and 'Rygoldbordys', terms for high-quality oak boards imported from the Baltic. Thus a protracted period of building is indicated, with the shell, including the undercroft ceiling being completed within a couple of years, and then the main roof, internal fittings, and glazing being completed by 1376 (Robinson 1911, 11-12, 16-21).

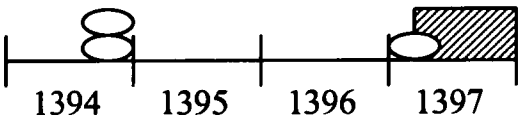
New Inn, Cornmarket, Oxford



The site for the New Inn, Cornmarket, Oxford, was assembled by John Gibbes, a prominent vintner, at an unknown date, but vacant land on which part of the inn was built was leased from the adjacent church of St. Michael at the Northgate in March 1386 for one hundred years, with permission to build new houses on it. Gibbes died in 1386 or 1387, and in 1396 his son granted the 'New Inn and five shops' to feoffees. The inn was of courtyard type, of stone and timber-framing, with traceried windows and both crown-post and clasped-purlin roofs. Certain features are comparable with contemporary work at New College (Munby 1992).

The dating of samples from different parts of the building proves that the shops at the front of the inn were built at the same time as the courtyard at the back. Interestingly, the felling date of winter 1381/2 and winter 1382/3 for two samples is somewhat earlier than the recorded grant. Was the lease of the 'vacant land' retrospective, or immediately prior to rearing the frame, or was the building constructed with timber that had been seasoned for a number of years? (Haddon-Reece *et al* 1988).

New College, Oxford: Bell Tower

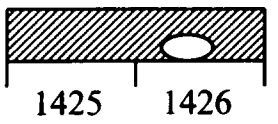


Three samples from the structural timbers of the bell tower at New College, Oxford, retained complete sapwood. Two of these were felled in the summer of 1394 – a main ceiling beam from the first floor ceiling, and a joist from the second floor ceiling, whilst the third timber, a joist from the first floor ceiling, was felled a few years later in the spring of 1397. Clearly the dates do not support a phased course of construction over three years, as the 1394 timber was found one storey higher than the 1397 timber. However, it is likely that some of the timbers were stock-piled during or before the course of construction, and that they were then used no earlier than spring 1397.

The building accounts covered the period from 12th March 1397 to 20th December of the same year, and as they detail the construction of the roof, and other fittings such doors and shutters, ironmongery, lead for the roof, and for hanging the bells, it suggests that the works much have been essentially completed by the end of 1397. This makes a relatively narrow timeframe of six to nine months from when the joist on the first floor was felled in the spring of 1397 to when the accounts were written up at the end of the year on completion. As there is some 75 feet of masonry walls above the first floor ceiling level, it is not very likely that this was all built during 1397. Instead, it is more likely that the tower was constructed over two or three years, and that the two main beams to the first floor ceiling (felled late summer 1394) were laid in place during 1395. This would then give two years to raise the tower up the final 75 feet by 1397. Indeed, the accounts suggest that 33ft of tower was constructed during the previous year (1396). Given that the common floor joists are simply lodged on the two main longitudinal beams and the half-beams supported on corbels, these could have been installed later, as the tower walls were nearing completion (unpubl report by the Oxford Archaeological Unit, 1995).

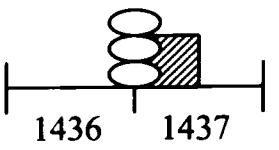
Thus, one possible scenario would be that the tower commenced construction sometime around 1392 or 1393, and then reached the top of the second stage by 1395 when the main longitudinal beams were inserted, and then the fourth stage and battlements completed two years later by the end of 1397. During this final year, the remainder of the floor joists would have been set on the main beams already in place, the flooring laid, doors and shutters made and hung, and the roof leaded (Worthington and Miles *in prep*).

Harmondsworth Tithe Barn, Hillingdon, Middlesex



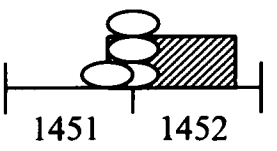
The Tithe Barn at Harmondsworth is a twelve-bayed aisled structure, part of the manor purchased by William of Wykeham in 1391 and which formed part of the endowment of Winchester College. The College accounts refer to carpenters inspecting timber for a barn in 1425/6, and a further entry the following year refers to the barn being completed. Thus the precise felling date of spring 1426 for a main arcade post confirm that the timber was used immediately on felling (Tyers and Hibberd 1993).

Lincoln College, Oxford, the Buttery



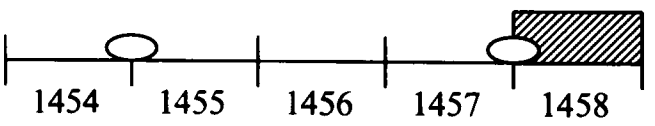
The Buttery at Lincoln College, Oxford, has a number of documentary references. The sequence of construction of the college buildings after the foundation in 1427 is uncertain, but John Forest, Dean of Wells, paid for completion of the college, which was described as fully built in June 1437. Three felling dates of winter 1436/7 for the buttery ceiling (in the NE corner of the front quadrangle) confirms that the hall range was under construction then (Miles and Worthington 1999).

Manor Barn, Old Burghclere, Hampshire



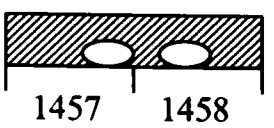
Manor Barn, Old Burghclere is an 8-bay, aisled barn with two porches. Opposite the porches were winnowing doors but no entrance wide enough for a wagon. It originally had one set of purlins that have apparently failed and have been replaced with two tiers of roughly-lodged purlins. The barn was gabled at both ends and each truss had queen struts to collars. Documentary sources record payment to a carpenter to build a barn of 8 bays and two porches at Old Burghclere in 1451/52. This compares well to a precise felling date of autumn 1451 and felling dates of winter 1451/2. (Miles and Worthington 1999) See *Section 7.1.3* and **Appendix 1B**.

Durham Cathedral: North transept repairs



The north transept roof at Durham Cathedral was damaged by a fire in 1458. Two timbers with precise felling dates were used in the replacement roof. One, a tiebeam, was felled over three years prior to the fire, proving that timbers were stock-piled, whilst a second timber, a brace, was felled at the end of the 1457 growing season and may have been recently-felled stock purchased for the rebuilding work (Howard *et al* 1992).

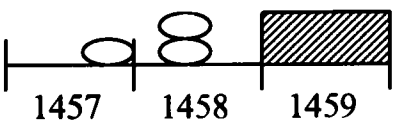
Bodleian Library, Oxford: Duke Humfrey's Library



Duke Humfrey's Library began as a Divinity School shortly before 1430, and in 1444 an exceptionally large donation from Humfrey, Duke of Gloucester provided the impetus to create a library above the uncompleted building. Previously thought to have been completed only after the outstanding fan-vaulted ceiling was added to the Divinity school in the early 1480s, the dendrochronology has here shown that in 1458 an elaborately moulded low-pitched open roof was constructed above the library, the majority of which still survives. This has been confirmed by documentary references to payments of 4

nobles in 1457 and a further £10 in 1458 for some sort of roofing. This roof consisted of low king-post trusses with arch-braces and tracery panels; each bay comprised a heavily moulded principal purlin with a simpler subsidiary purlin either side, and with a central intermediate rafter of the same profile. The common rafters, which survive above the later painted ceiling, all had a large hollow chamfer below and were rebated for panels above; a few surviving fragments of these are English rather than imported oak. Clearly this would have structurally completed the library at this time, although it was not until the following decade that the fittings were installed (Munby and Miles 2001)

Abbot's House, Shrewsbury

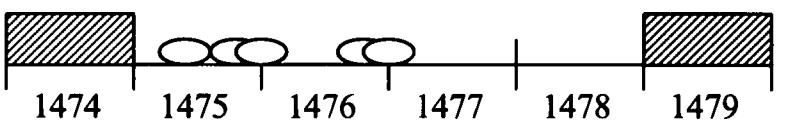


The Abbot's House, Butcher Row, Shrewsbury, is very useful for a fairly well-dated documentary account from the borough bailiffs' account roll for 37 Hen. VI. The regnal year ran from 1 Sept 1458 to 31 Aug 1459, although the bailiffs' account would actually cover their year in office, which would have corresponded fairly closely to Henry VI's regnal year, though displaced by about a month, i.e. beginning and ending about one month later than the regnal year. By getting a sense of the chronological flow of the document, it is likely that the entry relating to the Abbot of Lilleshall's house would have referred to an event within a few weeks of April 1459.

The entry when translated reads: 'And in pence paid to the carpenter of the abbot of Lilleshall for his reward, given at the sufficacio of his house in Fish Street 20*d*. And in wine given to the said abbot at the same time for the good reputation of the town 14*d*.' This most likely meaning of the word sufficacio is as a verb, when used of a building, to mean 'to lay the foundation for'. If that is so of the noun sufficacio in this case, could this mean that the carpenter had completed the prefabrication of the timber frame and that by about April 1459 a foundation had been made on which to erect it? (George Baugh, *pers comm*).

Given that three timbers have been dated with complete sapwood - one to the summer of 1457 and two to the late spring of 1458, it is likely that the building was prefabricated during the summer months of 1458, and that it was erected during the spring of 1459. Thus, the timber was used within a year, or two at the most, before erection (Miles and Haddon-Reece 1994).

Magdalen College, Oxford: West Cloister

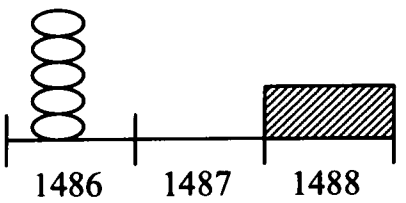


Although founded in 1458, Magdalen College initially utilised the remaining buildings from the hospital of St John the Baptist which itself was re-established on the site in 1231 (Durham 1991). It was not until 1474 that work commenced on the Great Quadrangle which on the west side included the Chapel and Muniment Tower, the original President's Lodgings to the south and the Old Library to the north of the Founder's Tower. Apart from the Chapel which was re-roofed by Wyatt in 1790, the rest of the west cloister range retains substantial amounts of early woodwork. This includes not only the structural timberwork of the floors and roofs, but also original fittings such as chests and deed boxes.

Samples taken from the roof timbers of the West Cloister range in the Great Quad produced precise felling dates of spring 1475 through to summer 1476. There are a number of documentary references to stonework in this range. First is an indenture of 16th September 1475 for the making of the great west window of the Chapel as well as windows for Library. The stonework was still progressing on the 8th of January 1478/9 when an agreement was made to provide buttresses and battlements for the Chapel, Hall, Library, Muniment and Founder's Towers, and the cloister chambers. Near the end of the work, another agreement was made on 17th April 1479 for a 'vyse' to the Founder's Tower with a spire over and for the pinnacles over the Hall, Chapel, and two towers (Magd Archives, Robin Darwall-Smith *pers*

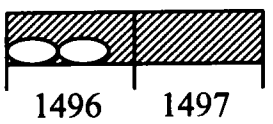
comm). Thus, it would seem that both the roof and the stonework were being prefabricated during 1476, though probably not installed until a year or two later.

Bodleian Library, Oxford: Duke Humfrey's alterations



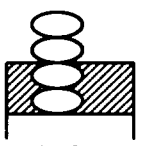
In the early 1480s the Divinity School was altered by the insertion of the stone vaults which necessitated raising the floor level, window heads, and wall tops in Duke Humfrey's Library above it. Five precise felling dates of spring 1486 relate to the original roof of 1458 being raised wholesale some five feet, with new, longer, arch-braces and wall posts supported by the original corbels, but retaining the rest of the roof structure. The date of 1488 has long been acknowledged as being the date the library was completed (Munby and Miles 2001).

Court Farm, Overton, Hants: Barn



Overton Court Farm Barn is at present a truncated structure of six bays; it may have originally contained nine bays with two wagon entrances. It is an aisled barn with queen struts and clasped purlins. It had timber-framed walls which have been replaced in masonry over the years. Overton Manor belonged to the Bishop of Winchester. Bishopric accounts show that timber was being brought to the site in 1496-97, and that the barn was built in 1497-98. Some 120 oaks were felled at Sapley and at Willersley, both about a mile away from Overton, while the roof tiles were brought from different sources ranging from Earlstone and Highclere (7 miles) to Woodhay (12 miles). An arcade post was found to have been felled in the summer of 1496, and timber found in the adjacent house (see house entry below) was felled in the spring of the same year was most likely a left-over from the barn (Miles and Haddon-Reece 1994).

Manor Farm, King's Somborne, Hampshire



Manor Farm, King's Somborne contains a cross frame dated to 1301 from the low end of a hall with two adjacent doors with two-centred arches. The rest of the house comprises two parallel wings, each of four bays. This phase is dated to 1504 by building accounts in the archives of Magdalen College, Oxford, the institution responsible for the building. The finer of the wings contains a three-bay great chamber with access to a one-bay room. This room has a small, original outshot that may have functioned as a latrine. Four samples with complete sapwood were all felled in the spring of 1504, tying up exactly with the building accounts (Miles and Worthington 1999)

[42/16 (1503/04) Robt Tanner farmer; farin of demesne lands £6 13 4d. perqs of court 14/6d
coll rent from various L Somborne - 17d.; Stockbridge 12/5d.; Braishfield - 15/- etc.
cust' dom';
Robert Tanner hath payd unto the kynge ffor Stokebrygge ..
Item paid to William Halle mason for the Reparacion or the kechen 4s 9d by taske.
Item for theyr borde 3s.
Item for the carrege of hewthe and stone 6s.
Item for a M tyle from Mechelmershe 6s
Item for ij M tyle from Oturborne 4s. (sic)"
for felling of timber and scinding (splitting) *6/8d.*
for the cordege of iij score loade of tiymber, £3.
Going to Oterburne .... for delevere of timber 4d. *sum £4 9s. 5d.*

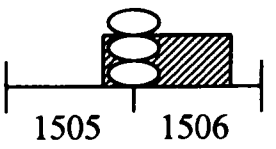
?scinding = trimming or splitting

42/6 (1504-08) building work as appear in two (missing) bills, £44 14s. 9d.

163/19 (1508-09) still £6 13*s*. 4*d*. for farm of manor - building an oxhouse with old timber - total 10*d*.

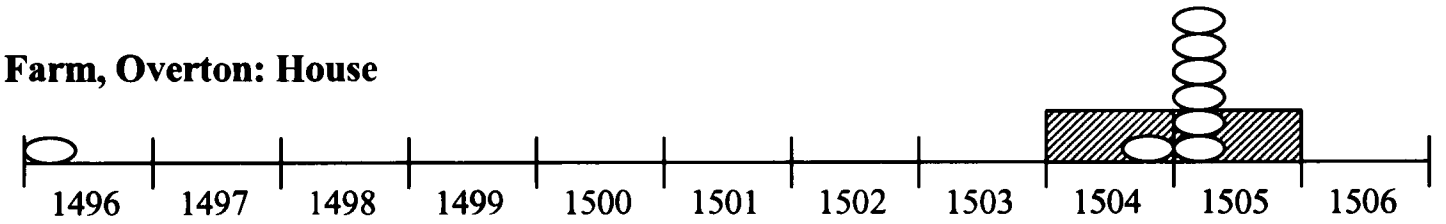
Edward Roberts, who studied the accounts for this building, states that 'after all this expenditure on a new house the College got no increased rent. However, the lease (missing) was due to be renewed in 1504-05. This is significant. The payment for renewal of lease (the entry fine) was negotiable and was shared amongst the fellows. I have little doubt that the fellows were spending the College's money on a grand new house and pocketing the increased entry fine that they could thus extract from Robert Tanner. This sharp practice was common and is discussed in vols. 2 and 3 of *A History of the University of Oxford* (pub. OUP)'. The question remains as to whether the kitchen as detailed in the building accounts represent part of the structure dated.

Headstone Manor Barn, Harrow, Middlesex



The large barn at Headstone Manor, Harrow, has accounts from the Archbishop of Canterbury for the year ending 1506 detailing its construction. Three tree-ring dates show that the trees were felled during the winter of 1505/6, and that the building must have been framed and erected during the following year of 1506 (Litton *et al* 2000).

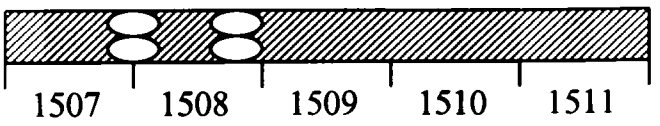
Court Farm, Overton: House



Overton Court Farmhouse comprises two blocks forming a T-shaped plan. One block seems to have contained three bays and may have conformed to a standard service-hall-parlour plan. The other block (to the south of the first) is of four bays; each floor probably contained one or two large rooms, This block could have contained a court house for the Bishop of Winchester's manor. The roof in each block is very similar, with queen struts, two rows of butt purlins, and windbraces. The bishopric accounts show that timber was felled in 1505-6 and the house built in 1506-7. Some 30 oaks were felled at Ecchinswell, some six miles away. Six saw-pits were constructed and 39 tons of timber were 'trimmed and dressed' either in the woods or at Willersley, where the framing yard might have been. Two apparent contradictions remain. The accounts referring to building a new hall and kitchen also mention 'groundcelles' being newly placed in the chamber to the south of the hall, implying that this wing pre-existed and was only being repaired. The dendrochronology, however, showed that four samples taken from various elements of this range dated to 1505, strongly indicating a completely new structure. The accounts further refer to two brick chimneys being constructed in the hall and chamber, yet what is thought to be the hall area has very heavy soot encrustation on two of the timbers, which dated to 1505. However, one floor joist in this bay was dated to 1496, implying that the hall was floored from the beginning. It is most likely to have been a leftover from the previous building campaign for the barn.

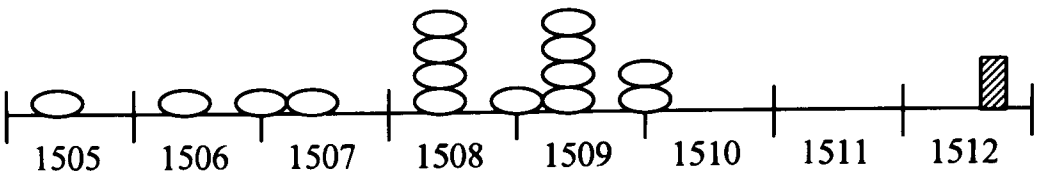
The chronology for the house does not match well with that from the barn. Interestingly, their timbers came from very different yet geographically close sources. Those from the barn came from the chalk downs and were from a larger number of smaller trees, each structural member being cut from a half or a whole tree, whereas the house timber came from the lower lying clay and from much larger trees, each log being sawn up into many different members (Miles and Haddon-Reece 1994).

43 High Street, Winchester, Hants



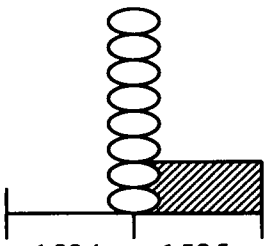
Four precise felling dates from 1507 to summer 1508 clearly relate to the documented building period of 1507-1511 for 43 High Street. This is an exceptionally wide range for construction, and the documents would need further examination to try and reduce this range (Tyers and Groves 2000, 123)

Edinburgh Castle: Hall roof



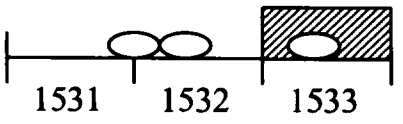
When the Great Hall roof was constructed at Edinburgh Castle, timber was imported from Scandinavia. Fifteen timbers produced precise felling dates, the latest dating from the winter of 1509/10, which relates with what little documentary evidence there is. Unfortunately no records survive in the *Treasurer's Accounts* for the years from 1508 to 1511 but even in the years prior to 1508 there is no record of timber being bought specifically for work in Edinburgh Castle. However, in August 1512 there is a final payment for the slating of the Great Hall so the building must have been completed by then. This demonstrates a certain degree of stock-piling for about five years (Crone 2002).

Trinity House, Newcastle: Dog Bank Building



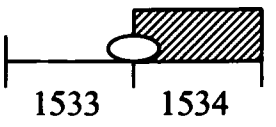
Trinity House, Newcastle, is fortunate in having much of its history well documented, the earliest of which dates to 1524 and stating that the lofts were added onto the north side of the site and above the cellars of the Dog Bank Building. Although the precise interpretation of this might be slightly inconclusive, nevertheless eight timbers from the rigging loft roof has dated to the autumn of 1524 to winter of 1524/5, exactly correlating to the reference (Howard *et al* 2002).

Tower of London: Flamstead Turret roof



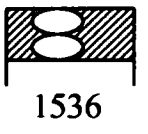
At the Tower of London, the north-east (Flamstead) Turret turns out to be the oldest carpentry with correlating documents. One rafter dates to the winter of 1531/2, one to spring 1532, and a third to spring 1533. The context of the 1530s work is interesting, for it again points to a state occasion when the Tower was brought into repair, this time the coronation of Anne Boleyn in 1533. The works accounts refer to the carpenters removing '*the olde tymber upon the iiij turretts upon the White Tower*', and plumbers covering the four turrets '*being half fynnysshed*'. This and the following account have many references to the '*four Types*' on the White Tower, which may mean that the turrets were themselves finished with heraldic beasts, though the references to roughcast brickwork suggests that they were set on their own brick piers. There is a separate reference to the north-east turret in the account of works (probably) before January 1533: '*Item a flower made and redy framed for the Rownde Tower on the White Tower whiche is not yet sett up*'. Clearly the roof frame was not quite ready in 1533, as one of the rafters was still growing in the woods that spring (Miles and Worthington 1997; Munby and Miles *in prep*).

Sutton House, Hackney, London



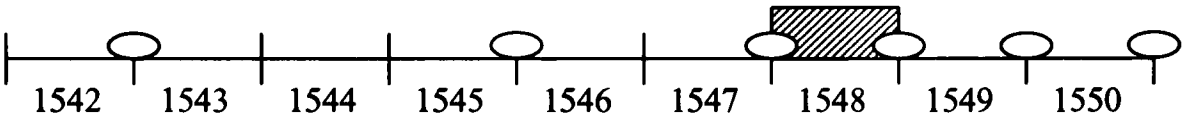
Sutton House is a large, H-plan brick-built house of Sir Ralph Sadler, who also built Brook House, Hackney, for Thomas Cromwell. There is documentary reference for 100 oaks felled in Enfield being granted to Cromwell in early 1535, and it has been suggested by Ian Tyers that some of these oaks have been used for the main transverse beams in the construction of Sutton House. Although none of these retained complete sapwood, a joist was found to have been felled in the winter of 1534/5 (Tyers and Hibberd 1993).

Hengrave Hall, Suffolk



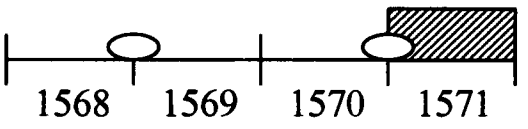
A single sample from the Queen Elizabeth Room at Hengrave Hall produced a felling date of summer 1536. A reference dating from May 1536 relates to work in the 'greatt chamber in ye tower' which has been identified as the Queen Elizabeth Room. The two timbers dated were spurs, or interrupted lower collars, which would have been integral with the construction of the roof frame (Bridge 2001).

Lincoln Cathedral, Lincs: Repairs following collapse of spire



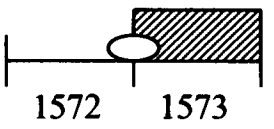
At Lincoln Cathedral the spire fell in 1548, damaging the adjacent roofs. Six timbers relating to these repairs produced precise felling dates. Three predated the fall of the spire and ranged in date from 1542/3 to 1547/8. Three others dated to 1548/9, 1549/50, and 1550/51, the latter date relating to when the actual repairs were carried out, some two years after the collapse (Laxton *et al* 2001, 63-4).

Stoneleigh Abbey, Warwickshire: East Wing



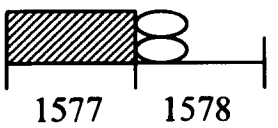
Stoneleigh Abbey is a large multi-phased country house of varying dates. The house was inherited by the second Thomas Leigh in 1571, and there are unspecified references to a substantial amount of construction work done at that time. Two precise felling dates of 1568 and 1570 from the east wing would appear to support that the 1571 date, although the time lag of between 1 and 3 years assume that construction would have proceeded immediately on inheriting the property (Howard *et al* 2000a)

Sinai Park, Staffs: Building F – South-west Wing



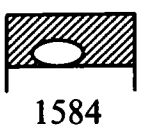
The large and complex mansion at Sinai Park, Burton upon Trent, Staffordshire, has been extensively studied. One sample, a wall plate from the south-west wing (building F) produced a precise felling date of winter 1572/3. Building accounts transcribed by Bob and Jean Meeson from 1573 detail the felling, transporting, and erecting the timber frame. The accounts also detail plastering and tiling, suggesting that the whole wing was essentially completed by the end of 1573. Accounts transcribed by Bob and Jean Meeson (Tyers 1997), see *Section 7.1.4* above and **Appendix 1D**.

Windsor Castle, Berks: Repairs to Round Tower



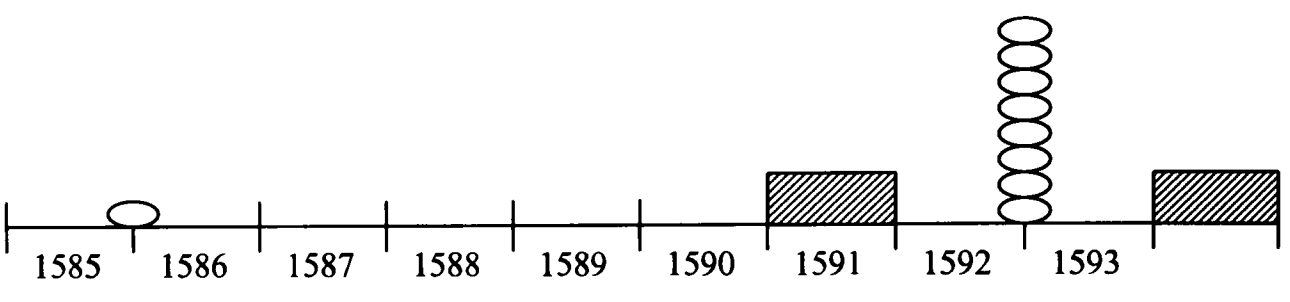
Five loose wedges and packs within the roof of the main courtyard range provided two precise felling dates of spring AD 1578 (Miles and Haddon-Reece 2003). Although they may have been older timbers re-used, it is likely that they were part of a series of repairs recommended in 1577 by the Clerk of Works: '*A Note of the moste necessarie places to be firste considered upon for to be repaired within the Castle of Windesore this year 1577....The Keepe is in great Ruyn and decaie bothe in stonewourke, timberwourcke and Leade*' (St John Hope 1913, 274).

Gell's Bedehouses, Wirksworth, Derbyshire



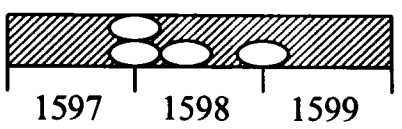
A documentary reference exists for the establishment of the almshouses in 1584, and the spring 1584 felling date for a single timber suggests that construction occurred in the same year (Howard *et al* 1994).

Cobham Hall: North-west Range



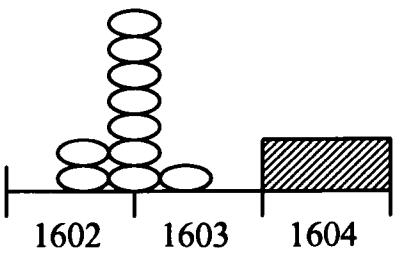
The north-west range is dated through a licence to import 200 tons of Caen stone in 1591, other unspecified documents state that the north range was roofed in 1594, and this date is collaborated by a date stone on the porch of 1594. Eight samples from six rafters as well as a collar and a brace were all felled during the late autumn 1592 or winter 1592/3. One brace was found to be from a timber felled seven years earlier, in 1585/6 as was clearly of stock-piled timber. These dates correlate well with the documented building dates, and show an interval of no more than a year or two to when the roofs were to have been completed in 1594 (Arnold *et al* 2003).

Bodleian Library, Oxford: Bodley Restoration



During the Reformation the Library was pillaged, and by the late 1590s lay derelict. Thomas Bodley restored the roof, and tree-ring dates of winter 1597/8 and the following spring showed that at least three of the principal tiebeams and arch-braces were replaced, as were some of the purlins. Analysis of the painted ceiling panels produced a clustering of last heartwood ring dates from the prepared oak panels, strongly suggesting that Bodley inserted these under the original moulded rafters at the same time, along with the moulded secondary rafters dividing the ceiling into nearly-square panels (Munby and Miles 2001).

White Tower, HM Tower of London, West Chambers



The columns of the western division of the ground floor (supporting the first floor), and the columns and ceiling joists on the first floor (supporting the second floor) are dated between summer 1602 and spring 1603. Queen Elizabeth died in March 1603, and preparations were made for King James's coronation, and in particular the Knight's bathroom in the White Tower (though in the event this took place in St James's Palace and not the Tower of London). The accounts include: '*layinge the newe planckes in Cesars hall in the Tower plaine one by another against the kinges Majestie comeinge for the knights of the Bath all over the olde broken floores*'..... '*Plasterers ..platforeing the wall of Casars hall for the knights of the Bathe againste the Coronacon*'. This has rather a makeshift ring to it, and is hardly consistent with the wholesale refitting that must have happened. There is better evidence for large-scale construction in the following years in association with the new Powder House that was being constructed in the basement. In the Works accounts for 1603-4 are more detailed description of the operations:

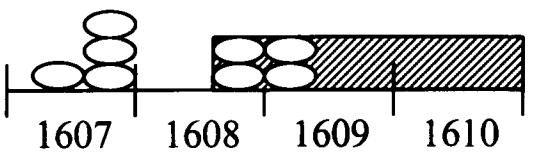
> *framinge of Joystes and Brest Sommers for the newe flower of the powderhouse in the white Tower, liftinge straight of planckes wch have been sawen twoe yeares for the same flower, and the next oulde flower under it...*
> *sommers of the new flower that is making in the white Tower for the new powderhowse helping the Labourers to crane up tymber out of the bardge at the wharf and loading the cartes wth it that carried up into the Tower to the Sawpitt, Craning up the framed tymber, framing and raysing of the Carpenters woorke of the postes plates ioystes and breast sommers for the newe flower made in the white tower for the powder house, Craning up the frames tymber framing and leauelling the ioystes upon the walles of either side of the flower, raising the breast sommers and the longe binding ioystes, lifting straight of planckes putting in and leuelling the ioystes for the newe flower, wch is making all the length of the great white Tower for the newe powder house*

And this continued into the next year of the Works Accounts, for 1604-5:

> *joisting and planckinge of the greate floore in white Tower for a powder house there puttinge in of sondrie newe joists in the middle floore under the newe floore Liftinge straighte of planckes and newe planckinge of the same flower in manie places, puttinge in of newe plates uppon the walls to beare the endes of the joists cuttinge out and takeinge downe some of the uprighte posts in the upper story of the white Tower wch did beare the roofe and were all rotten and decaied woorkinge and ymbowinge of newe posts to sett in their place proppinge and Screwing upp the maine beames and principall tymber of the roof of white Tower whilest the olde were taken out to put newe in their place frameinge in the newe posts and plate into the beames and braces of the roofe puttinge in of peces of Tymber on the backside of the other uprighte postes wch stood besides the wall againste the windowes for the strengthininge of them and boultinge them together wth greate yron boultes puttinge in of some new joiste uppon the toppe of the roofe under the leades and planckinge the same wth newe plancks, puttinge in quarters under the Recordes offyce and of tymber betwene the Joists overhead where the spaces were too wyde to lathe unto frameinge together twoe blocks of tymber to clippe the foote of the uprighte piller in the lowe darke sello^{r} under the recordes...*

If this work does comprise the present flooring of the western half of the White Tower, as it appears to do, then the timber must have already been felled (Munby and Miles *in prep*).

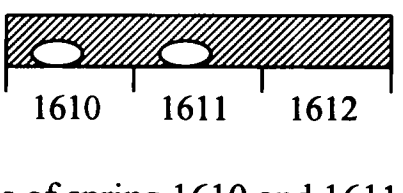
Merton College, Oxford: Fellows' Quad



Documentary sources state that on the 13th of September 1608 '*between the hours of eight and nine in the morning, the first and lowest foundation was laid of the new building...*' , the Fellows' Quad at Merton College, Oxford. One cannot be more precise than this as to when a building project begun, nor can one have a better record of the progress of the building. The following months were spent in digging further foundations, and on the 28th of January 1609 John Acroyde was appointed as mason, and in May Thomas Holt was appointed master carpenter for the whole project. Both were Yorkshiremen, and all of the workmen were brought down from the north. Due to the scarcity of competent tradesmen, work proceeded slowly, but between March 1609 and September 1610 the work was completed (Bott 2004).

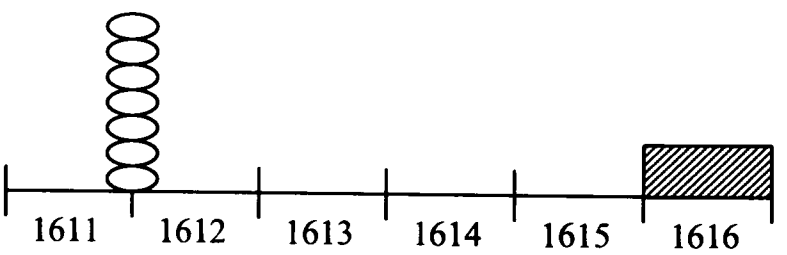
Eight timbers from the roofs over the south-east corner of the building were sampled, extending from staircases 2 to 4. Four were found to have been felled during the spring and summer of 1607, predating the digging of the foundations, and may have been timber stock-piled by the College for the new building works, or may have been timbers felled on spec. Four other timbers were found to have dated between the summer/autumn of 1608 and the spring of 1609 clearly were felled specifically for the new building. Framing would have commenced during the remained of 1609 and into 1610 whilst the stonework was being erected, and all must have been complete by the end of summer 1610. Probably all that required finishing off would be internal works through the winter of 1610/11 (Worthington and Miles *in prep*).

Bodleian Library, Oxford: Arts End



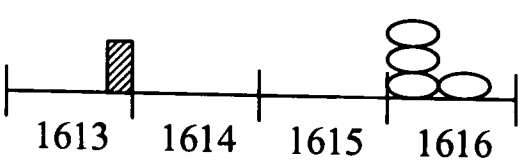
Three samples were also taken from the Arts End, and felling dates of spring 1610 and 1611 confirm the documented construction date of 1610-12 (Miles and Worthington 1999; Munby and Miles 2001).

Dilston Hall, Northumberland: Chapel



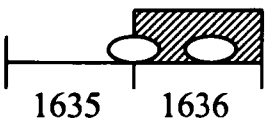
The Chapel at Dilston Hall was remodelled in 1616, according to an unspecified documentary account. Seven timbers from the roof above were all felled in the same season, between the autumn of 1611 to the winter of 1611/12. This suggests that the documents relate to later internal alterations completed a few years after the building was re-roofed and gallery inserted (Arnold *et al* 2003a).

The Almshouses, Mapledurham, Oxon



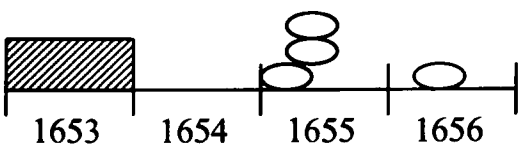
In the will of Sir Charles Lyster dated 23rd October 1613 transferred to Sir Richard Blount a lease of 1000 years on lands called Coxwell in Berkshire which could be sold and the proceeds used to erect and endow a hospital or a free school for the poor in either Mapledurham or Bicester (Cooke 1925, 152-3). However, the almshouses were not actually erected until the middle of 1616 at the earliest as evidenced by three precise felling dates of spring 1616 and one from the summer of the same year.

Wilton House, Wiltshire



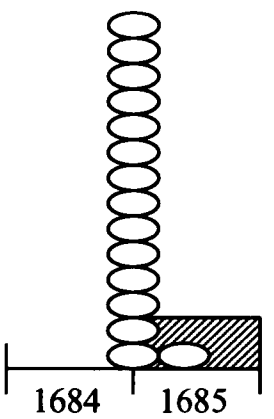
The south range of Wilton House was known to have been constructed during 1636 by unspecified documentary accounts. Two piles from under the foundations have produced felling dates of winter 1635/6 and summer 1636, demonstrating that the timber was used immediately on felling (Hillam 1990).

122-4 High Street, Marlborough, Wilts



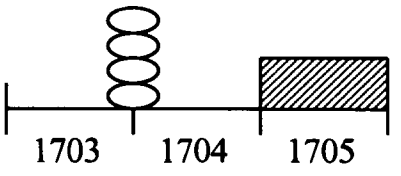
The building at 122-4 High Street, Marlborough, was nearly destroyed in the Great Fire of 1653 which destroyed much of the High Street. Three precise felling dates from spring 1653 and one further date from spring 1656 shows that the building was not reconstructed until three years after the fire, although there may have been some temporary works in the interim (Miles and Haddon-Reece 1995).

Felbrigg Hall, Norfolk



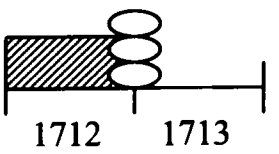
The construction of the wing designed by William Samwell for William Windham at Felbrigg Hall in Norfolk is exceptional in that detailed building accounts, the 'Green Book' recording the felling of trees in 1685. Fourteen samples were found to have been felled in the winter of 1684/5, and one other was found to have been felled slightly later, in the late spring or early summer of 1685. This correlates precisely with the documentary accounts and show that the timbers were used immediately upon felling (Tyers 1998).

Flitton Church, Beds: De Grey Mausolea



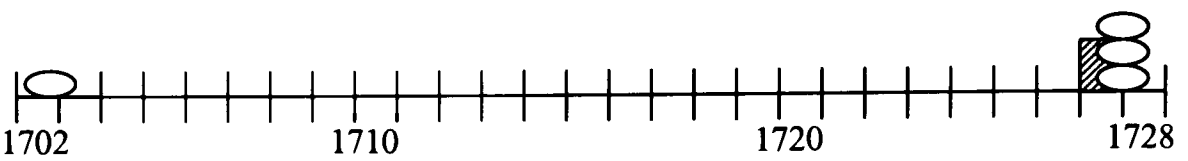
The De Grey Mausolea at Flitton parish church consists of three roofs, the first was thought to have been constructed in 1614, the second roof having a documentary date of 1705. Four samples from Roof 1 were felled in the winter of 1703/4, whilst samples from Roof 2 were felled between 1703 to 1721. This suggests that either the 1705 documents actually referred to Roof 1, or that all of the roofs were constructed at the same time using stock-piled timbers, although it seems unlikely that a roof of 1705 would require complete reconstruction only a generation later (Arnold *et al* 2003a).

Stowmarket Church, Suffolk: Spire repair phase 3



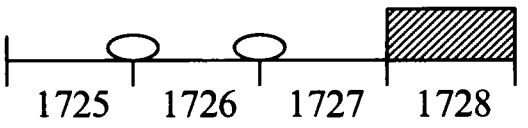
The spire was again reconstructed in 1674, but no samples with complete sapwood were obtained from this phase. However, the spire again fell in November 1703, and whilst the rest of the church was repaired immediately afterwards, it was not until 1712 when the death of William Kent left a legacy for its reconstruction. Felling dates of winter 1712/13 correlate well with this, as does a lead date plaque on the spire itself with the initials 'WK' and the date '1712'. Kent's will stated that the spire must be completed within 5 years of his death, and the felling of trees within one year show that this must have been fairly well completed within the following year. Here the date plaque must relate to the death of William Kent and not the completion of the spire (Simpson 1995).

Combermere Abbey, Whitchurch, Cheshire



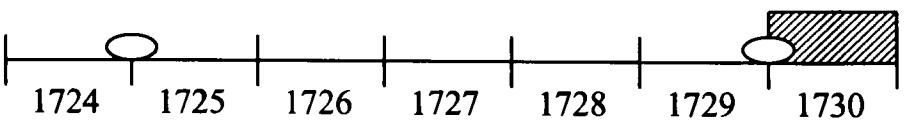
A painting of the house dated 1727 show the roofs of the Abbot's Lodging in their present form constructed with three timbers felled in autumn 1727 to winter 1727/8. One other purlin however, was felled 25 years earlier in 1702/3. The relationship of these dates is slightly confusing - does the painting actually portray the house before the roofs were repaired? (Howard *et al* 2003).

Worcester Cathedral: Choir Roof



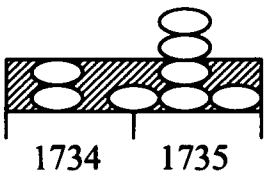
Worcester Cathedral has some documentary accounts, which show that the Choir roof was reconstructed in 1728. Two timbers, one felled in the late autumn 1725 or winter 1725/6, and another timber one year later, shows that some timbers were stock-piled at least two years before the known construction date (Howard *et al* 2000b).

Worcester Cathedral: Transept Roofs



The documents also show that the transepts were re-roofed in 1730. One timber from the north-east transept relates very closely to this with a dendro date of late autumn 1729 to winter 1729/30. Another timber from the south-east transept was felled five years earlier, again suggesting stock-piling(Howard *et al* 2000b).

Magdalen College, Oxford: New Building



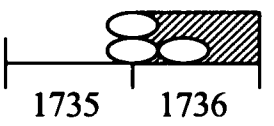
The New Building at Magdalen College has exceptionally full documentary building accounts covering the period 1733 to 1743. Work started on the foundations during 1733, and by the end of the year the masonry seems to have been to the full height of the basement. During this year a number of proposals were received from Edward Smith for the carpentry of the New Building, the main ones dating to 19th May 1733.

Evidently timber was being sourced and stock-piled as early as 1731, with oaks being obtained from Tubney Wood, Collier Coppice, and Magdalen Wood. One account dated 7th March 1734/5 details quantities of timber needed to complete the floors and roof timbers for the New Building. Trees were continued to be felled through 1735 (Magd Coll archives MC:FA14). There are bills dating from 1731-1733 showing that timber was being sawn and prepared in Magdalen Grove in advance of the building of the masonry walls. By January 1734 sash windows were being supplied, suggesting that the walls were rising above ground-floor level. (Magd Coll archives MC:FA14/2/5F/36-51).

By middle 1734 slates are being acquired, these continue through November 1735 (Magd Coll archives MC:FA14/2/4F/1-24). The shell of the building is thought to have been completed and roofed by the end of 1736, although construction probably continued through to the end of the decade, as evidenced by bills for plastering and slating from July 1735 to April 1740 (Magd Coll archives MC:FA14/2/17F/1-11).

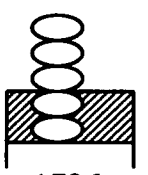
Felling dates for eight timbers ranging from spring 1734 through the summer of 1735 were all from the roof timbers, and were clearly the last phase of the structural carpentry to be fabricated. It is likely that the roof was framed and completed during 1736. Given the protracted period of construction of the New Building, it is difficult to make any further interpretation of the building without accessing the lower floor timbers. See *Section 7.1.5.*

Bishop's Palace, Salisbury, Wiltshire: Drawing Room



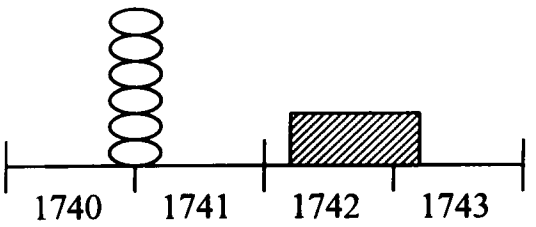
The drawing room roof of the former Bishop's Palace at Salisbury was also reconstructed at the same time as the Cathedral roofs were being worked on. A drawing forming part of specification dated November 1736 top the Bishop referring to the roof as 'proposed'. This is interesting considering that timbers had already been felled in winter 1735/6 and spring 1736 (Miles and Worthington 2000).

Salisbury Cathedral, Wiltshire: Choir Crossing



Although it is known that Francis Price re-built or extensively repaired all of the roofs to the Cathedral from 1734 onwards, only the choir crossing roof is documented. This is in the form of a portrait of Price (see figure X) holding a drawing of the choir crossing frame which itself is dated 1736. A number of timbers which are present in the portrait have been dated to spring 1736, as well as a number of roof boards used to repair the north porch roof (Miles *in prep*).

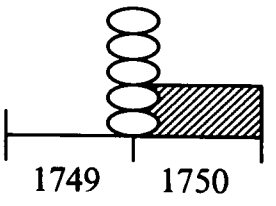
Radcliffe Camera Dome, Oxford



The Radcliffe Camera, part of the Bodleian Library, was begun in 1737 to the designs of James Gibbs, which included a stone dome. Work on the lower part of the stone drum had begun but by February 1741 work was abandoned as the span was considered too ambitious. On 22th March 1742 an agreement was signed to complete the dome, including the leadwork, by the 25th of March 1743. This suggests a construction period of one year to frame and erect the dome, with the timberwork ready for the plumbers by the 1st of November 1742. Interestingly, the agreement specifies that the structural oak timber be "cut Square, free from Sap, well season'd, and wrought after the best manner", and that the circular curved purlins "...to be also out of the best season's Timber" (Gillam 1958, 22-3).

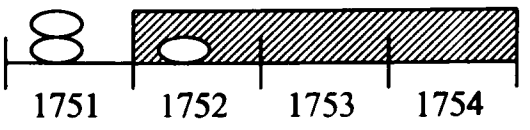
This raises two very interesting points. Firstly, if work did not commence until the end of March 1742, and was to be completed by the end of October of the same year, this would allow only seven months to frame and erect, an impressive achievement for such a complex structure. Is it possible that some of the work had already been started a year earlier, when the stone dome was abandoned? It seems unlikely that this was the case, given that the second model had yet to be approved by the University. The second point relates to the seasoning of the timber. Allowing for the rule of thumb rate of seasoning for oak of one inch per year in thickness, and given that the thinnest scantling of the structural timber is 5", and 4" for the curved purlins, the oak would have had to been felled no later than spring 1738, and probably five years earlier for most of the structural timbers. Six timbers sampled which produced precise felling dates included the curved principal rafters, struts, and curved purlins, and all were felled during the winter of 1740/1, i.e. between October 1740 and April 1741. Thus the timber would only have had one year to season before the agreement of March 1742 was signed, and if work actually commenced a year earlier, then the oak would have been freshly felled. In point of fact, the timber would have been felled and converted for this project, as it is highly unlikely there were any large timber-yards with rotating stock of air-seasoning timber in operation during the 18th century. One might imagine some square straight beams having been left over here and there from other projects, but nothing curved. Therefore the most likely scenario is that the timber was felled specifically for the dome, possibly on spec, but certainly with no more than one year before final conversion and fabrication.

Bolsover Castle, Derbyshire: the Keep



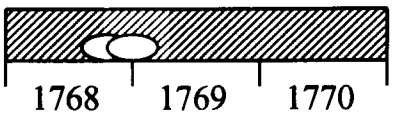
The Keep at Bolsover Castle, Derbyshire, was repaired in 1750, as evidenced by an entry stating that '*upwards of 500 has been spent on repairs*' with many invoices showing expenses for carpentry and the sawing up of timber. It is not known if this relates to the main Keep, or the Riding School, where similar material was found. Five samples were found which were felled in the late autumn 1749 to winter 1749/50, within 1 year of the documented date of repairs (Arnold *et al* 2003c).

Stowe, Buckinghamshire: the Rotondo



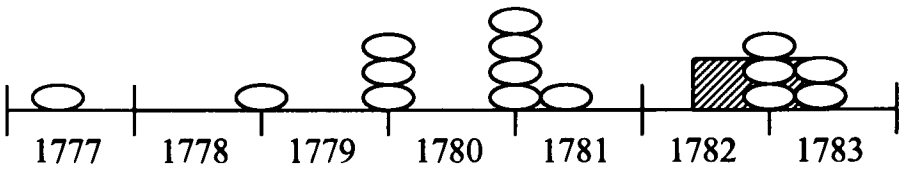
One of the earliest buildings at Stowe is the Rotunda, erected c.1720 and attributed to the architect, Sir John Vanbrugh. The felling dates of spring 1751 and spring 1752 accords well with a detailed series of building accounts for the gardens which suggest that between 1752 and 1754 the original domed roof was removed and replaced by a dome with a much lower profile (Miles and Worthington 1998).

Cobham Hall: Hall Range



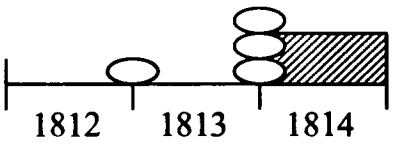
Works to the hall roof under the direction of Sir William Chambers between 1768 and 1770 relate well to two timbers felled in autumn 1768 to winter 1768/9. One other timber, a brace, was found to have been felled in 1662, and probably was re-used from the original hall roof. However, there were no obvious signs of re-use for this timber (Arnold *et al* 2003).

Tower of London: Turret repairs



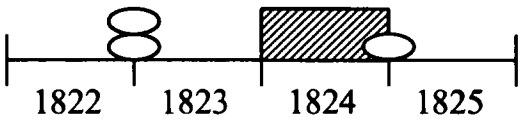
The recorded eighteenth-century repair work to the turrets began with the erection of a scaffold on the turrets in 1780, and various works by masons and plumbers are noted, but not specifically any carpentry, though it must all have been completed by December 1782 when payment was made for gilding the four weather cocks on the White Tower. Again, felling date of three timbers during the winter of 1782/3 and two more during the spring of 1783 suggests that further carpentry works continued beyond the December 1782 reference (Miles and Worthington 1997; Munby and Miles *in prep*).

Stoneleigh Abbey, Warwickshire: Stable Block



The stable block at Stoneleigh has surviving drawings by C S Smith dated 1814, and the felling dates of 1812/13 and 1813/14 from four of the timbers suggest that construction commenced during 1814 or shortly thereafter (Howard *et al* 2000a).

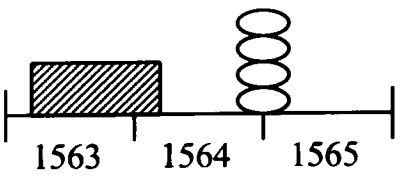
Magdalen College, Oxford: Old Library Roof



In 1824, the north cloister range was largely demolished and rebuilt by Joseph Parkinson, re-using the original principal rafters but inserting king posts and passing scissors-braces. Two precise felling dates of winter 1822/3 and one of winter 1824/5 were found from this work (Miles and Worthington 2000).

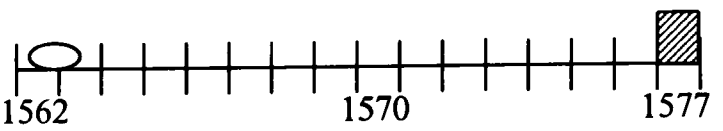
B. Timber Inscriptions:

Combermere Abbey, Cheshire: Oak Room



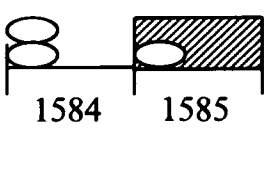
Combermere Abbey in Cheshire has two phases for which there is some independent evidence for construction. A date plaque of 1563 for bedroom A - the Oak Room, is slightly earlier then the autumn 1564 or winter 1564/5 felling dates for four joists. Either the datestone (exact location not specified) is on an adjoining range which was constructed slightly earlier, or the construction period was extended significantly beyond when the initial walls were built (Howard *et al* 2003).

19-20 High Street, Kinver, Staffs



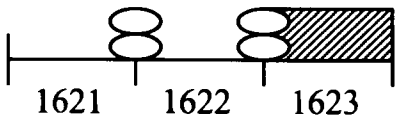
The building at 19-20 High Street, Kinver, has a precise date of 1562 for a structural timber, with other timbers with heartwood/sapwood transition ranging from 1546 – 1554. An internal door has an inscribed date of 1577, which suggests that either the 1562 felling date relates to a stock-piled timber, or the internal finishes were not completed for 15 years. The 1552 and 1554 heartwood/sapwood boundaries would imply 8 and 10 sapwood rings if they were felled in 1562, suggesting that they might have been felled nearer the 1577 inscribed date (Howard *et al* 1995)

Wigborough Manor, South Petherton, Somerset



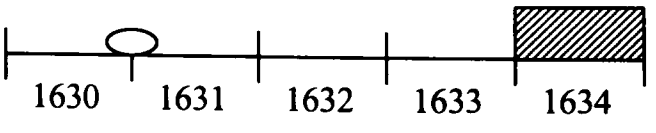
Wigborough Manor House, South Petherton, is an example of a small classic Elizabethan manor house. The plan is traditional and rather old-fashioned for its date; originally symmetrical, with two wings, a central porch, a two-storey oriel and a garderobe turret (one wing and turret have gone). The roof has tiebeam-and-collar trusses throughout with no windbraces. There is a date of 1585 is carved on the panelling in the oriel room, which corresponds with the tree-ring felling dates obtained from the roof structure of early 1584 and spring 1585 (Miles and Worthington 1997).

Cressing Temple, Essex: Granary



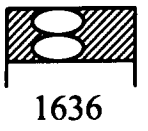
The Granary at Cressing Temple has a carved oak plaque dated 1623 fixed to the southern gable. Two tree-ring dates of winter 1621/2 and two more of winter 1622/3 correlate well with the inscription. This suggests that timber was stock-piled for at least one year before fabrication during 1623 (Andrews *et al* 1994, 79-106; Tyers *et al* 1997).

St Margaret's Church, Wetton, Staffs



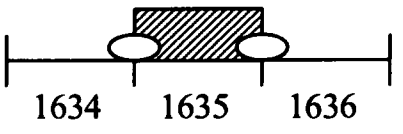
The bell frame at St Margaret's Church, Wetton, Staffs, has an inscribed date on a rail of '1634' with the initials 'RC DB' inscribed on another rail. Four samples were all felled in the late autumn of 1630 or the winter of 1630/31. It is not known if the inscribed date was carved immediately on completion of the frame, or a few years later (CfA 22/2003 (Arnold *et al* 2003d).

Isaac Lord Complex, Fore Street, Ipswich: Range 2



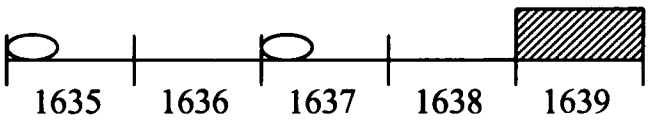
The cross-wing at number 80a Fore Street consists of two storeys and attic, double jettied, and a decorative carved bressumers. The gable bressumer has the date 1636 inscribed on it, with the initials H above W F. Two precise felling dates of spring 1636 were produced from timbers within this range (Bridge 1999; Richard Bond unpubl report).

Cherrington Manor, Shropshire



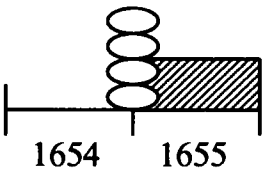
At Cherrington Manor, Shropshire, the tiebeam on the main front has carved '*---ARE ---OLOWING---1635*'. Two timbers with precise felling dates of winter 1634/5 and winter 1635/6. This is interesting in that some of the timbers may not yet been felled when the front tiebeam was inscribed - does this date relate to the commencement of construction rather than completion? (Miles and Worthington 2000).

Meeson Hall, Shropshire



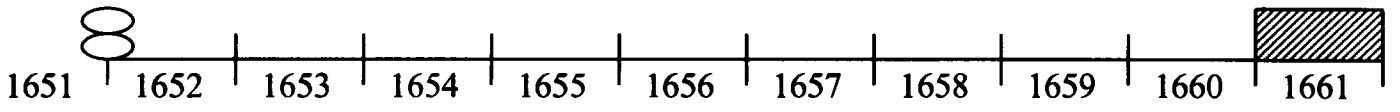
Meeson Hall, Shropshire, is a large timber-framed house with an inscribed date of 1639 on an overmantel, presumably indicating the date of completion of the internal fittings. Felling dates of spring 1635 and spring 1637 give a range of between two and four years between felling and completion (Miles and Haddon-Reece 1996)

Chawton House, Hants: East Hall Corridor



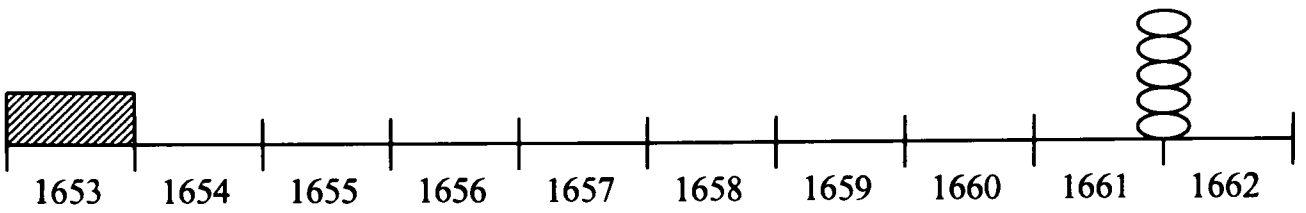
Chawton House is a large, multi-phased country house predominantly dating from the late 1500s. The south wing bears a date of 1655 carved above an internal door to the east hall corridor. Four precise felling dates of winter 1654/5 fit well with the inscribed date (Miles and Worthington 1998).

1 Soar Lane, Sutton Bonington, Nottinghamshire



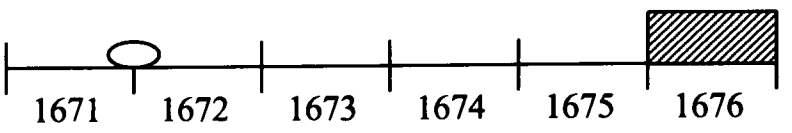
No. 1 Soar Lane is a three-bayed building with an inscribed date of 1661 carved on a first floor bressumer. This is a decade later than two precise felling dates of winter 1651/2 for roof purlins (Howard *et al* 1993b).

Staunton Harold Church, Leics: Box Pews



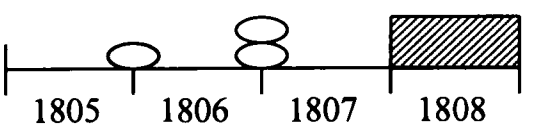
The late church at Staunton Harold has been dated through an inscription to 1653. The box pews however were clearly a slightly later phase with five precise felling dates of winter 1661/2. This indicates that whilst the shell of the church was probably completed, or at least commenced in 1653, the internal fittings were not constructed until nearly a decade later (Howard *et al* 1996a, 79-80).

Low End Barn, Sheen, Staffs



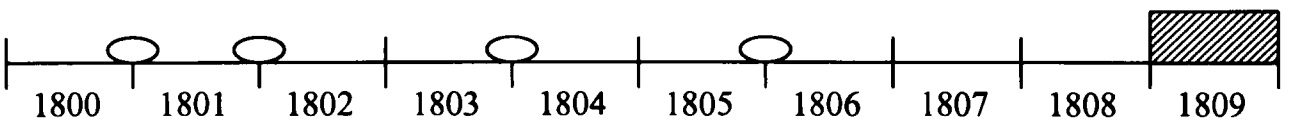
A purlin from Low End Barn, Sheen, Staffs, produced a precise felling date of 1671, which is five years earlier than the inscribed date of 1676 on a door lintel (Howard *et al* 1996b, 83-4).

Blagrave Farm, Mapledurham, Oxon: Barns



The two barns at Blagrave Farm, Mapledurham are built as two sides of a farm complex. The three felling dates of winter 1805/6 and 1806/7 relate well to the inscribed date of 1808 on a tiebeam (Haddon-Reece *et al* 1989, 47-8).

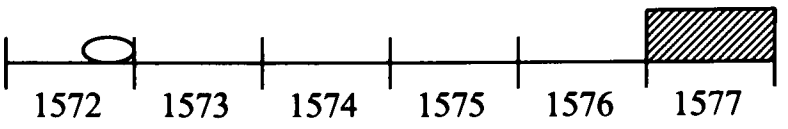
Bretby Hall, Derbyshire: South Range Roof



The roof of the south range at Bretby Hall, Derbyshire, is thought to have been constructed by Jeffry Wyatt (later Wyatville) who was appointed in 1812. One of the king posts has the initials 'J W' and the date '1813' written on in red crayon, and another king post has what appears to be the date '1809', although this is not entirely clear. The 1809 date is from the section of roof to the east of the central tower, whilst the 1813 date is from the section of the roof to the west of the central tower. Four samples with complete sapwood were taken within one of trusses adjacent to the possible 1809 crayoned date, but no samples were taken from the western section with the 1813 date. Should these dates actually reflect the date the trusses were erected, then the felling dates obtained would range from four to nine years earlier than the 1809 date, or between 8 and 13 years earlier of both section were constructed in 1813. In either permutation this would suggest the use of seasoned or stock-piled timber for the roof trusses. AML Rep 43/99 (Howard *et al* 1999a).

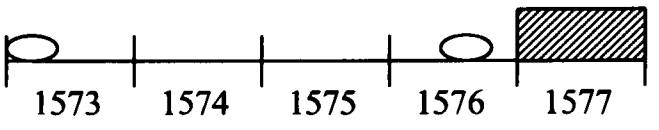
C. Date Stones and Other Inscriptions in Plaster, Lead and Iron:

Fenton Tower, Kingston, East Lothian

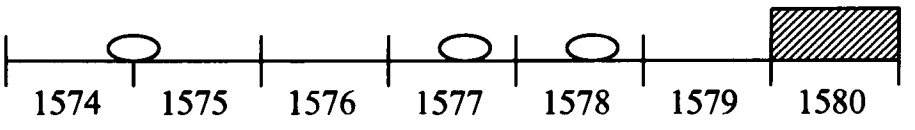


At Fenton Tower, Kingston, East Lothian, a single precise felling date of 1572 was obtained for a floor joist. A date plaque, now missing, is reputed to have given the date 1577, which has been interpreted as the date the building was ready for occupation (Crone and Mills 2004).

Plas Mawr, Conwy: North Range

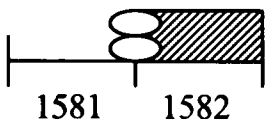


Plas Mawr, Conwy: Hall Range



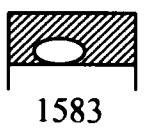
Plas Mawr House in Conwy posed a structural puzzle. The north end of the building has a number of plasterwork panels dated 1577, and felling dates of spring 1573 and summer 1576 accord well, suggesting stock-piling with a construction period of no more than two years. The middle roof over the withdrawing room is an elaborate decorated roof clearly intended to be visible from an open hall or upper chamber; the trusses are chamfered with arch-braces, butt-purlins, and highly decorated pegging. Unusually each truss has nearly 100 pegs carefully staggered in two rows. Immediately below this a flat plaster ceiling which seemed to be integral with the roof trusses above. This ceiling is dated 1580, leading to the questions - when was the roof built, was the roof re-used from a different site, or was the building itself an earlier structure which was simply remodelled? Three felling dates were determined ranging from winter 1574 to summer 1578, showing that the south and hall ranges were coeval and dated to the presumed building period of 1576-80. The dating also showed that the decorated roof over the withdrawing room, which clearly was designed to be seen from below, was the subject of a change of plan between framing off site after the summer of 1578, and erection on completion of the stone walls whereupon it was ceiled from below with a fine plaster ceiling dated 1580 (Miles and Haddon-Reece 1996).

Cobham Hall, Gravesend, Kent: South-west Range



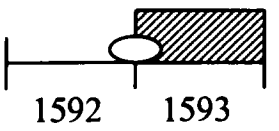
Cobham Hall is a large multi-phased country house. The earliest phase for which documentary evidence correlates with the dendro is the south-west range. Here a date plaque of 1582 on the south front relates well to the two rafters which were felled in the late autumn of 1581 to winter 1581/2 (Arnold *et al* 2003).

Oakwell House, Birstall, West Yorks: Hall



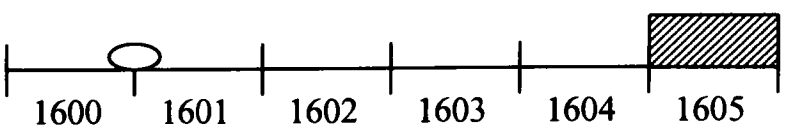
The main hall range at Oakwell House has a date stone on the porch of 1583. This has perfect correlation with one sample having been felled in spring 1583. The map room wing was added slightly later, as evidenced by felling dates of 1586/7 (Howard *et al* 1991, 40-43).

Chawton House, Hants: The Stables



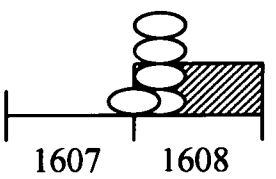
The Old Stables, Chawton, is a symmetrical, U-shaped building with two equal wings. The date 1593 incised over the main central door accords well with the single tree-ring date of 1592/3 (Miles and Haddon-Reece 1996).

Old School House, Ford, Staffs



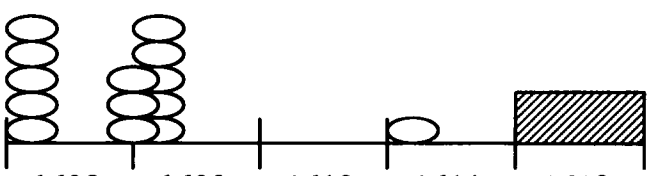
At the Old School House in Ford a datestone over the front door is inscribed 1605, some five later than the single felling date of winter 1600 (Howard *et al* 1997a, 128-9).

High Ercall Hall, Shropshire



High Ercall Hall, Shropshire consists of two ranges of brick construction with a date stone of 1608. One timber was felled in the late winter 1607/8, with four other timbers produced precise felling dates of spring 1608. Thus the dates coincide precisely with the date stone (Miles and Worthington 2002).

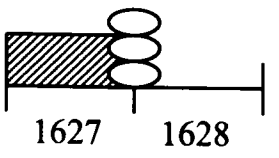
Mapledurham House, Oxon



At Mapledurham House, five samples were found to have been felled during the spring of 1608, three samples were felled during the winter of 1608/9, and five samples were felled during the spring of 1609. This would suggest that the most probable construction period for the house was between 1608 and 1610.

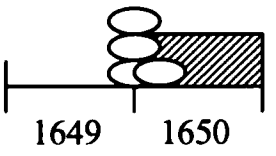
A number of samples were taken from studs making up the side walls of the Long Gallery, and as well as producing felling dates ranging from spring 1608 to spring 1609, one timber was felled during the spring of 1611, showing that this must have been one of the last elements of the building to be framed up, probably during 1611 or shortly thereafter. As the dated ceilings of 1612 below give a clear *terminus ante quem* for the construction of the house, it is most likely that construction commenced during 1608 or 1609 with the construction of the cellar walls up to ground floor level, and that by 1609 or 1610 had reached second floor level. The house is constructed in such a way that the floors were constructed as prefabricated frames which were built into the walls as they reach the required height, precluding any possibility of them being a later insertion (Miles *in prep*).

Astley Castle, Warwickshire: Main Range



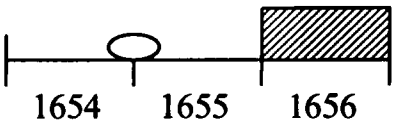
The main range of Astley Castle was rebuilt in 1627 as evidenced through three precise tree-ring dates which coincided precisely with a 1627 datestone salvaged from the ruins at the south end of the building (Howard *et al* 1997b, 130-32).

Astley Hospital (Dam House), Manchester



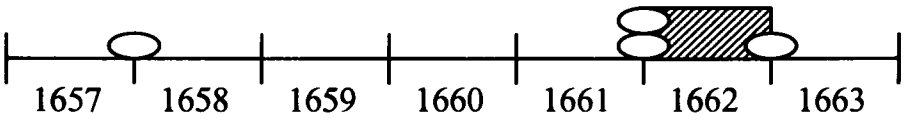
Astley Hospital, formerly known as Dam House, has a date stone inscription which reads 'Erected by Adam Mort and Margaret Mort 1650'. One sample, a purlin, was felled in the early spring of the same year. Three other samples were felled in the autumn of 1649 or winter 1649/50. CfA Rep 66/2001 (Howard *et al* 2001b).

Bede House Chapel, Newark, Notts: Chapel



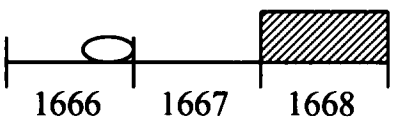
Bede House Chapel (Phillipot's Chapel) has a date plaque salvaged from the main almshouse, demolished in 1961. The plaque dated from 1783 when the almshouses were enlarged, but which also stated that the original almhouses were founded and endowed in 1656. One purlin from the adjoining chapel dated to autumn 1654 to winter 1654/5 is within a year or two of the inscribed date (Arnold *et al* 2002, 249-62).

Cobham Hall: Hall Range



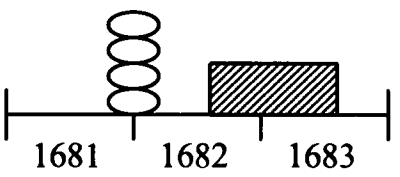
Rainwater hopper heads inscribed with the date 1662 relate to rebuilding work to the hall range. Four timbers, felled in the late autumn or winter of 1657, 1661, and 1662 show that stock-piling was in evidence, with two timbers felled one year earlier, and one five years earlier then the 1662 inscribed date (Arnold *et al* 2003).

Golding Hall, Cound, Shropshire: Wing



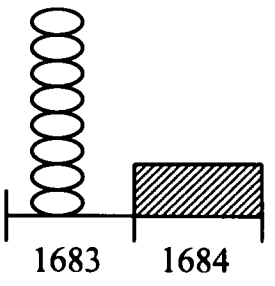
Golding Hall, Cound, Shropshire, has a brick-built parlour wing with a datestone of '1668' and the initials 'T. L.' for Thomas Langley, a wealthy lawyer. A principal rafter from the roof produced a date of summer / autumn 1666, leaving one or two years to construct and complete (Miles and Haddon-Reece 1994).

Gunns Mills, Mitcheldean, Glos



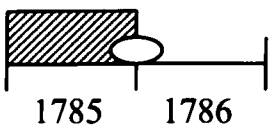
Gunns Mills near Mitcheldean was rebuilt in 1682-3 as evidenced by date cast in a cast lintel. Four samples had felling dates of late autumn 1681 to winter 1681/2, giving felling dates one to two years before the inscription date. CfA Rep 25/2001 (Howard *et al* 2001c).

Middle Temple, London: Gatehouse



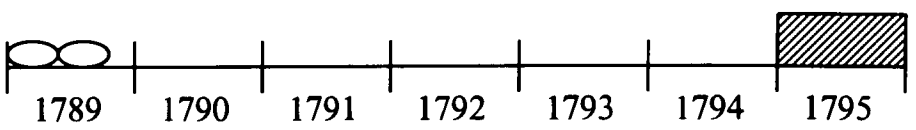
Eight samples from the gatehouse at Middle Temple, City of London, were all felled between April and May 1683, which correlates well with the 1684 inscribed datestone (Tyers *et al* 1997, 143, 151).

St Mary Magdalene Church, Cowden, Kent: Belfry



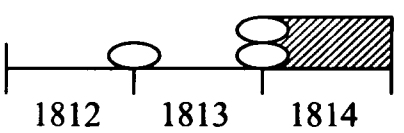
St Mary Magdalene Church, Cowden, Kent. A date plaque at the base of the tower dating to ?1785 refers to the repair of the belfry. This is supported by a single precise felling date of late autumn 1785 to winter 1785/6. AML Rep 44/99 (Howard *et al* 1999b).

Chastleton House, Oxon:
South and east range roofs



At Chastleton House, it was recorded that timber and slate was being purchased as early as 1785, and that the south, east, and west range roofs had been entirely replaced in the late 1790s. A dated rainwater-head dated 1795 presumably records the date of completion of the re-roofing works. Tree-ring dates of spring 1789 for a purlin in the south range roof and summer 1789 for the east range side confirm the reference to stock-piling prior to the roof renewal (Miles *et al* forthcoming).

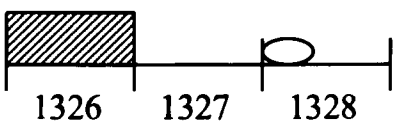
Chicksands Priory, Beds: Cross-wing D2 & D3



Two sections of Chicksands Priory, Bedfordshire, have dated rainwater hopper heads inscribed with the date '1814'. Three samples from the roofs correlated well with this, one with an 1812 felling date, and two others with an 1813 felling date, giving a range of between one and two years before the inscribed date (Howard *et al* 1998).

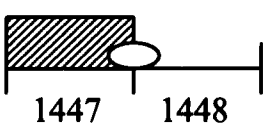
D. Inheritances, deeds, and other changes of ownership:

Long Sutton Courthouse, Somerset



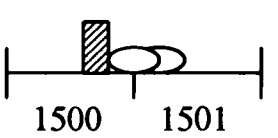
Long Sutton Courthouse, Somerset was part of the property whose owners have been traced back to 1326 when Richard de St Clare granted to Henry Power an estate of 184 acres in Long Sutton and Martock; this was settled on his daughter Joan, and her husband William Shareshull, in 1344. The felling date of spring 1328 shows that the building was constructed shortly after the 1326 grant (Williams and Gilson 1979).

South Yarde, Rose Ash, Devon



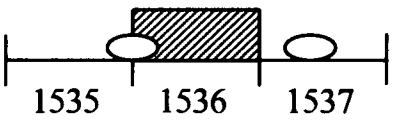
South Yarde, a medieval hall house, changed ownership in 1447. A precise felling date of winter 1447/8 correlates well, suggesting that the house was immediately rebuilt (Groves and Hillam 1993).

Council House, Shrewsbury Castle



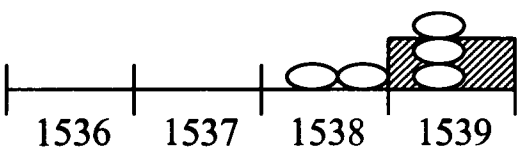
The Council House at Shrewsbury Castle was sold to Peter Newton on the 18th of Sept 1500. Two precise felling dates of winter 1500/1501 and spring 1501 show that he immediately rebuilt the hall against the existing cross-wing (Miles and Worthington 1997).

Holy Cross Church, Crediton, Devon: Clock Chamber



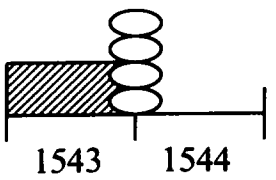
The church of the Holy Cross in Crediton, Devon, was purchased by the town in 1536 following the Dissolution. The two precise felling dates of winter 1535/6 and spring 1537 suggest that improvements to the clock chamber were undertaken immediately on transferring ownership (Tyers 2004a).

Mottisfont Abbey, Romsey



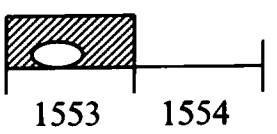
Mottisfont Abbey, Romsey, was suppressed by the Crown in 1536 and granted to William, Lord Sandys. Extensive rebuilding of the Abbey commenced in 1538 and 1539 as evidenced by the five precise felling dates ranging from spring 1538 to spring 1539. By the time Sandys died in 1540, the reconstruction of the Abbey must have been nearly complete (Miles 1996).

Aydon Castle, Northumberland



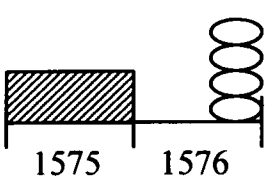
Aydon Castle in Corbridge, Northumberland, was inherited in 1543 by Cuthbert de Reymes. Four timbers from the roof of the kitchen range were felled during the winter of 1543/4, suggesting that alterations were commenced within the year. Rep 42/91 (Hillam and Groves 1991).

Lightshaw Hall, Goldborne, Greater Manchester



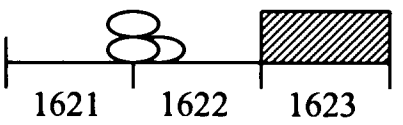
The single precise date of spring 1553 for a wall beam at Lightshaw Hall, Goldborne, probably relates to the death of the owner, Henry de Kighley in 1554. The present interpretation is that the building was constructed after his death, showing that at least some of the timber had been felled prior to this event (Tyers *et al* 1997, 143, 152).

Welltown Manor, Trevalga, Cornwall



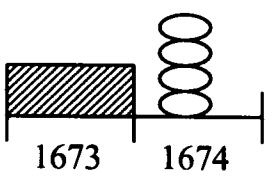
Documentary evidence shows that Welltown Manor had a change of ownership and tenancy in 1575. The four precise felling dates of summer 1576 correlate well to a new tenancy (Tyers 2004b).

Tankerdale Farm, Steep, Hants



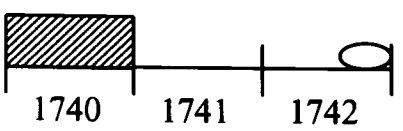
Tankerdale Farm is a 3½ bay farmhouse with a rear outshut enclosing a stair tower which rises to the attic floor. The felling dates of winter 1621/2 and spring 1622 predate the inheritance of the property in 1623 by one Thomas Eames (Miles and Worthington 1998).

Daneway House, Sapperton, Bisley, Glos: Tower Wing



The fourteenth-century Daneway House in Gloucestershire was inherited by William Hancox in 1673. Four precise felling dates of spring 1674 for the tower wing indicates that this was constructed almost immediately on his taking possession (Howard *et al* 1995, 47-50).

Hall Farm, Moorhouse, Cumbria



Hall Farm, Moorhouse, was sold in 1740 to a John Bell, whose name is found carved on the underside of the hearth bressumer. A single precise date of 1742 shows that the house rebuilt shortly thereafter (Howard *et al* 1999, 90-91).

APPENDIX 3:
EXAMPLES OF GROUPS OF *TPQ*s WITH INDEPENDENT DATING

A) The great door to the bell tower, New College, Oxford
This has a documented date of 1397. Four boards were dated, the outermost ring dates being 1347, 1357, 1357 and 1360. This gives an average last ring date of 1355, 42 years prior to the documented construction date. However, the material here was imported from the Baltic. Although Baltic material has less sapwood (8-24 rings), it does have on average narrower mean ring widths (Worthington and Miles *in prep*).

B) Ceiling panels to Duke Humfrey's Library, Bodleian Library, Oxford
This has a documented date of 1600. 20+ samples range in end date from 1546-1570, the average last ring date being 1563, 35 years before the latest associated felling date of spring 1598 for the roof structure (Munby and Miles 2001), and 37 years before the known completion date of late 1599 (Gillam 1998).

C) Ceiling boards from Bowhill, Exeter, Devon
Of the 54 Baltic oak boards dated at Bowhill, none retained any evidence of sapwood. The last measured heartwood ring dates ranged from 1320 to 1483, but 41 of these boards (75% of the assemblage) finished between 1451 and 1483, suggesting the minimum number of heartwood rings were removed with the sapwood (Groves 2002)

D) Ceiling panels from 26-26a East St Helens Street, Abingdon
Precise felling date of 1431 obtained for structural timbers, last ring dates for the ceiling panels are 1392, 1397, 1408, 1408, 1415 and 1416 – average last ring date 1406, 25 years before the known date (Miles and Haddon-Reece 1995). Again, this material is imported from the Baltic.

E) Salisbury Cathedral
The upper door from the Parvis Chamber to the north nave triforium has two planks of English origin with outer ring dates of 1229 and 1234, average date 1232, 19 rings before the 1251 date of the wall. Perhaps a more useful comparison can be made with the Irish roof boards from the north nave triforium. Here 33 trees with last measured ring dates ranging from 1140 to 1230, compared with a dendro construction date for the roof structure of 1254/5. A group of boards were found to originate from 14 trees clustering between 1214 and 1230, virtually all with the H/S boundary, and some with incomplete sap. The west doors were also of Irish timber, but there is no known building phase to independently date them from. Although none of the boards retained heartwood/sapwood boundaries, seven of the boards had last ring dates ranging between 1169 and 1208, taking account of grain drift (Miles 2002b).

F) Muchelney Abbey, Somerset
A door to the South Cloister walk was sampled. Four boards were dated, and two pairs were found to have originated from two individual trees. One tree was represented by two boards with last heartwood rings dates of 1349 and 1356, and the other tree was represented by two boards with last heartwood ring dates of 1387 and 1401 (Bridge 2002). Although this shows that boards originating from the same parent tree vary between 7 and 14 years respectively, the average last ring date for the two trees is some 41 years apart. However, there is no precise date of construction to which the door can be ascribed, and there is some question as to whether the door itself has been re-used.

G) Church of St Peter, Barton on Humber, Lincolnshire

Another useful corpus of material to compare with are the series of 137 coffin boards from 34 burials, dating from 1071 and 1134 from the Church of St Peter, Barton on Humber, Lincolnshire (Tyers 2001). This is probably the most relevant group of comparative data in that the trees are local in origin, radially converted from old, slow-grown trees between 180 and 250 years in age. Many of the trees were slowly and fairly evenly grown oaks, producing boards much wider than later English material. The study resulted in 94 oak timbers from 31 coffins being dated. Ten of the coffins gave only *terminus post quem* dates because of the lack of sapwood rings on the boards. In the cases where there was a mix of boards with and without sapwood retained, variable numbers of heartwood rings had been lost either through trimming of the boards, or through rot.

There are only six cases in which the collection of boards in a single burial includes both some retaining the heartwood-sapwood boundary or some sapwood rings, allowing a felling date range to be derived, and other boards with only heartwood rings. If one looks at the length of time between the date of the latest board without evidence of the heartwood-sapwood boundary and the likely felling date range in these cases, the number of rings lost ranges from a minimum of 21, to more than 87, with a mean value of 48.

H) Door to Chapter House Undercroft, Westminster Abbey

This door was originally one of the north transept doors leading into Solomon's Porch, and was moved to the Chapter House undercroft by Scott in the 1860s. Four timbers dated to this period, with two boards originating from the same tree, and had estimated last ring dates of 1187 and 1215, and the other two horizontal timbers had last measured rings of 1181 and 1191. A fifth timber, a brace, had a heartwood sapwood boundary of 1111, and was clearly a re-used timber. All timber was of English origin. The north transept was completed about 1250, and the door would have been constructed about this time. There are between 35 and 69 years difference between the last measured rings and the known construction date (Miles and Bridge 2005).

I) Door to the North-east Vice Stairs, North Transept, Westminster Abbey

Four boards dated from this door with last heartwood ring dates of 1181, 1187, 1191, and 1219. The timber was imported from the German / Netherlands border. Again, the door would have dated to about 1250 when the north transept was completed. Thus there are between 31 and 69 years difference between the last measured rings and the known construction date (Miles and Bridge 2005).

J) Pyx Chamber Doors, Westminster Abbey

Seven boards from the inner and outer doors to the Pyx Chamber were dated, and were found to be of Baltic origin. Last measured rings ranged from 1263 to 1275. In 1303 there was a documented robbery of the Pyx Chamber, and the doors are thought to have been constructed as a result of this event. Assuming a construction date of about 1303, the boards would have last measured ring dates between 28 and 40 years prior (Miles and Bridge 2005).

K) Warden's Hall, Winchester College

Some 25 oak panels had been found re-used in a dormitory at Winchester College which were found to have originated from the Warden's Hall. Most had no sapwood, but five panels had some incomplete sapwood, the latest finishing in 1490 including five rings of sapwood. This allowed an empirical felling date range of 1498-1505 to be determined (Miles 1995b). Thirteen trees made up the assemblage, and a most likely felling date can be estimated at *c*1500.

APPENDIX 4: TABLE OF SAPWOOD RING DATA

This section details the 3313 samples obtained from mainland Britain, and 1067 samples from Ireland and the rest of Europe. Space limitations precluded the inclusion of all the fields contained in the database. The samples are arranged alphabetically by county then by sample code.
The fields shown include, from left to right:

Code – the sample code

Phase – identifies the phase of building in relation to multi-phased buildings

Pith – where possible, the estimated number of rings missing to the pith are entered

H/Wd – the number of heartwood rings present on the sample

S/Wd – the number of complete sapwood rings to the bark edge on the sample

Rings – the total number of rings present on the sample (*H/Wd* + *S/Wd*)

H/S bdy – the date of the last heartwood ring

LMR Date – the date of the last complete sapwood ring, either actual or estimated

Phase – the latest *LMR Date* or felling date representing the phase of building

H/Wd MRW – the mean ring width of the heartwood rings present on the sample

S/Wd MRW – the mean ring width of the sapwood

MRW-10 – the mean ring width of the last 10 heartwood rings

MRW – the mean ring width of the complete sample

Region – the local government region as detailed on **Figure 5.2**, and **Table 5.1**

County – the county in the Britain, or the European country from where the sample originated

Parish – the parish in which the site is located

Building – the name and address of the building or site

Source – the abbreviation of the dendrochronology laboratory providing the sample

Radius – the number of individual radii comprising the sample

Variance – the maximum number of years between the heartwood/sapwood boundaries

Season – the season of felling where known

Date Type – indicates if the sample is dated through dendro (D), associated (A), or estimated (E)

Member – gives the structural member where known

Type – gives the typological category of the building as detailed in *Section 6.2.4*

Status – gives the status of the building as detailed in *Section 6.2.5*

NGR – the National Grid Reference of the site, from which the lat-longs are calculated

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
CHK-P02	1		36	17	53	1523	1540	1541	2.69	2.54	1.84	2.64	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	principal			TL 122 394
CHK-P06A	1		23	15	38	1526	1541	1541	3.27	3.63	2.94	3.41	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	principal			TL 122 394
CHK-P09B	1		62	23	85	1518	1541	1541	2.29	1.41	1.50	2.05	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	principal			TL 122 394
CHK-P10A	1		54	15	69	1525	1540	1541	2.51	2.06	1.81	2.41	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	tiebeam			TL 122 394
CHK-P14B	2		74	26	100	1442	1468	1468	1.59	1.02	1.21	1.44	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	collar			TL 122 394
CHK-P28	3		143	32	175	1437	1469	1469	0.59	0.57	0.59	0.59	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	brace			TL 122 394
CHK-P39B	4		67	28	95	1476	1504	1504	1.50	1.21	1.68	1.41	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	rafter			TL 122 394
CHK-P44B	4		28	27	55	1477	1504	1504	1.49	1.29	1.42	1.39	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	rafter			TL 122 394
CHK-P47A	5		39	22	61	1791	1813	1813	2.88	2.41	2.83	2.71	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	post			TL 122 394
CHK-P58	5		86	23	109	1789	1812	1813	1.61	1.25	1.54	1.53	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	post			TL 122 394
CHK-P59A	5		65	22	87	1791	1813	1813	2.05	1.48	2.13	1.91	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	post			TL 122 394
CHK-P60A	5		33	18	51	1795	1813	1813	4.06	0.95	3.32	2.96	4	Beds	Chicksands	Chicksands Priory	NT	0	0		A	stud			TL 122 394
CHK-P68B	5		28	17	45	1796	1813	1813	4.45	1.73	3.10	3.42	4	Beds	Chicksands	Chicksands Priory	NT	0	0		A	post			TL 122 394
CHK-P69A	5		39	26	65	1787	1813	1813	3.27	1.13	1.75	2.41	4	Beds	Chicksands	Chicksands Priory	NT	0	0		A	stud			TL 122 394
CHK-P72	6		61	17	78	1797	1814	1814	2.20	1.92	2.14	2.14	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	rail			TL 122 394
CHK-P73A	6		54	25	79	1789	1814	1814	2.12	1.42	1.54	1.90	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	post			TL 122 394
CHK-P78	6		62	18	80	1796	1814	1814	2.39	1.68	1.61	2.23	4	Beds	Chicksands	Chicksands Priory	NT	0	0		D	post			TL 122 394
FLT-A02A	1		174	20	194	1683	1703	1703	0.84	0.94	0.84	0.85	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	principal			TL 059 359
FLT-A07A	1		50	23	73	1680	1703	1703	2.55	1.38	1.87	2.18	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	principal			TL 059 359
FLT-A08A	1		34	23	57	1680	1703	1703	2.05	1.56	2.05	1.85	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	purlin			TL 059 359
FLT-A09A	1		57	21	78	1682	1703	1703	2.22	1.37	2.03	1.99	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	principal			TL 059 359
FLT-A14A	2		84	25	109	1678	1703	1703	1.22	0.93	1.32	1.15	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	stud			TL 059 359
FLT-A16A	2		72	26	98	1677	1703	1718	1.65	1.08	1.31	1.50	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	principal			TL 059 359
FLT-A18A	2		51	24	75	1679	1703	1718	1.78	1.58	1.79	1.72	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	principal			TL 059 359
FLT-A20A	2		35	19	54	1699	1718	1718	1.32	1.63	0.86	1.43	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	principal			TL 059 359
FLT-A25A	3		29	25	54	1683	1708	1726	2.94	2.50	3.01	2.74	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	purlin			TL 059 359
FLT-A26A	3		34	20	54	1706	1726	1726	3.02	2.44	3.16	2.80	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	stud			TL 059 359
FLT-A28A	3		35	29	64	1679	1708	1726	1.96	1.39	1.41	1.70	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	rafter			TL 059 359
FLT-A29A	3		49	27	76	1676	1703	1726	2.05	1.49	1.16	1.85	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	principal			TL 059 359
FLT-A32A	3		44	32	76	1676	1708	1726	2.74	1.38	1.62	2.17	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	principal			TL 059 359
FLT-A36A	3		36	19	55	1702	1721	1726	2.88	2.41	2.52	2.72	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	stud			TL 059 359
FLT-A37B	3		36	18	54	1690	1708	1726	2.60	1.86	2.56	2.36	4	Beds	Flitton	De Grey Mauloleum	NT	0	0		D	rafter			TL 059 359
wv039	1	1	44	21	65	1063	1084	1125	1.32	1.27	1.58	1.30	4	Beds	Sandy	Warren Villas	SH	0	0	W	D				TL 182 469
wv041	1	5	41	45	86	1042	1087	1125	0.78	0.76	0.86	0.77	4	Beds	Sandy	Warren Villas	SH	0	0	W	D				TL 182 469
wv090	1		112	27	139	1098	1125	1125	0.91	0.88	1.26	0.90	4	Beds	Sandy	Warren Villas	SH	0	0	W	D				TL 182 469
wv124	1		68	37	105	1069	1106	1125	0.82	0.82	0.79	0.82	4	Beds	Sandy	Warren Villas	SH	0	0	Sp	D				TL 182 469
wv176	1		92	21	113	1104	1125	1125	1.38	1.32	1.60	1.37	4	Beds	Sandy	Warren Villas	SH	0	0	W	D				TL 182 469
wl1	1		55	25	80	1518	1543	1544	1.73	1.32	1.75	1.60	4	Beds	Willington	Willington Dovecote	OX	0	0	Su	A		Agricultural	Gentry	TL 107 499
wl3	1		100	24	124	1519	1543	1544	1.24	0.74	0.65	1.15	4	Beds	Willington	Willington Dovecote	OX	0	0	Sp	D		Agricultural	Gentry	TL 107 499
wl5	1		63	25	88	1519	1544	1544	1.17	0.98	0.83	1.12	4	Beds	Willington	Willington Dovecote	OX	0	0	Sp	D		Agricultural	Gentry	TL 107 499
wl6	1	1	119	30	149	1513	1543	1544	1.77	0.85	0.97	1.58	4	Beds	Willington	Willington Dovecote	OX	0	0	Sp	D		Agricultural	Gentry	TL 107 499
wl11	1	10	85	19	104	1521	1540	1540	2.87	1.89	1.93	2.70	4	Beds	Willington	Willington Stables	OX	2	1	W	D		Agricultural	Gentry	TL 107 499
wl12a	1		52	24	76	1516	1540	1540	1.48	1.02	0.91	1.34	4	Beds	Willington	Willington Stables	OX	0	0	Su	A		Agricultural	Gentry	TL 107 499
wl13	1		110	28	138	1512	1540	1540	1.77	0.95	1.35	1.61	4	Beds	Willington	Willington Stables	OX	0	0	Sp	D		Agricultural	Gentry	TL 107 499
wl15	1		112	21	133	1519	1540	1540	1.31	1.31	0.98	1.31	4	Beds	Willington	Willington Stables	OX	0	0	Su	D		Agricultural	Gentry	TL 107 499
wl16	1		72	18	90	1522	1540	1540	1.30	1.18	1.07	1.27	4	Beds	Willington	Willington Stables	OX	0	0	Su	A		Agricultural	Gentry	TL 107 499

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
wl17	1	10	99	30	129	1509	1539	1540	1.50	1.49	1.16	1.50	4	Beds	Willington	Willington Stables	OX	0	0	W	D		Agricultural	Gentry	TL 107 499
bcb1	1		70	20	90	1539	1559	1559	1.46	1.52	1.37	1.47	1	Berks	Barkham	Bailiffs Cottage	OX	0	0	W	D	joist	Domestic	Low	SU 781 670
bcb2	2	5	51	18	69	1582	1600	0	2.65	2.22	1.47	2.54	1	Berks	Barkham	Bailiffs Cottage	OX	0	0	W	E	beam	Domestic	Low	SU 781 670
cfb1	1		58	14	72	1585	1599	1599	1.86	3.12	3.31	2.10	1	Berks	Bradfield	Cripps Farmhouse	OX	0	0	Sp	A	post	Domestic	Middle	SU 590 702
cfb2	1		34	22	56	1577	1599	1599	1.99	0.91	1.70	1.56	1	Berks	Bradfield	Cripps Farmhouse	OX	0	0	Sp	D	post	Domestic	Middle	SU 590 702
shl13	2	50	86	23	109	1559	1582	1581	1.08	0.55	0.76	0.97	1	Berks	Brimpton	Shalford Farm	OX	0	0	Su	D	misc	Domestic	Middle	SU 569 649
shl14	2	50	132	20	152	1562	1582	1581	1.31	0.82	0.83	1.24	1	Berks	Brimpton	Shalford Farm	OX	0	0	Su	D	beam	Domestic	Middle	SU 569 649
shl15	3	5	36	15	51	1730	1745	1744	2.34	2.20	2.24	2.30	1	Berks	Brimpton	Shalford Farm	OX	0	0	Su	D	misc	Domestic	Middle	SU 569 649
shl22	2	20	52	16	68	1564	1580	1581	1.62	1.99	1.97	1.70	1	Berks	Brimpton	Shalford Farm	OX	0	0	Su	A	rail	Domestic	Middle	SU 569 649
shl23	2	25	124	24	148	1556	1580	1581	1.15	0.85	0.97	1.10	1	Berks	Brimpton	Shalford Farm	OX	0	0	W	D	rail	Domestic	Middle	SU 569 649
shl4	1	3	11	20	31	1409	1429	1430	3.13	2.32	3.07	2.61	1	Berks	Brimpton	Shalford Farm	OX	2	0	Sp	D	rafter	Domestic	Middle	SU 569 649
cmb46	2	10	84	17	101	1601	1618	1618	2.02	1.32	1.83	1.91	1	Berks	Combe	St Swithun's Church	OX	2	3	Su	D	rail	Church	Monastic	SU 373 608
cmb9	2	50	200	22	222	1596	1618	1618	0.94	0.92	0.89	0.94	1	Berks	Combe	St Swithun's Church	OX	0	0	W	D	brace	Church	Monastic	SU 373 608
negmf12	1		122	17	139	1553	1570	1570	1.26	1.43	1.13	1.28	1	Berks	Greenham	Greenham Mill	OX	0	0	W	D		Agricultural	Low	SU 478 673
negmf19	1		170	17	187	1553	1570	1570	1.49	1.17	0.81	1.46	1	Berks	Greenham	Greenham Mill	OX	0	0	W	D		Agricultural	Low	SU 478 673
negmf5	2	1	108	23	131	1567	1590	1590	1.88	1.02	0.73	1.72	1	Berks	Greenham	Greenham Mill	OX	2	1	W	D		Agricultural	Low	SU 478 673
negmf9	1		109	30	139	1540	1570	1570	1.42	0.88	1.07	1.30	1	Berks	Greenham	Greenham Mill	OX	0	0	Su	D		Agricultural	Low	SU 478 673
hn14	1	5	40	16	56	1779	1795	1796	2.24	1.23	1.64	1.95	1	Berks	Hampstead Norries	Skeleton Barn, Oakhouse Farm	OX	0	0	W	D		Agricultural	Low	SU 509 764
hn2	2	7	25	27	52	1785	1812	1812	2.20	1.36	2.38	1.77	1	Berks	Hampstead Norries	Skeleton Barn, Oakhouse Farm	OX	0	0	W	D		Agricultural	Low	SU 509 764
hn4	1	10	47	23	70	1773	1796	1796	1.82	1.73	2.58	1.79	1	Berks	Hampstead Norries	Skeleton Barn, Oakhouse Farm	OX	0	0	W	D		Agricultural	Low	SU 509 764
hn5	2	2	58	19	77	1793	1812	1812	1.73	1.10	2.04	1.58	1	Berks	Hampstead Norries	Skeleton Barn, Oakhouse Farm	OX	0	0	W	D		Agricultural	Low	SU 509 764
hn6	1	3	53	14	67	1782	1796	1796	1.58	1.52	1.91	1.57	1	Berks	Hampstead Norries	Skeleton Barn, Oakhouse Farm	OX	2	0	W	A		Agricultural	Low	SU 509 764
hn8	2	5	30	27	57	1785	1812	1812	3.51	1.58	3.03	2.60	1	Berks	Hampstead Norries	Skeleton Barn, Oakhouse Farm	OX	0	0	W	A		Agricultural	Low	SU 509 764
hn9	2		41	25	66	1787	1812	1812	3.02	2.12	3.77	2.68	1	Berks	Hampstead Norries	Skeleton Barn, Oakhouse Farm	OX	0	0	W	D		Agricultural	Low	SU 509 764
lsr50	1		92	23	115	1556	1579	1579	1.43	0.90	0.93	1.33	1	Berks	Reading	69 London Street	OX	0	0	W	A	post	Domestic	Middle	SU 718 730
lsr7	1		64	22	86	1557	1579	1579	1.33	1.02	1.30	1.25	1	Berks	Reading	69 London Street	OX	0	0	Su	D	collar	Domestic	Middle	SU 718 730
w039	3	1	27	11	38	1755	1766	1766	3.70	3.72	4.05	3.71	1	Berks	Reading	Reading Abbey waterfront	SH	0	0	W	D				SU 719 734
w118	2		110	28	138	1315	1343	1343	1.32	0.88	0.75	1.23	1	Berks	Reading	Reading Abbey waterfront	SH	0	0	W	D				SU 719 734
w211	2		117	36	153	1307	1343	1343	1.59	1.11	1.05	1.48	1	Berks	Reading	Reading Abbey waterfront	SH	0	0	W	D				SU 719 734
w215	2		118	24	142	1319	1343	1343	1.56	1.01	1.02	1.46	1	Berks	Reading	Reading Abbey waterfront	SH	0	0	W	D				SU 719 734
w416	1		70	15	85	1300	1315	1315	2.88	1.69	2.32	2.67	1	Berks	Reading	Reading Abbey waterfront	SH	0	0	Sp	D				SU 719 734
hgf3	1		39	15	54	1445	1460	1460	2.42	1.80	1.82	2.25	1	Berks	Warfield	Hayley Green Farm Barn	OX	0	0	Su	E		Agricultural	Low	SU 886 714
wcc21	2		106	35	141	1405	1440	1440	0.88	0.78	1.06	0.86	1	Berks	Windsor	Canons Cloisters, Windsor Castle	OX	0	0		D		Church	Royal	SU 968 770
wcc24	3	10	38	11	49	1489	1500	1500	3.43	2.62	3.34	3.25	1	Berks	Windsor	Canons Cloisters, Windsor Castle	OX	0	0	Sp	E		Church	Royal	SU 968 770
wcc4	1		27	18	45	1334	1352	1352	3.04	2.22	2.26	2.71	1	Berks	Windsor	Canons Cloisters, Windsor Castle	OX	0	0	Su	D		Church	Royal	SU 968 770
wcc6	1	5	36	22	58	1329	1351	1352	1.66	1.08	1.26	1.44	1	Berks	Windsor	Canons Cloisters, Windsor Castle	OX	0	0	Sp	D		Church	Royal	SU 968 770
wcc7	1		35	20	55	1315	1335	1352	1.75	1.47	0.55	1.65	1	Berks	Windsor	Canons Cloisters, Windsor Castle	OX	0	0	Su	D		Church	Royal	SU 968 770
w16	1		82	18	100	1337	1355	1355	2.41	1.45	1.16	2.24	1	Berks	Windsor	Windsor Castle - Round Tower	OX	0	0	Sp	D	brace			SU 970 770
w17	1	1	62	24	86	1330	1354	1355	1.82	0.70	0.69	1.51	1	Berks	Windsor	Windsor Castle - Round Tower	OX	0	0	W	D	rafter			SU 970 770
w19	2	5	30	23	53	1202	1225	1225	2.67	1.48	2.17	2.15	1	Berks	Windsor	Windsor Castle - Round Tower	OX	0	0	Su	D	joist			SU 970 770
w4134	3		117	20	137	1558	1578	1578	1.01	1.11	0.97	1.03	1	Berks	Windsor	Windsor Castle - Round Tower	OX	2	3	Sp	D	misc			SU 970 770
w55	4	5	43	19	62	1449	1468	1468	2.18	1.76	1.44	2.05	1	Berks	Windsor	Windsor Castle - Round Tower	OX	0	0	Su	D	rafter			SU 970 770
klb2	1	5	112	20	132	1567	1587	1587	1.85	0.77	1.78	1.68	1	Berks	Winkfield	Kilbees Farm	OX	0	0	Su	D	post	Agricultural	Middle	SU 922 719
grv2	1	10	100	32	132	1468	1500	1500	2.54	0.94	1.88	2.15	1	Bucks	Ashley Green	Grove Farm	OX	2	4	W	D		Domestic	Middle	SP 986 042
grv3	1	10	36	21	57	1478	1499	1500	1.71	1.74	1.83	1.72	1	Bucks	Ashley Green	Grove Farm	OX	0	0	Sp	D		Domestic	Middle	SP 986 042
brst1	2		93	13	106	1602	1615	1614	1.51	1.12	1.14	1.46	1	Bucks	Boarstall	Boarstall Tower	OX	0	0	W	D		Domestic	Gentry	SP 624 141

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
brst23	2		131	28	159	1586	1614	1614	1.09	1.37	1.26	1.14	1	Bucks	Boarstall	Boarstall Tower	OX	2	7	W	D		Domestic	Gentry	SP 624 141
brst4	2		125	38	163	1575	1613	1614	0.87	0.84	0.64	0.87	1	Bucks	Boarstall	Boarstall Tower	OX	0	0	W	D		Domestic	Gentry	SP 624 141
brst5	2		56	19	75	1595	1614	1614	1.18	1.25	1.39	1.20	1	Bucks	Boarstall	Boarstall Tower	OX	0	0	Su	D		Domestic	Gentry	SP 624 141
brst6	2		127	16	143	1597	1613	1614	1.21	0.71	0.86	1.16	1	Bucks	Boarstall	Boarstall Tower	OX	0	0	Sp	D		Domestic	Gentry	SP 624 141
brst9	1	20	82	30	112	1283	1313	1313	1.83	1.33	1.70	1.70	1	Bucks	Boarstall	Boarstall Tower	OX	0	0	W	D		Domestic	Gentry	SP 624 141
bdm10	1	4	67	25	92	1628	1653	1653	1.79	0.64	1.29	1.48	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	W	D		Domestic	Gentry	SU 825 970
bdm12	1	4	77	22	99	1631	1653	1653	1.80	1.39	1.38	1.71	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	Sp	D		Domestic	Gentry	SU 825 970
bdm13	1	2	65	23	88	1630	1653	1653	1.50	0.65	0.69	1.28	1	Bucks	High Wycombe	Bradenham Manor	OX	2	1	W	A		Domestic	Gentry	SU 825 970
bdm14	1	5	84	23	107	1630	1653	1653	1.24	0.88	0.71	1.16	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	Su	D		Domestic	Gentry	SU 825 970
bdm15	1	5	80	19	99	1635	1654	1653	1.68	1.35	1.10	1.61	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	W	E		Domestic	Gentry	SU 825 970
bdm18	1		62	21	83	1633	1654	1653	1.27	0.55	0.67	1.09	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	W	E		Domestic	Gentry	SU 825 970
bdm2	1	10	40	20	60	1633	1653	1653	1.55	1.27	1.11	1.45	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	W	A		Domestic	Gentry	SU 825 970
bdm3	1	15	66	22	88	1631	1653	1653	1.62	1.13	1.25	1.50	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	W	D		Domestic	Gentry	SU 825 970
bdm4	1	20	78	19	97	1634	1653	1653	1.86	1.30	1.74	1.75	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	W	D		Domestic	Gentry	SU 825 970
bdm6	1	5	78	17	95	1636	1653	1653	1.48	1.34	1.50	1.45	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	Su	A		Domestic	Gentry	SU 825 970
bdm7	1		37	20	57	1633	1653	1653	2.05	1.00	1.16	1.68	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	Su	A		Domestic	Gentry	SU 825 970
bdm8	1	4	78	14	92	1639	1653	1653	1.90	1.24	3.47	1.80	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	Su	A		Domestic	Gentry	SU 825 970
bdm9	1	5	64	19	83	1634	1653	1653	2.28	1.38	1.54	2.07	1	Bucks	High Wycombe	Bradenham Manor	OX	0	0	Sp	D		Domestic	Gentry	SU 825 970
lcch1b	1		42	28	70	1457	1485	1491	2.11	0.59	1.68	1.50	1	Bucks	Long Crendon	Long Crendon Courthouse	OX	0	0	Sp	D		Public	Middle	SP 689 091
lcch2	1	5	56	21	77	1464	1485	1491	1.88	0.83	1.37	1.60	1	Bucks	Long Crendon	Long Crendon Courthouse	OX	0	0	Su	A		Public	Middle	SP 689 091
kya1	1	5	47	13	60	1556	1569	1569	2.22	1.51	1.94	2.07	1	Bucks	Ludgershall	Kya House	OX	2	1	Sp	D		Domestic	Low	SP 658 178
kya11	1	5	63	13	76	1556	1569	1569	1.60	0.73	0.84	1.45	1	Bucks	Ludgershall	Kya House	OX	0	0	Su	D		Domestic	Low	SP 658 178
kya12	1	1	27	33	60	1536	1569	1569	1.14	0.78	1.13	0.94	1	Bucks	Ludgershall	Kya House	OX	2	5	Su	A		Domestic	Low	SP 658 178
kya2	1	35	38	21	59	1548	1569	1569	1.43	0.88	1.12	1.23	1	Bucks	Ludgershall	Kya House	OX	0	0	Sp	D		Domestic	Low	SP 658 178
kya3	1	5	55	13	68	1556	1569	1569	1.66	1.16	1.70	1.57	1	Bucks	Ludgershall	Kya House	OX	2	1	Sp	D		Domestic	Low	SP 658 178
kya4	1	5	28	26	54	1543	1569	1569	1.74	1.67	2.14	1.70	1	Bucks	Ludgershall	Kya House	OX	0	0	Sp	D		Domestic	Low	SP 658 178
kya5	1	10	37	19	56	1550	1569	1569	1.53	0.84	1.35	1.30	1	Bucks	Ludgershall	Kya House	OX	0	0	Sp	D		Domestic	Low	SP 658 178
kya6	1	5	55	14	69	1555	1569	1569	1.82	0.87	1.95	1.63	1	Bucks	Ludgershall	Kya House	OX	0	0	Sp	D		Domestic	Low	SP 658 178
kya7	1	1	58	21	79	1548	1569	1569	1.56	0.99	1.62	1.41	1	Bucks	Ludgershall	Kya House	OX	0	0	Sp	D		Domestic	Low	SP 658 178
kya8	1	20	46	25	71	1544	1569	1569	1.50	1.23	1.66	1.40	1	Bucks	Ludgershall	Kya House	OX	0	0	Sp	D		Domestic	Low	SP 658 178
kya9	1	1	55	22	77	1547	1569	1569	1.18	0.84	0.66	1.08	1	Bucks	Ludgershall	Kya House	OX	0	0	Sp	A		Domestic	Low	SP 658 178
hvl1	1	15	27	21	48	1791	1812	1812	1.00	0.72	0.66	0.88	1	Bucks	Ludgershall	The Hovel	OX	2	8	Sp	D		Domestic	Low	SP 663 176
hvl2	1	1	55	42	97	1770	1812	1812	1.03	0.76	1.23	0.91	1	Bucks	Ludgershall	The Hovel	OX	2	31	Sp	D		Domestic	Low	SP 663 176
hvl3	1	3	50	40	90	1772	1812	1812	0.93	0.47	0.72	0.73	1	Bucks	Ludgershall	The Hovel	OX	2	8	Sp	D		Domestic	Low	SP 663 176
lfm11	4	5	61	18	79	1766	1784	1784	1.47	1.69	1.79	1.52	1	Bucks	Medmenham	Lodge Farm	OX	0	0	W	D	purlin	Agricultural	Low	SU 808 847
lfm2	2	25	87	18	105	1546	1564	1564	2.13	1.77	1.79	2.07	1	Bucks	Medmenham	Lodge Farm	OX	0	0	W	D	tiebeam	Agricultural	Low	SU 808 847
lfm5	3	25	78	20	98	1704	1724	1724	2.20	1.47	1.40	2.05	1	Bucks	Medmenham	Lodge Farm	OX	2	2	W	D	tiebeam	Agricultural	Low	SU 808 847
lfm6	1	50	61	26	87	1535	1561	1561	1.29	0.55	0.86	1.07	1	Bucks	Medmenham	Lodge Farm	OX	0	0	W	D	stud	Agricultural	Low	SU 808 847
lfm7	1	30	98	29	127	1532	1561	1561	1.08	0.52	0.82	0.95	1	Bucks	Medmenham	Lodge Farm	OX	0	0	W	D	stud	Agricultural	Low	SU 808 847
clay03	1		84	26	110	1730	1756	1756	1.71	1.30	1.78	1.62	1	Bucks	Middle Claydon	Claydon House	SH	0	0	Sp	D				SP 720 253
clay05	1		67	16	83	1740	1756	1756	2.36	1.73	1.78	2.24	1	Bucks	Middle Claydon	Claydon House	SH	0	0		E				SP 720 253
bfd3	1	20	51	18	69	1442	1460	1460	2.26	1.52	2.03	2.07	1	Bucks	New Beaconsfield	Baylins Farm	OX	0	0	Su	E		Domestic	Middle	SU 928 927
bfd5	1	10	22	15	37	1445	1460	1460	2.91	1.68	2.31	2.41	1	Bucks	New Beaconsfield	Baylins Farm	OX	0	0	Su	E		Domestic	Middle	SU 928 927
bfd8	2	20	57	30	87	1533	1563	1563	2.17	0.80	0.97	1.70	1	Bucks	New Beaconsfield	Baylins Farm	OX	2	2	W	D		Domestic	Middle	SU 928 927
stw1	3		46	14	60	1737	1751	1752	2.07	2.37	2.86	2.14	1	Bucks	Stowe	Stowe House & Gardens	OX	0	0	Sp	A		Agricultural	Low	SP 674 371
stw2	3	15	112	19	131	1732	1751	1752	1.02	1.00	0.93	1.02	1	Bucks	Stowe	Stowe House & Gardens	OX	0	0	Sp	D		Agricultural	Low	SP 674 371

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
stw35	1	1	43	15	58	1760	1775	1775	2.42	1.67	2.16	2.22	1	Bucks	Stowe	Stowe House & Gardens	OX	0	0	W	E		Agricultural	Low	SP 674 371
stw36	1		55	26	81	1749	1775	1775	2.20	1.15	1.89	1.86	1	Bucks	Stowe	Stowe House & Gardens	OX	0	0	Sp	E		Agricultural	Low	SP 674 371
stw37	1	10	62	28	90	1747	1775	1775	1.67	0.95	2.04	1.44	1	Bucks	Stowe	Stowe House & Gardens	OX	0	0	Sp	E		Agricultural	Low	SP 674 371
stw38	1		57	22	79	1753	1775	1775	2.67	1.45	2.40	2.33	1	Bucks	Stowe	Stowe House & Gardens	OX	0	0	Su	E		Agricultural	Low	SP 674 371
stw4	3		122	19	141	1732	1751	1752	1.04	1.33	1.00	1.08	1	Bucks	Stowe	Stowe House & Gardens	OX	2	2	Sp	D		Agricultural	Low	SP 674 371
stw59	2	50	74	24	98	1739	1763	1763	1.05	1.07	1.19	1.06	1	Bucks	Stowe	Stowe House & Gardens	OX	0	0	Sp	D		Agricultural	Low	SP 674 371
stw6	3		111	21	132	1731	1752	1752	1.13	1.31	1.58	1.16	1	Bucks	Stowe	Stowe House & Gardens	OX	2	1	Sp	D		Agricultural	Low	SP 674 371
wwa1	2	3	118	19	137	1512	1531	1532	1.21	1.27	1.24	1.22	1	Bucks	West Wycombe	No. 25 West Wycombe	OX	2	1	W	D	tiebeam	Domestic	Middle	SU 830 947
wwa2	2		104	28	132	1504	1532	1532	0.94	1.12	1.62	0.98	1	Bucks	West Wycombe	No. 25 West Wycombe	OX	0	0	Sp	D	tiebeam	Domestic	Middle	SU 830 947
wwa3	2	20	71	19	90	1511	1530	1532	1.58	0.89	2.66	1.43	1	Bucks	West Wycombe	No. 25 West Wycombe	OX	0	0	W	D	stud	Domestic	Middle	SU 830 947
wwa4	2		71	25	96	1507	1532	1532	0.86	1.28	0.64	0.97	1	Bucks	West Wycombe	No. 25 West Wycombe	OX	0	0	Sp	D	joist	Domestic	Middle	SU 830 947
wwa5	2	20	73	20	93	1511	1531	1532	1.00	0.49	0.67	0.89	1	Bucks	West Wycombe	No. 25 West Wycombe	OX	0	0	W	D	stud	Domestic	Middle	SU 830 947
wwa6	2	1	50	7	57	1525	1532	1532	4.61	4.16	6.15	4.56	1	Bucks	West Wycombe	No. 25 West Wycombe	OX	0	0	Sp	D	beam	Domestic	Middle	SU 830 947
wwa7	1	10	42	25	67	1425	1450	1450	2.21	1.28	2.02	1.86	1	Bucks	West Wycombe	No. 25 West Wycombe	OX	0	0	W	D	joist	Domestic	Middle	SU 830 947
wpc06	1		84	20	104	1595	1615	1615	1.60	0.87	1.13	1.46	4	Cambs	Wimpole	Chicheley Chapel, St Andrews	MB	0	0		D	brace			TL 336 510
toad1	1		121	19	140	1532	1551	1551	1.66	0.71	1.76	1.53	8	Cheshire	Goostrey	Toad Hall, Blackden	OX	0	0	W	A	stud	Domestic	Low	SJ 789 707
toad2	1	1	41	23	64	1528	1551	1551	3.42	1.39	3.50	2.69	8	Cheshire	Goostrey	Toad Hall, Blackden	OX	0	0	W	A	misc	Domestic	Low	SJ 789 707
toad3	1	5	31	13	44	1538	1551	1551	3.74	2.18	2.46	3.28	8	Cheshire	Goostrey	Toad Hall, Blackden	OX	0	0	Su	A	purlin	Domestic	Low	SJ 789 707
toad8	1	5	98	22	120	1529	1551	1551	1.46	0.61	0.63	1.30	8	Cheshire	Goostrey	Toad Hall, Blackden	OX	0	0	W	D	misc	Domestic	Low	SJ 789 707
ooh3	1	5	95	22	117	1594	1616	1616	2.54	1.49	1.58	2.35	8	Cheshire	Malpas	Overton Old Hall	OX	0	0	W	D		Domestic	Middle	SJ 471 484
ooh4	1		80	21	101	1595	1616	1616	2.44	1.67	1.61	2.28	8	Cheshire	Malpas	Overton Old Hall	OX	0	0	W	D		Domestic	Middle	SJ 471 484
CBM-A16A	1		93	17	110	1485	1502	1502	1.89	1.57	2.45	1.84	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	principal			SJ 598 440
CBM-A23A	1		86	19	105	1483	1502	1502	1.37	0.80	1.32	1.27	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	rafter			SJ 598 440
CBM-A31A	2		98	23	121	1704	1727	1727	1.66	1.37	0.89	1.60	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	collar			SJ 598 440
CBM-A32	2		73	33	106	1694	1727	1727	1.40	1.02	0.90	1.28	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	principal			SJ 598 440
CBM-A33A	2		78	15	93	1712	1727	1727	1.37	1.60	1.51	1.41	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	principal			SJ 598 440
CBM-A39A	2		84	24	108	1678	1702	1727	1.71	0.90	1.12	1.53	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	purlin			SJ 598 440
CBM-A43A	3		66	27	93	1537	1564	1564	1.68	1.28	1.58	1.57	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	joist			SJ 598 440
CBM-A61A	3		41	14	55	1550	1564	1564	2.75	3.46	1.65	2.93	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	joist			SJ 598 440
CBM-A63A	3		39	15	54	1549	1564	1564	2.75	3.01	1.91	2.82	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	joist			SJ 598 440
CBM-A64A	3		48	16	64	1548	1564	1564	2.71	2.92	2.46	2.76	8	Cheshire	Whitchurch	Combermere Abbey	NT	0	0		D	joist			SJ 598 440
TUN-A02A	1		50	18	68	1466	1484	1484	2.05	1.83	1.59	1.99	9	Cleveland	Hartlepool	Tunstall Hall Farm	NT	0	0		A	collar			NZ 493 322
TUN-A04A	1		37	17	54	1467	1484	1484	1.68	1.51	1.76	1.62	9	Cleveland	Hartlepool	Tunstall Hall Farm	NT	0	0		D	rafter			NZ 493 322
TUN-A07A	1		54	27	81	1457	1484	1484	2.01	0.78	1.11	1.60	9	Cleveland	Hartlepool	Tunstall Hall Farm	NT	0	0		D	rafter			NZ 493 322
TUN-A10A	1		52	19	71	1465	1484	1484	1.68	1.47	1.28	1.62	9	Cleveland	Hartlepool	Tunstall Hall Farm	NT	0	0		D	rafter			NZ 493 322
TUN-A12A	1		39	22	61	1462	1484	1484	2.05	1.43	1.37	1.82	9	Cleveland	Hartlepool	Tunstall Hall Farm	NT	0	0		D	principal			NZ 493 322
m24	2	5	44	21	65	1579	1600	1600	2.97	2.22	1.67	2.73	3	Cornwall	St Germans	Molenick Farmhouse	OX	0	0	W	E	principal			
m4b	1	5	43	13	56	1587	1600	1600	2.67	1.90	2.73	2.49	3	Cornwall	St Germans	Molenick Farmhouse	OX	0	0	Sp	E	collar			
m5	1		17	24	41	1576	1600	1600	4.37	0.93	4.55	2.35	3	Cornwall	St Germans	Molenick Farmhouse	OX	0	0	Su	E	purlin			
c11	1	5	64	23	87	1458	1481	1481	1.74	1.59	1.64	1.70	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Su	D	principal			SX 303 880
c12	1	5	30	11	41	1470	1481	1481	2.56	2.23	2.02	2.47	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	A	purlin			SX 303 880
c13	1	10	52	18	70	1463	1481	1481	2.68	1.90	2.10	2.48	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	A	principal			SX 303 880
c14	1	1	32	14	46	1464	1478	1481	2.07	1.34	1.62	1.85	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	D	purlin			SX 303 880
c15	1	5	60	10	70	1471	1481	1481	2.29	1.94	2.40	2.24	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	A	principal			SX 303 880
c16	1	5	28	14	42	1458	1472	1481	2.53	1.02	1.88	2.03	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	D	rafter			SX 303 880
c17	1	1	33	19	52	1462	1481	1481	2.78	0.98	2.07	2.13	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	A	joist			SX 303 880

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
c18	1	1	16	12	28	1469	1481	1481	3.92	3.10	4.14	3.57	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	A	joist			SX 303 880
c21	2	5	65	18	83	1532	1550	1550	1.24	0.97	1.27	1.18	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	E	joist			SX 303 880
c23	2	10	59	22	81	1528	1550	1550	2.82	1.30	2.15	2.40	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Su	E	joist			SX 303 880
c31	2	5	20	15	35	1535	1550	1550	2.58	1.73	2.18	2.21	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	E	joist			SX 303 880
c32	2	5	68	14	82	1536	1550	1550	1.23	0.60	0.71	1.12	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	E	joist			SX 303 880
c41	3		54	11	65	1589	1600	1600	2.89	2.59	3.52	2.84	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	E	misc			SX 303 880
c42	3	10	62	20	82	1580	1600	1600	1.33	0.73	0.49	1.19	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	E	joist			SX 303 880
c43	3	1	32	16	48	1584	1600	1600	1.96	1.21	1.63	1.71	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	E	joist			SX 303 880
c44	3	5	41	13	54	1587	1600	1600	2.75	1.97	2.97	2.57	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	W	E	joist			SX 303 880
c45	3		31	19	50	1581	1600	1600	1.11	1.51	1.03	1.26	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	W	E	joist			SX 303 880
c46	3		45	17	62	1583	1600	1600	1.06	1.35	1.41	1.14	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	W	E	joist			SX 303 880
c51	1		7	19	26	1462	1481	1481	2.86	2.10	2.86	2.31	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	A	stave			SX 303 880
c52	4	5	29	16	45	1584	1600	1600	1.44	1.27	0.82	1.38	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Su	E	stud			SX 303 880
c53	4	5	29	23	52	1577	1600	1600	1.55	0.55	1.83	1.11	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	E	stud			SX 303 880
c54	4		30	11	41	1589	1600	1600	2.00	1.30	1.78	1.82	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Su	E	stud			SX 303 880
c56	4	5	43	25	68	1575	1600	1600	1.13	1.10	0.71	1.12	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Sp	E	joist			SX 303 880
c61	5		82	24	106	1626	1650	1650	1.18	0.56	1.87	1.03	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Su	E	purlin			SX 303 880
c64	5	10	66	24	90	1626	1650	1650	1.58	1.04	1.62	1.43	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Su	E	joist			SX 303 880
c65	5	10	82	29	111	1621	1650	1650	1.25	0.74	0.86	1.12	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Su	E	joist			SX 303 880
c66	5	5	84	30	114	1620	1650	1650	0.97	0.63	0.49	0.88	3	Cornwall	Werrington	Cullacott, the Old Farmhouse	OX	0	0	Su	E	joist			SX 303 880
bal-b01	1		117	21	138	1547	1568	1568	1.83	1.45	1.49	1.77	8	Cumbria	Baldwinholme	Baldwinholme Farm	NT	0	0		D	cruck			NY 338 519
bbs-a01a	1		84	16	100	1534	1550	1550	2.37	1.98	2.18	2.31	8	Cumbria	Burgh-by-Sands	Cross Farm	NT	0	0		E	cruck			NY 327 591
bbs-a04a	1		100	22	122	1528	1550	1550	2.34	1.80	1.70	2.24	8	Cumbria	Burgh-by-Sands	Cross Farm	NT	0	0		E	cruck			NY 327 591
bbs-b01a	1		134	18	152	1597	1615	1615	0.97	1.10	0.98	0.99	8	Cumbria	Burgh-by-Sands	Lamonby Farm	NT	0	0		D	cruck			NY 326 592
bbs-b02a	1		103	22	125	1593	1615	1615	0.71	1.03	0.59	0.77	8	Cumbria	Burgh-by-Sands	Lamonby Farm	NT	0	0		D	collar			NY 326 592
bbs-b08a	1		53	27	80	1588	1615	1615	2.17	0.97	1.68	1.77	8	Cumbria	Burgh-by-Sands	Lamonby Farm	NT	0	0		A	collar			NY 326 592
b013	1	1	17	23	40	777	800	800	1.61	1.06	1.91	1.29	8	Cumbria	Carlisle	Carlisle B Old Bush Lane	SH	0	0	W	E				NY 400 560
b018	1		61	13	74	787	800	800	1.46	1.70	1.64	1.50	8	Cumbria	Carlisle	Carlisle B Old Bush Lane	SH	0	0	Sp	E				NY 400 560
dal-a03a	1		30	11	41	1539	1550	1550	2.68	3.05	3.65	2.78	8	Cumbria	Dalston	Powbank Cottage	NT	0	0		E	cruck			NY 385 499
dal-a04a	1		35	18	53	1532	1550	1550	2.66	0.64	1.80	1.98	8	Cumbria	Dalston	Powbank Cottage	NT	0	0		E	cruck			NY 385 499
dal-a05a	1		23	18	41	1532	1550	1550	1.62	0.99	1.30	1.34	8	Cumbria	Dalston	Powbank Cottage	NT	0	0		E	cruck			NY 385 499
dal-a06a	1		59	23	82	1527	1550	1550	1.09	1.28	0.83	1.14	8	Cumbria	Dalston	Powbank Cottage	NT	0	0		E	cruck			NY 385 499
dal-a07a	1		27	16	43	1534	1550	1550	2.39	2.22	3.06	2.33	8	Cumbria	Dalston	Powbank Cottage	NT	0	0		E	misc			NY 385 499
rat-a01a	1		53	17	70	1569	1586	1586	1.52	1.51	1.15	1.52	8	Cumbria	Durdar	Ratten Row	NT	0	0		D	cruck			NY 349 496
rat-a02a	1		36	11	47	1575	1586	1586	2.22	1.11	1.28	1.96	8	Cumbria	Durdar	Ratten Row	NT	0	0		A	cruck			NY 349 496
rat-a03a	1		33	9	42	1577	1586	1586	2.18	1.91	2.18	2.12	8	Cumbria	Durdar	Ratten Row	NT	0	0		A	collar			NY 349 496
rat-a06a	1		71	30	101	1556	1586	1586	0.59	0.50	0.45	0.56	8	Cumbria	Durdar	Ratten Row	NT	0	0		A	rafter			NY 349 496
rat-a07a	1		73	20	93	1566	1586	1586	1.08	0.96	0.92	1.05	8	Cumbria	Durdar	Ratten Row	NT	0	0		A	rafter			NY 349 496
rat-a08a	1		23	19	42	1567	1586	1586	2.60	2.22	1.96	2.43	8	Cumbria	Durdar	Ratten Row	NT	0	0		A	cruck			NY 349 496
rat-a09a	1		37	14	51	1572	1586	1586	1.87	1.14	2.20	1.67	8	Cumbria	Durdar	Ratten Row	NT	0	0		A	collar			NY 349 496
rat-a10a	1		87	15	102	1490	1505	1586	2.11	1.34	0.72	1.99	8	Cumbria	Durdar	Ratten Row	NT	0	0		D	cruck			NY 349 496
rat-a11a	1		31	14	45	1572	1586	1586	4.30	2.07	4.80	3.61	8	Cumbria	Durdar	Ratten Row	NT	0	0		A	cruck			NY 349 496
lng-c01a	1		105	20	125	1467	1487	1489	1.12	1.96	0.89	1.25	8	Cumbria	Longburgh	Brewery Farm	NT	0	0		D	cruck			NY 309 589
lng-c02a	1		100	19	119	1470	1489	1489	1.09	0.89	0.65	1.06	8	Cumbria	Longburgh	Brewery Farm	NT	0	0		D	cruck			NY 309 589
lng-c03a	1		80	20	100	1466	1486	1489	1.71	1.03	0.90	1.57	8	Cumbria	Longburgh	Brewery Farm	NT	0	0		D	cruck			NY 309 589
lng-c04a	1		120	32	152	1456	1488	1489	0.80	0.50	0.46	0.74	8	Cumbria	Longburgh	Brewery Farm	NT	0	0		D	cruck			NY 309 589

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
lng-c06a	1		45	30	75	1458	1488	1489	1.20	0.37	0.63	0.87	8	Cumbria	Longburgh	Brewery Farm	NT	0	0		D	cruck			NY 309 589
mrh-d01	1		105	21	126	1721	1742	1742	1.38	1.17	0.49	1.35	8	Cumbria	Moorhouse	Hall Farm	NT	0	0		D	cruck			NY 334 567
mrh-b04a	1		89	33	122	1575	1608	1608	1.58	0.67	0.61	1.33	8	Cumbria	Moorhouse	Moorhouse Barn	NT	0	0		A	cruck			NY 330 568
mrh-b06a	1		86	23	109	1585	1608	1608	1.82	1.45	1.81	1.74	8	Cumbria	Moorhouse	Moorhouse Barn	NT	0	0		D	cruck			NY 330 568
mrh-a05a	1		69	16	85	1384	1400	1400	1.00	1.32	1.15	1.06	8	Cumbria	Moorhouse	Royal Oak Cottage	NT	0	0		E	collar			NY 332 586
mrh-c03a	1		91	18	109	1637	1655	1655	1.60	0.67	0.51	1.45	8	Cumbria	Moorhouse	Washouse Cottage	NT	0	0		D	tiebeam			NY 330 568
mrh-c04a	1		52	20	72	1635	1655	1655	1.98	0.86	0.89	1.67	8	Cumbria	Moorhouse	Washouse Cottage	NT	0	0		A	purlin			NY 330 568
mrh-c05a	1		45	20	65	1635	1655	1655	1.61	1.08	0.60	1.44	8	Cumbria	Moorhouse	Washouse Cottage	NT	0	0		A	purlin			NY 330 568
mrh-c06a	1		31	25	56	1630	1655	1655	2.18	0.71	2.40	1.52	8	Cumbria	Moorhouse	Washouse Cottage	NT	0	0		A	rafter			NY 330 568
CHT-A01A	1		56	23	79	1717	1740	1740	2.25	1.57	2.04	2.05	8	Cumbria	Penrith	Clifton Hall Tower	NT	0	0		A	principal			NY 530 271
CHT-A08A	1		71	16	87	1724	1740	1740	2.04	2.45	1.84	2.12	8	Cumbria	Penrith	Clifton Hall Tower	NT	0	0		D	tiebeam			NY 530 271
wd1107e	1		157	17	174	102	119	119	1.19	1.94	1.55	1.26	8	Cumbria	Preston	Walton-le-Dale	SH	0	0	Sp	D				SD 551 282
thr-a01a	1		44	24	68	1526	1550	1550	2.38	0.75	1.14	1.80	8	Cumbria	Thursby	Orchard Cottage	NT	0	0		E	cruck			NY 326 506
thr-a02a	1		47	17	64	1533	1550	1550	2.25	1.20	1.18	1.97	8	Cumbria	Thursby	Orchard Cottage	NT	0	0		E	cruck			NY 326 506
thr-a03a	1		36	11	47	1539	1550	1550	2.98	3.81	3.58	3.17	8	Cumbria	Thursby	Orchard Cottage	NT	0	0		E	cruck			NY 326 506
thr-a04a	1		35	18	53	1532	1550	1550	2.17	1.44	2.06	1.92	8	Cumbria	Thursby	Orchard Cottage	NT	0	0		E	cruck			NY 326 506
wkb-a02a	1		182	35	217	1535	1570	1571	0.88	0.60	0.49	0.83	8	Cumbria	Warwick Bridge	Howard's Cottage	NT	0	0		D	cruck			NY 475 568
wkb-a03a	1		90	20	110	1533	1553	1571	1.64	0.66	0.86	1.46	8	Cumbria	Warwick Bridge	Howard's Cottage	NT	0	0		D	misc			NY 475 568
wkb-a04a	1		85	31	116	1540	1571	1571	0.70	0.82	0.64	0.73	8	Cumbria	Warwick Bridge	Howard's Cottage	NT	0	0		D	cruck			NY 475 568
wkb-a07a	1		52	22	74	1549	1571	1571	2.09	1.26	0.81	1.84	8	Cumbria	Warwick Bridge	Howard's Cottage	NT	0	0		A	cruck			NY 475 568
wkb-a08a	1		39	21	60	1550	1571	1571	1.90	1.18	1.04	1.65	8	Cumbria	Warwick Bridge	Howard's Cottage	NT	0	0		A	cruck			NY 475 568
wkb-a09a	1		34	16	50	1555	1571	1571	1.98	1.40	2.07	1.79	8	Cumbria	Warwick Bridge	Howard's Cottage	NT	0	0		A	cruck			NY 475 568
BLS-B03A	1		153	28	181	1721	1749	1749	1.09	1.01	0.94	1.07	5	Derby	Bolsover	Bolsover Castle	NT	0	0		D	principal			SK 471 706
BLS-B06	1		74	53	127	1696	1749	1749	1.13	0.50	0.95	0.87	5	Derby	Bolsover	Bolsover Castle	NT	0	0		D	rafter			SK 471 706
BLS-B09A	1		181	27	208	1722	1749	1749	0.95	0.63	0.60	0.91	5	Derby	Bolsover	Bolsover Castle	NT	0	0		D	tiebeam			SK 471 706
BLS-B13A	1		111	29	140	1720	1749	1749	0.62	0.64	0.49	0.62	5	Derby	Bolsover	Bolsover Castle	NT	0	0		D	tiebeam			SK 471 706
BLS-B15A	1		121	23	144	1726	1749	1749	1.32	1.25	1.35	1.31	5	Derby	Bolsover	Bolsover Castle	NT	0	0		D	principal			SK 471 706
BRT-A03	1		90	32	122	1586	1618	1619	2.12	1.57	2.05	1.98	5	Derby	Bretby	Bretby Hall	NT	0	0		D	principal			SK 300 225
BRT-A08	1		63	16	79	1603	1619	1619	1.37	1.15	1.17	1.33	5	Derby	Bretby	Bretby Hall	NT	0	0		D	rafter			SK 300 225
BRT-A11	2		75	13	88	1705	1718	1718	1.43	1.55	1.50	1.45	5	Derby	Bretby	Bretby Hall	NT	0	0		D	purlin			SK 300 225
BRT-A16	2		109	20	129	1698	1718	1718	1.44	1.19	1.12	1.40	5	Derby	Bretby	Bretby Hall	NT	0	0		D	principal			SK 300 225
BRT-A17	3		77	18	95	1787	1805	1805	1.76	1.83	1.89	1.77	5	Derby	Bretby	Bretby Hall	NT	0	0		D	brace			SK 300 225
BRT-A19	3		79	13	92	1787	1800	1805	1.43	1.62	1.70	1.46	5	Derby	Bretby	Bretby Hall	NT	0	0		D	stud			SK 300 225
BRT-A21	3		74	21	95	1782	1803	1805	1.60	1.19	1.45	1.51	5	Derby	Bretby	Bretby Hall	NT	0	0		D	brace			SK 300 225
BRT-A22	3		68	13	81	1788	1801	1805	2.11	1.83	2.39	2.06	5	Derby	Bretby	Bretby Hall	NT	0	0		D	stud			SK 300 225
HDW-A21A	1		64	18	82	1568	1586	1586	1.83	1.59	1.81	1.78	5	Derby	Hardwick	Hardwick Old Hall	NT	0	0		D	beam			SK 462 637
HDW-A41A	2		62	30	92	1542	1572	1572	2.31	0.98	1.11	1.88	5	Derby	Hardwick	Hardwick Old Hall	NT	0	0		A	lintel			SK 462 637
HDW-A46A	2		58	27	85	1545	1572	1572	1.52	0.76	1.39	1.28	5	Derby	Hardwick	Hardwick Old Hall	NT	0	0		D	joist			SK 462 637
HDW-B09A	3		180	48	228	1577	1625	1625	0.97	0.65	1.44	0.90	5	Derby	Hardwick	Hardwick Old Hall	NT	0	0		D	misc			SK 462 637
HDW-B10A	3		77	41	118	1584	1625	1625	1.69	0.78	1.43	1.38	5	Derby	Hardwick	Hardwick Old Hall	NT	0	0		D	misc			SK 462 637
HRD-A06A	1		46	18	64	1607	1625	1625	2.36	1.78	1.71	2.20	5	Derby	Hardwick	Hardwick Old Hall	NT	0	0		E	rafter			SK 462 637
lcfb7	1	30	46	10	56	1615	1625	1625	2.23	1.40	1.78	2.08	3	Devon	Bradninch	Lower Coombe Farmhouse	OX	0	0	Sp	D		Domestic	Low	SS 987 036
brtn2	1	25	84	23	107	1244	1267	1267	1.38	1.01	0.82	1.30	3	Devon	Braunton	Church of St Brannock	OX	3	1	W	D	beam	Church	Monastic	SS 489 371
brtn8	1	50	82	16	98	1251	1267	1267	1.71	1.06	1.29	1.60	3	Devon	Braunton	Church of St Brannock	OX	0	0	Su	A	brace	Church	Monastic	SS 489 371
road11	1	1	39	20	59	1530	1550	1550	2.20	1.83	2.43	2.08	3	Devon	Broadwoodwidger	Roadford	SH	0	0	Su	E				SX 425 915
child3	2	40	90	19	109	1491	1510	1514	1.01	1.06	0.98	1.02	3	Devon	Cheriton Fitzpaine	South Coombe	OX	0	0	Sp	D		Domestic	Low	SS 890 087

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
child5	1	10	56	25	81	1440	1465	1465	2.39	1.05	1.81	1.98	3	Devon	Cheriton Fitzpaine	South Coombe	OX	0	0	W	D		Domestic	Low	SS 890 087
child6	1		31	24	55	1441	1465	1465	2.84	1.32	3.74	2.18	3	Devon	Cheriton Fitzpaine	South Coombe	OX	0	0	Sp	D		Domestic	Low	SS 890 087
child7	1	10	55	22	77	1443	1465	1465	2.14	1.35	0.98	1.91	3	Devon	Cheriton Fitzpaine	South Coombe	OX	0	0	Sp	A		Domestic	Low	SS 890 087
bow03a	1		24	31	55	1469	1500	1500	2.16	1.45	1.34	1.76	3	Devon	Exeter	Bowhill	SH	0	0		E				SX 906 916
EXT-C05A	11		106	26	132	1286	1312	1312	1.47	0.89	0.69	1.36	3	Devon	Exeter	Cathedral	NT	0	0		D	principal			SX 921 925
EXTC105A	3		97	16	113	1299	1315	1315	1.22	1.15	1.16	1.21	3	Devon	Exeter	Cathedral	NT	0	0		A	rafter			SX 921 925
EXTC110A	3		81	21	102	1291	1312	1315	1.77	2.03	1.74	1.82	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC111A	3		83	21	104	1293	1314	1315	1.87	1.94	1.98	1.89	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC117A	3		44	31	75	1284	1315	1315	1.68	0.91	1.71	1.36	3	Devon	Exeter	Cathedral	NT	0	0		A	brace			SX 921 925
EXTC124A	3		113	27	140	1288	1315	1315	1.24	1.06	1.01	1.21	3	Devon	Exeter	Cathedral	NT	0	0		D	brace			SX 921 925
EXTC134A	6		89	25	114	1591	1616	1616	1.73	1.51	1.02	1.68	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC135A	6		58	18	76	1598	1616	1616	1.53	1.52	1.34	1.53	3	Devon	Exeter	Cathedral	NT	0	0		D	stud			SX 921 925
EXTC136A	6		60	17	77	1599	1616	1616	2.70	1.72	2.18	2.48	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC137A	6		70	18	88	1598	1616	1616	2.25	1.05	0.83	2.01	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-C13A	9		53	19	72	1530	1549	1549	2.64	1.86	2.33	2.44	3	Devon	Exeter	Cathedral	NT	0	0		D	principal			SX 921 925
EXTC140A	4		51	20	71	1304	1324	1328	1.65	1.05	1.83	1.48	3	Devon	Exeter	Cathedral	NT	0	0		A	brace			SX 921 925
EXTC141A	7		57	23	80	1743	1766	1766	1.73	0.94	1.13	1.50	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC143A	7		46	26	72	1740	1766	1766	1.51	1.18	1.49	1.39	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC146A	4		52	19	71	1305	1324	1328	2.07	1.15	1.76	1.83	3	Devon	Exeter	Cathedral	NT	0	0		A	brace			SX 921 925
EXTC163A	4		63	16	79	1308	1324	1328	2.40	1.21	1.31	2.16	3	Devon	Exeter	Cathedral	NT	0	0		A	rafter			SX 921 925
EXTC164A	4		67	28	95	1292	1320	1328	2.07	0.88	1.15	1.72	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC165A	4		56	39	95	1285	1324	1328	2.02	0.73	0.95	1.49	3	Devon	Exeter	Cathedral	NT	0	0		D	brace			SX 921 925
EXTC168A	6		70	15	85	1601	1616	1616	2.62	1.84	1.97	2.48	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC175A	4		66	33	99	1291	1324	1328	1.77	0.79	0.86	1.44	3	Devon	Exeter	Cathedral	NT	0	0		D	brace			SX 921 925
EXTC179A	6		98	24	122	1586	1610	1616	1.42	1.01	0.69	1.34	3	Devon	Exeter	Cathedral	NT	0	0		D	stud			SX 921 925
EXTC180	6		76	16	92	1600	1616	1616	2.15	1.60	1.76	2.06	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC183A	4		89	10	99	1303	1313	1328	2.63	1.35	1.69	2.50	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC184A	4		27	23	50	1298	1321	1328	2.83	1.43	2.76	2.19	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC187	4		82	24	106	1300	1324	1328	1.62	1.13	2.01	1.51	3	Devon	Exeter	Cathedral	NT	0	0		A	brace			SX 921 925
EXTC190A	4		53	31	84	1293	1324	1328	1.95	0.61	0.79	1.45	3	Devon	Exeter	Cathedral	NT	0	0		A	collar			SX 921 925
EXTC193A	4		84	21	105	1300	1321	1328	1.89	1.40	1.63	1.79	3	Devon	Exeter	Cathedral	NT	0	0		D	collar			SX 921 925
EXTC196B	4		70	29	99	1295	1324	1328	1.41	0.51	0.36	1.15	3	Devon	Exeter	Cathedral	NT	0	0		A	brace			SX 921 925
EXTC197A	4		95	25	120	1299	1324	1328	1.02	1.11	1.06	1.04	3	Devon	Exeter	Cathedral	NT	0	0		A	stud			SX 921 925
EXTC214A	5		82	27	109	1310	1337	1337	2.10	1.45	1.47	1.94	3	Devon	Exeter	Cathedral	NT	0	0		D	collar			SX 921 925
EXTC215A	5		64	22	86	1314	1336	1337	1.97	1.41	1.41	1.82	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC219A	5		86	23	109	1297	1320	1337	2.09	1.07	1.39	1.88	3	Devon	Exeter	Cathedral	NT	0	0		D	collar			SX 921 925
EXT-C21A	1		109	18	127	1280	1298	1298	1.46	2.22	1.88	1.57	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC221A	5		73	29	102	1308	1337	1337	1.72	0.91	1.29	1.49	3	Devon	Exeter	Cathedral	NT	0	0		D	brace			SX 921 925
EXTC231A	5		59	17	76	1320	1337	1337	2.09	1.28	1.55	1.91	3	Devon	Exeter	Cathedral	NT	0	0		A	brace			SX 921 925
EXTC247A	5		44	23	67	1311	1334	1337	2.14	1.80	2.01	2.03	3	Devon	Exeter	Cathedral	NT	0	0		D	brace			SX 921 925
EXTC249A	5		74	14	88	1323	1337	1337	1.79	2.05	0.75	1.84	3	Devon	Exeter	Cathedral	NT	0	0		A	stud			SX 921 925
EXT-C24A	1		69	21	90	1273	1294	1298	0.97	1.14	0.89	1.01	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC250A	5		101	22	123	1308	1330	1337	1.60	1.32	0.94	1.55	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXTC269A	5		81	19	100	1309	1328	1337	1.78	1.22	1.30	1.67	3	Devon	Exeter	Cathedral	NT	0	0		D	brace			SX 921 925
EXTC278A	5		54	22	76	1315	1337	1337	0.85	0.99	0.65	0.89	3	Devon	Exeter	Cathedral	NT	0	0		A	stud			SX 921 925
EXTC295A	10		91	18	109	1903	1921	1921	1.56	0.99	0.99	1.47	3	Devon	Exeter	Cathedral	NT	0	0		D	misc			SX 921 925

Code	Phase	Pith	H Wd	S Wd	Rings	H'S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
EXT-C31A	1		78	18	96	1273	1291	1298	1.19	1.86	1.68	1.32	3	Devon	Exeter	Cathedral	NT	0	0		D	post			SX 921 925
EXT-C32A	1		102	37	139	1256	1293	1298	1.47	1.29	1.23	1.42	3	Devon	Exeter	Cathedral	NT	0	0		A	rafter			SX 921 925
EXT-C34A	1		110	18	128	1273	1291	1298	1.20	1.88	1.62	1.29	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-C35A	1		46	13	59	1280	1293	1298	2.65	2.47	3.04	2.61	3	Devon	Exeter	Cathedral	NT	0	0		A	collar			SX 921 925
EXT-C36B	1		122	23	145	1270	1293	1298	1.48	1.13	1.77	1.43	3	Devon	Exeter	Cathedral	NT	0	0		D	brace			SX 921 925
EXT-C49A	2		86	41	127	1265	1306	1306	1.13	0.63	0.67	0.97	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-C50A	2		72	43	115	1263	1306	1306	1.15	0.59	0.64	0.94	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-C57A	2		104	20	124	1274	1294	1306	1.57	1.39	0.96	1.54	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-C81A	8		107	23	130	1661	1684	1684	1.10	1.12	0.95	1.11	3	Devon	Exeter	Cathedral	NT	0	0		D	stud			SX 921 925
EXT-C82A	8		72	21	93	1662	1683	1684	1.46	1.12	1.10	1.38	3	Devon	Exeter	Cathedral	NT	0	0		D	stud			SX 921 925
EXT-C84A	3		90	26	116	1289	1315	1315	1.72	1.33	1.29	1.63	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-C85	3		94	31	125	1279	1310	1315	1.16	0.71	0.68	1.05	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-C86A	3		64	19	83	1273	1292	1315	1.38	1.14	1.14	1.32	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-C89A	3		121	30	151	1285	1315	1315	0.94	0.55	0.62	0.86	3	Devon	Exeter	Cathedral	NT	0	0		A	brace			SX 921 925
EXT-C90A	3		64	22	86	1293	1315	1315	1.21	1.29	1.10	1.23	3	Devon	Exeter	Cathedral	NT	0	0		A	brace			SX 921 925
EXT-C91A	3		96	24	120	1290	1314	1315	2.08	1.60	1.72	1.98	3	Devon	Exeter	Cathedral	NT	0	0		D	rafter			SX 921 925
EXT-E01	1		34	20	54	1455	1475	1475	2.34	0.98	1.41	1.83	3	Devon	Exeter	Exeter Guildhall	NT	0	0		E	purlin			SX 919 924
poug00			31	23	54	1971	1994	1994	2.52	1.88	2.17	2.25	3	Devon	Poughill	Poughill Woodyard	SH	0	0		A				SS 850 084
poug04			56	14	70	1980	1994	1994	2.34	2.37	2.59	2.34	3	Devon	Poughill	Poughill Woodyard	SH	0	0		D				SS 850 084
poug10		1	39	13	52	1981	1994	1994	2.68	3.16	2.76	2.80	3	Devon	Poughill	Poughill Woodyard	SH	0	0		A				SS 850 084
bc5	1		153	40	193	1347	1387	1387	1.23	0.90	0.92	1.16	3	Devon	Sowton	Great Barn, Bishop's Clyst	OX	0	0	Sp	D		Agricultural	Gentry	SX 982 920
e13	1	5	43	31	74	1469	1500	1500	2.09	1.03	0.96	1.65	3	Devon	Westleigh	Eastleigh Manor	OX	0	0	Su	E	purlin			SS 488 280
frd5	1	0	35	22	57	1428	1450	1450	1.84	1.55	2.08	1.73	3	Dorset	Forde	Forde Abbey	OX	0	0	W	E		Church	Monastic	ST 359 051
leigh1	1		68	21	89	1963	1984	1984	1.82	1.20	1.35	1.67	3	Dorset	Leigh	Modern trees	SH	0	0		D				ST610080
leigh3	1		65	18	83	1966	1984	1984	2.67	2.29	2.85	2.58	3	Dorset	Leigh	Modern trees	SH	0	0		D				ST610080
leigh4	1		52	25	77	1959	1984	1984	2.31	1.40	2.07	2.01	3	Dorset	Leigh	Modern trees	SH	0	0		D				ST610080
pm4617	1	1	26	17	43	1283	1300	1300	2.64	1.56	2.86	2.21	3	Dorset	Poole	Foundry site	SH	0	0	Sp	E				SU 020 910
fdf01	1		76	17	93	1536	1553	1553	1.11	1.77	1.35	1.23	3	Dorset	Sturminster Newton	Fiddleford Manor	MB	0	0	W	D				ST 801 136
wim1	1		82	22	104	1612	1634	1634	1.28	1.09	1.01	1.24	3	Dorset	Wimborne	Priest's House Museum	OX	0	0	Su	A	purlin			
wim12	2		33	13	46	1587	1600	1600	4.03	3.32	3.52	3.83	3	Dorset	Wimborne	Priest's House Museum	OX	0	0	Sp	E	principal			
wim15	2	10	50	25	75	1575	1600	1600	1.66	1.22	1.59	1.52	3	Dorset	Wimborne	Priest's House Museum	OX	0	0	Sp	E	tiebeam			
wim16	2		59	25	84	1575	1600	1600	2.00	1.19	1.02	1.76	3	Dorset	Wimborne	Priest's House Museum	OX	0	0	Sp	E	principal			
wim3	1		80	24	104	1610	1634	1634	1.49	0.93	1.26	1.36	3	Dorset	Wimborne	Priest's House Museum	OX	0	0	Su	A	purlin			
wim4	1		66	27	93	1607	1634	1634	1.29	1.02	1.11	1.21	3	Dorset	Wimborne	Priest's House Museum	OX	0	0	Su	A	purlin			
wim6	1	10	83	29	112	1605	1634	1634	1.11	0.97	0.92	1.07	3	Dorset	Wimborne	Priest's House Museum	OX	0	0	Su	D	stud			
BRP-A01A	1		36	30	66	1445	1475	1475	1.57	0.95	1.42	1.29	9	Durham	Bearpark	Bearpark Hall Farm Cottage	NT	0	0		D	tiebeam			NZ 244 439
BRP-A04A	1		63	28	91	1447	1475	1475	1.92	1.58	1.04	1.81	9	Durham	Bearpark	Bearpark Hall Farm Cottage	NT	0	0		D	tiebeam			NZ 244 439
BRP-B07B	1		164	18	182	1632	1650	1650	0.93	0.34	0.31	0.87	9	Durham	Bearpark	Bull Hole Byre	NT	0	0		E	cruck			NZ 233 422
FCL-A03A	1		94	19	113	1350	1369	1369	1.16	0.91	0.91	1.12	9	Durham	Durham	Finchale Priory Farmhouse	NT	0	0		D	brace			NZ 297 472
FCL-A04	1		50	40	90	1329	1369	1369	1.21	0.47	0.73	0.88	9	Durham	Durham	Finchale Priory Farmhouse	NT	0	0		D	brace			NZ 297 472
FCL-A05A	1		44	38	82	1331	1369	1369	1.31	0.73	0.92	1.04	9	Durham	Durham	Finchale Priory Farmhouse	NT	0	0		D	brace			NZ 297 472
FCL-A06A	1		123	29	152	1340	1369	1369	1.35	1.01	0.87	1.29	9	Durham	Durham	Finchale Priory Farmhouse	NT	0	0		D	tiebeam			NZ 297 472
FCL-A07A	1		33	28	61	1341	1369	1369	1.59	2.04	2.05	1.80	9	Durham	Durham	Finchale Priory Farmhouse	NT	0	0		D	rafter			NZ 297 472
FCL-A20A	1		62	15	77	1354	1369	1369	1.04	0.87	0.77	1.01	9	Durham	Durham	Finchale Priory Farmhouse	NT	0	0		D	brace			NZ 297 472
FCL-A24A	1		101	25	126	1344	1369	1369	1.74	0.63	0.70	1.52	9	Durham	Durham	Finchale Priory Farmhouse	NT	0	0		A	beam			NZ 297 472
STN-C19A	1		42	25	67	1508	1533	1533	1.48	1.36	1.73	1.43	9	Durham	Stanhope	Stonehouse	NT	0	0		D	joist			NY 997 393

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
STN-C23A	1		81	33	114	1500	1533	1533	1.46	0.74	0.84	1.25	9	Durham	Stanhope	Stonehouse	NT	0	0		D	beam			NY 997 393
STN-B12A	1		102	28	130	1525	1553	1553	1.10	0.76	0.77	1.03	9	Durham	Stanhope	Unthank Hall	NT	0	0		D	joist			NY 991 391
STN-B22A	2		122	18	140	1574	1592	1592	0.59	0.44	0.41	0.57	9	Durham	Stanhope	Unthank Hall	NT	0	0		D	rafter			NY 991 391
STN-B23A	2		67	27	94	1565	1592	1592	1.18	0.72	1.13	1.05	9	Durham	Stanhope	Unthank Hall	NT	0	0		D	principal			NY 991 391
CHD-F11	1		80	15	95	1561	1576	1576	2.01	1.54	1.07	1.94	1	E Sussex	Chiddingly	Chiddingly Place	NT	0	0		D	stud			TQ 541 143
CHD-F16A	1		64	16	80	1559	1575	1576	1.50	1.35	1.41	1.47	1	E Sussex	Chiddingly	Chiddingly Place	NT	0	0		D	purlin			TQ 541 143
CHD-F18A	1		77	10	87	1566	1576	1576	2.51	2.23	2.41	2.48	1	E Sussex	Chiddingly	Chiddingly Place	NT	0	0		D	stud			TQ 541 143
CHD-F19A	1		75	23	98	1552	1575	1576	1.45	0.83	0.80	1.30	1	E Sussex	Chiddingly	Chiddingly Place	NT	0	0		D	purlin			TQ 541 143
CHD-G07A	1		34	13	47	1560	1573	1573	2.67	2.17	3.13	2.53	1	E Sussex	Chiddingly	Chiddingly Place	NT	0	0		D	joist			TQ 541 143
shine02	1	1	10	34	44	-884	-850	-850	2.13	0.61	1.59	0.95	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0	W	E				TQ 615 029
shine03	1	1	15	13	28	-863	-850	-850	2.96	1.02	2.13	2.06	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0	W	E				TQ 615 029
shine08	1	1	19	30	49	-880	-850	-850	2.14	0.85	2.86	1.35	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0	W	E				TQ 615 029
shine09	1	1	27	17	44	-867	-850	-850	1.69	1.39	1.54	1.57	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0		E				TQ 615 029
shine10	1	1	23	23	46	-873	-850	-850	2.87	1.07	1.81	1.97	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0	W	E				TQ 615 029
shine11	1	1	32	20	52	-870	-850	-850	1.86	0.77	1.63	1.44	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0	W	E				TQ 615 029
shine12	1	1	8	19	27	-869	-850	-850	2.15	2.02	2.15	2.06	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0	W	E				TQ 615 029
shine15	1	1	11	13	24	-863	-850	-850	2.71	1.18	2.52	1.88	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0	W	E				TQ 615 029
shine16	1	1	14	15	29	-865	-850	-850	2.74	1.87	2.53	2.29	1	E Sussex	Eastbourne	Shinewater 1255	SH	0	0	W	E				TQ 615 029
wde05	1	1	26	17	43	-867	-850	-850	1.88	0.94	1.42	1.51	1	E Sussex	Eastbourne	Willingdon Grove	SH	0	0	W	E				TQ 615 029
wde06	1	5	25	20	45	-870	-850	-850	2.36	1.09	1.46	1.80	1	E Sussex	Eastbourne	Willingdon Grove	SH	0	0	W	E				TQ 615 029
wde18	1	1	37	27	64	-877	-850	-850	1.53	0.78	1.06	1.21	1	E Sussex	Eastbourne	Willingdon Grove	SH	0	0	W	E				TQ 615 029
wde20b	1	1	23	23	46	-873	-850	-850	1.40	0.53	0.94	0.97	1	E Sussex	Eastbourne	Willingdon Grove	SH	0	0	W	E				TQ 615 029
wde23	1	1	20	22	42	-872	-850	-850	2.14	1.06	1.65	1.57	1	E Sussex	Eastbourne	Willingdon Grove	SH	0	0	W	E				TQ 615 029
wde24	1	1	9	17	26	-867	-850	-850	2.88	1.68	2.88	2.09	1	E Sussex	Eastbourne	Willingdon Grove	SH	0	0	Sp	E				TQ 615 029
e1162	1	1	38	24	62	1069	1093	1093	0.94	0.93	0.52	0.93	7	E Yorks	Beverley	Eastgate	SH	0	0	Su	D				TA 038 393
e1522	1	5	31	16	47	1077	1093	1093	3.53	5.68	5.48	4.26	7	E Yorks	Beverley	Eastgate	SH	0	0		A				TA 038 393
e1571	1	1	1	30	31	1063	1093	1093	3.08	1.67	3.08	1.72	7	E Yorks	Beverley	Eastgate	SH	0	0	Su	A				TA 038 393
e1614	1	1	22	15	37	1078	1093	1093	2.01	2.00	3.02	2.01	7	E Yorks	Beverley	Eastgate	SH	0	0	Su	A				TA 038 393
btb02	1	1	50	19	69	1433	1452	1452	3.66	1.09	2.07	2.95	4	Essex	Bentfield	Bentfield Bury Barn	MB	0	0	W	D				TL 499 261
btb05	1		37	20	57	1432	1452	1452	2.92	1.28	2.01	2.34	4	Essex	Bentfield	Bentfield Bury Barn	MB	0	0	Sp	D				TL 499 261
brad01	1	10	82	16	98	1968	1984	1984	2.15	2.89	1.94	2.27	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad03	1		80	26	106	1958	1984	1984	1.71	0.90	1.15	1.51	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad05	1		35	9	44	1975	1984	1984	3.68	5.92	4.74	4.14	4	Essex	Bradfield	Bradfield Woods	SH	0	0	Sp	D				TL 925 600
brad06	1		58	12	70	1972	1984	1984	2.64	3.10	2.70	2.72	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad07	1		42	15	57	1969	1984	1984	2.53	2.01	2.18	2.39	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad08	1	1	19	9	28	1975	1984	1984	3.07	6.40	3.57	4.14	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad09	1	10	16	8	24	1976	1984	1984	5.30	7.30	6.06	5.96	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad12	1		62	20	82	1964	1984	1984	2.24	1.89	1.56	2.15	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad13	1	10	16	12	28	1972	1984	1984	3.62	3.37	3.08	3.52	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad16	1	1	37	14	51	1970	1984	1984	3.36	1.79	2.60	2.93	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad17	1	1	15	13	28	1971	1984	1984	3.23	3.89	3.05	3.54	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad18	1	1	16	11	27	1973	1984	1984	4.16	3.75	4.12	3.99	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad19	1	10	16	9	25	1975	1984	1984	3.94	6.29	4.26	4.79	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad20	1	10	24	11	35	1973	1984	1984	2.59	2.05	2.28	2.42	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad21	1	1	16	11	27	1973	1984	1984	2.70	3.62	2.94	3.08	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
brad23	1	1	34	22	56	1962	1984	1984	1.73	0.88	1.13	1.40	4	Essex	Bradfield	Bradfield Woods	SH	0	0	W	D				TL 925 600

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
brad24	1		32	16	48	1968	1984	1984	2.00	1.17	1.75	1.72	4	Essex	Bradfield	Bradfield Woods	SH	0	0		D				TL 925 600
cgcmod	1	1	69	25	94	1976	2001	2001	1.53	1.18	1.62	1.44	4	Essex	East Mersea	Cudmore Grove Country Park	SH	0	0	Su	D				TM 072 151
geb01	1		90	16	106	1511	1527	1527	1.14	0.38	1.10	1.03	4	Essex	Gt Easton	The Bell	MB	0	0	Sp	A				TL 610 255
geb09	1	1	22	24	46	1503	1527	1527	3.47	0.84	2.76	2.10	4	Essex	Gt Easton	The Bell	MB	0	0	W	D	joist			TL 610 255
00000C	1		13	19	32	181	200	200	2.30	1.96	2.28	2.10	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
08197	1		20	16	36	184	200	200	2.75	2.60	2.50	2.68	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
08217	1		35	16	51	184	200	200	3.04	2.54	2.39	2.88	4	Essex	Heybridge	Elms Farm	SH	0	0		E				TL 847 082
08218	1		20	16	36	184	200	200	2.99	2.71	2.93	2.87	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
08219	1		40	15	55	185	200	200	3.50	2.56	2.95	3.24	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
12143	1	0	18	14	32	186	200	200	1.95	1.98	1.67	1.96	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
14973	1		20	10	30	190	200	200	2.26	2.99	2.66	2.51	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
14974	1		25	11	36	189	200	200	2.80	3.01	2.72	2.86	4	Essex	Heybridge	Elms Farm	SH	0	0	Sp	E				TL 847 082
16132	1		13	14	27	186	200	200	2.78	1.65	2.82	2.19	4	Essex	Heybridge	Elms Farm	SH	0	0		E				TL 847 082
20051	1		21	12	33	188	200	200	2.57	2.30	1.91	2.47	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
20055	1	5	14	18	32	182	200	200	3.68	3.03	3.90	3.31	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
20113	1		13	21	34	179	200	200	1.81	0.95	1.74	1.28	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
20238	1	5	21	25	46	175	200	200	1.90	0.91	1.36	1.36	4	Essex	Heybridge	Elms Farm	SH	0	0		E				TL 847 082
20242	1	5	28	14	42	186	200	200	3.73	2.89	4.03	3.45	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
20245	1		19	13	32	187	200	200	3.71	2.81	3.99	3.34	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
20247	1		18	15	33	185	200	200	4.41	2.57	5.15	3.57	4	Essex	Heybridge	Elms Farm	SH	0	0	W	E				TL 847 082
lwn03	1		116	33	149	1515	1548	1548	0.81	0.57	0.45	0.76	4	Essex	Little Waltham	Lawns Farm	MB	0	0	W	D				TL 740 138
lwn06	1	10	119	14	133	1534	1548	1548	0.93	0.74	0.60	0.91	4	Essex	Little Waltham	Lawns Farm	MB	0	0	W	D				TL 740 138
rom01	1		61	14	75	1427	1441	1442	2.47	1.89	1.56	2.36	4	Essex	Lt Hallingbury	Romans, Wrights Green	MB	0	0	W	D				TL 512 173
rom03	1	10	54	15	69	1427	1442	1442	2.90	2.16	2.24	2.74	4	Essex	Lt Hallingbury	Romans, Wrights Green	MB	0	0	W	D				TL 512 173
rom04	1	10	23	21	44	1421	1442	1442	3.35	0.91	1.64	2.19	4	Essex	Lt Hallingbury	Romans, Wrights Green	MB	0	0	Su	A				TL 512 173
shf25	1		56	20	76	487	507	507	1.70	0.88	4.12	1.48	4	Essex	Malden	Slough House Farm	SH	0	0		D				TL 880 090
mgp01m	1		69	25	94	1433	1458	1458	1.08	0.82	0.51	1.01	4	Essex	Pebmarsh	Marvels Garden Farmhouse	MB	0	0	W	A				TL 851 327
mgp05r	1		57	16	73	1442	1458	1458	2.07	2.21	1.59	2.10	4	Essex	Pebmarsh	Marvels Garden Farmhouse	MB	0	0	W	A				TL 851 327
mgp07	1		53	16	69	1442	1458	1458	1.77	1.73	1.03	1.76	4	Essex	Pebmarsh	Marvels Garden Farmhouse	MB	0	0	W	A				TL 851 327
mgp09a	1	5	57	12	69	1446	1458	1458	2.46	2.07	1.43	2.39	4	Essex	Pebmarsh	Marvels Garden Farmhouse	MB	0	0	W	D	plate			TL 851 327
sfw08	1		39	19	58	1770	1789	1789	3.88	2.65	0.80	3.48	4	Essex	Saffron Walden	St Mary's Church	MB	0	0	W	D				TL 536 387
CHC-A01A	1		41	13	54	1737	1750	1750	2.22	1.92	2.45	2.15	3	Glos	Chipping Camden	Seymour House Hotel	NT	0	0		E	joist			SP 149 389
CHC-A02A	1		48	11	59	1739	1750	1750	2.96	1.97	2.51	2.78	3	Glos	Chipping Camden	Seymour House Hotel	NT	0	0		E	joist			SP 149 389
CHC-A03C	1		41	13	54	1737	1750	1750	2.26	2.04	2.74	2.21	3	Glos	Chipping Camden	Seymour House Hotel	NT	0	0		E	joist			SP 149 389
CHC-A04A	1		42	24	66	1726	1750	1750	2.96	2.24	2.88	2.70	3	Glos	Chipping Camden	Seymour House Hotel	NT	0	0		E	joist			SP 149 389
CHC-A06A	1		38	12	50	1738	1750	1750	2.56	2.31	1.32	2.50	3	Glos	Chipping Camden	Seymour House Hotel	NT	0	0		E	joist			SP 149 389
CHC-A07A	1		51	17	68	1733	1750	1750	2.26	0.90	1.00	1.92	3	Glos	Chipping Camden	Seymour House Hotel	NT	0	0		E	joist			SP 149 389
CHC-A08A	1		40	28	68	1722	1750	1750	1.27	0.73	1.48	1.05	3	Glos	Chipping Camden	Seymour House Hotel	NT	0	0		E	rafter			SP 149 389
oda04	1	10	172	16	188	1576	1592	1593	0.69	0.87	0.86	0.71	3	Glos	Deerhurst	Odda's Chapel	MB	0	0		D				SO 869 298
oda06	1	10	52	25	77	1568	1593	1593	1.97	1.59	1.45	1.85	3	Glos	Deerhurst	Odda's Chapel	MB	0	0	W	D				SO 869 298
oda07	1		67	22	89	1571	1593	1593	0.98	0.95	0.92	0.97	3	Glos	Deerhurst	Odda's Chapel	MB	0	0	W	D				SO 869 298
oda09	1		97	19	116	1571	1590	1593	1.33	0.72	0.61	1.23	3	Glos	Deerhurst	Odda's Chapel	MB	0	0		D				SO 869 298
FOS-C01A	1		75	47	122	1503	1550	1550	0.87	0.58	0.54	0.76	3	Glos	Frampton/P694Severn	Manor Farm Barn	NT	0	0		E	post			SO 748 080
GLO-B02B	2		66	20	86	1599	1619	1622	2.07	2.31	1.56	2.12	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	post			SO 831 187
GLO-B04A	2		98	21	119	1600	1621	1622	1.47	1.48	0.71	1.48	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	post			SO 831 187
GLO-B05A	2		76	26	102	1596	1622	1622	1.98	1.11	1.33	1.75	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	post			SO 831 187

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
GLO-B07B	2		105	16	121	1598	1614	1622	1.16	0.66	0.33	1.10	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	rail			SO 831 187
GLO-B08A	2		73	27	100	1594	1621	1622	1.68	1.09	0.97	1.52	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	brace			SO 831 187
GLO-B11B	4		70	18	88	1598	1616	1616	2.01	1.94	1.55	2.00	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	misc			SO 831 187
GLO-B13A	4		67	15	82	1601	1616	1616	2.01	2.45	1.78	2.09	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	misc			SO 831 187
GLO-B27B	1		93	22	115	1563	1585	1587	0.65	0.86	0.77	0.69	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	rafter			SO 831 187
GLO-B28	1		97	28	125	1558	1586	1587	0.85	0.69	0.69	0.82	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	collar			SO 831 187
GLO-B30A	1		73	20	93	1566	1586	1587	1.21	0.94	0.95	1.15	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	collar			SO 831 187
GLO-B32A	1		80	28	108	1559	1587	1587	1.31	1.05	1.46	1.24	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	rafter			SO 831 187
GLO-B39	1		132	26	158	1561	1587	1587	0.76	0.78	0.80	0.77	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	rail			SO 831 187
GLO-B41A	1		104	45	149	1538	1583	1587	0.97	0.91	0.95	0.95	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	rail			SO 831 187
GLO-B42A	1		46	22	68	1564	1586	1587	1.12	0.76	0.94	1.00	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	rail			SO 831 187
GLO-B48B	4		164	18	182	1599	1617	1616	0.57	1.02	0.40	0.62	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	misc			SO 831 187
GLO-B49A	4		67	33	100	1583	1616	1616	1.66	0.72	0.58	1.35	3	Glos	Gloucester	26 Westgate Street	NT	0	0		D	post			SO 831 187
g66ws27	1	10	26	20	46	1541	1561	1561	3.78	1.33	2.72	2.72	3	Glos	Gloucester	66 Westgate Street	SH	0	0	Sp	D	tiebeam			SO 830 187
g66ws28	1	10	26	14	40	1547	1561	1561	2.94	1.24	2.05	2.35	3	Glos	Gloucester	66 Westgate Street	SH	0	0	Sp	D	rail			SO 830 187
GLO-D37A	1		113	19	132	1518	1537	1537	0.93	0.60	0.76	0.88	3	Glos	Gloucester	Blackfriars Priory	NT	0	0		D	joist			SO 830 186
a05	1		168	22	190	1513	1535	1535	2.01	1.35	1.80	1.93	3	Glos	Iron Acton	Acton Court	OX	0	0	Sp	D	beam			ST 676 842
a07	1		46	20	66	1515	1535	1535	1.30	1.23	1.46	1.28	3	Glos	Iron Acton	Acton Court	OX	0	0	Sp	D	joist			ST 676 842
a18	2		72	20	92	1480	1500	1500	2.76	2.01	2.27	2.59	3	Glos	Iron Acton	Acton Court	OX	0	0	Sp	E	beam			ST 676 842
a23	3		175	14	189	1547	1561	1561	1.41	1.66	1.31	1.43	3	Glos	Iron Acton	Acton Court	OX	0	0	Sp	D	misc			ST 676 842
a24	3		140	14	154	1547	1561	1561	1.56	2.20	1.77	1.61	3	Glos	Iron Acton	Acton Court	OX	0	0	W	D	misc			ST 676 842
a25	3		106	15	121	1545	1560	1561	1.43	1.81	1.51	1.48	3	Glos	Iron Acton	Acton Court	OX	0	0	Sp	D	misc			ST 676 842
a28	2		49	13	62	1487	1500	1500	2.66	2.52	2.00	2.63	3	Glos	Iron Acton	Acton Court	OX	0	0	W	E	joist			ST 676 842
LYD-A22B	1		85	26	111	1639	1665	1665	1.58	0.80	0.69	1.40	3	Glos	Lydney	Naas House	NT	0	0		E	principal			SO 648 071
LYD-A23A	1		51	23	74	1642	1665	1665	2.83	0.96	2.36	2.25	3	Glos	Lydney	Naas House	NT	0	0		E	principal			SO 648 071
LYD-A32B	2		36	18	54	1682	1700	1700	2.97	2.59	3.73	2.85	3	Glos	Lydney	Naas House	NT	0	0		E	principal			SO 648 071
LYD-A36A	3		136	27	163	1564	1591	1591	1.07	0.63	0.65	1.00	3	Glos	Lydney	Naas House	NT	0	0		D	collar			SO 648 071
spl2	1	20	91	36	127	1352	1388	1388	2.25	0.73	0.99	1.82	3	Glos	Stanley Pontlarge	The Cottage	OX	0	0	Sp	D	misc	Domestic	Middle	SO 999 302
spl3	1	20	135	22	157	1366	1388	1388	1.27	0.91	1.04	1.22	3	Glos	Stanley Pontlarge	The Cottage	OX	0	0	Su	D	brace	Domestic	Middle	SO 999 302
SBC-B08	1		158	26	184	1566	1592	1592	0.96	0.73	0.89	0.92	3	Glos	Tintern	St Briavel's Castle	NT	0	0		D	tiebeam			SU 559 046
SBC-B23A	1		120	36	156	1556	1592	1592	1.03	0.82	0.72	0.98	3	Glos	Tintern	St Briavel's Castle	NT	0	0		D	principal			SU 559 046
SBC-B25A	1		127	51	178	1541	1592	1592	0.73	0.83	0.71	0.76	3	Glos	Tintern	St Briavel's Castle	NT	0	0		D	principal			SU 559 046
SBC-B32A	1		123	26	149	1566	1592	1592	1.28	1.19	0.62	1.27	3	Glos	Tintern	St Briavel's Castle	NT	0	0		D	beam			SU 559 046
SBC-B34A	1		174	38	212	1554	1592	1592	1.15	0.53	0.98	1.03	3	Glos	Tintern	St Briavel's Castle	NT	0	0		D	beam			SU 559 046
wtb1	1		119	23	142	1318	1341	1342	1.52	1.49	1.39	1.52	3	Glos	Winterbourne	Court Farm Barn, Church Lane	OX	0	0	Su	D	misc	Agricultural	Gentry	ST 641 808
wtb5	1	30	117	26	143	1316	1342	1342	1.58	1.27	1.42	1.52	3	Glos	Winterbourne	Court Farm Barn, Church Lane	OX	0	0	Sp	D	misc	Agricultural	Gentry	ST 641 808
wtb6	1	20	128	18	146	1322	1340	1342	1.16	0.81	0.79	1.11	3	Glos	Winterbourne	Court Farm Barn, Church Lane	OX	2	3	W	D	purlin	Agricultural	Gentry	ST 641 808
WTH-A08A	1		96	26	122	1403	1429	1429	1.05	1.13	0.64	1.06	3	Glos	Withington	Old Rectory	NT	0	0		D	joist			SP 032 157
WTH-A17A	1		67	23	90	1406	1429	1429	0.75	0.71	0.70	0.74	3	Glos	Withington	Old Rectory	NT	0	0		D	rafter			SP 032 157
alt1	1	10	40	15	55	1321	1336	1336	2.64	1.57	2.26	2.35	1	Hants	Alton	64 High Street	OX	0	0	Sp	D		Domestic	Low	SU 716 393
alt11	2	2	43	17	60	1337	1354	1354	2.04	1.68	2.15	1.94	1	Hants	Alton	64 High Street	OX	0	0	Su	E		Domestic	Low	SU 716 393
alt2	1	15	50	25	75	1308	1333	1336	1.75	1.26	1.13	1.59	1	Hants	Alton	64 High Street	OX	0	0	Sp	D		Domestic	Low	SU 716 393
alt3	1		46	26	72	1307	1333	1336	1.99	1.12	0.96	1.67	1	Hants	Alton	64 High Street	OX	0	0	Sp	D		Domestic	Low	SU 716 393
a&n1	1	10	120	31	151	1470	1501	1501	1.64	1.08	1.01	1.53	1	Hants	Alton	Army and Navy Stores, High Street	OX	0	0	W	D		Domestic	Low	SU 716 395
a&n3	1	15	86	20	106	1481	1501	1501	1.34	1.59	1.47	1.38	1	Hants	Alton	Army and Navy Stores, High Street	OX	0	0	W	D		Domestic	Low	SU 716 395
a&n4	1		70	29	99	1472	1501	1501	1.39	1.16	1.13	1.32	1	Hants	Alton	Army and Navy Stores, High Street	OX	0	0	Sp	D		Domestic	Low	SU 716 395

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
a&n5	1		131	18	149	1483	1501	1501	1.11	1.02	1.46	1.10	1	Hants	Alton	Army and Navy Stores, High Street	OX	0	0	W	D		Domestic	Low	SU 716 395
ac1	2	5	113	23	136	1606	1629	1629	2.24	0.81	1.03	1.99	1	Hants	Ashley	Ashley Cottage	OX	0	0	W	D		Domestic	Low	SU 383 311
ac2	1	5	106	28	134	1540	1568	1568	1.45	1.01	0.53	1.36	1	Hants	Ashley	Ashley Cottage	OX	2	2	W	D		Domestic	Low	SU 383 311
ac3	1	7	45	18	63	1549	1567	1568	2.44	1.57	1.92	2.19	1	Hants	Ashley	Ashley Cottage	OX	0	0	Sp	D		Domestic	Low	SU 383 311
lta1	1	2	29	22	51	1438	1460	1460	2.44	1.88	2.18	2.20	1	Hants	Ashley	Little Thatches	OX	0	0	W	E		Domestic	Low	SU 384 311
lta3	1	1	36	16	52	1444	1460	1460	2.66	1.93	1.85	2.44	1	Hants	Ashley	Little Thatches	OX	0	0	Sp	E		Domestic	Low	SU 384 311
lta4	1	10	30	20	50	1440	1460	1460	2.42	2.03	1.76	2.27	1	Hants	Ashley	Little Thatches	OX	0	0	Sp	E		Domestic	Low	SU 384 311
lta6	2	5	21	12	33	1538	1550	0	3.45	3.13	2.85	3.33	1	Hants	Ashley	Little Thatches	OX	0	0	Sp	E		Domestic	Low	SU 384 311
ash11	2	10	18	18	36	1503	1521	1521	2.85	2.33	2.28	2.59	1	Hants	Ashley	The Old Manor	OX	0	0	Sp	A		Domestic	Middle	SU 384 311
ash12	2		52	22	74	1498	1520	1521	2.45	1.34	3.10	2.12	1	Hants	Ashley	The Old Manor	OX	0	0	Su	D		Domestic	Middle	SU 384 311
ash13	3		39	16	55	1580	1596	1596	3.24	2.47	2.05	3.02	1	Hants	Ashley	The Old Manor	OX	0	0	Sp	D		Domestic	Middle	SU 384 311
ash14	2	5	55	19	74	1502	1521	1521	1.99	0.75	1.22	1.67	1	Hants	Ashley	The Old Manor	OX	0	0	Sp	D		Domestic	Middle	SU 384 311
ash2	1	15	75	18	93	1512	1530	1530	1.59	1.17	1.19	1.51	1	Hants	Ashley	The Old Manor	OX	0	0	Su	D		Domestic	Middle	SU 384 311
ash22	4		32	21	53	1584	1605	1605	2.95	1.39	1.68	2.33	1	Hants	Ashley	The Old Manor	OX	0	0	W	E		Domestic	Middle	SU 384 311
ash5	1		47	19	66	1511	1530	1530	1.89	1.15	1.37	1.67	1	Hants	Ashley	The Old Manor	OX	0	0	W	D		Domestic	Middle	SU 384 311
ash6	1		37	18	55	1512	1530	1530	2.27	1.58	2.37	2.04	1	Hants	Ashley	The Old Manor	OX	0	0	Su	D		Domestic	Middle	SU 384 311
cfbs1	1	50	126	32	158	1507	1539	1540	1.20	0.64	0.90	1.09	1	Hants	Barton Stacey	Church Farm	OX	2	1	W	D		Domestic	Middle	SU 434 413
cfbs3	1	50	94	32	126	1508	1540	1540	1.55	0.86	0.91	1.38	1	Hants	Barton Stacey	Church Farm	OX	2	0	Sp	D		Domestic	Middle	SU 434 413
cfbs5	1	10	114	25	139	1515	1540	1540	1.57	1.11	0.84	1.49	1	Hants	Barton Stacey	Church Farm	OX	0	0	W	D		Domestic	Middle	SU 434 413
moy1	1	5	157	57	214	1307	1364	1372	1.19	0.33	0.54	0.96	1	Hants	Bishops Waltham	Moysents	OX	0	0	W	D		Domestic	Middle	SU 556 176
moy3	1		81	24	105	1348	1372	1372	1.21	1.03	1.02	1.17	1	Hants	Bishops Waltham	Moysents	OX	0	0	W	D		Domestic	Middle	SU 556 176
moy4	1	5	20	13	33	1359	1372	1372	2.50	2.65	2.39	2.56	1	Hants	Bishops Waltham	Moysents	OX	0	0	W	A		Domestic	Middle	SU 556 176
moy6	1	7	21	12	33	1360	1372	1372	3.47	2.30	3.08	3.04	1	Hants	Bishops Waltham	Moysents	OX	0	0	W	A		Domestic	Middle	SU 556 176
brmly1	1		84	28	112	1516	1544	1546	1.30	1.03	1.69	1.23	1	Hants	Bramley	Bramley Manor	OX	0	0	Sp	D		Domestic	Middle	SU 645 588
brmly3	1	5	76	21	97	1525	1546	1546	1.62	1.17	1.37	1.52	1	Hants	Bramley	Bramley Manor	OX	0	0	W	D		Domestic	Middle	SU 645 588
brmly5	1	20	107	26	133	1520	1546	1546	0.80	0.78	0.62	0.80	1	Hants	Bramley	Bramley Manor	OX	0	0	W	A		Domestic	Middle	SU 645 588
brmly6	1		78	18	96	1528	1546	1546	1.30	1.56	1.14	1.35	1	Hants	Bramley	Bramley Manor	OX	0	0	Su	A		Domestic	Middle	SU 645 588
hfb4	1		231	41	272	1544	1585	1585	0.92	0.56	0.86	0.86	1	Hants	Breamore	Home Farm Barn	OX	0	0	Su	D		Agricultural	Middle	SU 150 198
hfb5b	1	80	63	14	77	1571	1585	1585	1.13	0.55	0.84	1.03	1	Hants	Breamore	Home Farm Barn	OX	0	0	Su	A		Agricultural	Middle	SU 150 198
cha02	1		79	43	122	1705	1748	1748	1.69	0.85	1.03	1.40	1	Hants	Chalton	Manor Farm Barn	MB	0	0		D	principal			SU 729 162
chw21	4		41	19	60	1636	1655	1655	2.88	0.98	1.66	2.28	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw22	4		66	28	94	1627	1655	1655	1.99	0.66	0.93	1.59	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw23	4		66	16	82	1639	1655	1655	3.33	1.26	1.45	2.92	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw25	1		113	24	137	1559	1583	1584	1.13	1.67	1.56	1.22	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw29	3		63	16	79	1636	1652	1652	1.60	1.32	1.13	1.55	1	Hants	Chawton	Chawton House	OX	0	0	Su	D		Domestic	Gentry	SU 709 370
chw30	3		30	17	47	1635	1652	1652	1.98	1.81	2.00	1.92	1	Hants	Chawton	Chawton House	OX	0	0	Su	D		Domestic	Gentry	SU 709 370
chw32	3		57	25	82	1627	1652	1652	1.55	1.09	1.16	1.41	1	Hants	Chawton	Chawton House	OX	0	0	Su	D		Domestic	Gentry	SU 709 370
chw34	5	5	71	22	93	1644	1666	1666	2.62	1.12	1.28	2.27	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw35	5		45	28	73	1638	1666	1666	1.74	1.28	1.47	1.56	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw36	5	10	92	15	107	1651	1666	1666	2.41	1.68	2.02	2.31	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw39	2		67	25	92	1565	1590	1590	1.56	1.25	0.88	1.48	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw40	1	8	149	18	167	1565	1583	1584	0.95	0.93	1.04	0.95	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw41	1	25	119	23	142	1560	1583	1584	1.94	1.28	1.22	1.83	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw42	1		72	18	90	1564	1582	1584	1.77	2.13	1.78	1.84	1	Hants	Chawton	Chawton House	OX	0	0	Su	D		Domestic	Gentry	SU 709 370
chw43	1		58	35	93	1546	1581	1584	1.45	0.86	1.38	1.23	1	Hants	Chawton	Chawton House	OX	0	0	Sp	D		Domestic	Gentry	SU 709 370
chw44	2		156	41	197	1549	1590	1590	2.12	0.92	1.08	1.87	1	Hants	Chawton	Chawton House	OX	0	0	Sp	D		Domestic	Gentry	SU 709 370

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H/Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
chw49	1		187	25	212	1559	1584	1584	1.82	1.33	1.75	1.77	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw53	4		45	16	61	1639	1655	1655	2.76	1.71	2.01	2.48	1	Hants	Chawton	Chawton House	OX	0	0	W	D		Domestic	Gentry	SU 709 370
chw4	1	1	52	17	69	1576	1593	1593	2.52	1.89	2.02	2.36	1	Hants	Chawton	The Old Stables	OX	0	0	W	D		Agricultural	Gentry	SU 708 371
wrtfm1	1	1	115	15	130	1385	1400	1400	1.69	1.62	1.86	1.68	1	Hants	Combe	Wright's Farm	OX	2	3	W	E		Domestic	Middle	SU 367 615
brh3	1	40	115	20	135	1540	1560	1560	1.47	1.33	2.43	1.45	1	Hants	Cove	Broomhill	OX	0	0	Sp	A	post	Domestic	Middle	SU 852 573
brh4	1	15	18	9	27	1551	1560	1560	4.25	3.92	3.72	4.14	1	Hants	Cove	Broomhill	OX	0	0	Sp	A	tiebeam	Domestic	Middle	SU 852 573
brh5	1	15	80	19	99	1541	1560	1560	1.39	1.18	1.42	1.35	1	Hants	Cove	Broomhill	OX	0	0	W	A	joist	Domestic	Middle	SU 852 573
brh7	1	15	139	30	169	1530	1560	1560	0.75	0.49	0.46	0.71	1	Hants	Cove	Broomhill	OX	0	0	W	D	beam	Domestic	Middle	SU 852 573
d1	1		93	18	111	1582	1600	1600	1.42	1.31	1.53	1.40	1	Hants	Ditcham	Barn, Old Ditcham Farm	OX	0	0	Sp	E		Agricultural	Middle	SU 759 203
d2	1		52	24	76	1576	1600	1600	2.47	0.92	1.14	1.98	1	Hants	Ditcham	Barn, Old Ditcham Farm	OX	0	0	Sp	E		Agricultural	Middle	SU 759 203
d3	1		28	14	42	1586	1600	1600	2.60	1.89	2.87	2.36	1	Hants	Ditcham	Barn, Old Ditcham Farm	OX	0	0	Sp	E		Agricultural	Middle	SU 759 203
d7	1		31	11	42	1589	1600	1600	3.56	2.06	2.90	3.17	1	Hants	Ditcham	Barn, Old Ditcham Farm	OX	0	0	Sp	E		Agricultural	Middle	SU 759 203
d8	1		20	9	29	1591	1600	1600	3.28	3.62	2.73	3.38	1	Hants	Ditcham	Barn, Old Ditcham Farm	OX	0	0	W	E		Agricultural	Middle	SU 759 203
mfd1	1	50	79	39	118	1567	1606	1606	2.00	0.61	1.28	1.54	1	Hants	Dockenfield	Mellow Farm	OX	0	0	W	A	rail	Domestic	Middle	SU 831 389
mfd2	1	50	85	32	117	1574	1606	1606	1.76	0.53	1.60	1.42	1	Hants	Dockenfield	Mellow Farm	OX	0	0	W	A	post	Domestic	Middle	SU 831 389
mfd3	1	50	121	26	147	1580	1606	1606	1.32	1.14	0.90	1.29	1	Hants	Dockenfield	Mellow Farm	OX	0	0	Sp	A	tiebeam	Domestic	Middle	SU 831 389
mfd4	1	50	243	28	271	1578	1606	1606	1.19	1.09	1.00	1.18	1	Hants	Dockenfield	Mellow Farm	OX	0	0	W	D	beam	Domestic	Middle	SU 831 389
dmrb1	1		55	28	83	1372	1400	1400	2.69	1.34	1.50	2.24	1	Hants	Dummer	Lime Tree Cottage	OX	2	7	W	E		Domestic	Low	SU 588 462
dmrb2	1	10	40	24	64	1376	1400	1400	2.41	1.54	1.78	2.08	1	Hants	Dummer	Lime Tree Cottage	OX	0	0	W	E		Domestic	Low	SU 588 462
dmrb4	1	15	21	60	81	1340	1400	1400	1.41	0.53	0.92	0.75	1	Hants	Dummer	Lime Tree Cottage	OX	2	14	Sp	E		Domestic	Low	SU 588 462
dmra1	1	2	56	25	81	1398	1423	1424	1.90	1.03	0.95	1.63	1	Hants	Dummer	The Nook	OX	0	0	Su	D		Domestic	Low	SU 584 458
dmra2	1		56	21	77	1400	1421	1424	3.52	2.03	3.15	3.12	1	Hants	Dummer	The Nook	OX	0	0	W	D		Domestic	Low	SU 584 458
dmra4	1	15	36	10	46	1413	1423	1424	2.60	2.81	2.62	2.65	1	Hants	Dummer	The Nook	OX	0	0	Sp	D		Domestic	Low	SU 584 458
dmra5	1	2	25	27	52	1397	1424	1424	2.35	0.82	2.52	1.56	1	Hants	Dummer	The Nook	OX	0	0	W	D		Domestic	Low	SU 584 458
them23	1	20	133	28	161	1305	1333	1333	1.73	0.79	0.67	1.57	1	Hants	East Meon	Tudor House	OX	0	0	Sp	D		Domestic	Middle	SU 678 222
tyb1	1	10	108	51	159	1309	1360	1360	0.86	0.34	0.38	0.70	1	Hants	Hannington	Tan-y-Bryn	OX	0	0	Sp	D		Domestic	Middle	SU 540 555
tyb2	1	10	65	37	102	1323	1360	1360	1.30	0.92	1.14	1.17	1	Hants	Hannington	Tan-y-Bryn	OX	2	1	Sp	D		Domestic	Middle	SU 540 555
tyb3	1		94	27	121	1333	1360	1360	1.53	1.16	1.01	1.45	1	Hants	Hannington	Tan-y-Bryn	OX	0	0	Sp	D		Domestic	Middle	SU 540 555
pem1	1	10	48	18	66	1394	1412	1413	3.14	2.11	2.74	2.85	1	Hants	Hartley Westpall	Pembroke Cottage	OX	3	1	Sp	D		Domestic	Low	SU 694 585
pem2	1	1	31	6	37	1407	1413	1413	3.51	2.44	2.80	3.33	1	Hants	Hartley Westpall	Pembroke Cottage	OX	0	0	W	A		Domestic	Low	SU 694 585
pem3	1	1	74	29	103	1383	1412	1413	2.08	0.58	1.07	1.66	1	Hants	Hartley Westpall	Pembroke Cottage	OX	0	0	Sp	D		Domestic	Low	SU 694 585
pem4	1	5	38	13	51	1400	1413	1413	3.81	2.87	3.03	3.57	1	Hants	Hartley Westpall	Pembroke Cottage	OX	0	0	Sp	D		Domestic	Low	SU 694 585
pem5	1		37	20	57	1392	1412	1413	2.88	1.18	1.98	2.29	1	Hants	Hartley Westpall	Pembroke Cottage	OX	0	0	W	A		Domestic	Low	SU 694 585
pem6	1	1	103	46	149	1367	1413	1413	1.90	0.99	1.20	1.62	1	Hants	Hartley Westpall	Pembroke Cottage	OX	2	0	Sp	D		Domestic	Low	SU 694 585
pem7	1	2	28	20	48	1393	1413	1413	3.28	1.54	2.23	2.56	1	Hants	Hartley Westpall	Pembroke Cottage	OX	0	0	W	A		Domestic	Low	SU 694 585
pem8	1		19	16	35	1397	1413	1413	2.22	1.44	1.85	1.86	1	Hants	Hartley Westpall	Pembroke Cottage	OX	0	0	Sp	A		Domestic	Low	SU 694 585
hch1	1	40	105	32	137	1525	1557	1557	0.97	0.53	0.75	0.87	1	Hants	Headley	Huntingford Cottage	OX	0	0	W	D		Domestic	Low	SU 824 387
hch23	2	20	127	19	146	1547	1566	1566	2.28	0.75	0.82	2.08	1	Hants	Headley	Huntingford Cottage	OX	4	12	Sp	D		Domestic	Low	SU 824 387
mhfn1	1	10	59	4	63	1481	1485	1485	2.93	2.89	2.29	2.93	1	Hants	Headley	Moor House Farm (North)	OX	0	0	Su	A	misc	Domestic	Middle	SU 822 389
mhfn3	1	25	103	20	123	1465	1485	1485	1.02	1.17	1.22	1.05	1	Hants	Headley	Moor House Farm (North)	OX	2	1	Sp	D	purlin	Domestic	Middle	SU 822 389
mhfn4	1	10	111	19	130	1466	1485	1485	1.43	1.82	0.92	1.49	1	Hants	Headley	Moor House Farm (North)	OX	2	1	Sp	D	collar	Domestic	Middle	SU 822 389
bhf12	1	10	72	12	84	1608	1620	1620	1.51	2.17	1.59	1.60	1	Hants	Hinton Ampner	Black House Farm	OX	2	9	Sp	D	purlin	Domestic	Middle	SU 610 255
bhf3	1	1	89	34	123	1586	1620	1620	1.03	0.51	0.51	0.89	1	Hants	Hinton Ampner	Black House Farm	OX	0	0	Sp	D	misc	Domestic	Middle	SU 610 255
bhf4	1	5	48	24	72	1596	1620	1620	2.10	0.88	1.32	1.69	1	Hants	Hinton Ampner	Black House Farm	OX	2	6	Sp	A	purlin	Domestic	Middle	SU 610 255
wq0005m	1	5	70	25	95	-325	-300	-2500	1.73	0.84	1.24	1.50	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq0024	1		256	26	282	-2802	-2776	-2500	0.92	0.58	0.68	0.89	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	D				SZ 578 932

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
wq0263	1		2	56	58	-2556	-2500	-2500	0.43	0.43	0.43	0.43	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	Sp	E				SZ 578 932
wq0602	1	10	257	26	283	-2802	-2776	-2500	1.86	0.91	1.27	1.77	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0		D				SZ 578 932
wq0923	1		61	15	76	-2515	-2500	-2500	1.38	1.49	1.31	1.41	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
WQ0924M	1	10	48	23	71	-2523	-2500	-2500	1.41	0.86	0.99	1.23	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq0927m	1	1	47	23	70	-2523	-2500	-2500	1.52	0.71	1.53	1.25	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq0929m	1		45	28	73	-2528	-2500	-2500	1.35	0.62	1.70	1.07	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq0930	1	1	81	30	111	-2530	-2500	-2500	1.24	0.60	1.50	1.06	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq0931m	1		51	27	78	-2527	-2500	-2500	1.46	1.37	1.83	1.43	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq0932m	1	1	64	35	99	-2535	-2500	-2500	1.19	0.72	1.25	1.02	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0		E				SZ 578 932
wq0933m	1	5	55	20	75	-2520	-2500	-2500	1.29	1.02	1.23	1.22	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq2369	1	5	156	30	186	-3094	-3064	-2500	0.90	0.56	0.54	0.84	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0		D				SZ 578 932
wq2383	1		56	41	97	-2541	-2500	-2500	1.66	0.79	0.93	1.29	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq2514	1	1	34	31	65	-2531	-2500	-2500	2.20	0.98	1.20	1.62	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	Sp	E				SZ 578 932
wq3160	1	10	247	43	290	-2423	-2380	-2500	0.81	0.43	0.59	0.76	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	Sp	D				SZ 578 932
wq3188b	1		60	26	86	-2526	-2500	-2500	0.94	0.75	1.02	0.89	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0	W	E				SZ 578 932
wq3190	1	1	123	31	154	-3199	-3168	-2500	0.79	0.74	0.71	0.78	1	Hants	Isle of Wight	Wootton Quarr	SH	0	0		D				SZ 578 932
kim10	1		40	18	58	1427	1445	1445	2.75	1.46	1.93	2.35	1	Hants	Kimpton	Kimpton Manor	OX	2	1	W	D		Domestic	Gentry	SU 282 467
kim11	2	10	46	12	58	1523	1535	1535	2.84	2.02	2.23	2.67	1	Hants	Kimpton	Kimpton Manor	OX	0	0	W	D		Domestic	Gentry	SU 282 467
kim12	2	15	18	9	27	1526	1535	1535	3.89	3.78	3.72	3.85	1	Hants	Kimpton	Kimpton Manor	OX	0	0	W	D		Domestic	Gentry	SU 282 467
kim14	3		69	33	102	1527	1560	1560	1.00	0.87	1.02	0.96	1	Hants	Kimpton	Kimpton Manor	OX	0	0	Sp	D		Domestic	Gentry	SU 282 467
kim16	4	20	37	21	58	1704	1725	1725	1.55	1.29	1.04	1.46	1	Hants	Kimpton	Kimpton Manor	OX	0	0	Sp	D		Domestic	Gentry	SU 282 467
kim8	1	4	73	22	95	1423	1445	1445	1.54	1.02	0.87	1.42	1	Hants	Kimpton	Kimpton Manor	OX	0	0	W	D		Domestic	Gentry	SU 282 467
kim9	1		23	15	38	1430	1445	1445	2.25	1.79	1.92	2.07	1	Hants	Kimpton	Kimpton Manor	OX	0	0	W	D		Domestic	Gentry	SU 282 467
ltm1a	1		71	23	94	1427	1450	1450	2.03	1.76	1.10	1.96	1	Hants	Kimpton	Littleton Manor	OX	0	0	W	E		Domestic	Middle	SU 290 467
ltm2	1		42	23	65	1427	1450	1450	1.90	1.28	1.33	1.68	1	Hants	Kimpton	Littleton Manor	OX	0	0	W	E		Domestic	Middle	SU 290 467
ltm3	1		39	20	59	1430	1450	1450	2.32	1.30	1.43	1.98	1	Hants	Kimpton	Littleton Manor	OX	0	0	W	E		Domestic	Middle	SU 290 467
ltm4	2		130	39	169	1539	1578	1578	1.24	0.42	0.62	1.05	1	Hants	Kimpton	Littleton Manor	OX	2	0	Sp	D		Domestic	Middle	SU 290 467
rhc1	1		46	14	60	1586	1600	1600	1.79	1.69	1.89	1.77	1	Hants	Kings Somborne	Red Hill Cottages	OX	0	0	Sp	E	stud	Domestic	Low	SU 367 313
rhc2	1		43	22	65	1578	1600	1600	2.45	1.26	1.44	2.05	1	Hants	Kings Somborne	Red Hill Cottages	OX	0	0	Sp	E	stud	Domestic	Low	SU 367 313
rhc3	1		103	19	122	1581	1600	1600	1.89	1.20	0.87	1.78	1	Hants	Kings Somborne	Red Hill Cottages	OX	2	0	W	E	tiebeam	Domestic	Low	SU 367 313
ksm1	2		94	14	108	1490	1504	1504	0.97	1.32	0.82	1.01	1	Hants	King's Somborne	Manor Farm	OX	0	0	Sp	D		Domestic	Middle	SU 367 314
ksm2	2		136	22	158	1482	1504	1504	1.35	1.34	1.31	1.35	1	Hants	King's Somborne	Manor Farm	OX	0	0	Sp	D		Domestic	Middle	SU 367 314
ksm4	2	15	109	13	122	1491	1504	1504	1.45	1.51	2.26	1.45	1	Hants	King's Somborne	Manor Farm	OX	0	0	Sp	A		Domestic	Middle	SU 367 314
ksm5	2		80	25	105	1479	1504	1504	0.84	1.11	1.47	0.90	1	Hants	King's Somborne	Manor Farm	OX	2	0	Sp	D		Domestic	Middle	SU 367 314
ksm6	2	15	32	16	48	1488	1504	1504	2.32	1.46	1.74	2.03	1	Hants	King's Somborne	Manor Farm	OX	0	0	Sp	A		Domestic	Middle	SU 367 314
ksm7	2	20	200	31	231	1473	1504	1504	0.91	1.12	0.70	0.94	1	Hants	King's Somborne	Manor Farm	OX	0	0	Sp	D		Domestic	Middle	SU 367 314
ksm8	1		99	34	133	1267	1301	1301	1.26	0.93	0.86	1.18	1	Hants	King's Somborne	Manor Farm	OX	0	0	Sp	A		Domestic	Middle	SU 367 314
ksm9	1		95	44	139	1257	1301	1301	1.43	0.49	0.32	1.13	1	Hants	King's Somborne	Manor Farm	OX	0	0	Sp	D		Domestic	Middle	SU 367 314
swsk3	1	2	32	13	45	1337	1350	1350	4.06	2.43	3.71	3.59	1	Hants	Kingsclere	20 Swan Street	OX	0	0	W	E		Domestic	Middle	SU 525 586
shk1	1	5	37	24	61	1424	1448	1449	4.81	2.19	3.83	3.78	1	Hants	Kingsclere	The Swan Inn	OX	0	0	Su	D		Domestic	Middle	SU 524 585
shk3	1	3	55	10	65	1438	1448	1449	1.87	1.92	1.87	1.88	1	Hants	Kingsclere	The Swan Inn	OX	0	0	Su	D		Domestic	Middle	SU 524 585
shk4	1		52	28	80	1421	1449	1449	1.43	0.97	1.10	1.27	1	Hants	Kingsclere	The Swan Inn	OX	0	0	W	A		Domestic	Middle	SU 524 585
shk7	1	10	53	16	69	1433	1449	1449	2.29	1.34	1.49	2.07	1	Hants	Kingsclere	The Swan Inn	OX	0	0	W	D		Domestic	Middle	SU 524 585
lyss1	1	10	51	9	60	1533	1542	1542	3.66	5.19	3.66	3.89	1	Hants	Liss	Lyss Place	OX	0	0	W	D		Domestic	Gentry	SU 764 283
lyss2	1	20	88	10	98	1532	1542	1542	2.23	3.35	1.70	2.34	1	Hants	Liss	Lyss Place	OX	0	0	W	D		Domestic	Gentry	SU 764 283
lyss34	1	10	72	11	83	1531	1542	1542	3.60	2.56	2.25	3.47	1	Hants	Liss	Lyss Place	OX	2	1	Sp	D		Domestic	Gentry	SU 764 283

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
lyss5	1	20	59	14	73	1528	1542	1542	2.63	2.13	1.81	2.54	1	Hants	Liss	Lyss Place	OX	0	0	W	D		Domestic	Gentry	SU 764 283
lyss678	1	30	165	28	193	1513	1541	1542	1.15	0.76	0.97	1.10	1	Hants	Liss	Lyss Place	OX	4	5	Sp	D		Domestic	Gentry	SU 764 283
lyss9	1	30	119	26	145	1516	1542	1542	1.14	1.08	1.24	1.13	1	Hants	Liss	Lyss Place	OX	0	0	W	D		Domestic	Gentry	SU 764 283
mrl3	1		32	11	43	1490	1501	1501	1.86	2.87	1.19	2.12	1	Hants	Littleton	Monk's Rest	OX	0	0	W	A		Domestic	Low	SU 455 329
mrl4	1		58	20	78	1481	1501	1501	1.63	1.06	1.34	1.48	1	Hants	Littleton	Monk's Rest	OX	0	0	W	D		Domestic	Low	SU 455 329
sfls16	1		137	31	168	1410	1441	1441	1.65	0.86	1.17	1.50	1	Hants	Long Sutton	Summers Farm Barn	OX	4	8	Su	D		Agricultural	Low	SU 752 471
sfls78	1		132	39	171	1402	1441	1441	1.32	0.84	1.40	1.21	1	Hants	Long Sutton	Summers Farm Barn	OX	2	2	Sp	D		Agricultural	Low	SU 752 471
rye1	1	5	146	24	170	1463	1487	1487	1.18	1.42	1.17	1.22	1	Hants	Mapledurwell	Rye Cottage	OX	0	0	W	D		Domestic	Low	SU 684 516
rye2	1	25	80	30	110	1457	1487	1487	1.12	0.51	0.73	0.95	1	Hants	Mapledurwell	Rye Cottage	OX	0	0	W	D		Domestic	Low	SU 684 516
rye3	1	15	103	17	120	1470	1487	1487	1.81	1.01	0.67	1.69	1	Hants	Mapledurwell	Rye Cottage	OX	0	0	W	D		Domestic	Low	SU 684 516
rye4	1	20	71	25	96	1461	1486	1487	2.01	0.93	1.34	1.73	1	Hants	Mapledurwell	Rye Cottage	OX	0	0	Su	D		Domestic	Low	SU 684 516
rye5	1		99	54	153	1433	1487	1487	0.84	0.53	0.55	0.73	1	Hants	Mapledurwell	Rye Cottage	OX	0	0	W	D		Domestic	Low	SU 684 516
rye6	1	15	111	57	168	1430	1487	1487	0.89	0.51	0.36	0.76	1	Hants	Mapledurwell	Rye Cottage	OX	0	0	Su	D		Domestic	Low	SU 684 516
rye7	2	1	122	27	149	1499	1526	1526	0.78	0.44	0.58	0.72	1	Hants	Mapledurwell	Rye Cottage	OX	2	2	W	D		Domestic	Low	SU 684 516
mfm4	1	25	95	33	128	1289	1322	1322	0.87	0.70	0.88	0.83	1	Hants	Michelmersh	Manor Farm	OX	5	5	W	D		Domestic	Gentry	SU 353 265
dcm11	2	30	89	25	114	1475	1500	1500	1.17	1.03	1.14	1.14	1	Hants	Mottisfont	Dairy Cottage	OX	0	0	W	D		Domestic	Middle	SU 324 268
dcm12	2	50	106	26	132	1474	1500	1500	1.29	1.05	1.01	1.24	1	Hants	Mottisfont	Dairy Cottage	OX	0	0	W	D		Domestic	Middle	SU 324 268
dcm21	3	50	71	17	88	1583	1600	0	1.27	0.68	0.68	1.16	1	Hants	Mottisfont	Dairy Cottage	OX	0	0	W	E		Domestic	Middle	SU 324 268
dcm45	1	30	78	29	107	1296	1325	0	1.30	0.73	0.80	1.14	1	Hants	Mottisfont	Dairy Cottage	OX	3	4	Sp	E		Domestic	Middle	SU 324 268
bcf19	1	2	89	27	116	1553	1580	1580	1.64	1.10	1.46	1.52	1	Hants	Nether Wallop	Berrycourt Farm	OX	2	0	Sp	D		Agricultural		SU 301 356
bcf2	1	5	69	29	98	1551	1580	1580	2.25	1.03	1.27	1.89	1	Hants	Nether Wallop	Berrycourt Farm	OX	0	0	Sp	D		Agricultural		SU 301 356
bcf3	1	20	130	21	151	1559	1580	1580	1.71	0.70	0.94	1.57	1	Hants	Nether Wallop	Berrycourt Farm	OX	0	0	W	D		Agricultural		SU 301 356
bcf4	1	25	113	21	134	1559	1580	1580	1.65	1.14	1.36	1.57	1	Hants	Nether Wallop	Berrycourt Farm	OX	0	0	W	D		Agricultural		SU 301 356
bcf56	1	2	72	15	87	1565	1580	1580	3.16	1.90	1.53	2.95	1	Hants	Nether Wallop	Berrycourt Farm	OX	2	0	Sp	D		Agricultural		SU 301 356
nwb1	1		26	14	40	1485	1499	1499	2.59	2.63	2.47	2.60	1	Hants	North Waltham	Batchelors	OX	0	0	Sp	D		Domestic	Low	SU 564 463
nwb2	1		61	20	81	1479	1499	1499	1.17	0.83	0.78	1.08	1	Hants	North Waltham	Batchelors	OX	0	0	Su	D		Domestic	Low	SU 564 463
nwb7	1	10	55	16	71	1483	1499	1499	2.86	2.05	2.08	2.68	1	Hants	North Waltham	Batchelors	OX	0	0	Sp	D		Domestic	Low	SU 564 463
nwb8	2	30	59	29	88	1545	1574	1574	1.68	0.61	1.27	1.33	1	Hants	North Waltham	Batchelors	OX	0	0	Sp	D		Domestic	Low	SU 564 463
cbc10	2		161	25	186	1508	1533	1535	1.06	0.41	0.54	0.97	1	Hants	North Warnborough	Castle Bridge Cottages	OX	0	0	W	D		Domestic	Middle	SU 722 520
cbc2b	2	15	28	14	42	1521	1535	1535	1.51	1.48	2.06	1.50	1	Hants	North Warnborough	Castle Bridge Cottages	OX	0	0	W	A		Domestic	Middle	SU 722 520
cbc3	1	5	75	21	96	1455	1476	1478	2.69	1.32	1.75	2.39	1	Hants	North Warnborough	Castle Bridge Cottages	OX	0	0	Sp	D		Domestic	Middle	SU 722 520
cbc4	1	2	40	21	61	1457	1478	1478	2.66	1.90	2.35	2.40	1	Hants	North Warnborough	Castle Bridge Cottages	OX	2	0	Su	A		Domestic	Middle	SU 722 520
cbc5	1	8	63	21	84	1455	1476	1478	2.25	1.22	1.33	1.99	1	Hants	North Warnborough	Castle Bridge Cottages	OX	0	0	Su	D		Domestic	Middle	SU 722 520
cbc6	1		55	25	80	1453	1478	1478	1.57	1.11	1.08	1.43	1	Hants	North Warnborough	Castle Bridge Cottages	OX	0	0	W	D		Domestic	Middle	SU 722 520
cbc7	2	10	106	33	139	1497	1530	1535	1.44	0.66	0.92	1.25	1	Hants	North Warnborough	Castle Bridge Cottages	OX	0	0	W	D		Domestic	Middle	SU 722 520
cbc8	2	15	66	27	93	1506	1533	1535	0.97	0.45	0.69	0.82	1	Hants	North Warnborough	Castle Bridge Cottages	OX	0	0	W	D		Domestic	Middle	SU 722 520
cbc9	2	10	65	23	88	1512	1535	1535	1.39	1.16	1.12	1.33	1	Hants	North Warnborough	Castle Bridge Cottages	OX	0	0	W	D		Domestic	Middle	SU 722 520
ccnw1	1	2	68	20	88	1362	1382	1384	2.50	2.04	1.86	2.39	1	Hants	North Warnborough	Cruck Cottage	OX	0	0	Su	D		Domestic	Low	SU 718 513
ccnw2	1	5	13	10	23	1374	1384	1384	4.22	2.83	3.68	3.61	1	Hants	North Warnborough	Cruck Cottage	OX	0	0	Su	A		Domestic	Low	SU 718 513
ccnw3	1		60	20	80	1362	1382	1384	2.33	0.75	0.56	1.94	1	Hants	North Warnborough	Cruck Cottage	OX	0	0	Sp	D		Domestic	Low	SU 718 513
ccnw4	1	2	126	18	144	1366	1384	1384	1.15	0.72	0.67	1.10	1	Hants	North Warnborough	Cruck Cottage	OX	2	0	W	D		Domestic	Low	SU 718 513
osc1	1	25	37	22	59	1379	1401	1402	2.04	1.37	1.52	1.79	1	Hants	North Warnborough	Oakholme / Shepherds Cottage	OX	0	0	Sp	D	rafter	Domestic	Middle	SU 730 515
osc2	1	20	37	16	53	1385	1401	1402	2.67	1.68	2.14	2.37	1	Hants	North Warnborough	Oakholme / Shepherds Cottage	OX	0	0	W	D	rafter	Domestic	Middle	SU 730 515
osc3	1		18	14	32	1388	1402	1402	3.06	2.36	2.74	2.75	1	Hants	North Warnborough	Oakholme / Shepherds Cottage	OX	0	0	Sp	D	rafter	Domestic	Middle	SU 730 515
osc4	1		35	17	52	1384	1401	1402	2.14	2.15	2.23	2.15	1	Hants	North Warnborough	Oakholme / Shepherds Cottage	OX	0	0	W	D	rafter	Domestic	Middle	SU 730 515
osc5	1		29	22	51	1379	1401	1402	3.30	1.69	2.52	2.60	1	Hants	North Warnborough	Oakholme / Shepherds Cottage	OX	0	0	W	A	rafter	Domestic	Middle	SU 730 515

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
osc6	1	25	79	23	102	1379	1402	1402	1.94	1.28	1.23	1.79	1	Hants	North Warnborough	Oakholme / Shepherds Cottage	OX	0	0	Su	D	misc	Domestic	Middle	SU 730 515
osc7	1	5	61	19	80	1381	1400	1402	2.76	1.30	1.18	2.41	1	Hants	North Warnborough	Oakholme / Shepherds Cottage	OX	0	0	Su	D	tiebeam	Domestic	Middle	SU 730 515
sfnw1	1		63	20	83	1427	1447	1448	2.86	1.11	0.91	2.44	1	Hants	North Warnborough	Strete Farm	OX	0	0	Sp	D		Domestic	Low	SU 722 521
sfnw34	1		81	21	102	1427	1448	1448	1.48	0.98	1.70	1.38	1	Hants	North Warnborough	Strete Farm	OX	2	1	Sp	D		Domestic	Low	SU 722 521
sfnw6	2		142	32	174	1474	1506	1506	0.92	1.10	1.14	0.95	1	Hants	North Warnborough	Strete Farm	OX	0	0	W	D		Domestic	Low	SU 722 521
tcnw12	1		79	19	98	1426	1445	1446	1.65	1.46	1.92	1.61	1	Hants	North Warnborough	Thatched Cottage	OX	2	0	W	D		Domestic	Low	SU 731 519
tcnw3	1	3	33	8	41	1438	1446	1446	3.10	2.82	3.16	3.05	1	Hants	North Warnborough	Thatched Cottage	OX	0	0	Su	A		Domestic	Low	SU 731 519
tcnw5	1		135	30	165	1416	1446	1446	0.57	0.43	0.43	0.54	1	Hants	North Warnborough	Thatched Cottage	OX	0	0	W	D		Domestic	Low	SU 731 519
kso1	3	1	63	17	80	1430	1447	1447	1.32	1.22	1.60	1.30	1	Hants	Odiham	1 King Street	OX	0	0	Su	D		Domestic	Low	SU 742 511
kso3	3		38	17	55	1429	1446	1447	2.19	1.25	1.53	1.90	1	Hants	Odiham	1 King Street	OX	0	0	Su	D		Domestic	Low	SU 742 511
kso5	2		120	49	169	1289	1338	1338	0.65	0.44	0.45	0.59	1	Hants	Odiham	1 King Street	OX	0	0	W	D		Domestic	Low	SU 742 511
kso6	1	10	91	31	122	1287	1318	1318	0.86	0.26	0.41	0.71	1	Hants	Odiham	1 King Street	OX	0	0	W	D		Domestic	Low	SU 742 511
pgf1	1		71	22	93	1510	1532	1532	1.22	1.21	1.27	1.22	1	Hants	Odiham	Cross Barn, Palace Gate Farm	OX	0	0	Sp	A		Agricultural	Middle	SU 739 511
pgf2	1		158	23	181	1509	1532	1532	0.77	1.09	0.63	0.81	1	Hants	Odiham	Cross Barn, Palace Gate Farm	OX	0	0	Sp	D		Agricultural	Middle	SU 739 511
pgf3	1		123	37	160	1495	1532	1532	1.28	0.58	0.98	1.12	1	Hants	Odiham	Cross Barn, Palace Gate Farm	OX	0	0	Sp	A		Agricultural	Middle	SU 739 511
gho1	1	20	87	20	107	1456	1476	1476	1.60	1.19	1.35	1.52	1	Hants	Odiham	Gainsborough House, 69 High Street	OX	2	3	W	D	stud	Domestic	Middle	SU 741 511
gho4	1	30	82	20	102	1726	1746	1476	1.08	1.19	1.02	1.10	1	Hants	Odiham	Gainsborough House, 69 High Street	OX	2	1	W	A	rafter	Domestic	Middle	SU 741 511
ivied2	1		42	27	69	1427	1454	1454	2.73	1.05	1.34	2.07	1	Hants	Odiham	Ivied Cottage	OX	0	0	W	D	tiebeam	Domestic	Middle	SU 742 510
ivied3	1	5	26	19	45	1434	1453	1454	2.65	1.40	2.43	2.12	1	Hants	Odiham	Ivied Cottage	OX	0	0	W	D	misc	Domestic	Middle	SU 742 510
lf2	1		114	31	145	1337	1368	1368	0.96	0.73	0.76	0.91	1	Hants	Odiham	Lodge Farm	OX	0	0	W	D	brace			SU 737 526
lf3	1		81	26	107	1342	1368	1368	1.27	0.94	0.97	1.19	1	Hants	Odiham	Lodge Farm	OX	0	0	W	D	rafter			SU 737 526
lf5	2		67	25	92	1349	1374	1374	1.27	1.03	0.97	1.20	1	Hants	Odiham	Lodge Farm	OX	0	0	Sp	D	rafter			SU 737 526
lf6	2		116	25	141	1348	1373	1374	1.19	0.97	0.99	1.15	1	Hants	Odiham	Lodge Farm	OX	0	0	Sp	D	rafter			SU 737 526
lf7	3	15	177	37	214	1409	1446	1446	0.65	0.62	0.55	0.64	1	Hants	Odiham	Lodge Farm	OX	0	0	W	D	collar			SU 737 526
man1	1	5	26	17	43	1383	1400	1400	2.29	1.44	2.13	1.95	1	Hants	Odiham	Manisty Cottage	OX	0	0	Sp	D		Domestic	Low	SU 743 512
man2	1	1	49	11	60	1389	1400	1400	1.62	2.05	1.43	1.70	1	Hants	Odiham	Manisty Cottage	OX	0	0	Sp	D		Domestic	Low	SU 743 512
man3	1	1	40	15	55	1385	1400	1400	2.92	1.97	2.85	2.66	1	Hants	Odiham	Manisty Cottage	OX	0	0	Sp	D		Domestic	Low	SU 743 512
man4	1	10	29	10	39	1390	1400	1400	2.05	1.72	1.49	1.96	1	Hants	Odiham	Manisty Cottage	OX	0	0	Su	A		Domestic	Low	SU 743 512
man5	1	5	28	17	45	1383	1400	1400	2.91	1.47	2.27	2.36	1	Hants	Odiham	Manisty Cottage	OX	0	0	Su	D		Domestic	Low	SU 743 512
man6	1	15	34	14	48	1386	1400	1400	1.46	2.61	1.50	1.79	1	Hants	Odiham	Manisty Cottage	OX	0	0	W	A		Domestic	Low	SU 743 512
man7	1	10	90	51	141	1349	1400	1400	1.79	0.56	0.74	1.34	1	Hants	Odiham	Manisty Cottage	OX	0	0	W	A		Domestic	Low	SU 743 512
mc1	1	5	91	43	134	1257	1300	1300	2.15	0.63	1.13	1.66	1	Hants	Odiham	Monks Cottage	OX	0	0	Su	D		Domestic	Low	SU 740 511
mc2	1	5	58	15	73	1285	1300	1300	3.66	1.55	1.46	3.23	1	Hants	Odiham	Monks Cottage	OX	0	0	Su	D		Domestic	Low	SU 740 511
och1	1		90	30	120	1336	1366	1366	0.69	0.73	0.73	0.70	1	Hants	Odiham	The Old Church House	OX	0	0	Sp	D		Domestic	Middle	SU 740 510
och2	1	15	150	34	184	1332	1366	1366	0.89	0.51	0.57	0.82	1	Hants	Odiham	The Old Church House	OX	0	0	Sp	D		Domestic	Middle	SU 740 510
ovo1	1	10	75	17	92	1376	1393	1395	1.35	0.79	0.62	1.25	1	Hants	Odiham	The Old Vicarage	OX	0	0	W	D	joist	Domestic	Gentry	SU 739 510
ovo2	1	1	34	18	52	1377	1395	1395	1.95	1.44	1.81	1.77	1	Hants	Odiham	The Old Vicarage	OX	2	3	W	D	joist	Domestic	Gentry	SU 739 510
ovo3	1	1	50	25	75	1370	1395	1395	1.27	1.23	1.07	1.26	1	Hants	Odiham	The Old Vicarage	OX	0	0	W	D	joist	Domestic	Gentry	SU 739 510
ovo4	1	5	55	22	77	1373	1395	1395	1.82	1.75	2.10	1.80	1	Hants	Odiham	The Old Vicarage	OX	0	0	W	D	joist	Domestic	Gentry	SU 739 510
ovo5	1	10	75	26	101	1369	1395	1395	2.12	0.86	0.91	1.80	1	Hants	Odiham	The Old Vicarage	OX	0	0	W	D	post	Domestic	Gentry	SU 739 510
ovo6ii	1	40	29	27	56	1368	1395	1395	1.65	1.56	1.84	1.61	1	Hants	Odiham	The Old Vicarage	OX	0	0	W	A	post	Domestic	Gentry	SU 739 510
ovo7	1		74	16	90	1379	1395	1395	1.03	0.66	0.59	0.96	1	Hants	Odiham	The Old Vicarage	OX	0	0	W	D	brace	Domestic	Gentry	SU 739 510
ovo8	1		30	26	56	1369	1395	1395	1.84	1.04	1.83	1.47	1	Hants	Odiham	The Old Vicarage	OX	0	0	W	D	stave	Domestic	Gentry	SU 739 510
odmpry1	1		124	23	147	1425	1448	1448	1.23	1.12	1.24	1.21	1	Hants	Odiham	The Priory	OX	2	1	W	D	brace	Domestic	Gentry	SU 737 510
odmpry2	1		217	25	242	1423	1448	1448	0.76	0.61	0.55	0.74	1	Hants	Odiham	The Priory	OX	0	0	W	D	misc	Domestic	Gentry	SU 737 510
odmpry3	1		149	28	177	1420	1448	1448	0.76	0.76	0.53	0.76	1	Hants	Odiham	The Priory	OX	0	0	W	D	brace	Domestic	Gentry	SU 737 510

Code	Phase	Puh	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
tho2	2		82	22	104	1518	1540	1540	1.40	1.16	1.35	1.35	1	Hants	Odiham	Tudor Cottage, King Street	OX	0	0	W	D		Domestic	Low	SU 743 508
tho3	I	1	110	40	150	1453	1493	1493	0.76	0.44	0.64	0.68	1	Hants	Odiham	Tudor Cottage, King Street	OX	0	0	Sp	D		Domestic	Low	SU 743 508
tho4	2	10	111	27	138	1513	1540	1540	1.36	0.75	0.59	1.24	1	Hants	Odiham	Tudor Cottage, King Street	OX	0	0	Sp	D		Domestic	Low	SU 743 508
wlrs3	1	5	67	24	91	1469	1493	1493	1.84	1.11	1.15	1.65	1	Hants	Odiham	Wheelers	OX	0	0	Sp	D		Domestic	Low	SU 754 507
wlrs5	2	40	61	25	86	1574	1599	1599	1.72	0.95	1.08	1.50	1	Hants	Odiham	Wheelers	OX	0	0	Sp	D		Domestic	Low	SU 754 507
obm2	1	10	25	16	41	1313	1329	1329	3.44	1.39	2.45	2.64	1	Hants	Old Burghclere	Burghclere Manor	OX	0	0	W	A		Domestic	Gentry	SU 468 579
obm3	1	2	12	9	21	1320	1329	1329	3.20	4.44	3.42	3.73	1	Hants	Old Burghclere	Burghclere Manor	OX	0	0	W	A		Domestic	Gentry	SU 468 579
obm5	2		57	29	86	1422	1451	1451	1.54	0.84	1.57	1.30	1	Hants	Old Burghclere	Burghclere Manor	OX	0	0	?	E		Domestic	Gentry	SU 468 579
obm6	2		45	19	64	1432	1451	1451	1.08	1.09	0.82	1.08	1	Hants	Old Burghclere	Burghclere Manor	OX	0	0	?	E		Domestic	Gentry	SU 468 579
obm7	2		61	20	81	1431	1451	1451	1.56	1.86	1.81	1.63	1	Hants	Old Burghclere	Burghclere Manor	OX	0	0	W	E		Domestic	Gentry	SU 468 579
obm8	2		80	30	110	1421	1451	1451	1.72	0.90	1.21	1.50	1	Hants	Old Burghclere	Burghclere Manor	OX	0	0	?	E		Domestic	Gentry	SU 468 579
obb1	1		74	28	102	1423	1451	1451	2.19	1.06	1.68	1.88	1	Hants	Old Burghclere	Manor Barn, Burghclere Manor	OX	2	3	W	D		Agricultural	Middle	SU 469 579
obb3	1	20	86	17	103	1434	1451	1451	1.72	1.66	2.09	1.71	1	Hants	Old Burghclere	Manor Barn, Burghclere Manor	OX	0	0	Su	D		Agricultural	Middle	SU 469 579
obb5	1		61	25	86	1426	1451	1451	1.53	1.19	1.12	1.43	1	Hants	Old Burghclere	Manor Barn, Burghclere Manor	OX	0	0	W	D		Agricultural	Middle	SU 469 579
obb6	1	20	54	14	68	1437	1451	1451	2.25	1.54	1.95	2.10	1	Hants	Old Burghclere	Manor Barn, Burghclere Manor	OX	0	0	W	D		Agricultural	Middle	SU 469 579
obb7	1	10	60	32	92	1419	1451	1451	1.88	0.40	0.29	1.36	1	Hants	Old Burghclere	Manor Barn, Burghclere Manor	OX	0	0	Su	A		Agricultural	Middle	SU 469 579
gso1	1	10	42	18	60	1524	1542	1542	3.00	2.09	2.54	2.73	1	Hants	Overton	31-35 High Street	OX	0	0	W	D		Domestic	Low	SU 514 497
gso11	3	20	50	26	76	1589	1615	1615	1.55	1.10	1.20	1.40	1	Hants	Overton	31-35 High Street	OX	0	0	W	A		Domestic	Low	SU 514 497
gso12	3	10	48	22	70	1593	1615	1615	1.96	1.22	1.58	1.73	1	Hants	Overton	31-35 High Street	OX	0	0	Sp	D		Domestic	Low	SU 514 497
gso13	3		51	23	74	1592	1615	1615	2.02	1.02	1.62	1.71	1	Hants	Overton	31-35 High Street	OX	0	0	Sp	D		Domestic	Low	SU 514 497
gso14	3	10	46	22	68	1593	1615	1615	1.65	1.10	1.18	1.47	1	Hants	Overton	31-35 High Street	OX	0	0	Sp	D		Domestic	Low	SU 514 497
gso2	1	20	16I	27	188	1514	1541	1542	0.98	0.88	0.90	0.97	1	Hants	Overton	31-35 High Street	OX	2	2	Su	D		Domestic	Low	SU 514 497
gso3	1		38	19	57	1523	1542	1542	2.88	1.77	1.48	2.51	1	Hants	Overton	31-35 High Street	OX	0	0	W	D		Domestic	Low	SU 514 497
gso5	2		130	28	158	1541	1569	1569	0.91	0.92	0.73	0.91	1	Hants	Overton	31-35 High Street	OX	2	4	W	D		Domestic	Low	SU 514 497
wso11	2	1	51	14	65	1636	1650	1650	2.02	1.66	1.91	1.94	1	Hants	Overton	56 and 58 Winchester Street	OX	0	0	Sp	E	rail	Domestic	Middle	SU 517 493
wso12	2	1	42	12	54	1638	1650	1650	2.71	2.38	3.02	2.64	1	Hants	Overton	56 and 58 Winchester Street	OX	0	0	Sp	E	post	Domestic	Middle	SU 517 493
wso2	1	10	42	31	73	1500	1531	1533	2.71	1.06	2.01	2.01	1	Hants	Overton	56 and 58 Winchester Street	OX	0	0	W	D	stud	Domestic	Middle	SU 517 493
wso3	1		40	17	57	1516	1533	1533	1.84	1.16	1.17	1.64	1	Hants	Overton	56 and 58 Winchester Street	OX	0	0	W	A	rafter	Domestic	Middle	SU 517 493
wso4	1		62	24	86	1509	1533	1533	1.46	1.16	1.14	1.38	1	Hants	Overton	56 and 58 Winchester Street	OX	0	0	Sp	D	rafter	Domestic	Middle	SU 517 493
wso5	1		60	24	84	1509	1533	1533	1.29	1.13	1.32	1.24	1	Hants	Overton	56 and 58 Winchester Street	OX	0	0	Sp	D	rafter	Domestic	Middle	SU 517 493
ovrtn1	1	10	106	16	122	1526	1542	1544	1.95	0.77	0.64	1.80	1	Hants	Overton	75-77 Winchester Street	OX	0	0	Sp	D		Domestic	Low	SU 516 496
ovrtn2	1	10	38	16	54	1528	1544	1544	2.59	1.76	1.76	2.34	1	Hants	Overton	75-77 Winchester Street	OX	0	0	W	D		Domestic	Low	SU 516 496
ovrtn3	1		34	13	47	1531	1544	1544	2.65	2.44	2.20	2.59	1	Hants	Overton	75-77 Winchester Street	OX	0	0	W	D		Domestic	Low	SU 516 496
ovrtn4	1	10	25	21	46	1523	1544	1544	2.47	1.65	2.01	2.10	1	Hants	Overton	75-77 Winchester Street	OX	0	0	Sp	A		Domestic	Low	SU 516 496
ovrtn5	1		66	7	73	1537	1544	1544	1.69	1.79	1.97	1.70	1	Hants	Overton	75-77 Winchester Street	OX	0	0	Sp	D		Domestic	Low	SU 516 496
ovrtn6	1		118	27	145	1517	1544	1544	1.13	1.29	0.95	1.16	1	Hants	Overton	75-77 Winchester Street	OX	0	0	W	D		Domestic	Low	SU 516 496
ovrtn7	1	10	71	21	92	1523	1544	1544	1.42	0.92	0.99	1.31	1	Hants	Overton	75-77 Winchester Street	OX	0	0	Sp	A		Domestic	Low	SU 516 496
ovrtn8	1		111	36	147	1508	1544	1544	1.20	0.90	1.35	1.13	1	Hants	Overton	75-77 Winchester Street	OX	0	0	W	D		Domestic	Low	SU 516 496
ovrtn9	1	1	127	17	144	1526	1543	1544	1.17	1.10	0.96	1.16	1	Hants	Overton	75-77 Winchester Street	OX	0	0	Su	D		Domestic	Low	SU 516 496
cf11	1		74	19	93	1477	1496	1496	1.29	1.12	1.03	1.26	1	Hants	Overton	Court Farm Barn	OX	0	0	Su	D	post			SU 514 500
cf1	1		76	18	94	1486	1504	1504	1.10	1.48	1.34	1.17	1	Hants	Overton	Court Farm House	OX	0	0	Sp	D	stud			SU 514 500
cf2	1	10	76	26	102	1478	1504	1504	1.31	1.45	1.43	1.34	1	Hants	Overton	Court Farm House	OX	0	0	Sp	D	collar			SU 514 500
cf3	1	10	120	21	141	1483	1504	1504	1.17	1.06	1.11	1.15	1	Hants	Overton	Court Farm House	OX	0	0	Sp	D	stud			SU 514 500
cf4	1		96	57	153	1447	1504	1504	1.43	0.66	0.78	1.14	1	Hants	Overton	Court Farm House	OX	0	0	Su	D	joist			SU 514 500
cf5	1		115	17	132	1479	1496	1504	0.92	1.33	1.16	0.97	1	Hants	Overton	Court Farm House	OX	0	0	Sp	D	joist			SU 514 500
cf6	1		96	33	129	1471	1504	1504	1.48	1.08	0.85	1.38	1	Hants	Overton	Court Farm House	OX	0	0	Sp	D	joist			SU 514 500

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
cf7	1	30	94	20	114	1484	1504	1504	1.20	1.00	1.18	1.17	1	Hants	Overton	Court Farm House	OX	0	0	Sp	D	collar			SU 514 500
cf8	1		111	34	145	1470	1504	1504	1.28	0.59	0.75	1.12	1	Hants	Overton	Court Farm House	OX	0	0	Sp	D	stud			SU 514 500
spn1n	1	100	80	27	107	1552	1579	1579	0.99	0.90	0.85	0.97	1	Hants	Petersfield	15 The Spain	OX	0	0	W	A	post	Domestic	Middle	SU 744 243
spn2	1		41	18	59	1561	1579	1579	2.89	2.06	2.51	2.63	1	Hants	Petersfield	15 The Spain	OX	0	0	W	D	tiebeam	Domestic	Middle	SU 744 243
spn3	1	1	62	21	83	1558	1579	1579	2.15	1.75	1.50	2.05	1	Hants	Petersfield	15 The Spain	OX	0	0	W	D	misc	Domestic	Middle	SU 744 243
spn4	1	5	57	17	74	1562	1579	1579	2.07	2.14	2.12	2.09	1	Hants	Petersfield	15 The Spain	OX	0	0	W	D	misc	Domestic	Middle	SU 744 243
spn5	1		104	22	126	1557	1579	1579	1.86	1.12	1.39	1.73	1	Hants	Petersfield	15 The Spain	OX	0	0	Sp	A	post	Domestic	Middle	SU 744 243
spn6	1	10	33	20	53	1559	1579	1579	3.13	2.11	2.22	2.75	1	Hants	Petersfield	15 The Spain	OX	0	0	W	D	misc	Domestic	Middle	SU 744 243
gdyr1	1	10	98	22	120	1610	1632	1632	1.44	0.88	1.11	1.34	1	Hants	Petersfield	Goodyers	OX	0	0	Su	D	post	Domestic	Middle	SU 745 241
gdyr10	2	10	68	15	83	1622	1637	1637	2.02	1.49	0.89	1.92	1	Hants	Petersfield	Goodyers	OX	0	0	Sp	D	stud	Domestic	Middle	SU 745 241
gdyr12	3	10	58	35	93	1606	1641	1641	2.53	0.80	1.09	1.88	1	Hants	Petersfield	Goodyers	OX	0	0	W	D	tiebeam	Domestic	Middle	SU 745 241
gdyr23	1	20	174	26	200	1606	1632	1632	0.78	0.60	0.70	0.76	1	Hants	Petersfield	Goodyers	OX	2	1	W	D	rail	Domestic	Middle	SU 745 241
gdyr4	1	20	51	22	73	1610	1632	1632	1.80	0.54	0.94	1.42	1	Hants	Petersfield	Goodyers	OX	0	0	W	D	purlin	Domestic	Middle	SU 745 241
gdyr5	1	10	79	25	104	1606	1631	1632	1.41	0.70	0.97	1.24	1	Hants	Petersfield	Goodyers	OX	0	0	Su	D	misc	Domestic	Middle	SU 745 241
gdyr6	1	20	73	20	93	1612	1632	1632	1.47	0.71	0.90	1.31	1	Hants	Petersfield	Goodyers	OX	0	0	W	D	purlin	Domestic	Middle	SU 745 241
gdyr7	2	5	68	19	87	1617	1636	1637	1.59	1.23	1.11	1.51	1	Hants	Petersfield	Goodyers	OX	0	0	Sp	D	rail	Domestic	Middle	SU 745 241
gdyr8	2	10	65	20	85	1616	1636	1637	2.10	0.87	0.56	1.81	1	Hants	Petersfield	Goodyers	OX	0	0	Su	D	rail	Domestic	Middle	SU 745 241
gdyr9	2	10	66	16	82	1620	1636	1637	1.94	1.29	0.99	1.81	1	Hants	Petersfield	Goodyers	OX	0	0	W	D	rail	Domestic	Middle	SU 745 241
pet1	1		39	19	58	1515	1534	1534	2.52	1.65	1.98	2.24	1	Hants	Petersfield	The Donkry Cart PH	OX	0	0	W	D		Domestic	Low	SU 747 233
pet2	1		76	11	87	1523	1534	1534	1.35	1.48	1.51	1.37	1	Hants	Petersfield	The Donkry Cart PH	OX	0	0	W	D		Domestic	Low	SU 747 233
tlys2	1	15	52	15	67	1426	1441	1442	2.38	1.39	1.75	2.16	1	Hants	Petersfield	Tullys, 26 The Spain	OX	0	0	W	D	misc	Domestic	Middle	SU 745 242
tlys3	1	20	53	29	82	1413	1442	1442	1.49	0.75	1.23	1.23	1	Hants	Petersfield	Tullys, 26 The Spain	OX	0	0	Sp	D	brace	Domestic	Middle	SU 745 242
tlys4	1	20	47	18	65	1423	1441	1442	2.08	1.35	1.86	1.88	1	Hants	Petersfield	Tullys, 26 The Spain	OX	0	0	Sp	D	rafter	Domestic	Middle	SU 745 242
tlys6	2	25	127	29	156	1495	1524	1524	0.97	0.65	0.88	0.91	1	Hants	Petersfield	Tullys, 26 The Spain	OX	0	0	W	D	collar	Domestic	Middle	SU 745 242
pd1	1	1	77	20	97	1580	1600	1600	2.03	1.77	2.48	1.98	1	Hants	Priors Dean	Church	OX	2	1	W	E		Church	Middle	SU 727 296
gm1	2		47	20	67	1626	1646	1646	1.46	1.77	1.53	1.56	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	W	A		Domestic	Gentry	SU 743 313
gm10	1		40	29	69	1434	1463	1465	1.69	0.71	1.03	1.28	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	W	D		Domestic	Gentry	SU 743 313
gm11	2		73	23	96	1623	1646	1646	1.23	0.91	0.61	1.15	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	Su	A		Domestic	Gentry	SU 743 313
gm2	2		122	24	146	1622	1646	1646	1.13	0.77	1.01	1.07	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	W	A		Domestic	Gentry	SU 743 313
gm3	1		39	50	89	1415	1465	1465	2.65	0.70	1.10	1.56	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	W	A		Domestic	Gentry	SU 743 313
gm4	1	15	40	26	66	1439	1465	1465	2.27	1.47	1.74	1.95	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	Sp	D		Domestic	Gentry	SU 743 313
gm5	1		39	16	55	1449	1465	1465	1.42	0.82	1.20	1.24	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	W	A		Domestic	Gentry	SU 743 313
gm6	1	2	61	32	93	1433	1465	1465	1.43	0.67	0.81	1.17	1	Hants	Priors Dean	Goleigh Manor	OX	2	4	W	D		Domestic	Gentry	SU 743 313
gm7	2	3	109	43	152	1603	1646	1646	1.75	0.79	1.04	1.48	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	Su	D		Domestic	Gentry	SU 743 313
gm8	1		62	22	84	1444	1466	1465	1.83	1.25	1.36	1.68	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	Sp	D		Domestic	Gentry	SU 743 313
gm9	1	10	71	17	88	1448	1465	1465	1.35	0.70	0.75	1.23	1	Hants	Priors Dean	Goleigh Manor	OX	0	0	Sp	D		Domestic	Gentry	SU 743 313
kjh1	1	3	69	17	86	1239	1256	1256	2.75	2.07	2.21	2.61	1	Hants	Romsey	King John's House	OX	0	0	Sp	D		Domestic	Middle	SU 353 213
kjh11	1	1	33	26	59	1230	1256	1256	1.59	1.57	1.39	1.58	1	Hants	Romsey	King John's House	OX	2	4	Sp	A		Domestic	Middle	SU 353 213
kjh2	1		28	20	48	1236	1256	1256	2.51	2.26	2.20	2.40	1	Hants	Romsey	King John's House	OX	0	0	W	A		Domestic	Middle	SU 353 213
kjh3	1		83	21	104	1234	1255	1256	1.45	0.93	1.09	1.34	1	Hants	Romsey	King John's House	OX	0	0	W	D		Domestic	Middle	SU 353 213
kjh4	1	5	19	9	28	1247	1256	1256	3.69	3.78	3.53	3.72	1	Hants	Romsey	King John's House	OX	0	0	W	A		Domestic	Middle	SU 353 213
whi1	1	2	37	17	54	1433	1450	1450	2.85	1.38	1.40	2.38	1	Hants	Romsey	White Horse Inn	OX	0	0	Sp	E		Domestic	Low	SU 353 212
whi2	1	5	39	15	54	1435	1450	1450	3.38	1.73	2.65	2.92	1	Hants	Romsey	White Horse Inn	OX	0	0	Sp	E		Domestic	Low	SU 353 212
wes1	1		50	23	73	1418	1441	1444	3.54	2.41	2.15	3.19	1	Hants	Sherborne St John	6-8 West End	OX	2	9	Sp	D		Domestic	Low	SU 618 558
wes2	1	5	74	17	91	1427	1444	1444	1.56	1.27	1.30	1.51	1	Hants	Sherborne St John	6-8 West End	OX	0	0	Sp	D		Domestic	Low	SU 618 558
wes4	1	15	63	20	83	1424	1444	1444	1.35	1.01	1.27	1.27	1	Hants	Sherborne St John	6-8 West End	OX	0	0	Sp	A		Domestic	Low	SU 618 558

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
wes5	1	1	77	30	107	1414	1444	1444	1.81	1.16	1.65	1.63	1	Hants	Sherborne St John	6-8 West End	OX	0	0	W	A		Domestic	Low	SU 618 558
vyne1	7	5	146	26	172	1605	1631	1632	1.80	0.96	1.17	1.67	1	Hants	Sherborne St John	The Vyne	OX	2	1	Sp	D		Domestic	Gentry	SU 633 563
vyne11	6	5	52	22	74	1628	1650	1650	3.06	1.12	1.89	2.48	1	Hants	Sherborne St John	The Vyne	OX	0	0	W	E		Domestic	Gentry	SU 633 563
vyne12	6	2	67	18	85	1632	1650	1650	2.35	1.58	1.54	2.18	1	Hants	Sherborne St John	The Vyne	OX	0	0	W	E		Domestic	Gentry	SU 633 563
vyne13	1		67	20	87	1504	1524	1524	2.41	2.41	1.93	2.41	1	Hants	Sherborne St John	The Vyne	OX	0	0	Sp	D		Domestic	Gentry	SU 633 563
vyne15	1	10	36	19	55	1505	1524	1524	3.08	2.24	3.41	2.79	1	Hants	Sherborne St John	The Vyne	OX	0	0	Sp	A		Domestic	Gentry	SU 633 563
vyne16	1		113	22	135	1502	1524	1524	1.48	1.27	1.24	1.44	1	Hants	Sherborne St John	The Vyne	OX	0	0	Sp	D		Domestic	Gentry	SU 633 563
vyne17	2	20	158	32	190	1493	1525	1525	1.01	0.79	0.73	0.97	1	Hants	Sherborne St John	The Vyne	OX	0	0	Su	D		Domestic	Gentry	SU 633 563
vyne18	3	20	110	17	127	1509	1526	1526	1.31	0.94	0.75	1.26	1	Hants	Sherborne St John	The Vyne	OX	0	0	Su	D		Domestic	Gentry	SU 633 563
vyne2	7		41	16	57	1616	1632	1632	1.79	1.15	1.15	1.61	1	Hants	Sherborne St John	The Vyne	OX	0	0	Su	A		Domestic	Gentry	SU 633 563
vyne21	4	1	83	28	111	1626	1654	1654	1.53	1.08	1.18	1.42	1	Hants	Sherborne St John	The Vyne	OX	0	0	Sp	D		Domestic	Gentry	SU 633 563
vyne22	4		57	25	82	1629	1654	1654	1.62	1.48	1.51	1.58	1	Hants	Sherborne St John	The Vyne	OX	0	0	Sp	D		Domestic	Gentry	SU 633 563
vyne23	4		55	28	83	1626	1654	1654	1.59	0.72	0.97	1.30	1	Hants	Sherborne St John	The Vyne	OX	0	0	Sp	D		Domestic	Gentry	SU 633 563
vyne26	5		70	13	83	1512	1525	1525	1.63	1.49	0.71	1.61	1	Hants	Sherborne St John	The Vyne	OX	0	0	W	D		Domestic	Gentry	SU 633 563
vyne29	5		83	20	103	1505	1525	1525	1.70	1.14	1.23	1.59	1	Hants	Sherborne St John	The Vyne	OX	0	0	W	D		Domestic	Gentry	SU 633 563
vyne3	7		79	26	105	1606	1632	1632	0.96	0.74	0.66	0.91	1	Hants	Sherborne St John	The Vyne	OX	0	0	Sp	D		Domestic	Gentry	SU 633 563
vyne4	7	15	37	13	50	1619	1632	1632	2.39	1.51	1.71	2.16	1	Hants	Sherborne St John	The Vyne	OX	0	0	Su	A		Domestic	Gentry	SU 633 563
shmbl1	1	5	72	16	88	1532	1548	1548	1.45	1.21	1.52	1.41	1	Hants	South Stoneham	Shamblehurst Manor	OX	0	0	W	D		Domestic	Middle	SU 496 148
shmbl2	1		104	24	128	1523	1547	1548	1.20	0.91	1.36	1.14	1	Hants	South Stoneham	Shamblehurst Manor	OX	0	0	Su	D		Domestic	Middle	SU 496 148
shmbl3	1		49	19	68	1529	1548	1548	1.64	1.58	2.26	1.62	1	Hants	South Stoneham	Shamblehurst Manor	OX	0	0	W	D		Domestic	Middle	SU 496 148
shmbl4	2	5	124	18	142	1558	1576	1576	1.78	1.78	2.11	1.78	1	Hants	South Stoneham	Shamblehurst Manor	OX	0	0	W	D		Domestic	Middle	SU 496 148
swb1	1		148	24	172	1490	1514	1514	1.02	0.87	1.06	1.00	1	Hants	Southwick	Southwick Barn	OX	0	0	W	A		Agricultural	Low	SU 626 087
swb2	1		98	37	135	1477	1514	1514	2.18	0.96	1.26	1.84	1	Hants	Southwick	Southwick Barn	OX	0	0	Su	D		Agricultural	Low	SU 626 087
swb4	1	1	82	19	101	1495	1514	1514	1.67	1.28	1.31	1.60	1	Hants	Southwick	Southwick Barn	OX	0	0	Sp	A		Agricultural	Low	SU 626 087
swb5	3	10	63	20	83	1580	1600	1600	2.47	1.63	1.86	2.27	1	Hants	Southwick	Southwick Barn	OX	0	0	Sp	E		Agricultural	Low	SU 626 087
swb6	3		84	22	106	1578	1600	1600	2.15	1.38	1.75	1.99	1	Hants	Southwick	Southwick Barn	OX	0	0	Su	E		Agricultural	Low	SU 626 087
swb79	2	15	114	18	132	1476	1494	1494	1.31	1.28	1.15	1.31	1	Hants	Southwick	Southwick Barn	OX	2	0	W	D		Agricultural	Low	SU 626 087
tnk10	1	3	72	16	88	1606	1622	1622	1.86	0.83	0.98	1.67	1	Hants	Steep	Tankerdale Farm	OX	0	0	W	D		Domestic	Low	SU 766 258
tnk38	1	5	59	24	83	1598	1622	1622	2.78	1.40	1.85	2.38	1	Hants	Steep	Tankerdale Farm	OX	2	4	W	D		Domestic	Low	SU 766 258
tnk4	1	10	44	20	64	1602	1622	1622	2.17	1.48	1.58	1.95	1	Hants	Steep	Tankerdale Farm	OX	0	0	W	A		Domestic	Low	SU 766 258
tnk5	1	5	41	32	73	1590	1622	1622	1.99	0.72	1.27	1.44	1	Hants	Steep	Tankerdale Farm	OX	0	0	Su	A		Domestic	Low	SU 766 258
tnk6	1	10	54	13	67	1609	1622	1622	2.16	1.73	2.19	2.07	1	Hants	Steep	Tankerdale Farm	OX	0	0	W	A		Domestic	Low	SU 766 258
tnk7	1		48	21	69	1601	1622	1622	2.69	1.62	2.02	2.36	1	Hants	Steep	Tankerdale Farm	OX	0	0	Sp	D		Domestic	Low	SU 766 258
opot	1	15	168	33	201	1575	1608	1608	1.00	0.37	0.50	0.90	1	Hants	Tichbourne	Old Post Office	OX	4	17	W	D	beam	Domestic	Low	SU 571 304
phc1	1	5	105	32	137	1416	1448	1448	1.49	0.70	0.82	1.30	1	Hants	Titchfield	Place House Cottage	OX	0	0	W	D		Domestic	Middle	SU 543 066
smp1	1	5	86	28	114	1595	1623	1623	1.74	1.24	1.29	1.62	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	Sp	D	beam	Domestic	Gentry	SU 534 063
smp10	1		82	21	103	1602	1623	1623	1.56	1.46	1.87	1.54	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	Sp	D	joist	Domestic	Gentry	SU 534 063
smp12	1		45	19	64	1603	1622	1623	2.05	1.34	1.58	1.84	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	W	D	joist	Domestic	Gentry	SU 534 063
smp13	1		56	18	74	1604	1622	1623	1.70	1.22	1.21	1.58	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	W	D		Domestic	Gentry	SU 534 063
smp15	1		93	14	107	1609	1623	1623	1.45	1.94	2.11	1.52	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	Sp	D	misc	Domestic	Gentry	SU 534 063
smp16	1	20	124	20	144	1602	1622	1623	0.90	0.81	0.97	0.89	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	Sp	D	joist	Domestic	Gentry	SU 534 063
smp2	1		52	20	72	1602	1622	1623	2.04	1.45	1.54	1.87	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	W	D	beam	Domestic	Gentry	SU 534 063
smp3	1		62	20	82	1602	1622	1623	2.50	1.47	1.76	2.25	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	W	D	joist	Domestic	Gentry	SU 534 063
smp4	1	20	121	22	143	1599	1621	1623	1.24	1.37	0.79	1.26	1	Hants	Titchfield	St Margaret's Priory	OX	2	1	W	D	beam	Domestic	Gentry	SU 534 063
smp58	1		105	21	126	1602	1623	1623	1.11	0.76	0.80	1.05	1	Hants	Titchfield	St Margaret's Priory	OX	2	1	Sp	D	joist	Domestic	Gentry	SU 534 063
smp7	1		85	19	104	1604	1623	1623	1.14	1.32	1.46	1.17	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	Sp	D	joist	Domestic	Gentry	SU 534 063

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
smp9	1	20	87	17	104	1605	1622	1623	2.31	1.54	1.78	2.18	1	Hants	Titchfield	St Margaret's Priory	OX	0	0	W	D	beam	Domestic	Gentry	SU 534 063
jty2	1	3	19	26	45	1387	1413	1413	1.97	0.96	1.13	1.39	1	Hants	Titchfield	The Jetty, 28 South Street	OX	0	0	W	D		Domestic	Middle	SU 540 057
jty4	1	5	45	13	58	1400	1413	1413	2.66	2.03	2.74	2.52	1	Hants	Titchfield	The Jetty, 28 South Street	OX	0	0	W	D		Domestic	Middle	SU 540 057
jty5	1		27	18	45	1395	1413	1413	1.37	1.02	1.23	1.23	1	Hants	Titchfield	The Jetty, 28 South Street	OX	0	0	W	D		Domestic	Middle	SU 540 057
titch1	1	5	79	19	98	1390	1409	1409	2.50	1.55	1.79	2.31	1	Hants	Titchfield	Titchfield Tithe Barn	OX	0	0	W	D		Agricultural	Monastic	SU 539 066
titch2	1	5	77	15	92	1394	1409	1409	1.71	1.59	1.26	1.69	1	Hants	Titchfield	Titchfield Tithe Barn	OX	3	2	W	A		Agricultural	Monastic	SU 539 066
titch3	1	5	144	38	182	1369	1407	1409	2.06	0.57	0.79	1.75	1	Hants	Titchfield	Titchfield Tithe Barn	OX	2	16	Sp	D		Agricultural	Monastic	SU 539 066
titch5	1	10	107	29	136	1380	1409	1409	1.80	0.58	0.49	1.54	1	Hants	Titchfield	Titchfield Tithe Barn	OX	0	0	W	D		Agricultural	Monastic	SU 539 066
titch6	1	5	86	14	100	1395	1409	1409	1.32	1.81	1.16	1.39	1	Hants	Titchfield	Titchfield Tithe Barn	OX	0	0	W	A		Agricultural	Monastic	SU 539 066
titch7	1	10	63	20	83	1389	1409	1409	1.88	1.24	0.99	1.72	1	Hants	Titchfield	Titchfield Tithe Barn	OX	0	0	W	A		Agricultural	Monastic	SU 539 066
titch8	1		78	33	111	1376	1409	1409	1.05	0.57	0.72	0.91	1	Hants	Titchfield	Titchfield Tithe Barn	OX	0	0	W	A		Agricultural	Monastic	SU 539 066
bct1	1	20	67	23	90	1578	1601	1601	1.45	1.08	1.20	1.36	1	Hants	Tunworth	Beechcroft	OX	0	0	W	A	post	Domestic	Middle	SU 673 485
bct4	1		140	9	149	1592	1601	1601	1.45	1.13	0.74	1.43	1	Hants	Tunworth	Beechcroft	OX	0	0	W	D	post	Domestic	Middle	SU 673 485
bct56	1	20	79	14	93	1587	1601	1601	2.16	1.61	1.48	2.08	1	Hants	Tunworth	Beechcroft	OX	2	1	Su	A	joist	Domestic	Middle	SU 673 485
bct8	2		43	20	63	1666	1686	1687	1.92	1.21	1.10	1.69	1	Hants	Tunworth	Beechcroft	OX	0	0	W	D	rafter	Domestic	Middle	SU 673 485
rook3	1	10	39	14	53	1374	1388	1388	1.53	0.87	1.11	1.36	1	Hants	Up Somborne	Rookley Farmhouse	OX	0	0	Su	A		Domestic	Middle	SU 397 283
rook4	1		8	21	29	1367	1388	1388	3.62	2.84	3.62	3.06	1	Hants	Up Somborne	Rookley Farmhouse	OX	0	0	Sp	A		Domestic	Middle	SU 397 283
rook5	1	15	85	28	113	1360	1388	1388	1.26	1.08	1.11	1.22	1	Hants	Up Somborne	Rookley Farmhouse	OX	0	0	Sp	D		Domestic	Middle	SU 397 283
rook7	1		19	28	47	1360	1388	1388	1.25	0.81	1.17	0.99	1	Hants	Up Somborne	Rookley Farmhouse	OX	0	0	Sp	A		Domestic	Middle	SU 397 283
bere1	1		38	18	56	1511	1529	1529	2.49	1.06	1.12	2.03	1	Hants	Warnford	Bere Farm	OX	0	0	W	A		Domestic	Middle	SU 626 253
bere2	1		96	33	129	1496	1529	1529	1.31	0.70	1.07	1.15	1	Hants	Warnford	Bere Farm	OX	2	1	W	D		Domestic	Middle	SU 626 253
bere3	1		52	25	77	1504	1529	1529	1.81	1.02	1.56	1.55	1	Hants	Warnford	Bere Farm	OX	2	13	W	D		Domestic	Middle	SU 626 253
riv12	1	20	103	36	139	1291	1327	1327	1.53	0.58	0.81	1.28	1	Hants	Warnsford	Riversdown	OX	2	9	Sp	D	misc	Domestic	Gentry	SU 603 248
riv3	1		91	25	116	1300	1325	1327	2.57	1.79	2.26	2.40	1	Hants	Warnsford	Riversdown	OX	0	0	W	D	post	Domestic	Gentry	SU 603 248
gc1	1	2	32	6	38	1435	1441	1441	2.07	4.46	3.03	2.45	1	Hants	West Meon	Garden Cottage	OX	0	0	Sp	D		Domestic	Low	SU 641 238
gc10	1	1	28	21	49	1420	1441	1441	1.48	1.63	1.11	1.54	1	Hants	West Meon	Garden Cottage	OX	0	0	W	A		Domestic	Low	SU 641 238
gc2	1	3	55	20	75	1421	1441	1441	1.31	1.45	0.85	1.35	1	Hants	West Meon	Garden Cottage	OX	0	0	W	A		Domestic	Low	SU 641 238
gc3	1	1	42	30	72	1411	1441	1441	1.37	0.53	0.56	1.02	1	Hants	West Meon	Garden Cottage	OX	0	0	W	A		Domestic	Low	SU 641 238
gc4	1	10	46	20	66	1421	1441	1441	1.45	1.32	1.88	1.41	1	Hants	West Meon	Garden Cottage	OX	0	0	Sp	A		Domestic	Low	SU 641 238
gc5	1	1	61	20	81	1421	1441	1441	1.81	1.15	1.38	1.64	1	Hants	West Meon	Garden Cottage	OX	0	0	W	D		Domestic	Low	SU 641 238
gc6	1	8	47	22	69	1419	1441	1441	1.09	1.04	1.18	1.07	1	Hants	West Meon	Garden Cottage	OX	0	0	Sp	D		Domestic	Low	SU 641 238
gc7	1		51	22	73	1419	1441	1441	1.10	1.22	1.07	1.14	1	Hants	West Meon	Garden Cottage	OX	0	0	Sp	D		Domestic	Low	SU 641 238
gc8	1	10	49	27	76	1414	1441	1441	2.08	1.71	1.88	1.95	1	Hants	West Meon	Garden Cottage	OX	0	0	W	A		Domestic	Low	SU 641 238
gc9	1	5	54	17	71	1424	1441	1441	1.42	1.33	1.58	1.40	1	Hants	West Meon	Garden Cottage	OX	0	0	Sp	D		Domestic	Low	SU 641 238
wp33	1		38	19	57	1522	1541	1541	3.71	1.57	1.99	2.99	1	Hants	Weston Patrick	New Farm Barn	OX	0	0	Sp	D		Agricultural	Low	SU 696 453
wrl1	1	5	70	19	89	1230	1249	1250	2.71	1.00	1.90	2.35	1	Hants	Wherrell	The Old Stables, Wherrell Priory	OX	0	0	Su	D		Church	Monastic	SU 392 406
wrl2	1	5	44	17	61	1232	1249	1250	2.64	1.77	2.26	2.40	1	Hants	Wherrell	The Old Stables, Wherrell Priory	OX	0	0	W	D		Church	Monastic	SU 392 406
wrl3	1	2	108	14	122	1235	1249	1250	2.00	1.69	1.46	1.97	1	Hants	Wherrell	The Old Stables, Wherrell Priory	OX	0	0	W	D		Church	Monastic	SU 392 406
wrl4	1	3	48	24	72	1226	1250	1250	1.46	0.89	0.65	1.27	1	Hants	Wherrell	The Old Stables, Wherrell Priory	OX	0	0	Sp	D		Church	Monastic	SU 392 406
wrl5	2	4	63	17	80	1263	1280	1280	2.20	1.06	1.79	1.95	1	Hants	Wherrell	The Old Stables, Wherrell Priory	OX	2	0	W	D		Church	Monastic	SU 392 406
wrl6	2	5	55	24	79	1255	1279	1280	2.70	1.68	2.05	2.39	1	Hants	Wherrell	The Old Stables, Wherrell Priory	OX	0	0	Su	D		Church	Monastic	SU 392 406
wrl7	2	3	66	16	82	1264	1280	1280	1.07	0.88	0.86	1.04	1	Hants	Wherrell	The Old Stables, Wherrell Priory	OX	0	0	Sp	D		Church	Monastic	SU 392 406
wrl8	2	5	64	22	86	1258	1280	1280	1.51	1.29	1.17	1.46	1	Hants	Wherrell	The Old Stables, Wherrell Priory	OX	0	0	Sp	D		Church	Monastic	SU 392 406
nsw1	1	15	67	18	85	1564	1582	1582	2.60	1.91	1.59	2.45	1	Hants	Whitchurch	31 Newbury Street	OX	0	0	W	D		Domestic	Low	SU 465 484
nsw2	1	10	51	20	71	1562	1582	1582	1.96	1.78	1.69	1.91	1	Hants	Whitchurch	31 Newbury Street	OX	0	0	W	D		Domestic	Low	SU 465 484
nsw3	1	25	63	17	80	1565	1582	1582	2.18	1.51	1.85	2.04	1	Hants	Whitchurch	31 Newbury Street	OX	2	1	W	D		Domestic	Low	SU 465 484

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
nsw4	1	10	58	19	77	1563	1582	1582	2.68	1.69	1.63	2.43	1	Hants	Whitchurch	31 Newbury Street	OX	2	2	W	D		Domestic	Low	SU 465 484
nsw5	1	15	74	22	96	1560	1582	1582	2.40	1.72	1.51	2.25	1	Hants	Whitchurch	31 Newbury Street	OX	0	0	W	D		Domestic	Low	SU 465 484
bll1	1	5	62	18	80	1422	1440	1440	1.24	0.78	0.87	1.14	1	Hants	Whitchurch	4 Bell Street	OX	0	0	Sp	A		Domestic	Low	SU 463 481
bll2	1	20	93	24	117	1416	1440	1440	1.48	1.30	0.46	1.45	1	Hants	Whitchurch	4 Bell Street	OX	0	0	Sp	D		Domestic	Low	SU 463 481
bll3	1	10	52	29	81	1411	1440	1440	1.68	0.76	1.48	1.35	1	Hants	Whitchurch	4 Bell Street	OX	0	0	Sp	A		Domestic	Low	SU 463 481
bll4	2		71	22	93	1419	1441	1441	2.03	1.11	2.37	1.81	1	Hants	Whitchurch	4 Bell Street	OX	0	0	W	A		Domestic	Low	SU 463 481
bll5	2		55	21	76	1420	1441	1441	2.17	1.39	2.54	1.96	1	Hants	Whitchurch	4 Bell Street	OX	0	0	W	A		Domestic	Low	SU 463 481
bll6	2		38	17	55	1424	1441	1441	1.40	1.34	1.09	1.38	1	Hants	Whitchurch	4 Bell Street	OX	0	0	Su	A		Domestic	Low	SU 463 481
bll7	2	5	57	23	80	1418	1441	1441	0.99	0.82	0.77	0.94	1	Hants	Whitchurch	4 Bell Street	OX	0	0	Sp	D		Domestic	Low	SU 463 481
bll8	2	3	66	22	88	1419	1441	1441	1.05	1.00	0.76	1.04	1	Hants	Whitchurch	4 Bell Street	OX	0	0	Sp	D		Domestic	Low	SU 463 481
bee2	1	5	45	18	63	1532	1550	1550	2.10	1.69	2.34	1.98	1	Hants	Whitchurch	The Beehive, Market Square	OX	0	0	W	E		Domestic	Low	SU 463 481
bee3	1	15	53	21	74	1529	1550	1550	1.98	1.17	1.74	1.75	1	Hants	Whitchurch	The Beehive, Market Square	OX	0	0	W	E		Domestic	Low	SU 463 481
xwc1	2	20	139	21	160	1423	1444	1443	1.27	1.23	1.11	1.27	1	Hants	Winchester	10 The Close, Winchester Cathedral	OX	3	2	W	D		Church	Monastic	SU 481 290
xwc10	2		93	14	107	1422	1436	1443	1.59	1.54	1.68	1.58	1	Hants	Winchester	10 The Close, Winchester Cathedral	OX	2	1	W	D		Church	Monastic	SU 481 290
xwc13	1		66	23	89	1370	1393	1392	2.75	1.72	2.29	2.48	1	Hants	Winchester	10 The Close, Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 481 290
xwc9	3		41	25	66	1505	1530	1530	3.02	1.22	1.94	2.34	1	Hants	Winchester	10 The Close, Winchester Cathedral	OX	0	0	Su	D		Church	Monastic	SU 481 290
hsw1	1		109	23	132	1436	1459	1459	1.36	1.44	1.62	1.37	1	Hants	Winchester	33-4 High Street	OX	0	0	Su	D		Domestic	Low	SU 483 297
hsw2	1		63	20	83	1439	1459	1459	2.14	1.03	1.02	1.87	1	Hants	Winchester	33-4 High Street	OX	0	0	Sp	D		Domestic	Low	SU 483 297
hsw3	1		53	19	72	1445	1464	1459	1.91	1.82	2.15	1.89	1	Hants	Winchester	33-4 High Street	OX	0	0	W	D		Domestic	Low	SU 483 297
hsw4	1		68	20	88	1439	1459	1459	2.39	1.14	2.30	2.10	1	Hants	Winchester	33-4 High Street	OX	0	0	Sp	D		Domestic	Low	SU 483 297
hsw5	1		33	13	46	1451	1464	1459	3.73	3.41	3.40	3.64	1	Hants	Winchester	33-4 High Street	OX	0	0	W	A		Domestic	Low	SU 483 297
bts1	1	1	94	20	114	1320	1340	1340	1.67	1.32	1.79	1.61	1	Hants	Winchester	35 High Street	OX	2	1	Sp	A		Domestic	Low	SU 483 297
bts2	1	5	43	23	66	1317	1340	1340	2.39	1.47	2.52	2.07	1	Hants	Winchester	35 High Street	OX	0	0	W	D		Domestic	Low	SU 483 297
bts3	1	3	51	26	77	1314	1340	1340	2.97	1.65	2.42	2.52	1	Hants	Winchester	35 High Street	OX	0	0	Sp	D		Domestic	Low	SU 483 297
csl1	1	10	70	17	87	1267	1284	1293	1.79	1.75	1.85	1.78	1	Hants	Winchester	42 Chesil Street	OX	3	0	W	D		Domestic	Low	SU 487 292
csl3	1	8	29	14	43	1279	1293	1293	2.76	1.82	1.71	2.45	1	Hants	Winchester	42 Chesil Street	OX	0	0	Sp	A		Domestic	Low	SU 487 292
csl4	1	10	30	24	54	1269	1293	1293	2.23	1.52	1.79	1.91	1	Hants	Winchester	42 Chesil Street	OX	0	0	W	D		Domestic	Low	SU 487 292
csl5	1	1	40	18	58	1275	1293	1293	1.71	1.71	1.51	1.71	1	Hants	Winchester	42 Chesil Street	OX	0	0	Sp	A		Domestic	Low	SU 487 292
abf2	1	10	77	27	104	1464	1491	1492	1.40	1.22	0.90	1.35	1	Hants	Winchester	Abbots Barton Farmhouse	OX	0	0	Su	D		Domestic	Middle	SU 485 305
abf3	2		52	20	72	1476	1496	1496	2.73	1.91	2.07	2.50	1	Hants	Winchester	Abbots Barton Farmhouse	OX	0	0	Su	D		Domestic	Middle	SU 485 305
abf6	1	40	43	27	70	1464	1491	1492	1.20	1.12	0.87	1.17	1	Hants	Winchester	Abbots Barton Farmhouse	OX	0	0	W	A		Domestic	Middle	SU 485 305
abf7	1		71	20	91	1471	1491	1492	1.93	1.58	1.98	1.85	1	Hants	Winchester	Abbots Barton Farmhouse	OX	0	0	Sp	D		Domestic	Middle	SU 485 305
abf8	1		66	34	100	1458	1492	1492	2.04	0.69	1.37	1.58	1	Hants	Winchester	Abbots Barton Farmhouse	OX	0	0	W	D		Domestic	Middle	SU 485 305
abf9	3		137	31	168	1529	1560	1560	1.03	1.06	0.95	1.04	1	Hants	Winchester	Abbots Barton Farmhouse	OX	0	0	Sp	D		Domestic	Middle	SU 485 305
crw1	1	3	40	19	59	1281	1300	1300	2.98	1.25	2.99	2.42	1	Hants	Winchester	Chesil Rectory	OX	0	0	W	E	tiebeam	Domestic	Middle	SU 487 293
crw2	1	1	41	14	55	1286	1300	1300	3.49	2.54	3.22	3.25	1	Hants	Winchester	Chesil Rectory	OX	0	0	Sp	E	tiebeam	Domestic	Middle	SU 487 293
crw3	1	5	53	18	71	1282	1300	1300	3.09	0.82	2.61	2.51	1	Hants	Winchester	Chesil Rectory	OX	0	0	Sp	E	tiebeam	Domestic	Middle	SU 487 293
gbg1	1	10	94	29	123	1434	1463	1463	1.37	0.65	0.93	1.20	1	Hants	Winchester	Godbegot, High Street	OX	0	0	W	D		Domestic	Low	SU 482 297
gbg2	1	1	107	17	124	1446	1463	1463	1.41	1.44	1.17	1.41	1	Hants	Winchester	Godbegot, High Street	OX	0	0	W	D		Domestic	Low	SU 482 297
gbg3	1	5	101	30	131	1433	1463	1463	1.50	0.63	0.96	1.30	1	Hants	Winchester	Godbegot, High Street	OX	0	0	W	D		Domestic	Low	SU 482 297
gbg4	1	30	81	23	104	1440	1463	1463	1.30	0.95	0.91	1.22	1	Hants	Winchester	Godbegot, High Street	OX	0	0	W	D		Domestic	Low	SU 482 297
gbg5	1	10	119	23	142	1440	1463	1463	1.30	0.55	0.68	1.18	1	Hants	Winchester	Godbegot, High Street	OX	2	1	W	D		Domestic	Low	SU 482 297
phw1	1	25	119	18	137	1291	1309	1310	1.42	1.02	1.01	1.37	1	Hants	Winchester	Pilgrims Hall, Winchster Cathedral	OX	4	3	Sp	D	brace	Church	Monastic	SU 482 291
phw3	1		98	13	111	1294	1307	1310	2.34	2.69	2.29	2.38	1	Hants	Winchester	Pilgrims Hall, Winchster Cathedral	OX	0	0	Sp	D	beam	Church	Monastic	SU 482 291
phw4	1		134	18	152	1282	1300	1310	2.21	1.72	1.77	2.15	1	Hants	Winchester	Pilgrims Hall, Winchster Cathedral	OX	4	3	Sp	D	post	Church	Monastic	SU 482 291
phw6	1		80	16	96	1294	1310	1310	2.06	0.89	1.32	1.86	1	Hants	Winchester	Pilgrims Hall, Winchster Cathedral	OX	0	0	W	D	brace	Church	Monastic	SU 482 291

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
phw7	1	1	36	8	44	1294	1302	1310	2.62	1.57	2.30	2.43	1	Hants	Winchester	Pilgrims Hall, Winchster Cathedral	OX	0	0	Su	D	rafter	Church	Monastic	SU 482 291
wcn1	1	1	50	21	71	1228	1249	1250	2.22	1.17	1.69	1.91	1	Hants	Winchester	Winchester Cathedral	OX	0	0	Su	D		Church	Monastic	SU 483 293
wcn2	1	2	48	20	68	1230	1250	1250	3.03	1.16	1.90	2.48	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
wcn3	1		39	17	56	1230	1247	1250	3.05	1.42	2.60	2.56	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
wcn4	1		18	19	37	1228	1247	1250	2.94	1.39	2.90	2.15	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
wcn6	1	1	74	14	88	1235	1249	1250	2.17	1.87	1.95	2.12	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
west10	2		101	32	133	1285	1317	1318	1.72	0.84	0.91	1.51	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
west11	2	4	100	35	135	1282	1317	1318	1.70	0.75	1.03	1.45	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
west12	2		99	19	118	1299	1318	1318	1.34	0.84	1.29	1.26	1	Hants	Winchester	Winchester Cathedral	OX	0	0	Sp	D		Church	Monastic	SU 483 293
west13	2	10	61	20	81	1286	1306	1318	1.78	1.23	1.21	1.64	1	Hants	Winchester	Winchester Cathedral	OX	0	0	Sp	D		Church	Monastic	SU 483 293
west2	2	0	99	32	131	1285	1317	1318	1.13	0.94	0.94	1.08	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
west3	2		90	24	114	1293	1317	1318	1.27	1.10	1.14	1.23	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
west4	2		85	34	119	1283	1317	1318	1.45	0.84	1.15	1.28	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
west5	2		61	31	92	1286	1317	1318	1.54	0.87	0.92	1.31	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	A		Church	Monastic	SU 483 293
west7	2		62	30	92	1287	1317	1318	1.58	0.95	1.15	1.37	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
west8	2	2	188	31	219	1286	1317	1318	1.10	0.60	0.76	1.03	1	Hants	Winchester	Winchester Cathedral	OX	0	0	W	D		Church	Monastic	SU 483 293
west9	2		123	26	149	1282	1308	1318	1.42	1.05	1.14	1.35	1	Hants	Winchester	Winchester Cathedral	OX	0	0	Sp	D		Church	Monastic	SU 483 293
sopc1	1	3	92	23	115	1512	1535	1536	1.85	0.86	0.96	1.65	1	Hants	Wonston	St Olafs Pond Cottage	OX	0	0	W	D		Domestic	Low	SU 417 395
sopc2	1		65	14	79	1522	1536	1536	1.65	1.54	1.67	1.63	1	Hants	Wonston	St Olafs Pond Cottage	OX	0	0	Sp	D		Domestic	Low	SU 417 395
sopc3	1		121	28	149	1508	1536	1536	1.78	1.27	1.27	1.68	1	Hants	Wonston	St Olafs Pond Cottage	OX	0	0	Sp	D		Domestic	Low	SU 417 395
sopc4	1	10	128	31	159	1504	1535	1536	1.17	0.75	0.61	1.09	1	Hants	Wonston	St Olafs Pond Cottage	OX	2	1	Su	D		Domestic	Low	SU 417 395
sopc5	1	3	125	37	162	1499	1536	1536	0.85	0.59	1.18	0.79	1	Hants	Wonston	St Olafs Pond Cottage	OX	0	0	Sp	A		Domestic	Low	SU 417 395
sopc6	1		111	16	127	1519	1535	1536	1.91	1.27	1.73	1.83	1	Hants	Wonston	St Olafs Pond Cottage	OX	0	0	W	D		Domestic	Low	SU 417 395
din21	1		112	38	150	1566	1604	1604	0.50	0.30	0.34	0.45	6	Hereford	Dinmore	Dinmore Manor	OX	0	0	W	D	post	Domestic	Gentry	SO 486 502
din4	1		143	40	183	1563	1603	1604	1.27	0.88	1.11	1.18	6	Hereford	Dinmore	Dinmore Manor	OX	2	1	W	D	purlin	Domestic	Gentry	SO 486 502
din5b	1		66	37	103	1566	1603	1604	1.27	0.92	0.61	1.14	6	Hereford	Dinmore	Dinmore Manor	OX	0	0	W	D	purlin	Domestic	Gentry	SO 486 502
din8	1	25	198	35	233	1569	1604	1604	1.72	0.93	0.49	1.60	6	Hereford	Dinmore	Dinmore Manor	OX	0	0	Sp	D	tiebeam	Domestic	Gentry	SO 486 502
bpal1	1	10	85	26	111	1153	1179	1179	2.42	1.49	1.74	2.20	6	Hereford	Hereford	Bishop's Palace	OX	0	0	W	D	plate			SO 509 397
hc1	2	10	118	16	134	1291	1307	1307	2.45	1.06	1.14	2.29	6	Hereford	Kington	Hergest Court	OX	2	4	Sp	D		Domestic	Gentry	SO 281 554
hc11	4	5	85	17	102	1649	1666	1666	1.39	1.82	1.50	1.46	6	Hereford	Kington	Hergest Court	OX	2	0	W	D		Domestic	Gentry	SO 281 554
hc13	1	20	76	17	93	1250	1267	1267	1.67	1.46	1.58	1.63	6	Hereford	Kington	Hergest Court	OX	0	0	Su	D		Domestic	Gentry	SO 281 554
hc15	5	5	31	28	59	1722	1750	1750	3.61	2.30	3.09	2.99	6	Hereford	Kington	Hergest Court	OX	0	0	Su	E		Domestic	Gentry	SO 281 554
hc18	4	40	90	42	132	1624	1666	1666	1.11	0.84	0.78	1.03	6	Hereford	Kington	Hergest Court	OX	2	2	W	D		Domestic	Gentry	SO 281 554
hc20	4	15	96	47	143	1619	1666	1666	1.25	0.77	0.47	1.09	6	Hereford	Kington	Hergest Court	OX	0	0	W	A		Domestic	Gentry	SO 281 554
hc24	1	10	116	28	144	1239	1267	1267	1.48	1.18	1.06	1.42	6	Hereford	Kington	Hergest Court	OX	2	1	W	D		Domestic	Gentry	SO 281 554
hc27	3		121	25	146	1641	1666	1666	1.03	1.20	1.14	1.06	6	Hereford	Kington	Hergest Court	OX	0	0	Sp	D		Domestic	Gentry	SO 281 554
hc28	3	20	173	23	196	1643	1666	1666	1.38	1.02	0.93	1.34	6	Hereford	Kington	Hergest Court	OX	0	0	Sp	D		Domestic	Gentry	SO 281 554
hc30	6		44	22	66	1430	1452	1452	2.18	0.96	1.71	1.77	6	Hereford	Kington	Hergest Court	OX	0	0	Sp	D		Domestic	Gentry	SO 281 554
hc4	3	5	65	24	89	1642	1666	1666	2.76	1.59	1.77	2.44	6	Hereford	Kington	Hergest Court	OX	0	0	Su	D		Domestic	Gentry	SO 281 554
hc5a	3	40	164	50	214	1616	1666	1666	0.64	0.70	0.68	0.65	6	Hereford	Kington	Hergest Court	OX	0	0	Su	D		Domestic	Gentry	SO 281 554
hc6	3	25	208	22	230	1644	1666	1666	0.99	1.66	1.69	1.05	6	Hereford	Kington	Hergest Court	OX	0	0	Sp	A		Domestic	Gentry	SO 281 554
hc7	3		45	34	79	1632	1666	1666	1.53	1.31	2.23	1.44	6	Hereford	Kington	Hergest Court	OX	0	0	W	A		Domestic	Gentry	SO 281 554
hc8	3		66	9	75	1656	1665	1666	1.54	1.41	1.64	1.52	6	Hereford	Kington	Hergest Court	OX	0	0	Su	D		Domestic	Gentry	SO 281 554
gbl1	2	5	94	26	120	1473	1499	1500	1.65	1.07	1.36	1.52	6	Hereford	Leominster	40 Broad Street	OX	2	2	Su	D		Domestic	Middle	SO 495 593
gbl2	2		112	20	132	1479	1499	1500	2.00	1.48	2.30	1.92	6	Hereford	Leominster	40 Broad Street	OX	0	0	Sp	D		Domestic	Middle	SO 495 593
gbl3	2	15	95	24	119	1475	1499	1500	1.75	1.49	1.61	1.70	6	Hereford	Leominster	40 Broad Street	OX	0	0	Su	D		Domestic	Middle	SO 495 593

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
gbl5	2	10	89	27	116	1472	1499	1500	1.95	1.14	1.55	1.77	6	Hereford	Leominster	40 Broad Street	OX	0	0	Su	D		Domestic	Middle	SO 495 593
gbl6	2	10	92	24	116	1476	1500	1500	0.95	0.96	0.99	0.95	6	Hereford	Leominster	40 Broad Street	OX	0	0	W	D		Domestic	Middle	SO 495 593
gbl9	1		98	27	125	1436	1463	1463	1.49	0.87	0.74	1.35	6	Hereford	Leominster	40 Broad Street	OX	0	0	Sp	D		Domestic	Middle	SO 495 593
pem12	1	10	61	20	81	1648	1668	1668	2.32	1.65	1.78	2.15	6	Hereford	Pembridge	Bell tower	SH	0	0	W	E				SO 392 581
pem14	1		69	16	85	1652	1668	1668	2.01	2.55	1.35	2.11	6	Hereford	Pembridge	Bell tower	SH	0	0		E				SO 392 581
pem24	1		61	16	77	1652	1668	1668	2.56	1.89	2.30	2.43	6	Hereford	Pembridge	Bell tower	SH	0	0	W	E				SO 392 581
pem32	2		82	24	106	1644	1668	1668	2.08	0.90	1.22	1.81	6	Hereford	Pembridge	Bell tower	SH	0	0	W	D				SO 392 581
pem35	2		52	23	75	1645	1668	1668	1.90	1.29	1.20	1.71	6	Hereford	Pembridge	Bell tower	SH	0	0	W	D				SO 392 581
pem3738	2		69	22	91	1646	1668	1668	2.64	1.76	1.59	2.42	6	Hereford	Pembridge	Bell tower	SH	0	0	W	D				SO 392 581
pem55	1		65	22	87	1646	1668	1668	1.68	1.23	0.73	1.56	6	Hereford	Pembridge	Bell tower	SH	0	0	W	E				SO 392 581
CLB-A13A	1		65	22	87	1345	1367	1367	1.51	1.05	1.18	1.40	4	Herts	Baldock	Clothall Bury Barn	NT	0	0		D	brace			TL 289 320
CLB-B02A	1		54	23	77	1730	1753	1753	2.10	1.13	1.38	1.81	4	Herts	Baldock	Clothall Bury Farmhouse	NT	0	0		A	tiebeam			TL 289 320
CLB-B03A	1		53	18	71	1735	1753	1753	1.99	1.06	1.50	1.76	4	Herts	Baldock	Clothall Bury Farmhouse	NT	0	0		D	post			TL 289 320
CLB-B04A	1		21	29	50	1724	1753	1753	1.26	1.26	1.20	1.26	4	Herts	Baldock	Clothall Bury Farmhouse	NT	0	0		A	stud			TL 289 320
CLB-B07A	1		61	20	81	1727	1747	1753	2.15	0.88	1.32	1.84	4	Herts	Baldock	Clothall Bury Farmhouse	NT	0	0		D	post			TL 289 320
cxh05	1		30	19	49	1378	1397	1397	1.80	1.71	0.82	1.77	4	Herts	Croxley Green	Croxley Barn	MB	0	0	W	A				TQ 070 946
cxh06	1	5	55	21	76	1376	1397	1397	2.52	1.48	2.17	2.23	4	Herts	Croxley Green	Croxley Barn	MB	0	0	W	D	post			TQ 070 946
LSG-B01A	1		27	21	48	1429	1450	1450	2.42	1.94	2.20	2.21	4	Herts	Hemel Hempstead	Lower Westwick Farm	NT	0	0		E	cruck			TL 094 066
LSG-B03A	1		53	15	68	1435	1450	1450	2.74	1.97	1.28	2.57	4	Herts	Hemel Hempstead	Lower Westwick Farm	NT	0	0		E	cruck			TL 094 066
LSG-B04A	1		68	18	86	1432	1450	1450	1.62	1.37	0.86	1.57	4	Herts	Hemel Hempstead	Lower Westwick Farm	NT	0	0		E	cruck			TL 094 066
LSG-B05A	1		28	16	44	1434	1450	1450	2.89	1.33	2.47	2.33	4	Herts	Hemel Hempstead	Lower Westwick Farm	NT	0	0		E	collar			TL 094 066
LSG-B11A	1		26	17	43	1433	1450	1450	3.52	1.61	2.22	2.77	4	Herts	Hemel Hempstead	Lower Westwick Farm	NT	0	0		E	brace			TL 094 066
LSG-B14A	1		41	15	56	1435	1450	1450	2.26	1.48	1.75	2.05	4	Herts	Hemel Hempstead	Lower Westwick Farm	NT	0	0		E	tiebeam			TL 094 066
lwy01	1		55	17	72	1523	1540	1540	2.41	2.09	2.23	2.34	4	Herts	Little Wymondley	Priory Barn	MB	0	0	W	D	post			TL 218 279
lwy04	1		43	17	60	1523	1540	1540	2.41	2.33	2.17	2.38	4	Herts	Little Wymondley	Priory Barn	MB	0	0	W	D				TL 218 279
lwy06	1		54	14	68	1526	1540	1540	2.00	2.70	1.64	2.14	4	Herts	Little Wymondley	Priory Barn	MB	0	0	W	D	post			TL 218 279
lwy07	1		53	14	67	1526	1540	1540	2.49	1.90	1.58	2.37	4	Herts	Little Wymondley	Priory Barn	MB	0	0	W	D	post			TL 218 279
lwy12	1		62	18	80	1522	1540	1540	2.25	1.32	1.78	2.04	4	Herts	Little Wymondley	Priory Barn	MB	0	0	W	D	post			TL 218 279
lwy17	1		50	41	91	1499	1540	1540	2.63	0.91	2.11	1.86	4	Herts	Little Wymondley	Priory Barn	MB	0	0	W	D				TL 218 279
lwy25	1		18	19	37	1521	1540	1540	1.07	1.91	1.10	1.50	4	Herts	Little Wymondley	Priory Barn	MB	0	0	W	D				TL 218 279
lwy26	1		20	24	44	1516	1540	1540	1.74	1.09	1.16	1.39	4	Herts	Little Wymondley	Priory Barn	MB	0	0	W	D				TL 218 279
lwy30	1		45	26	71	1514	1540	1540	1.35	1.09	1.05	1.26	4	Herts	Little Wymondley	Priory Barn	MB	0	0	Sp	D				TL 218 279
kbr09	1	5	48	15	63	1403	1418	1418	2.68	1.98	2.27	2.51	4	Herts	St Albans	Kingsbury Manor	MB	0	0	W	D				TL 138 076
STA-B04A	1		43	9	52	1366	1375	1375	2.92	3.14	2.65	2.96	4	Herts	St Albans	Kingsbury Manor Barn	NT	0	0		E	post			TL 138 076
STA-B05A	1		41	13	54	1362	1375	1375	2.96	1.15	2.85	2.52	4	Herts	St Albans	Kingsbury Manor Barn	NT	0	0		E	post			TL 138 076
THO-H14A	1		42	14	56	1239	1253	1253	3.40	1.83	2.74	3.01	4	Herts	Thorley	Thorley Hall	NT	0	0		D	plate			TL 476 188
bg64	1	1	40	17	57	1583	1600	1600	1.89	1.07	1.39	1.64	9	Humberside	Hull	Beverleygate	SH	0	0	W	E				TA 097 287
bas121	1	1	36	20	56	1430	1450	1450	2.60	1.70	2.34	2.28	9	Humberside	Hull	Blaydes Staithe	SH	0	0	W	E				TA 102 289
bas132	1	1	40	19	59	1431	1450	1450	2.06	1.42	2.36	1.86	9	Humberside	Hull	Blaydes Staithe	SH	0	0	W	E				TA 102 289
bas135	1		32	21	53	1429	1450	1450	1.88	1.47	1.28	1.72	9	Humberside	Hull	Blaydes Staithe	SH	0	0	W	E				TA 102 289
bas152	1	1	39	17	56	1433	1450	1450	2.38	1.19	1.88	2.02	9	Humberside	Hull	Blaydes Staithe	SH	0	0	W	E				TA 102 289
AYL-A02	1		30	18	48	1682	1700	1700	2.38	2.24	2.42	2.33	1	Kent	Aylesford	Aylesford Priory	NT	0	0		E	stud			TQ 725 588
AYL-A03	1		71	15	86	1685	1700	1700	2.20	1.56	2.16	2.09	1	Kent	Aylesford	Aylesford Priory	NT	0	0		E	post			TQ 725 588
GNF-A06A	1		40	15	55	1535	1550	1550	2.00	1.47	0.88	1.86	1	Kent	Bobbing	Great Norwood Barn	NT	0	0		E	post			TQ 876 661
GNF-A10A	1		37	11	48	1539	1550	1550	4.16	2.99	4.09	3.89	1	Kent	Bobbing	Great Norwood Barn	NT	0	0		E	post			TQ 876 661
GNF-A11A	1		45	18	63	1532	1550	1550	2.80	1.16	2.26	2.33	1	Kent	Bobbing	Great Norwood Barn	NT	0	0		E	post			TQ 876 661

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
KLB-A20A	1		68	24	92	1558	1582	1582	2.05	1.38	2.66	1.87	1	Kent	Canterbury	Littlebourne Barn	NT	0	0		D	post			TR 211 579
KLB-A42A	2		90	24	114	1501	1525	1525	1.79	0.98	1.48	1.62	1	Kent	Canterbury	Littlebourne Barn	NT	0	0		D	brace			TR 211 579
KLB-A48A	2		86	28	114	1497	1525	1525	1.00	0.61	0.88	0.90	1	Kent	Canterbury	Littlebourne Barn	NT	0	0		D	stud			TR 211 579
KCH-A12B	1		47	21	68	1304	1325	1325	2.77	1.53	1.91	2.39	1	Kent	Charing	Archbishop's Palace	NT	0	0		E	rafter			TQ 954 494
KCH-A16A	1		45	20	65	1305	1325	1325	2.00	1.79	1.95	1.94	1	Kent	Charing	Archbishop's Palace	NT	0	0		E	stud			TQ 954 494
COB-B03A	1		49	28	77	1564	1592	1592	1.70	1.23	1.70	1.53	1	Kent	Cobham	Cobham Hall	NT	0	0		D	rafter			TQ 679 684
COB-B04A	1		104	18	122	1574	1592	1592	0.96	1.23	1.42	1.00	1	Kent	Cobham	Cobham Hall	NT	0	0		D	rafter			TQ 679 684
COB-B05A	1		70	36	106	1556	1592	1592	1.27	1.01	1.10	1.19	1	Kent	Cobham	Cobham Hall	NT	0	0		D	rafter			TQ 679 684
COB-B09A	1		81	36	117	1556	1592	1592	1.39	0.68	1.37	1.17	1	Kent	Cobham	Cobham Hall	NT	0	0		D	rafter			TQ 679 684
COB-B21A	1		81	31	112	1561	1592	1592	0.89	0.64	0.69	0.82	1	Kent	Cobham	Cobham Hall	NT	0	0		D	collar			TQ 679 684
COB-B24A	1		128	23	151	1569	1592	1592	1.21	0.56	0.77	1.11	1	Kent	Cobham	Cobham Hall	NT	0	0		D	rafter			TQ 679 684
COB-B28B	1		86	28	114	1564	1592	1592	1.15	0.43	0.70	0.97	1	Kent	Cobham	Cobham Hall	NT	0	0		D	rafter			TQ 679 684
COB-B45A	1		86	25	111	1567	1592	1592	1.27	0.82	0.99	1.17	1	Kent	Cobham	Cobham Hall	NT	0	0		D	brace			TQ 679 684
COB-B46A	1		84	21	105	1564	1585	1592	1.72	0.72	0.95	1.52	1	Kent	Cobham	Cobham Hall	NT	0	0		D	brace			TQ 679 684
COB-C48A	2		46	19	65	1562	1581	1581	1.36	1.53	1.62	1.41	1	Kent	Cobham	Cobham Hall	NT	0	0		D	rafter			TQ 679 684
COB-C66	2		100	33	133	1548	1581	1581	0.84	0.65	0.46	0.79	1	Kent	Cobham	Cobham Hall	NT	0	0		D	rafter			TQ 679 684
COB-D68A	3		93	24	117	1637	1661	1662	1.22	0.91	0.84	1.15	1	Kent	Cobham	Cobham Hall	NT	0	0		D	joist			TQ 679 684
COB-D74A	3		68	45	113	1612	1657	1662	0.94	0.57	0.61	0.79	1	Kent	Cobham	Cobham Hall	NT	0	0		D	joist			TQ 679 684
COB-D77A	3		106	32	138	1629	1661	1662	1.65	0.59	0.66	1.40	1	Kent	Cobham	Cobham Hall	NT	0	0		D	joist			TQ 679 684
COBF110A	3		94	29	123	1633	1662	1662	1.46	0.94	1.15	1.34	1	Kent	Cobham	Cobham Hall	NT	0	0		D	brace			TQ 679 684
COBF113A	4		76	17	93	1751	1768	1768	2.06	1.85	1.65	2.02	1	Kent	Cobham	Cobham Hall	NT	0	0		D	principal			TQ 679 684
COBF114A	4		42	28	70	1740	1768	1768	1.53	0.97	0.95	1.30	1	Kent	Cobham	Cobham Hall	NT	0	0		D	stud			TQ 679 684
COB-M01A	5		116	24	140	1977	2001	2001	2.58	1.04	1.11	2.32	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M02A	5		147	27	174	1974	2001	2001	2.09	1.32	0.79	1.97	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M03A	5		177	28	205	1973	2001	2001	1.77	1.20	0.88	1.69	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M05A	5		213	19	232	1982	2001	2001	1.49	2.07	0.95	1.53	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M07A	5		137	18	155	1983	2001	2001	2.26	1.48	1.81	2.17	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M09A	5		112	19	131	1982	2001	2001	2.70	1.07	2.31	2.46	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M10A	5		114	17	131	1984	2001	2001	2.65	2.46	2.05	2.62	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M11A	5		117	23	140	1978	2001	2001	2.21	1.15	1.33	2.03	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M12A	5		121	15	136	1986	2001	2001	2.64	1.37	1.77	2.50	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M13A	5		117	21	138	1979	2000	2001	2.95	2.89	2.11	2.94	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
COB-M14A	5		190	16	206	1984	2000	2001	0.86	0.69	0.57	0.85	1	Kent	Cobham	Cobham Hall	NT	0	0		D	Parkland			TQ 679 684
CWD-A08B	1		44	25	69	1370	1395	1395	2.23	1.55	1.92	1.98	1	Kent	Cowden	St Mary Magdalene Church	NT	0	0		D	joist			TQ 466 404
CWD-A12A	2		50	22	72	1763	1785	1785	2.89	1.48	2.56	2.46	1	Kent	Cowden	St Mary Magdalene Church	NT	0	0		A	brace			TQ 466 404
CWD-A16A	2		99	22	121	1763	1785	1785	1.25	0.45	0.60	1.11	1	Kent	Cowden	St Mary Magdalene Church	NT	0	0		D	beam			TQ 466 404
EDB-A01A	1		29	29	58	1476	1505	1505	2.13	1.16	1.73	1.64	1	Kent	Edenbridge	Church House	NT	0	0		D	plate			TQ 443 461
EDB-A12A	2		39	16	55	1359	1375	1375	3.25	2.06	2.20	2.90	1	Kent	Edenbridge	Church House	NT	0	0		E	rafter			TQ 443 461
FAV-A02B	1		67	21	88	1454	1475	1475	2.41	2.45	2.04	2.42	1	Kent	Faversham	Abbey Farm	NT	0	0		E	plate			TR 020 617
WHC-A14A	1		61	31	92	1453	1484	1484	1.44	0.94	1.29	1.27	1	Kent	Folkestone	Westenhanger Castle	NT	0	0		D	rafter			TR 123 372
KMF-A06A	1		23	24	47	1532	1556	1556	1.69	1.88	1.75	1.79	1	Kent	Fordwich	Manor House	NT	0	0		D	rafter			TR 184 599
KMF-A08A	1		73	19	92	1537	1556	1556	1.28	1.48	1.10	1.32	1	Kent	Fordwich	Manor House	NT	0	0		D	collar			TR 184 599
KMF-A09A	1		46	15	61	1541	1556	1556	1.41	1.43	1.36	1.41	1	Kent	Fordwich	Manor House	NT	0	0		A	brace			TR 184 599
FRD-B01A	1		73	22	95	1287	1309	1403	1.91	1.08	1.40	1.72	1	Kent	Frindsbury	Manor Farm Barn	NT	0	0		D	post			TQ 747 700
KIM-R03	1		92	26	118	1587	1613	1613	1.08	1.21	1.40	1.10	1	Kent	Ivy Hatch	Ightham Mote	NT	0	0		D	rafter			TQ 585 533
KIM-R04	1		87	31	118	1581	1612	1613	0.73	0.85	0.63	0.76	1	Kent	Ivy Hatch	Ightham Mote	NT	0	0		D	collar			TQ 585 533

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
OSP-A01A	1		55	21	76	1454	1475	1475	2.58	1.50	2.43	2.28	1	Kent	Ospringe	Maison Dieu	NT	0	0		E	beam			TR 003 608
SWA-A04A	1		29	20	49	1605	1625	1625	1.83	1.03	1.29	1.51	1	Kent	Penshurst	Swaylands Barn	NT	0	0		E	post			TQ 534 427
SND-C11	1		42	14	56	1436	1450	1450	2.58	1.56	2.14	2.33	1	Kent	Sandwich	33 Strand Street	NT	0	0		E	tiebeam			TR 330 582
SND-B04A	1		62	32	94	1302	1334	1334	1.88	0.79	1.30	1.51	1	Kent	Sandwich	39 Strand Street	NT	0	0		D	post			TR 330 583
SND-B06A	1		55	37	92	1297	1334	1334	1.65	0.93	1.40	1.36	1	Kent	Sandwich	39 Strand Street	NT	0	0		D	joist			TR 330 583
SND-B07A	1		50	33	83	1301	1334	1334	1.72	1.08	1.21	1.46	1	Kent	Sandwich	39 Strand Street	NT	0	0		D	joist			TR 330 583
SND-B09A	1		65	16	81	1318	1334	1334	1.64	0.88	1.11	1.49	1	Kent	Sandwich	39 Strand Street	NT	0	0		D	joist			TR 330 583
KSM-A03B	1		60	24	84	1473	1497	1497	1.36	0.91	1.08	1.23	1	Kent	Seal	Stonepitts Manor	NT	0	0		D	rafter			TQ 568 570
KSM-A04A	1		66	26	92	1471	1497	1497	0.94	0.69	0.39	0.87	1	Kent	Seal	Stonepitts Manor	NT	0	0		D	rafter			TQ 568 570
KSM-A13A	1		73	36	109	1461	1497	1497	1.26	0.37	0.53	0.96	1	Kent	Seal	Stonepitts Manor	NT	0	0		D	rafter			TQ 568 570
tbh2	2		60	20	80	1530	1550	1550	1.73	1.46	1.47	1.66	1	Kent	Sellenge	Talbot House	OX	0	0	Sp	A	joist	Domestic	Middle	TR 106 377
tbh3	2		85	29	114	1521	1550	1550	2.46	0.60	1.38	1.99	1	Kent	Sellenge	Talbot House	OX	0	0	W	A	beam	Domestic	Middle	TR 106 377
KSP-A03A	1		27	18	45	1632	1650	1650	2.37	2.41	1.92	2.39	1	Kent	Speldhurst	The Cottage	NT	0	0		E	joist			TQ 554 414
KST-A01A	1		61	14	75	1730	1744	1744	2.51	2.77	2.72	2.56	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	beam			TQ 790 450
KST-A04A	1		49	19	68	1725	1744	1744	1.35	1.10	1.04	1.28	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	stave			TQ 790 450
KST-A05A	1		56	15	71	1729	1744	1744	2.36	2.10	0.98	2.30	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		A	plate			TQ 790 450
KST-A07A	1		51	16	67	1728	1744	1744	2.07	1.51	1.51	1.93	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		A	post			TQ 790 450
KST-A08A	1		32	18	50	1726	1744	1744	1.95	1.17	1.26	1.67	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		A	post			TQ 790 450
KST-A12A	1		46	18	64	1726	1744	1744	1.49	1.19	0.98	1.40	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	stud			TQ 790 450
KST-A15A	2		67	16	83	1750	1766	1766	2.11	2.53	1.63	2.19	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	post			TQ 790 450
KST-A19A	2		63	22	85	1744	1766	1766	1.61	0.41	0.65	1.30	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		A	beam			TQ 790 450
KST-A20A	2		49	14	63	1752	1766	1766	1.47	1.88	1.39	1.56	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	post			TQ 790 450
KST-A21A	2		59	31	90	1735	1766	1766	1.85	1.10	1.86	1.59	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	post			TQ 790 450
KST-A23B	2		52	22	74	1744	1766	1766	1.48	0.75	1.16	1.26	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	brace			TQ 790 450
KST-A27A	3		47	30	77	1749	1779	1780	2.05	0.77	1.74	1.55	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	stud			TQ 790 450
KST-A32A	3		68	17	85	1763	1780	1780	1.29	1.22	1.53	1.27	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	rafter			TQ 790 450
KST-A36B	3		59	16	75	1763	1779	1780	1.78	1.39	1.25	1.69	1	Kent	Staplehurst	Manor Barn, Gt Newstead	NT	0	0		D	plate			TQ 790 450
HRD-A02	1		97	22	119	1478	1500	1500	1.39	1.54	1.41	1.42	1	Kent	Upper Hardres	Hardres Court	NT	0	0		E	brace			TR 152 508
KWW-A06A	1		32	15	47	1760	1775	1775	2.66	2.32	2.32	2.55	1	Kent	Wittersham	Stocks Mill	NT	0	0		E	brace			TQ 913 272
ttn04	1		28	13	41	1482	1495	1495	3.48	2.28	3.30	3.10	8	Lancs	Ashton under Lyne	Taunton Hall	MB	0	0	W	A	cruck			SD 927 004
ttn10	1		79	16	95	1479	1495	1495	2.58	1.69	1.49	2.43	8	Lancs	Ashton under Lyne	Taunton Hall	MB	0	0	Sp	D	cruck			SD 927 004
pen07m	1		81	12	93	1788	1800	1800	2.35	1.43	1.04	2.23	8	Lancs	Barrowford	Park Hall	MB	0	0		E				SD 862 397
hw003	1	1	67	28	95	1547	1575	1575	2.25	1.28	3.04	1.96	8	Lancs	Bolton	Hall I Th Wood	SH	0	0	Su	E				SO 723 116
lh009	1		76	20	96	1532	1552	1552	1.17	1.09	0.93	1.15	8	Lancs	Golborne	Lightshaw Hall	SH	0	0	Sp	D	plate			SJ 614 996
AST-B05A	1		46	20	66	1629	1649	1650	2.90	2.05	1.50	2.65	8	Lancs	Manchester	Astley Hospital	NT	0	0		D	beam			NY 991 391
AST-B11A	1		26	16	42	1634	1650	1650	3.66	2.65	3.66	3.28	8	Lancs	Manchester	Astley Hospital	NT	0	0		A	purlin			NY 991 391
AST-B13A	1		58	24	82	1625	1649	1650	1.88	1.47	1.90	1.76	8	Lancs	Manchester	Astley Hospital	NT	0	0		D	purlin			NY 991 391
AST-B15A	1		94	16	110	1633	1649	1650	1.28	2.08	1.46	1.39	8	Lancs	Manchester	Astley Hospital	NT	0	0		D	principal			NY 991 391
AST-B16A	1		89	31	120	1619	1650	1650	1.35	0.80	0.74	1.21	8	Lancs	Manchester	Astley Hospital	NT	0	0		D	purlin			NY 991 391
AST-B19A	1		19	14	33	1636	1650	1650	3.99	2.34	3.62	3.29	8	Lancs	Manchester	Astley Hospital	NT	0	0		A	purlin			NY 991 391
sf01	1	1	39	13	52	1588	1601	1601	4.85	4.05	1.73	4.65	8	Lancs	Manchester	Sefton Fold	SH	0	0	W	A				SD 648 097
sf02	1	1	77	18	95	1583	1601	1601	1.71	1.89	4.75	1.74	8	Lancs	Manchester	Sefton Fold	SH	0	0	W	D				SD 648 097
MDB-A02	1		128	20	148	1267	1287	1287	1.10	1.13	0.96	1.11	5	Leics	Medbourne	The Manor House	NT	0	0		D	tiebeam			SP 803 930
MDB-A11	2		36	20	56	1218	1238	1238	1.75	0.85	1.66	1.43	5	Leics	Medbourne	The Manor House	NT	0	0		D	collar			SP 803 930
MDB-A13	2		45	13	58	1224	1237	1238	2.08	1.89	2.12	2.04	5	Leics	Medbourne	The Manor House	NT	0	0		D	stud			SP 803 930
MDB-A16	2		57	19	76	1218	1237	1238	1.80	1.42	2.21	1.71	5	Leics	Medbourne	The Manor House	NT	0	0		D	brace			SP 803 930

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
MDB-A17	2		52	11	63	1226	1237	1238	2.02	1.06	1.01	1.86	5	Leics	Medbourne	The Manor House	NT	0	0		D	stud			SP 803 930
ALF-A09A	1		41	21	62	1590	1611	1611	1.47	1.24	1.22	1.39	5	Lincs	Alford	Manor House	NT	0	0		D	collar			TF 454 759
ALF-A31A	1		85	19	104	1592	1611	1611	2.22	1.55	1.67	2.10	5	Lincs	Alford	Manor House	NT	0	0		D	beam			TF 454 759
ALF-A33A	1		52	21	73	1590	1611	1611	1.57	1.75	1.57	1.63	5	Lincs	Alford	Manor House	NT	0	0		D	joist			TF 454 759
ALF-A34A	1		47	21	68	1590	1611	1611	1.76	1.31	1.15	1.62	5	Lincs	Alford	Manor House	NT	0	0		D	joist			TF 454 759
ALF-A36A	1		52	22	74	1589	1611	1611	2.06	1.46	1.86	1.88	5	Lincs	Alford	Manor House	NT	0	0		D	joist			TF 454 759
ALF-A37A	2		96	42	138	1622	1664	1664	1.33	0.66	0.60	1.13	5	Lincs	Alford	Manor House	NT	0	0		D	beam			TF 454 759
ALF-A40A	1		64	17	81	1594	1611	1611	1.32	1.14	1.13	1.28	5	Lincs	Alford	Manor House	NT	0	0		D	joist			TF 454 759
831578	1		130	24	154	1106	1130	1100	1.70	1.85	2.16	1.73	5	Lincs	Barton on Humber	St Peters Church	SH	0	0	W	D				TA 034 219
831593	1		135	22	157	1066	1088	1100	1.05	1.08	1.07	1.05	5	Lincs	Barton on Humber	St Peters Church	SH	0	0	W	D				TA 034 219
831626	1		80	39	119	1095	1134	1100	1.79	0.96	1.70	1.52	5	Lincs	Barton on Humber	St Peters Church	SH	0	0	Sp	D				TA 034 219
896476	1		131	24	155	1095	1119	1100	1.98	1.44	1.59	1.89	5	Lincs	Barton on Humber	St Peters Church	SH	0	0	W	D				TA 034 219
896487	1		63	30	93	1104	1134	1100	1.86	1.25	1.72	1.66	5	Lincs	Barton on Humber	St Peters Church	SH	0	0	W	D				TA 034 219
896488	1		149	30	179	1103	1133	1100	1.29	0.81	1.24	1.21	5	Lincs	Barton on Humber	St Peters Church	SH	0	0		D				TA 034 219
896503	1		198	35	233	1094	1129	1100	0.83	0.57	0.74	0.79	5	Lincs	Barton on Humber	St Peters Church	SH	0	0	Sp	D				TA 034 219
896504	1		208	48	256	1055	1103	1100	1.13	1.09	0.82	1.12	5	Lincs	Barton on Humber	St Peters Church	SH	0	0	W	D				TA 034 219
bohsp19	2		49	19	68	1694	1713	1713	2.09	1.75	1.77	2.00	5	Lincs	Barton on Humber	St Peters Church	SH	0	0	Sp	D				TA 034 219
BEN-A01B	1		75	15	90	1702	1717	1717	1.60	1.06	1.12	1.51	5	Lincs	Benington	Bay Hall	NT	0	0		D	beam			TF 393 463
BEN-A03	1		82	15	97	1702	1717	1717	1.85	1.16	1.24	1.74	5	Lincs	Benington	Bay Hall	NT	0	0		D	beam			TF 393 463
BEN-A04	1		75	31	106	1685	1716	1717	1.48	1.15	1.11	1.38	5	Lincs	Benington	Bay Hall	NT	0	0		D	beam			TF 393 463
BEN-A05A	1		76	25	101	1692	1717	1717	1.87	0.94	0.76	1.64	5	Lincs	Benington	Bay Hall	NT	0	0		D	beam			TF 393 463
swh01	1		72	23	95	1454	1477	1477	1.18	0.77	0.97	1.08	5	Lincs	Spalding	White Hart Hotel	MB	0	0		D				TF 248 227
swh02	1		46	34	80	1443	1477	1477	1.04	0.65	0.58	0.88	5	Lincs	Spalding	White Hart Hotel	MB	0	0		D				TF 248 227
east04m	1		118	36	154	1529	1565	1565	1.28	0.76	0.58	1.16	2	London	Barking	Eastbury Manor House	SH	0	0	Sp	D				TQ 457 838
east07m	1		199	30	229	1535	1565	1565	1.07	1.00	1.00	1.06	2	London	Barking	Eastbury Manor House	SH	0	0	Sp	D				TQ 457 838
bfl02	1		82	17	99	1545	1562	1562	0.70	0.66	0.57	0.70	2	London	Enfield	Broomfield House	MB	0	0	Sp	D				TQ 305 927
kin07	1		23	18	41	1440	1458	1458	1.40	1.62	1.28	1.50	2	London	Kingston on Thames	39-41 High Street	MB	0	0	Sp	D				TQ 177 688
b4978	1	1	46	13	59	1207	1220	1150	2.01	1.28	1.58	1.85	2	London	London	Billingsgate Lorry Park	SH	0	0	W	D				TQ 329 806
b5049	1	5	39	10	49	1040	1050	1150	2.59	4.03	2.53	2.88	2	London	London	Billingsgate Lorry Park	SH	0	0	W	E				TQ 329 806
b5478	1	5	50	26	76	1024	1050	1150	1.69	1.68	2.76	1.69	2	London	London	Billingsgate Lorry Park	SH	0	0	W	E				TQ 329 806
b5686	1		60	12	72	1038	1050	1150	3.77	5.55	4.53	4.07	2	London	London	Billingsgate Lorry Park	SH	0	0		E				TQ 329 806
b5725	1		132	29	161	1186	1215	1150	0.76	0.47	0.62	0.70	2	London	London	Billingsgate Lorry Park	SH	0	0		D				TQ 329 806
b5855a	1		29	14	43	1036	1050	1150	2.22	1.97	2.60	2.14	2	London	London	Billingsgate Lorry Park	SH	0	0	W	E				TQ 329 806
b5904	1		65	30	95	1024	1054	1150	0.72	1.00	0.77	0.81	2	London	London	Billingsgate Lorry Park	SH	0	0		D				TQ 329 806
b5915b	1		55	26	81	1024	1050	1150	1.22	1.01	1.67	1.16	2	London	London	Billingsgate Lorry Park	SH	0	0		E				TQ 329 806
b5931b	1		75	45	120	1009	1054	1150	0.88	0.63	0.99	0.78	2	London	London	Billingsgate Lorry Park	SH	0	0	Sp	D				TQ 329 806
b6109	1	1	18	46	64	1004	1050	1150	1.54	0.71	1.28	0.94	2	London	London	Billingsgate Lorry Park	SH	0	0	W	E				TQ 329 806
b6310	1		78	24	102	1026	1050	1150	1.49	1.87	1.57	1.58	2	London	London	Billingsgate Lorry Park	SH	0	0	W	E				TQ 329 806
b6312	1		48	21	69	1018	1039	1150	1.06	1.81	1.10	1.29	2	London	London	Billingsgate Lorry Park	SH	0	0	W	D				TQ 329 806
b6340	1		170	49	219	1004	1053	1150	0.55	0.40	0.50	0.52	2	London	London	Billingsgate Lorry Park	SH	0	0	W	D				TQ 329 806
b6448	1		117	21	138	1018	1039	1150	0.93	0.68	0.97	0.89	2	London	London	Billingsgate Lorry Park	SH	0	0	W	D				TQ 329 806
b6528	1		93	17	110	1019	1036	1150	0.67	0.59	0.85	0.66	2	London	London	Billingsgate Lorry Park	SH	0	0	W	D				TQ 329 806
b6658	1	10	34	34	68	1016	1050	1150	0.98	1.31	1.05	1.14	2	London	London	Billingsgate Lorry Park	SH	0	0	Su	E				TQ 329 806
b6723	1	10	173	17	190	1037	1054	1150	0.70	0.41	0.81	0.68	2	London	London	Billingsgate Lorry Park	SH	0	0		D				TQ 329 806
b6726	1		25	71	96	979	1050	1150	0.49	0.46	0.63	0.46	2	London	London	Billingsgate Lorry Park	SH	0	0		E				TQ 329 806
b6869a	1	10	28	14	42	1036	1050	1150	3.50	2.89	4.27	3.30	2	London	London	Billingsgate Lorry Park	SH	0	0	W	E				TQ 329 806

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
b6965	1	5	39	16	55	1034	1050	1150	1.79	2.36	1.32	1.96	2	London	London	Billingsgate Lorry Park	SH	0	0	Sp	E				TQ 329 806
b7100	1		69	29	98	1010	1039	1150	1.90	2.24	1.54	2.00	2	London	London	Billingsgate Lorry Park	SH	0	0	W	D				TQ 329 806
b7119	1		63	32	95	1007	1039	1150	2.03	0.91	1.01	1.65	2	London	London	Billingsgate Lorry Park	SH	0	0	W	D				TQ 329 806
b7422	1	10	24	15	39	1035	1050	1150	2.53	1.76	2.35	2.24	2	London	London	Billingsgate Lorry Park	SH	0	0	W	E				TQ 329 806
pet1297	1	5	42	32	74	262	294	294	1.46	0.73	1.35	1.14	2	London	London	St Peters Hill	SH	0	0		D				TQ 320 809
pet1304	1	5	31	23	54	270	293	294	2.26	0.84	1.10	1.66	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1307	1	1	88	15	103	278	293	294	1.23	0.79	0.84	1.16	2	London	London	St Peters Hill	SH	0	0	W	D				TQ 320 809
pet1350	1	5	38	24	62	269	293	294	2.50	0.89	1.67	1.88	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1367	1	5	41	20	61	273	293	294	1.66	1.55	1.40	1.62	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1369	1	1	41	23	64	270	293	294	2.12	0.91	1.59	1.69	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1467	1	1	40	19	59	274	293	294	1.95	1.21	1.14	1.71	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1477	1	5	45	20	65	273	293	294	1.88	1.32	1.33	1.70	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1484	1	5	42	17	59	276	293	294	1.89	1.16	1.26	1.68	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1551	1		36	19	55	274	293	294	1.20	0.81	0.91	1.07	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1558	1		29	21	50	272	293	294	2.08	1.03	1.99	1.64	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1562	1	1	43	21	64	272	293	294	1.73	0.94	0.95	1.47	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
pet1569	1	10	41	13	54	280	293	294	1.17	0.79	0.96	1.08	2	London	London	St Peters Hill	SH	0	0	Sp	D				TQ 320 809
sus43	1	1	27	13	40	280	293	293	2.49	1.94	2.20	2.31	2	London	London	Sunlight Wharf	SH	0	0	W	D				TQ 320 809
sus51	1	1	38	15	53	278	293	293	1.82	1.76	1.64	1.80	2	London	London	Sunlight Wharf	SH	0	0	W	D				TQ 320 809
sus51b	1	1	43	19	62	274	293	293	1.75	1.01	1.16	1.52	2	London	London	Sunlight Wharf	SH	0	0	W	D				TQ 320 809
sus52	1	1	47	18	65	275	293	293	1.33	0.82	0.88	1.19	2	London	London	Sunlight Wharf	SH	0	0	W	D				TQ 320 809
sus54	1	1	49	20	69	273	293	293	1.49	0.73	1.09	1.27	2	London	London	Sunlight Wharf	SH	0	0	W	D				TQ 320 809
sus55	1	1	37	18	55	275	293	293	2.13	1.45	1.50	1.90	2	London	London	Sunlight Wharf	SH	0	0	W	D				TQ 320 809
sus57	1	1	49	17	66	276	293	293	1.53	1.32	0.92	1.48	2	London	London	Sunlight Wharf	SH	0	0	W	D				TQ 320 809
sus642	1	1	25	21	46	272	293	293	2.09	0.90	1.08	1.55	2	London	London	Sunlight Wharf	SH	0	0	W	D				TQ 320 809
to11	3	5	36	11	47	1592	1603	1603	4.70	3.52	4.16	4.42	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	D	Misc	Royal		TQ 336 805
to110	3	5	125	14	139	1588	1602	1603	2.00	2.00	1.78	2.00	2	London	London	White Tower, HM Tower of London	OX	0	0	Su	D	Misc	Royal		TQ 336 805
to111	3	5	60	25	85	1578	1603	1603	1.85	1.45	1.41	1.73	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805
to112	7	10	79	16	95	1601	1617	1617	1.99	1.73	2.61	1.95	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805
to119	8	5	80	20	100	1759	1779	1780	1.41	0.97	1.01	1.32	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805
to12	3	3	72	11	83	1592	1603	1603	2.10	2.19	1.98	2.11	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805
to121	1	10	166	22	188	1467	1489	1490	1.34	1.16	0.98	1.32	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	D	Misc	Royal		TQ 336 805
to124	1	20	132	20	152	1470	1490	1490	1.72	1.12	1.29	1.64	2	London	London	White Tower, HM Tower of London	OX	2	0	Sp	D	Misc	Royal		TQ 336 805
to13	3	5	144	20	164	1583	1603	1603	0.98	0.97	0.47	0.98	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	A	Misc	Royal		TQ 336 805
to131	1		56	17	73	1471	1488	1490	1.32	1.53	1.34	1.37	2	London	London	White Tower, HM Tower of London	OX	2	1	Sp	D	Misc	Royal		TQ 336 805
to133	6		59	19	78	1762	1781	1781	3.79	2.00	2.59	3.35	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805
to134	6	1	62	23	85	1758	1781	1781	2.22	0.99	1.55	1.89	2	London	London	White Tower, HM Tower of London	OX	2	2	Sp	D	Misc	Royal		TQ 336 805
to135	6		18	9	27	1772	1781	1781	2.67	1.90	2.60	2.41	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805
to14	3		69	18	87	1585	1603	1603	1.77	1.38	1.15	1.69	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805
to142a2	9	50	48	19	67	1762	1781	1781	2.12	0.82	1.12	1.75	2	London	London	White Tower, HM Tower of London	OX	0	0	W	A	Misc	Royal		TQ 336 805
to143	9	1	46	13	59	1768	1781	1781	2.58	2.39	2.49	2.54	2	London	London	White Tower, HM Tower of London	OX	2	1	W	D	Misc	Royal		TQ 336 805
to144	9	1	95	53	148	1724	1777	1781	1.51	0.64	1.01	1.20	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	D	Misc	Royal		TQ 336 805
to146	9	10	64	16	80	1764	1780	1781	2.13	1.81	2.18	2.06	2	London	London	White Tower, HM Tower of London	OX	2	1	W	D	Misc	Royal		TQ 336 805
to147	9	10	67	30	97	1751	1781	1781	1.87	0.39	1.46	1.41	2	London	London	White Tower, HM Tower of London	OX	0	0		A	Misc	Royal		TQ 336 805
to148	9	1	72	15	87	1765	1780	1781	2.10	2.14	1.53	2.10	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805
to149	9	20	51	20	71	1761	1781	1781	2.17	1.50	1.33	1.98	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D	Misc	Royal		TQ 336 805

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
tol5	3		100	23	123	1580	1603	1603	1.43	1.64	1.67	1.47	2	London	London	White Tower, HM Tower of London	OX	2	2	W	D		Misc	Royal	TQ 336 805
tol50	8	3	81	19	100	1761	1780	1780	1.51	1.75	1.52	1.56	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D		Misc	Royal	TQ 336 805
tol51	3	1	63	19	82	1583	1602	1603	2.72	1.56	1.63	2.45	2	London	London	White Tower, HM Tower of London	OX	0	0	Su	D		Misc	Royal	TQ 336 805
tol54	2	10	63	20	83	1546	1566	1566	2.64	1.13	2.15	2.28	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D		Misc	Royal	TQ 336 805
tol6b	3	50	38	44	82	1559	1603	1603	1.06	0.49	0.64	0.75	2	London	London	White Tower, HM Tower of London	OX	0	0	W	A		Misc	Royal	TQ 336 805
tol7	3	5	93	21	114	1582	1603	1603	1.60	1.36	1.33	1.56	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D		Misc	Royal	TQ 336 805
tol8	3	15	109	22	131	1581	1603	1603	2.04	0.93	1.37	1.85	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	A		Misc	Royal	TQ 336 805
tol80	5	5	79	14	93	1769	1783	1783	2.17	1.85	1.87	2.12	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D		Misc	Royal	TQ 336 805
tol82	4		58	17	75	1515	1532	1533	1.71	1.46	1.87	1.65	2	London	London	White Tower, HM Tower of London	OX	0	0	W	D		Misc	Royal	TQ 336 805
tol84	4		95	23	118	1510	1533	1533	1.43	1.01	1.24	1.35	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	D		Misc	Royal	TQ 336 805
tol85	5		39	13	52	1770	1783	1783	3.25	2.56	2.73	3.08	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	D		Misc	Royal	TQ 336 805
tol86	5		39	18	57	1765	1783	1783	2.98	2.14	2.43	2.72	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	D		Misc	Royal	TQ 336 805
tol87	4		88	21	109	1511	1532	1533	1.10	0.88	1.09	1.06	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	D		Misc	Royal	TQ 336 805
tol88	5	10	37	15	52	1768	1783	1783	2.92	2.13	2.34	2.69	2	London	London	White Tower, HM Tower of London	OX	0	0	Sp	D		Misc	Royal	TQ 336 805
tol9	3	5	74	21	95	1582	1603	1603	1.69	1.03	0.25	1.54	2	London	London	White Tower, HM Tower of London	OX	0	0	W	A		Misc	Royal	TQ 336 805
tf02	1	1	58	18	76	1759	1777	1777	1.93	2.63	2.14	2.09	2	London	Tilbury	Tilbury Fort 1988	SH	0	0	W	A				TQ 651 755
tf03	1	1	44	27	71	1750	1777	1777	2.28	1.72	1.46	2.07	2	London	Tilbury	Tilbury Fort 1988	SH	0	0	Sp	D				TQ 651 755
tpr01	1		83	24	107	1597	1621	1621	1.35	0.97	2.02	1.26	2	London	Tottenham	The Priory, Church Lane	MB	0	0	Su	D				TQ 333 109
wa1	2	1	61	23	84	1347	1370	1370	1.68	1.33	2.00	1.58	2	London	Westminster	Westminster Abbey	OX	0	0	W	E		Church	Monastic	TQ 300 795
wa11	1	1	47	16	63	1734	1750	1750	2.32	1.42	2.04	2.09	2	London	Westminster	Westminster Abbey	OX	2	1	W	E		Church	Monastic	TQ 300 795
wa5	2	20	24	10	34	1360	1370	1370	3.47	3.97	3.36	3.62	2	London	Westminster	Westminster Abbey	OX	0	0	Su	E		Church	Monastic	TQ 300 795
wa6	2	1	68	16	84	1354	1370	1370	1.76	1.32	1.40	1.67	2	London	Westminster	Westminster Abbey	OX	0	0	Sp	E		Church	Monastic	TQ 300 795
STKA101A	1		45	16	61	1604	1620	1620	2.22	1.75	1.16	2.10	8	Manchester	Stockport	Staircase House	NT	0	0		A	purlin			SJ 897 906
STKA104A	1		42	12	54	1447	1459	1620	2.25	1.82	1.29	2.15	8	Manchester	Stockport	Staircase House	NT	0	0		D	rafter			SJ 897 906
STKA105A	1		44	14	58	1606	1620	1620	2.24	1.80	1.42	2.13	8	Manchester	Stockport	Staircase House	NT	0	0		A	rafter			SJ 897 906
STKA106A	1		58	13	71	1523	1536	1620	1.42	1.24	1.33	1.39	8	Manchester	Stockport	Staircase House	NT	0	0		D	rafter			SJ 897 906
STKA108A	1		53	14	67	1604	1618	1620	1.81	1.68	1.63	1.78	8	Manchester	Stockport	Staircase House	NT	0	0		D	rafter			SJ 897 906
STKA109A	1		46	21	67	1599	1620	1620	1.81	1.09	1.75	1.58	8	Manchester	Stockport	Staircase House	NT	0	0		A	misc			SJ 897 906
STKA112A	1		39	15	54	1597	1612	1620	1.43	1.61	1.27	1.48	8	Manchester	Stockport	Staircase House	NT	0	0		D	rafter			SJ 897 906
STKA116A	1		50	20	70	1600	1620	1620	0.87	0.81	0.70	0.85	8	Manchester	Stockport	Staircase House	NT	0	0		D	rail			SJ 897 906
STKA128A	2		96	32	128	1620	1652	1656	0.97	1.08	0.40	0.99	8	Manchester	Stockport	Staircase House	NT	0	0		D	rail			SJ 897 906
STKA130A	2		51	33	84	1623	1656	1656	1.63	0.97	1.12	1.37	8	Manchester	Stockport	Staircase House	NT	0	0		D	post			SJ 897 906
STKA135A	2		34	20	54	1636	1656	1656	2.93	1.34	2.42	2.34	8	Manchester	Stockport	Staircase House	NT	0	0		A	stud			SJ 897 906
STKA137B	2		57	20	77	1636	1656	1656	2.00	1.21	2.54	1.80	8	Manchester	Stockport	Staircase House	NT	0	0		A	rail			SJ 897 906
STK-A97A	1		49	15	64	1602	1617	1620	1.67	2.16	2.23	1.78	8	Manchester	Stockport	Staircase House	NT	0	0		D	joist			SJ 897 906
HED-B01A	1		128	26	154	1479	1505	1505	1.58	0.60	0.72	1.41	2	Middlesex	Harrow	Headstone Manor	NT	0	0		A	post			TQ 141 897
HED-B08A	1		72	21	93	1484	1505	1505	1.49	1.06	1.24	1.39	2	Middlesex	Harrow	Headstone Manor	NT	0	0		D	rail			TQ 141 897
HED-B15B	1		95	18	113	1487	1505	1505	2.07	1.21	1.63	1.93	2	Middlesex	Harrow	Headstone Manor	NT	0	0		D	post			TQ 141 897
HED-B16A	1		65	29	94	1476	1505	1505	2.02	1.04	1.62	1.72	2	Middlesex	Harrow	Headstone Manor	NT	0	0		D	post			TQ 141 897
WDR-A01A	1		44	30	74	1470	1500	1500	2.45	1.03	1.61	1.88	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	tiebeam			TQ 077 813
WDR-A02A	1		55	21	76	1479	1500	1500	2.10	0.74	1.82	1.73	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	stud			TQ 077 813
WDR-A03A	1		78	19	97	1481	1500	1500	1.64	1.16	1.29	1.55	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	post			TQ 077 813
WDR-A07A	1		41	26	67	1474	1500	1500	1.99	1.19	1.13	1.68	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	tiebeam			TQ 077 813
WDR-A12A	1		139	30	169	1470	1500	1500	0.93	0.76	0.74	0.90	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	stud			TQ 077 813
WDR-A13A	1		103	25	128	1475	1500	1500	1.08	0.66	0.75	1.00	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	principal			TQ 077 813
WDR-A16A	1		48	17	65	1483	1500	1500	2.05	1.15	2.41	1.81	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	post			TQ 077 813

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
WDR-A17A	1		50	15	65	1485	1500	1500	2.04	1.04	1.64	1.81	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	stud			TQ 077 813
WDR-A25A	1		164	32	196	1468	1500	1500	0.80	0.67	0.72	0.78	2	Middlesex	Hillingdon	Hubbards Farm	NT	0	0		E	rail			TQ 077 813
rdl1	1	10	151	28	179	1542	1570	1570	2.00	1.08	1.40	1.86	7	N Yorks	Harome	The Manor House	OX	0	0	Sp	D		Domestic	Middle	SE 644 820
rdl2	1		126	29	155	1541	1570	1570	1.18	0.72	0.80	1.09	7	N Yorks	Harome	The Manor House	OX	0	0	Sp	D		Domestic	Middle	SE 644 820
tph25	2		102	32	134	1551	1583	1583	2.20	0.69	1.24	1.84	7	N Yorks	Ripon	Thorpe Prebend House	SH	0	0	W	D				SE 316 714
tph29	2		110	23	133	1560	1583	1583	2.05	1.26	1.30	1.91	7	N Yorks	Ripon	Thorpe Prebend House	SH	0	0	W	D				SE 316 714
tph39	1		81	21	102	1495	1516	1516	1.31	1.14	1.26	1.27	7	N Yorks	Ripon	Thorpe Prebend House	SH	0	0	W	D				SE 316 714
snngtn16	1		60	22	82	1494	1516	1516	1.52	0.86	1.62	1.35	7	N Yorks	Sinnington	Old Chapel	SH	0	0	W	D				SE 746 861
snngtn18	1		67	33	100	1483	1516	1516	1.35	1.22	1.39	1.31	7	N Yorks	Sinnington	Old Chapel	SH	0	0	W	D				SE 746 861
c8431	1		114	31	145	1256	1287	1287	1.41	0.91	1.49	1.30	7	N Yorks	York	Coppergate	SH	0	0	Su	D				SE 604 516
c8957	1	1	79	32	111	1268	1300	1287	0.63	0.40	0.39	0.56	7	N Yorks	York	Coppergate	SH	0	0	Su	E				SE 604 516
cap33	1	5	88	23	111	1377	1400	1400	2.01	0.83	0.77	1.77	4	Norfolk	Castle Acre	Castle Acre Priory	SH	0	0	Su	E				TF 815 147
flbrg01	1	10	127	22	149	1662	1684	1684	1.46	1.01	1.11	1.40	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0		D				TG 193 394
flbrg02	1		84	17	101	1667	1684	1684	1.42	1.95	1.89	1.51	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg03	1		55	14	69	1670	1684	1684	3.93	3.83	4.59	3.91	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0		A				TG 193 394
flbrg04	1	1	58	15	73	1669	1684	1684	2.83	2.20	1.72	2.70	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg06	1		97	22	119	1662	1684	1684	1.59	0.85	0.84	1.46	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg07	1		30	14	44	1670	1684	1684	4.32	3.67	4.51	4.11	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg08	1		106	20	126	1664	1684	1684	1.58	1.88	1.30	1.63	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg09	1		78	19	97	1665	1684	1684	1.36	0.99	1.08	1.28	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg10	1		104	15	119	1669	1684	1684	1.59	2.20	1.75	1.67	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg11	1		90	27	117	1657	1684	1684	1.25	0.91	1.12	1.17	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0		D				TG 193 394
flbrg12	1		82	19	101	1665	1684	1684	1.38	0.81	1.38	1.27	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg13	1		74	21	95	1663	1684	1684	2.06	1.68	2.02	1.97	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg14	1	5	103	37	140	1647	1684	1684	1.50	0.54	0.78	1.25	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg15	1		35	14	49	1670	1684	1684	4.92	3.50	4.66	4.52	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0		D				TG 193 394
flbrg17	1		31	28	59	1656	1684	1684	2.02	1.71	1.65	1.87	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
flbrg18	1		60	20	80	1664	1684	1684	3.12	1.36	2.45	2.68	4	Norfolk	Felbrigg	Felbrigg Hall	SH	0	0	W	D				TG 193 394
hns10a	1	10	75	22	97	-2070	-2048	-2048	0.99	0.73	0.98	0.93	4	Norfolk	Holme next the Sea	Seahenge	SH	0	0	Sp	D				TF 711 452
hns12a	1	10	64	21	85	-2069	-2048	-2048	3.41	1.27	4.27	2.88	4	Norfolk	Holme next the Sea	Seahenge	SH	0	0	Sp	D				TF 711 452
hns27	1	1	57	55	112	-2103	-2048	-2048	1.27	0.77	0.92	1.02	4	Norfolk	Holme next the Sea	Seahenge	SH	0	0	Sp	D				TF 711 452
hns31	1	1	71	40	111	-2088	-2048	-2048	0.97	0.61	0.86	0.84	4	Norfolk	Holme next the Sea	Seahenge	SH	0	0		D				TF 711 452
hns35a	1		34	29	63	-2077	-2048	-2048	1.18	0.82	1.26	1.02	4	Norfolk	Holme next the Sea	Seahenge	SH	0	0	Sp	D				TF 711 452
hns46a	1	10	106	19	125	-2067	-2048	-2048	1.21	0.67	1.16	1.12	4	Norfolk	Holme next the Sea	Seahenge	SH	0	0	Sp	D				TF 711 452
hns64a	1	1	87	36	123	-2084	-2048	-2048	1.23	0.85	1.05	1.12	4	Norfolk	Holme next the Sea	Seahenge	SH	0	0	Sp	D				TF 711 452
gfi05	1	10	34	29	63	1347	1376	1376	3.68	1.02	3.04	2.46	4	Norfolk	Ingham	Grange Farm Barn	MB	0	0	Sp	D				TG 385 261
mar02	3		44	16	60	1553	1569	1583	4.62	2.02	3.27	3.93	4	Norfolk	Kings Lynn	Marriots Warehouse	SH	0	0	W	A				TF 616 196
mar06	2		121	24	145	1545	1569	1569	1.14	1.13	0.83	1.14	4	Norfolk	Kings Lynn	Marriots Warehouse	SH	0	0	W	D				TF 616 196
mar07	1		120	18	138	1480	1498	1498	1.82	1.10	1.50	1.72	4	Norfolk	Kings Lynn	Marriots Warehouse	SH	0	0	W	D				TF 616 196
mar14	3		66	28	94	1554	1582	1583	2.33	1.24	1.72	2.01	4	Norfolk	Kings Lynn	Marriots Warehouse	SH	0	0		D				TF 616 196
mar16	3		141	17	158	1566	1583	1583	1.77	2.22	2.85	1.81	4	Norfolk	Kings Lynn	Marriots Warehouse	SH	0	0	W	D				TF 616 196
pkr03	1		102	20	122	1383	1403	1403	1.41	1.01	1.03	1.34	4	Norfolk	Norwich	Gt Hospital	MB	0	0		D				TG 236 090
THT-A01	1		61	19	80	1514	1533	1536	1.66	1.74	1.44	1.68	4	Norfolk	Thetford	Abbey Farm	NT	0	0		D	brace			TL 865 835
THT-A17B	1		61	21	82	1512	1533	1536	1.33	0.54	0.92	1.13	4	Norfolk	Thetford	Abbey Farm	NT	0	0		D	brace			TL 865 835
THT-A33	1		139	25	164	1509	1534	1536	0.72	0.71	0.62	0.72	4	Norfolk	Thetford	Abbey Farm	NT	0	0		D	brace			TL 865 835
THT-A49B	1		97	19	116	1514	1533	1536	1.00	0.77	0.77	0.96	4	Norfolk	Thetford	Abbey Farm	NT	0	0		D	purlin			TL 865 835

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
THT-A50A	1		31	26	57	1510	1536	1536	1.62	1.43	1.61	1.53	4	Norfolk	Thetford	Abbey Farm	NT	0	0		D	rafter			TL 865 835
THT-A65	2		43	20	63	1608	1628	1628	1.98	0.83	1.50	1.62	4	Norfolk	Thetford	Abbey Farm	NT	0	0		A	rafter			TL 865 835
THT-A67A	2		41	19	60	1609	1628	1628	1.82	1.55	1.24	1.74	4	Norfolk	Thetford	Abbey Farm	NT	0	0		D	rafter			TL 865 835
cot1	1	10	72	17	89	1244	1261	1262	1.95	0.49	0.87	1.67	5	Northants	Cottingham	The Royal George	OX	0	0	W	D	misc	Domestic	Low	SP 844 902
cot4	1	20	36	38	74	1223	1261	1262	1.95	1.00	1.60	1.46	5	Northants	Cottingham	The Royal George	OX	0	0	W	D	collar	Domestic	Low	SP 844 902
cot8	1	20	72	12	84	1250	1262	1262	3.13	1.92	2.06	2.96	5	Northants	Cottingham	The Royal George	OX	0	0	Su	D	misc	Domestic	Low	SP 844 902
FAW-A05B	1		100	25	125	1540	1565	1565	0.92	0.47	0.75	0.83	5	Northants	Fawsley	Dower House, Fawsley Park	NT	0	0		D	lintel			SP 570 578
FAW-A21A	2		116	28	144	1547	1575	1575	1.02	0.51	0.51	0.92	5	Northants	Fawsley	Dower House, Fawsley Park	NT	0	0		D	lintel			SP 570 578
FAW-A24B	3		105	27	132	1868	1895	1895	1.14	0.74	1.00	1.06	5	Northants	Fawsley	Dower House, Fawsley Park	NT	0	0		D	lintel			SP 570 578
pmc06r	1		78	8	86	1498	1506	1506	1.89	1.05	0.86	1.81	5	Northants	Lower Catesby	Priory Meadow	MB	0	0	Sp	D				SP 515 596
pmc08r	1	1	107	19	126	1487	1506	1506	0.92	0.64	0.48	0.88	5	Northants	Lower Catesby	Priory Meadow	MB	0	0	W	A				SP 515 596
pmc09	2	1	74	18	92	1561	1579	1579	1.68	1.37	1.18	1.62	5	Northants	Lower Catesby	Priory Meadow	MB	0	0	W	D				SP 515 596
pmc13	2		107	29	136	1547	1576	1579	1.19	0.71	0.96	1.09	5	Northants	Lower Catesby	Priory Meadow	MB	0	0	Sp	D	lintel			SP 515 596
ASK-A21A	1		65	23	88	1701	1724	1724	1.01	0.78	0.90	0.95	5	Notts	Askham	Manor Farm	NT	0	0		D	rafter			SK 740 749
MST-B02A	1		123	29	152	1571	1600	1600	0.98	0.53	0.75	0.89	5	Notts	Misterton	Ravens Farm	NT	0	0		D	beam			SK 763 948
MST-B09A	1		73	35	108	1565	1600	1600	0.64	0.35	0.34	0.55	5	Notts	Misterton	Ravens Farm	NT	0	0		A	rafter			SK 763 948
MST-C07A	2		27	23	50	1459	1482	1482	2.30	0.89	1.97	1.65	5	Notts	Misterton	Ravens Farm	NT	0	0		A	rafter			SK 763 948
MST-C09A	2		46	11	57	1471	1482	1482	2.29	1.61	2.10	2.16	5	Notts	Misterton	Ravens Farm	NT	0	0		D	beam			SK 763 948
MST-C11A	2		29	15	44	1467	1482	1482	2.15	1.63	1.52	1.97	5	Notts	Misterton	Ravens Farm	NT	0	0		A	joist			SK 763 948
MST-C14A	2		45	17	62	1465	1482	1482	1.22	1.88	1.63	1.40	5	Notts	Misterton	Ravens Farm	NT	0	0		A	collar			SK 763 948
NWK-I02A	1		32	19	51	1432	1451	1451	1.96	1.34	1.61	1.73	5	Notts	Newark	17-21 Boar Lane	NT	0	0		D	rafter			SK 797 539
NWK-I03A	1		31	27	58	1424	1451	1451	1.74	0.58	0.98	1.20	5	Notts	Newark	17-21 Boar Lane	NT	0	0		A	rafter			SK 797 539
NWK-I07A	2		74	37	111	1620	1657	1657	0.91	0.75	0.90	0.85	5	Notts	Newark	17-21 Boar Lane	NT	0	0		D	rafter			SK 797 539
NWK-K07A	3		81	30	111	1298	1328	1328	1.83	0.77	0.95	1.55	5	Notts	Newark	17-21 Boar Lane	NT	0	0		D	joist			SK 797 539
NWK-N01A	4		40	16	56	1729	1745	1745	3.49	3.16	3.87	3.39	5	Notts	Newark	17-21 Boar Lane	NT	0	0		D	cruck			SK 797 539
NWK-B01A	1		97	27	124	1310	1337	1337	0.84	0.94	0.74	0.86	5	Notts	Newark	22-24 Kirkgate	NT	0	0		D	rafter			SK 798 540
NWK-B03A	1		28	36	64	1301	1337	1337	0.93	0.92	1.04	0.93	5	Notts	Newark	22-24 Kirkgate	NT	0	0		A	brace			SK 798 540
NWK-B04A	1		90	37	127	1300	1337	1337	0.69	0.62	0.59	0.67	5	Notts	Newark	22-24 Kirkgate	NT	0	0		A	brace			SK 798 540
NWK-G07A	1		138	38	176	1315	1353	1353	0.60	0.59	0.68	0.60	5	Notts	Newark	40-44 Cartergate	NT	0	0		D	brace			SK 799 537
NWK-G09A	2		36	16	52	1668	1684	1684	1.97	1.73	1.28	1.90	5	Notts	Newark	40-44 Cartergate	NT	0	0		D	joist			SK 799 537
NWK-H01	1		111	26	137	1278	1304	1304	1.15	0.92	1.09	1.11	5	Notts	Newark	40-44 Castlegate	NT	0	0		D	tiebeam			SK 795 538
NWK-R12A	1		100	33	133	1617	1650	1650	0.77	0.65	0.87	0.74	5	Notts	Newark	5 Church Street	NT	0	0		E	purlin			SK 798 575
NWK-R18A	2		91	38	129	1617	1655	1655	0.86	0.70	0.65	0.82	5	Notts	Newark	5 Church Street	NT	0	0		D	rafter			SK 798 575
NWK-Q03A	1		60	40	100	1713	1753	1753	1.69	0.49	0.87	1.21	5	Notts	Newark	6-12 Chain Street	NT	0	0		D	beam			SK 798 539
NWK-O09A	1		70	18	88	1536	1554	1554	1.33	1.25	1.22	1.31	5	Notts	Newark	Bede House Chapel	NT	0	0		D	purlin			SK 800 538
NWK-F03A	1		29	15	44	1450	1465	1465	2.87	0.98	1.94	2.23	5	Notts	Newark	Governor's House, 23-4 Lombard St	NT	0	0		D	rafter			SK 799 538
NWK-P01A	1		139	19	158	1637	1656	1656	0.72	0.63	0.62	0.71	5	Notts	Newark	Old Swan & Salmon, 36-8 Castlegate	NT	0	0		D	rafter			SK 795 538
NWK-P04A	1		140	22	162	1634	1656	1656	0.63	0.65	0.62	0.63	5	Notts	Newark	Old Swan & Salmon, 36-8 Castlegate	NT	0	0		D	rafter			SK 795 538
NWK-P06A	1		97	20	117	1636	1656	1656	0.76	0.81	0.73	0.77	5	Notts	Newark	Old Swan & Salmon, 36-8 Castlegate	NT	0	0		D	rafter			SK 795 538
NWK-P07A	1		106	19	125	1637	1656	1656	0.77	0.67	0.66	0.76	5	Notts	Newark	Old Swan & Salmon, 36-8 Castlegate	NT	0	0		D	rafter			SK 795 538
NWK-P08A	1		217	20	237	1636	1656	1656	0.82	0.36	0.40	0.78	5	Notts	Newark	Old Swan & Salmon, 36-8 Castlegate	NT	0	0		D	rafter			SK 795 538
NWK-E01	1		77	17	94	1723	1740	1740	2.07	1.24	0.83	1.92	5	Notts	Newark	Potterdike House, Lombard St	NT	0	0		D	principal			SK 797 537
NWK-E05	1		89	20	109	1711	1731	1740	1.45	1.08	1.26	1.39	5	Notts	Newark	Potterdike House, Lombard St	NT	0	0		D	purlin			SK 797 537
NWK-D03A	1		29	18	47	1632	1650	1650	1.92	1.27	0.85	1.67	5	Notts	Newark	Snaiths, 18 Kirkdate	NT	0	0		E	rafter			SK 798 540
NWK-D05A	1		33	12	45	1638	1650	1650	1.21	1.00	0.57	1.15	5	Notts	Newark	Snaiths, 18 Kirkdate	NT	0	0		E	collar			SK 798 540
NWK-D06A	1		36	23	59	1627	1650	1650	1.13	0.62	0.81	0.93	5	Notts	Newark	Snaiths, 18 Kirkdate	NT	0	0		E	collar			SK 798 540

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
NWK-D08A	1		22	22	44	1628	1650	1650	1.54	1.10	1.93	1.32	5	Notts	Newark	Snaiths, 18 Kirkdate	NT	0	0		E	collar			SK 798 540
NWK-D10A	1		34	23	57	1627	1650	1650	1.16	0.45	0.56	0.87	5	Notts	Newark	Snaiths, 18 Kirkdate	NT	0	0		E	collar			SK 798 540
NWK-D12A	1		30	22	52	1628	1650	1650	1.46	0.87	1.17	1.21	5	Notts	Newark	Snaiths, 18 Kirkdate	NT	0	0		E	rafter			SK 798 540
NEW-D02	1		45	20	65	1429	1449	1451	1.92	1.16	1.50	1.68	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		D	rafter			SK 796 538
NEW-D03	1		55	18	73	1433	1451	1451	1.27	1.47	1.89	1.32	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		A	rafter			SK 796 538
NEW-D08	1		45	21	66	1430	1451	1451	1.98	0.76	1.01	1.59	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		A	purlin			SK 796 538
NEW-D11	1		32	18	50	1433	1451	1451	1.30	0.91	1.63	1.16	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		A	rafter			SK 796 538
NEW-D12	1		37	19	56	1432	1451	1451	1.97	0.90	1.91	1.61	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		D	rafter			SK 796 538
NEW-D13	1		43	14	57	1437	1451	1451	1.33	1.45	2.46	1.36	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		A	rafter			SK 796 538
NEW-D14	1		27	15	42	1436	1451	1451	1.63	0.89	1.19	1.37	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		D	rafter			SK 796 538
NEW-D15	1		35	20	55	1431	1451	1451	2.19	1.35	2.06	1.89	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		D	rafter			SK 796 538
NEW-D16	1		44	12	56	1439	1451	1451	1.62	1.15	1.65	1.52	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		A	rafter			SK 796 538
NEW-D17	1		25	22	47	1429	1451	1451	1.64	1.17	1.82	1.42	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		D	rafter			SK 796 538
NEW-D19	1		33	17	50	1434	1451	1451	1.70	1.59	2.19	1.66	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		A	rafter			SK 796 538
NEW-D21	1		43	12	55	1439	1451	1451	1.95	1.54	2.91	1.86	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		A	rafter			SK 796 538
NEW-D23	1		38	21	59	1430	1451	1451	1.70	1.28	1.65	1.55	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		D	rafter			SK 796 538
NEW-D25	1		40	22	62	1424	1446	1451	1.32	1.32	1.35	1.32	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		D	rafter			SK 796 538
NEW-D31	1		38	13	51	1438	1451	1451	1.97	0.95	1.32	1.71	5	Notts	Newark	Woolpack Inn, 46 Stodman St	NT	0	0		A	rafter			SK 796 538
Q4658	2		392	35	427	1939	1974	1974	0.46	0.49	0.46	0.47	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q4659	1		306	44	350	1855	1899	1899	0.52	0.34	0.35	0.50	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8061	3		87	35	122	1955	1990	1990	0.62	0.48	0.38	0.58	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8062	3		90	18	108	1972	1990	1990	0.75	0.93	0.91	0.78	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8063	3		97	25	122	1962	1987	1990	0.64	0.42	0.73	0.59	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8064	3		40	22	62	1967	1989	1990	0.91	1.07	0.96	0.97	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8066	3		53	20	73	1970	1990	1990	0.76	0.91	0.87	0.80	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8067	3		30	25	55	1965	1990	1990	0.85	0.66	0.76	0.76	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8068	3		45	20	65	1970	1990	1990	0.85	0.97	0.82	0.89	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8069	3		78	25	103	1965	1990	1990	0.86	0.67	0.89	0.81	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8070	3		69	22	91	1968	1990	1990	0.75	0.62	0.64	0.72	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8071	3		63	22	85	1968	1990	1990	0.56	0.52	0.60	0.55	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8073	3	20	237	46	283	1944	1990	1990	0.58	0.49	0.30	0.57	5	Notts	Sherwood	Sherwood Forest	BF	0	0		D				SK 610 670
Q8074b	3	1	253	52	305	1937	1989	1990	0.48	0.57	0.31	0.50	5	Notts	Sherwood	Sherwood Forest	BF	2	30	W	D				SK 610 670
NTM-A08A	1		124	22	146	1610	1632	1632	1.42	0.87	1.03	1.34	5	Notts	Sutton-in-Ashfield	Teversal Manor Garages	NT	0	0		D	purlin			SK 483 628
gam04	1	25	33	16	49	1968	1984	1984	2.67	2.93	4.13	2.76	5	Notts		Gamston Wood	SH	0	0	Sp	D				SK 720 770
gam05	1	1	60	17	77	1966	1983	1984	1.66	1.68	1.88	1.67	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
gam06	1	1	56	20	76	1963	1983	1984	2.19	3.26	3.87	2.47	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
gam07	1	5	53	20	73	1964	1984	1984	2.60	2.04	3.30	2.44	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
gam09	1	1	46	15	61	1969	1984	1984	2.05	1.43	1.90	1.90	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
gam10	1	1	64	13	77	1970	1983	1984	2.13	2.28	4.11	2.16	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
gam11	1	1	48	27	75	1956	1983	1984	1.85	1.45	2.24	1.70	5	Notts		Gamston Wood	SH	0	0	Sp	D				SK 720 770
gam12	1	1	53	26	79	1957	1983	1984	1.84	1.53	3.53	1.74	5	Notts		Gamston Wood	SH	0	0	Sp	D				SK 720 770
gam13	1	10	51	22	73	1961	1983	1984	2.22	2.22	2.38	2.22	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
gam22	1	1	18	17	35	1966	1983	1984	3.05	1.63	3.36	2.36	5	Notts		Gamston Wood	SH	0	0	W	A				SK 720 770
gam27	1	1	35	13	48	1970	1983	1984	1.71	1.56	2.32	1.67	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
gam30	1	1	23	22	45	1961	1983	1984	2.28	0.95	1.65	1.63	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
gam32	1	1	36	50	86	1933	1983	1984	2.40	0.65	1.62	1.38	5	Notts		Gamston Wood	SH	0	0	W	A				SK 720 770

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
gam35	1	1	56	26	82	1958	1984	1984	2.04	2.02	2.17	2.04	5	Notts		Gamston Wood	SH	0	0	W	D				SK 720 770
ac01	1		59	26	85	1517	1543	1543	1.93	1.12	1.42	1.68	9	Nrthmbrlnd	Corbridge	Aydon Castle	SH	0	0	W	D	rafter			NZ 002 665
ac02	1		56	30	86	1513	1543	1543	1.63	1.17	1.51	1.47	9	Nrthmbrlnd	Corbridge	Aydon Castle	SH	0	0	W	D	rafter			NZ 002 665
ac07	1		65	17	82	1526	1543	1543	1.56	1.87	1.46	1.62	9	Nrthmbrlnd	Corbridge	Aydon Castle	SH	0	0	W	D	rafter			NZ 002 665
ac09	1		83	23	106	1520	1543	1543	1.06	0.84	0.95	1.01	9	Nrthmbrlnd	Corbridge	Aydon Castle	SH	0	0	W	D	purlin			NZ 002 665
AYD-A01A	1		69	23	92	1518	1541	1545	1.54	1.71	1.44	1.59	9	Nrthmbrlnd	Corbridge	Aydon Castle	NT	0	0		D	principal			NZ 002 663
AYD-A02	1		51	24	75	1517	1541	1545	1.70	1.04	1.09	1.49	9	Nrthmbrlnd	Corbridge	Aydon Castle	NT	0	0		D	principal			NZ 002 663
AYD-A03A	1		50	25	75	1516	1541	1545	1.91	1.17	1.21	1.67	9	Nrthmbrlnd	Corbridge	Aydon Castle	NT	0	0		D	principal			NZ 002 663
AYD-A04A	1		107	29	136	1512	1541	1545	1.17	1.19	0.97	1.18	9	Nrthmbrlnd	Corbridge	Aydon Castle	NT	0	0		D	principal			NZ 002 663
AYD-A07A	1		50	13	63	1528	1541	1545	2.19	2.00	1.57	2.15	9	Nrthmbrlnd	Corbridge	Aydon Castle	NT	0	0		D	purlin			NZ 002 663
AYD-A11	1		117	18	135	1527	1545	1545	1.73	1.45	1.53	1.69	9	Nrthmbrlnd	Corbridge	Aydon Castle	NT	0	0		D	beam			NZ 002 663
HTC-A04A	1		116	34	150	1525	1559	1559	0.97	0.48	0.34	0.86	9	Nrthmbrlnd	Corbridge	Halton Castle	NT	0	0		D	purlin			NY 977 678
HTC-A08A	1		122	34	156	1525	1559	1559	1.03	0.56	0.56	0.93	9	Nrthmbrlnd	Corbridge	Halton Castle	NT	0	0		D	purlin			NY 977 678
DST-A04A	1		65	26	91	1585	1611	1611	1.42	0.61	1.14	1.19	9	Nrthmbrlnd	Dilston	Dilston Hall Chapel	NT	0	0		D	tiebeam			NY 962 533
DST-A05A	1		133	39	172	1572	1611	1611	1.25	0.76	0.74	1.14	9	Nrthmbrlnd	Dilston	Dilston Hall Chapel	NT	0	0		D	purlin			NY 962 533
DST-A09A	1		136	30	166	1581	1611	1611	1.04	0.60	0.89	0.96	9	Nrthmbrlnd	Dilston	Dilston Hall Chapel	NT	0	0		D	purlin			NY 962 533
DST-A10A	1		91	20	111	1591	1611	1611	2.04	1.20	1.35	1.89	9	Nrthmbrlnd	Dilston	Dilston Hall Chapel	NT	0	0		D	tiebeam			NY 962 533
DST-A13A	1		184	26	210	1585	1611	1611	0.70	0.33	0.43	0.65	9	Nrthmbrlnd	Dilston	Dilston Hall Chapel	NT	0	0		D	purlin			NY 962 533
DST-A16A	1		173	33	206	1578	1611	1611	0.79	0.53	0.57	0.75	9	Nrthmbrlnd	Dilston	Dilston Hall Chapel	NT	0	0		D	joist			NY 962 533
DST-A17A	1		145	30	175	1581	1611	1611	1.15	0.88	1.00	1.11	9	Nrthmbrlnd	Dilston	Dilston Hall Chapel	NT	0	0		D	joist			NY 962 533
abv3939	1	5	89	24	113	1484	1508	1508	1.46	1.11	1.22	1.38	1	Oxon	Abingdon	Bridge, Lay Cemetery Ditch	OX	2	3	Sp	D		Church	Low	SU 499 972
ah2	1	20	43	33	76	1629	1662	1663	2.32	0.70	2.21	1.62	1	Oxon	Ashdown	Ashdown House	OX	0	0	Su	A	post	Domestic	Gentry	SU 282 821
ah3	1	2	110	27	137	1634	1661	1663	1.23	0.65	0.48	1.11	1	Oxon	Ashdown	Ashdown House	OX	0	0	Sp	D	beam	Domestic	Gentry	SU 282 821
ah4	1	1	129	8	137	1655	1663	1663	1.10	0.80	0.63	1.08	1	Oxon	Ashdown	Ashdown House	OX	0	0	Sp	D	brace	Domestic	Gentry	SU 282 821
ah6	1	1	64	19	83	1643	1662	1663	2.01	1.12	1.29	1.81	1	Oxon	Ashdown	Ashdown House	OX	0	0	W	A	beam	Domestic	Gentry	SU 282 821
asl1	2		70	14	84	1752	1766	1767	2.19	1.76	1.90	2.12	1	Oxon	Ashdown	Ashdown House	OX	0	0	W	D	beam	Domestic	Gentry	SU 282 821
asl2	2		75	28	103	1739	1767	1767	1.67	1.03	1.50	1.50	1	Oxon	Ashdown	Ashdown House	OX	0	0	Sp	D	misc	Domestic	Gentry	SU 282 821
asl3	2	1	46	28	74	1738	1766	1767	0.94	1.00	0.86	0.96	1	Oxon	Ashdown	Ashdown House	OX	0	0	W	D	beam	Domestic	Gentry	SU 282 821
asl4	2	70	44	20	64	1746	1766	1767	2.04	2.10	2.38	2.06	1	Oxon	Ashdown	Ashdown House	OX	0	0	W	D	brace	Domestic	Gentry	SU 282 821
asl5	2		66	19	85	1748	1767	1767	2.39	2.10	2.37	2.32	1	Oxon	Ashdown	Ashdown House	OX	0	0	Sp	D	brace	Domestic	Gentry	SU 282 821
asl6	2		48	23	71	1744	1767	1767	2.37	1.62	1.77	2.12	1	Oxon	Ashdown	Ashdown House	OX	0	0	Sp	D	misc	Domestic	Gentry	SU 282 821
bcs1	1	1	75	23	98	1533	1556	1556	1.46	1.47	1.31	1.46	1	Oxon	Brightwell/Sotwell	Red Lion/Thatch End	OX	0	0	Sp	D		Domestic	Low	SU 581 907
bcs2	3	40	64	44	108	1456	1500	0	1.91	0.71	1.19	1.42	1	Oxon	Brightwell/Sotwell	Red Lion/Thatch End	OX	0	0	Su	E		Domestic	Low	SU 581 907
bcs4	2	10	65	36	101	1266	1302	1302	1.63	0.98	0.83	1.40	1	Oxon	Brightwell/Sotwell	Red Lion/Thatch End	OX	2	0	Sp	D		Domestic	Low	SU 581 907
bcs5	1	30	55	23	78	1533	1556	1556	2.19	1.54	1.43	2.00	1	Oxon	Brightwell/Sotwell	Red Lion/Thatch End	OX	0	0	Sp	D		Domestic	Low	SU 581 907
bcs6	1	20	102	30	132	1526	1556	1556	1.35	0.93	0.71	1.26	1	Oxon	Brightwell/Sotwell	Red Lion/Thatch End	OX	0	0	Sp	D		Domestic	Low	SU 581 907
bcs7	1	15	47	23	70	1532	1555	1556	1.15	1.28	1.00	1.19	1	Oxon	Brightwell/Sotwell	Red Lion/Thatch End	OX	0	0	Sp	D		Domestic	Low	SU 581 907
eahc10	1		85	34	119	1386	1420	1420	1.27	0.99	0.76	1.19	1	Oxon	East Hendred	Godfrey's Farm	OX	0	0	W	D		Domestic	Middle	SU 460 885
ehh11	2		53	25	78	1497	1522	1522	1.66	0.63	1.39	1.33	1	Oxon	East Hendred	Hendred House	OX	0	0	W	D	rail	Domestic	Gentry	SU 460 885
ehh12	2		67	18	85	1504	1522	1522	1.89	1.39	1.97	1.78	1	Oxon	East Hendred	Hendred House	OX	0	0	W	D	rail	Domestic	Gentry	SU 460 885
ehh15	2		38	26	64	1496	1522	1522	1.63	0.50	0.53	1.17	1	Oxon	East Hendred	Hendred House	OX	0	0	Sp	A	tiebeam	Domestic	Gentry	SU 460 885
ehh16	2		60	31	91	1460	1491	1522	1.43	1.44	1.63	1.44	1	Oxon	East Hendred	Hendred House	OX	0	0	Sp	D	beam	Domestic	Gentry	SU 460 885
ehh20	4		24	16	40	1684	1700	0	2.31	1.30	2.15	1.91	1	Oxon	East Hendred	Hendred House	OX	0	0	W	E	stud	Domestic	Gentry	SU 460 885
ehh24	1		62	22	84	1313	1335	1336	1.93	1.43	1.31	1.80	1	Oxon	East Hendred	Hendred House	OX	0	0	W	D	rail	Domestic	Gentry	SU 460 885
ehh3	3		29	11	40	1522	1533	1535	4.54	3.14	4.31	4.15	1	Oxon	East Hendred	Hendred House	OX	0	0	W	D	joist	Domestic	Gentry	SU 460 885
ehh4	3	20	39	16	55	1519	1535	1535	2.42	1.49	1.61	2.15	1	Oxon	East Hendred	Hendred House	OX	0	0	W	D	post	Domestic	Gentry	SU 460 885

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
chh5	3	10	36	13	49	1522	1535	1535	3.22	2.68	3.15	3.08	1	Oxon	East Hendred	Hendred House	OX	0	0	W	A	misc	Domestic	Gentry	SU 460 885
calm12	1	20	109	34	143	1519	1553	1556	1.81	0.75	0.66	1.56	1	Oxon	East Hendred	The Old Forge	OX	2	2	Sp	D		Domestic	Low	SU 458 885
calm34	1	15	62	19	81	1537	1556	1556	1.92	1.60	1.40	1.84	1	Oxon	East Hendred	The Old Forge	OX	0	0	Sp	D		Domestic	Low	SU 458 885
chs1	1		88	25	113	1448	1473	1473	1.37	1.07	1.94	1.30	1	Oxon	East Hendred	Wisteria House & The Stores	OX	0	0	W	D		Domestic	Middle	SU 460 888
chs2	1	10	100	41	141	1432	1473	1473	1.15	0.78	1.01	1.04	1	Oxon	East Hendred	Wisteria House & The Stores	OX	0	0	W	D		Domestic	Middle	SU 460 888
chs3	1	20	85	23	108	1450	1473	1473	1.14	1.03	1.24	1.12	1	Oxon	East Hendred	Wisteria House & The Stores	OX	0	0	W	D		Domestic	Middle	SU 460 888
chs4	1	10	98	22	120	1451	1473	1473	0.99	1.05	0.69	1.00	1	Oxon	East Hendred	Wisteria House & The Stores	OX	0	0	W	D		Domestic	Middle	SU 460 888
ott1	1		70	16	86	1586	1602	1602	1.63	1.31	1.33	1.57	1	Oxon	Ewelme	Cottesmore Farm Barn	OX	2		Sp	D		Agricultural	Low	SU 685 766
ott3	1		159	15	174	1587	1602	1602	0.81	1.03	0.94	0.83	1	Oxon	Ewelme	Cottesmore Farm Barn	OX	0	0	Sp	D		Agricultural	Low	SU 685 766
ott4	1		127	37	164	1565	1602	1602	0.49	0.43	0.82	0.48	1	Oxon	Ewelme	Cottesmore Farm Barn	OX	0	0	Sp	A		Agricultural	Low	SU 685 766
ott5	1		71	28	99	1574	1602	1602	0.77	0.83	0.87	0.79	1	Oxon	Ewelme	Cottesmore Farm Barn	OX	0	0	W	A		Agricultural	Low	SU 685 766
ott6	1		146	23	169	1579	1602	1602	0.97	1.02	0.87	0.98	1	Oxon	Ewelme	Cottesmore Farm Barn	OX	0	0	Sp	D		Agricultural	Low	SU 685 766
ott8	1	0	111	17	128	1585	1602	1602	1.16	1.07	1.26	1.14	1	Oxon	Ewelme	Cottesmore Farm Barn	OX	0	0	Sp	D		Agricultural	Low	SU 685 766
hwk1	1	1	203	33	236	1966	1999	1999	1.14	0.84	1.11	1.10	1	Oxon	Hardwick	Hardwick woods	OX	2	5		D	Woodland			SU 666 793
hwk10b	1	3	175	20	195	1979	1999	1999	1.69	1.78	1.86	1.70	1	Oxon	Hardwick	Hardwick woods	OX	0	0		D	Woodland			SU 666 793
hwk11	1	2	86	17	103	1982	1999	1999	2.50	2.28	2.17	2.47	1	Oxon	Hardwick	Hardwick woods	OX	2	5		D	Woodland			SU 666 793
hwk12	1	5	76	12	88	1987	1999	1999	3.42	3.18	2.91	3.39	1	Oxon	Hardwick	Hardwick woods	OX	2	2		D	Woodland			SU 666 793
hwk13	1	2	60	16	76	1983	1999	1999	3.29	2.66	2.83	3.16	1	Oxon	Hardwick	Hardwick woods	OX	2	5		D	Woodland			SU 666 793
hwk14	1	5	133	21	154	1978	1999	1999	1.78	1.17	1.15	1.70	1	Oxon	Hardwick	Hardwick woods	OX	2	8		D	Woodland			SU 666 793
hwk15	1	1	200	26	226	1973	1999	1999	1.28	0.67	1.34	1.21	1	Oxon	Hardwick	Hardwick woods	OX	2	3		D	Woodland			SU 666 793
hwk16	1	10	173	28	201	1971	1999	1999	1.55	2.09	2.27	1.63	1	Oxon	Hardwick	Hardwick woods	OX	2	6		D	Woodland			SU 666 793
hwk17	1	2	193	31	224	1968	1999	1999	1.43	0.91	1.28	1.36	1	Oxon	Hardwick	Hardwick woods	OX	2	4		D	Woodland			SU 666 793
hwk18	1	5	161	16	177	1983	1999	1999	1.56	1.57	1.41	1.56	1	Oxon	Hardwick	Hardwick woods	OX	2	5		D	Woodland			SU 666 793
hwk19	1	10	173	22	195	1977	1999	1999	1.77	1.81	1.77	1.78	1	Oxon	Hardwick	Hardwick woods	OX	2	1		D	Woodland			SU 666 793
hwk2	1	5	73	16	89	1983	1999	1999	3.03	0.97	1.55	2.66	1	Oxon	Hardwick	Hardwick woods	OX	2	4		D	Hedgerow			SU 666 793
hwk20	1	5	212	22	234	1977	1999	1999	1.15	0.96	0.74	1.13	1	Oxon	Hardwick	Hardwick woods	OX	2	0		D	Woodland			SU 666 793
hwk21	1	5	152	16	168	1983	1999	1999	1.98	1.87	2.42	1.97	1	Oxon	Hardwick	Hardwick woods	OX	2	8		D	Woodland			SU 666 793
hwk22	1	5	128	43	171	1956	1999	1999	1.88	0.86	1.30	1.63	1	Oxon	Hardwick	Hardwick woods	OX	2	15		D	Woodland			SU 666 793
hwk23a	1		135	34	169	1965	1999	1999	1.76	1.08	1.04	1.62	1	Oxon	Hardwick	Hardwick woods	OX	0	0		D	Woodland			SU 666 793
hwk3	1	5	52	13	65	1986	1999	1999	5.06	3.15	3.92	4.68	1	Oxon	Hardwick	Hardwick woods	OX	2	1		D	Hedgerow			SU 666 793
hwk4	1	5	48	22	70	1977	1999	1999	4.63	3.99	4.20	4.43	1	Oxon	Hardwick	Hardwick woods	OX	2	2		D	Hedgerow			SU 666 793
hwk5	1	1	129	15	144	1984	1999	1999	2.25	2.10	2.55	2.23	1	Oxon	Hardwick	Hardwick woods	OX	2	4		D	Woodland			SU 666 793
hwk6	1	4	203	20	223	1979	1999	1999	1.32	1.28	1.00	1.32	1	Oxon	Hardwick	Hardwick woods	OX	2	2		D	Woodland			SU 666 793
hwk8	1	1	187	26	213	1973	1999	1999	1.11	1.09	1.01	1.11	1	Oxon	Hardwick	Hardwick woods	OX	2	5		D	Woodland			SU 666 793
hwk9	1	5	151	22	173	1977	1999	1999	2.16	2.03	2.28	2.15	1	Oxon	Hardwick	Hardwick woods	OX	2	3		D	Woodland			SU 666 793
htc1	1	10	59	29	88	1572	1601	1602	1.21	0.51	0.46	0.98	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Sp	D	brace	Agricultural	Middle	SU 759 826
htc10	1	20	44	11	55	1591	1602	1602	2.68	2.87	2.66	2.72	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Sp	A	rail	Agricultural	Middle	SU 759 826
htc2	1	25	85	28	113	1573	1601	1602	1.39	1.32	1.37	1.37	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Su	D	post	Agricultural	Middle	SU 759 826
htc3	1	35	43	19	62	1583	1602	1602	2.25	1.76	2.04	2.10	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Sp	D	joist	Agricultural	Middle	SU 759 826
htc4	1		94	20	114	1582	1602	1602	1.67	1.25	1.92	1.60	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	W	A	joist	Agricultural	Middle	SU 759 826
htc5	1		28	14	42	1588	1602	1602	3.82	3.14	3.45	3.59	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Sp	A	joist	Agricultural	Middle	SU 759 826
htc6	1	15	67	20	87	1582	1602	1602	1.86	1.58	1.74	1.80	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Sp	D	joist	Agricultural	Middle	SU 759 826
htc7	1		48	21	69	1581	1602	1602	1.33	1.32	2.12	1.33	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Sp	A	joist	Agricultural	Middle	SU 759 826
htc8	1		62	16	78	1586	1602	1602	2.85	2.10	2.53	2.69	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Sp	D	beam	Agricultural	Middle	SU 759 826
htc9	1		62	18	80	1584	1602	1602	1.80	1.61	1.59	1.75	1	Oxon	Henley-on-Thames	Kings Arms Barn	OX	0	0	Sp	D	joist	Agricultural	Middle	SU 759 826
aisle3	1	10	34	27	61	1713	1740	1740	2.52	1.65	1.63	2.13	1	Oxon	Mapledurham	Aisled Barn, New Farm	OX			W	D	misc	Agricultural	Middle	SU 679757

Code	Phase	Path	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
aisle4	1	5	33	12	45	1728	1740	1740	2.88	2.13	3.11	2.68	1	Oxon	Mapledurham	Aisled Barn, New Farm	OX			W	D	rafter	Agricultural	Middle	SU 679757
blag1	1	1	66	15	81	1790	1805	1806	2.14	1.01	1.97	1.93	1	Oxon	Mapledurham	Blagrave Farm Barns	OX	0	0	W	D	post			SU 695 762
blag4	1	10	32	12	44	1794	1806	1806	2.68	2.63	2.33	2.67	1	Oxon	Mapledurham	Blagrave Farm Barns	OX	0	0	W	D	plate			SU 695 762
blag5	1	1	45	13	58	1793	1806	1806	2.43	2.26	2.62	2.39	1	Oxon	Mapledurham	Blagrave Farm Barns	OX	0	0	W	D	plate			SU 695 762
bfg2	1	35	59	24	83	1751	1775	1775	1.18	1.03	0.64	1.14	1	Oxon	Mapledurham	Bottom Farm Granary	OX	0	0	Su	D		Agricultural	Low	SU 672 776
bfg3	1	5	48	19	67	1756	1775	1775	1.65	2.00	1.14	1.75	1	Oxon	Mapledurham	Bottom Farm Granary	OX	0	0	Su	D		Agricultural	Low	SU 672 776
bfg45	1	1	90	21	111	1754	1775	1775	1.23	1.06	0.71	1.20	1	Oxon	Mapledurham	Bottom Farm Granary	OX	2	2	Su	D		Agricultural	Low	SU 672 776
bfg67	1	5	90	21	111	1754	1775	1775	0.89	1.03	0.55	0.92	1	Oxon	Mapledurham	Bottom Farm Granary	OX	2	2	Su	D		Agricultural	Low	SU 672 776
mpl33	1		90	21	111	1980	2001	2001	2.96	1.05	1.90	2.59	1	Oxon	Mapledurham	Bottom Farm South Bank	OX	2	18		D	Hedgerow			SU 670 775
chz1	1	2	75	23	98	1586	1609	1610	2.27	1.24	1.51	2.03	1	Oxon	Mapledurham	Chazey Court Barn	OX	2	6	Sp	D	tiebeam			SU 691 751
chz10	1	1	39	28	67	1582	1610	1610	2.12	0.95	1.05	1.63	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	W	D	purlin			SU 691 751
chz11	2	7	57	22	79	1714	1736	1736	2.18	1.43	1.30	1.97	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	W	A	lintel			SU 691 751
chz12	2	1	33	13	46	1723	1736	1736	2.80	2.05	2.77	2.59	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	Su	D	lintel			SU 691 751
chz13	3	8	127	16	143	1784	1800	1800	0.77	0.74	0.83	0.76	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	Sp	D	tiebeam			SU 691 751
chz2	1		36	19	55	1591	1610	1610	2.29	1.57	1.51	2.04	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	W	D	rafter			SU 691 751
chz3	1		37	21	58	1589	1610	1610	2.30	1.40	1.74	1.98	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	Sp	D	rafter			SU 691 751
chz5	1		50	16	66	1594	1610	1610	2.05	1.04	1.31	1.81	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	W	D	rafter			SU 691 751
chz7	1		65	24	89	1586	1610	1610	1.52	0.91	0.84	1.36	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	Sp	D	principal			SU 691 751
chz8	1	2	78	25	103	1584	1609	1610	1.79	0.96	1.68	1.59	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	Su	D	principal			SU 691 751
chz9	1	3	86	14	100	1595	1609	1610	2.36	1.78	1.63	2.28	1	Oxon	Mapledurham	Chazey Court Barn	OX	0	0	Su	D	tiebeam			SU 691 751
chz14	1	2	71	16	87	1597	1613	1614	2.65	1.58	1.34	2.45	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	Su	D	principal			SU 691 751
chz15	1	4	54	22	76	1591	1613	1614	2.70	1.31	2.33	2.30	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	Su	D	principal			SU 691 751
chz16	1	5	62	13	75	1600	1613	1614	2.96	3.05	1.44	2.98	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	Su	D	principal			SU 691 751
chz18	1	4	51	17	68	1597	1614	1614	2.64	1.53	1.64	2.37	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	2	6	W	D	tiebeam			SU 691 751
chz19	1	4	54	25	79	1588	1613	1614	2.53	1.25	1.53	2.12	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	Su	D	post			SU 691 751
chz20	2		43	21	64	1716	1737	1737	1.34	1.05	1.22	1.25	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	W	D	plate			SU 691 751
chz21	3	5	55	17	72	1594	1611	1611	2.63	1.30	2.40	2.31	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	W	D	cruck			SU 691 751
chz22	3	5	31	22	53	1589	1611	1611	2.96	1.98	1.11	2.55	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	W	A	cruck			SU 691 751
chz23	3	10	53	16	69	1595	1611	1611	1.85	1.13	1.22	1.68	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	W	D	collar			SU 691 751
chz27	4	10	43	22	65	1589	1611	1611	2.52	1.42	1.82	2.15	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	Sp	D	tiebeam			SU 691 751
chz28	4	2	46	19	65	1590	1609	1611	3.96	1.69	1.95	3.30	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	W	D	tiebeam			SU 691 751
chz29	4	5	48	19	67	1592	1611	1611	2.59	1.12	2.00	2.17	1	Oxon	Mapledurham	Chazey Court Farmhouse	OX	0	0	W	A	principal			SU 691 751
mpl12	1	5	151	21	172	1978	1999	1999	1.58	1.50	1.31	1.57	1	Oxon	Mapledurham	Chazey Wood	OX	2	0		D	Woodland			SU 688 761
mpl1	1	5	217	32	249	1967	1999	1999	1.27	0.92	0.85	1.22	1	Oxon	Mapledurham	Huntley Wood	OX	0	0		D	Woodland			SU 674 774
mpl2	1	10	177	18	195	1981	1999	1999	1.62	1.23	1.15	1.58	1	Oxon	Mapledurham	Huntley Wood	OX	2	2		D	Woodland			SU 674 774
mpl3	1	2	76	25	101	1974	1999	1999	2.41	1.81	2.35	2.26	1	Oxon	Mapledurham	Huntley Wood	OX	2	5		D	Woodland			SU 674 774
mpl4	1	3	86	14	100	1985	1999	1999	2.94	1.75	2.40	2.78	1	Oxon	Mapledurham	Huntley Wood	OX	2	0		D	Woodland			SU 674 774
mdmh12	1		57	22	79	1586	1608	1610	2.92	1.28	2.11	2.47	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	tiebeam			SU 670 767
mdmh13	1	10	75	20	95	1588	1608	1610	2.08	2.00	1.74	2.06	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	principal			SU 670 767
mdmh14	1	10	123	20	143	1588	1608	1610	0.95	1.72	1.40	1.06	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	W	D	stud			SU 670 767
mdmh15	1		48	21	69	1587	1608	1610	1.61	0.91	1.31	1.40	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	stud			SU 670 767
mdmh16	1		16	51	67	1557	1608	1610	2.50	1.10	2.15	1.44	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	A	stud			SU 670 767
mdmh17	1	10	49	20	69	1588	1608	1610	2.18	1.72	1.70	2.05	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	tiebeam			SU 670 767
mdmh18	1		72	24	96	1584	1608	1610	1.12	1.00	0.81	1.09	1	Oxon	Mapledurham	Mapledurham House	OX	2	1		D	purlin			SU 670 767
mdmh19	1		46	29	75	1578	1607	1610	1.70	0.94	1.31	1.40	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	stud			SU 670 767
mdmh2	1		91	28	119	1579	1607	1610	1.76	0.49	0.81	1.46	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	principal			SU 670 767

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
mdmh20	1		91	39	130	1568	1607	1610	0.83	0.33	0.38	0.68	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	stud			SU 670 767
mdmh21	1		42	26	68	1584	1610	1610	0.87	0.65	1.12	1.40	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	stud			SU 670 767
mdmh22	1		51	24	75	1583	1607	1610	1.88	1.14	1.36	1.65	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	tiebeam			SU 670 767
mdmh23	1		64	27	91	1580	1607	1610	1.67	1.27	0.96	1.55	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	tiebeam			SU 670 767
mdmh24	1		50	29	79	1579	1608	1610	1.21	0.91	0.99	1.10	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	stud			SU 670 767
mdmh3	1	5	95	21	116	1587	1608	1610	1.35	0.51	0.62	1.20	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	W	D	principal			SU 670 767
mdmh31	2		65	17	82	1777	1794	1794	1.68	1.36	1.75	1.62	1	Oxon	Mapledurham	Mapledurham House	OX	0	0	Sp	D	misc			SU 670 767
mnm1	1	5	60	21	81	1629	1650	1650	1.67	1.78	2.51	1.70	1	Oxon	Mapledurham	Mill	OX	0	0	W	E	beam			SU 669 767
mnm11	2		44	20	64	1775	1795	1795	1.46	0.86	1.50	1.27	1	Oxon	Mapledurham	Mill	OX	0	0	Sp	D	purlin			SU 669 767
mnm12	3	5	49	22	71	1540	1562	1562	2.22	0.84	1.51	1.79	1	Oxon	Mapledurham	Mill	OX	0	0	Su	E	purlin			SU 669 767
mnm13	4	10	42	18	60	1746	1764	1764	1.24	0.97	0.74	1.16	1	Oxon	Mapledurham	Mill	OX	0	0	Su	D	plate			SU 669 767
mnm14	4	5	54	17	71	1747	1764	1764	1.76	1.50	1.48	1.70	1	Oxon	Mapledurham	Mill	OX	0	0	W	D	plate			SU 669 767
mnm15	4	5	65	16	81	1748	1764	1764	1.06	1.13	0.75	1.08	1	Oxon	Mapledurham	Mill	OX	0	0	Su	D	beam			SU 669 767
mnm16	4		57	17	74	1747	1764	1764	1.42	1.28	1.15	1.39	1	Oxon	Mapledurham	Mill	OX	0	0	Su	D	beam			SU 669 767
mnm17	4	2	65	28	93	1736	1764	1764	1.61	0.81	0.89	1.37	1	Oxon	Mapledurham	Mill	OX	0	0	W	D	beam			SU 669 767
mnm2	1	1	58	15	73	1635	1650	1650	2.10	1.36	2.12	1.95	1	Oxon	Mapledurham	Mill	OX	0	0		E	beam			SU 669 767
mnm21	5	5	35	24	59	1721	1745	1746	4.06	1.93	2.57	3.19	1	Oxon	Mapledurham	Mill	OX	0	0	W	D	beam			SU 669 767
mnm22	5	3	69	12	81	1733	1745	1746	1.74	2.43	1.93	1.85	1	Oxon	Mapledurham	Mill	OX	0	0	Su	D	beam			SU 669 767
mnm23	5	5	40	18	58	1727	1745	1746	2.44	1.93	2.10	2.28	1	Oxon	Mapledurham	Mill	OX	0	0	W	D	beam			SU 669 767
mnm24	5	5	38	16	54	1730	1746	1746	2.16	2.27	1.65	2.19	1	Oxon	Mapledurham	Mill	OX	0	0	Sp	D	purlin			SU 669 767
mnm3	1	5	53	16	69	1634	1650	1650	2.17	1.07	1.70	1.92	1	Oxon	Mapledurham	Mill	OX	0	0	Sp	E	principal			SU 669 767
mnm31	6	4	51	21	72	1754	1775	1776	1.41	0.87	0.71	1.25	1	Oxon	Mapledurham	Mill	OX	0	0	Sp	D	post			SU 669 767
mnm32	6		48	18	66	1758	1776	1776	1.61	1.18	1.23	1.49	1	Oxon	Mapledurham	Mill	OX	0	0	W	D	stud			SU 669 767
mnm4	1	1	68	16	84	1634	1650	1650	2.51	1.87	2.73	2.39	1	Oxon	Mapledurham	Mill	OX	0	0	W	E	purlin			SU 669 767
mnm41	7	1	30	19	49	1731	1750	1750	1.78	0.96	1.52	1.46	1	Oxon	Mapledurham	Mill	OX	0	0	W	E	post			SU 669 767
mnm5	1	1	52	21	73	1629	1650	1650	1.96	1.55	1.85	1.84	1	Oxon	Mapledurham	Mill	OX	0	0	W	E	tiebeam			SU 669 767
mnm6	1	1	68	13	81	1637	1650	1650	1.57	2.18	0.96	1.67	1	Oxon	Mapledurham	Mill	OX	0	0	Sp	E	purlin			SU 669 767
mpl25	1		133	34	167	1967	2001	2001	2.07	0.92	1.33	1.84	1	Oxon	Mapledurham	Mill	OX	2	10		D	Hedgerow			SU 679 779
mpl26	1		90	23	113	1978	2001	2001	2.39	1.39	1.27	2.19	1	Oxon	Mapledurham	Mill	OX	2	6		D	Hedgerow			SU 679 779
mpl27	1		145	29	174	1972	2001	2001	1.83	0.81	1.21	1.66	1	Oxon	Mapledurham	Mill	OX	2	9		D	Hedgerow			SU 679 779
mpl28	1		174	26	200	1975	2001	2001	1.46	0.65	0.72	1.36	1	Oxon	Mapledurham	Mill	OX	2	3		D	Hedgerow			SU 679 779
mpl29	1		135	23	158	1978	2001	2001	1.87	1.63	1.21	1.84	1	Oxon	Mapledurham	Mill	OX	2	16		D	Hedgerow			SU 679 779
mpl30	1		59	12	71	1989	2001	2001	3.73	3.45	3.52	3.68	1	Oxon	Mapledurham	Mill	OX	2	3		D	Hedgerow			SU 679 779
mpl31	1		134	26	160	1975	2001	2001	1.85	0.74	1.08	1.67	1	Oxon	Mapledurham	Mill	OX	2	7		D	Hedgerow			SU 679 779
mpl32	1		70	13	83	1988	2001	2001	3.65	2.53	4.61	3.47	1	Oxon	Mapledurham	Mill	OX	2	3		D	Hedgerow			SU 679 779
mpl1	1	1	50	32	82	1710	1742	1742	2.40	1.24	1.48	1.95	1	Oxon	Mapledurham	Mill Farm Barn	OX	0	0	Sp	D	post			SU 676 777
mpl2	1	1	63	21	84	1721	1742	1742	1.55	0.87	0.99	1.38	1	Oxon	Mapledurham	Mill Farm Barn	OX	0	0	W	D	plate			SU 676 777
mpl3	1	1	37	28	65	1714	1742	1742	1.79	0.84	0.78	1.38	1	Oxon	Mapledurham	Mill Farm Barn	OX	2	3	W	D	plate			SU 676 777
mpl4	1	5	43	29	72	1713	1742	1742	2.14	1.32	1.62	1.81	1	Oxon	Mapledurham	Mill Farm Barn	OX	0	0	W	D	brace			SU 676 777
mpl5	1	1	37	14	51	1320	1334	1334	4.37	1.65	3.89	3.63	1	Oxon	Mapledurham	Mill Farmhouse	OX	0	0	W	D	cruck			SU 676 777
mpl6	1	1	27	15	42	1319	1334	1334	2.18	2.29	1.73	2.22	1	Oxon	Mapledurham	Mill Farmhouse	OX	0	0	W	D	collar			SU 676 777
mpl7	3		31	20	51	1738	1758	1758	3.74	2.71	2.63	3.34	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	D	purlin	Domestic	Middle	SU 679 757
mpl1	1	5	79	17	96	1633	1650	1650	1.78	1.30	1.42	1.69	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	E	stud	Domestic	Middle	SU 679 757
mpl2	1	10	51	29	80	1621	1650	1650	1.70	1.20	1.44	1.52	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	E		Domestic	Middle	SU 679 757
mpl3	1	10	41	19	60	1631	1650	1650	1.75	0.91	1.38	1.49	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	E		Domestic	Middle	SU 679 757
mpl4	1	10	55	15	70	1635	1650	1650	1.47	1.15	1.06	1.40	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	E	stud	Domestic	Middle	SU 679 757

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
nfh2	3	5	40	18	58	1740	1758	1758	3.04	2.15	2.48	2.77	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	D	purlin	Domestic	Middle	SU 679 757
nfh21	2		42	15	57	1725	1740	1740	1.14	1.49	1.29	1.23	1	Oxon	Mapledurham	New Farm House	OX	0	0	Sp	D	rafter	Domestic	Middle	SU 679 757
nfh22	2	10	42	13	55	1726	1739	1740	1.22	1.57	1.28	1.30	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	D	rafter	Domestic	Middle	SU 679 757
nfh23	2	10	60	19	79	1720	1739	1740	1.19	1.27	1.62	1.21	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	A	rafter	Domestic	Middle	SU 679 757
nfh24	2	5	53	19	72	1721	1740	1740	1.47	0.79	0.85	1.29	1	Oxon	Mapledurham	New Farm House	OX	0	0	Sp	D	rafter	Domestic	Middle	SU 679 757
nfh25	2		60	19	79	1721	1740	1740	0.93	1.02	1.41	0.95	1	Oxon	Mapledurham	New Farm House	OX	0	0	Sp	A	rafter	Domestic	Middle	SU 679 757
nfh3	3	5	53	12	65	1746	1758	1758	1.80	2.93	1.41	2.01	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	D	collar	Domestic	Middle	SU 679 757
nfh4	3		21	14	35	1744	1758	1758	2.71	2.15	2.33	2.49	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	D	tiebeam	Domestic	Middle	SU 679 757
nfh5	3		46	29	75	1729	1758	1758	1.88	1.18	1.80	1.61	1	Oxon	Mapledurham	New Farm House	OX	0	0	W	D	rafter	Domestic	Middle	SU 679 757
mpl13	1	5	87	18	105	1981	1999	1999	2.80	2.42	2.60	2.74	1	Oxon	Mapledurham	Noke End	OX	2	5		D	Hedgerow			SU 688 768
mpl14	1	5	82	16	98	1983	1999	1999	2.68	2.16	3.09	2.60	1	Oxon	Mapledurham	Noke End	OX	2	4		D	Hedgerow			SU 688 768
mpl15	1	5	69	15	84	1984	1999	1999	3.15	2.57	4.38	3.04	1	Oxon	Mapledurham	Noke End	OX	2	2		D	Hedgerow			SU 688 768
mpl16	1	1	73	16	89	1983	1999	1999	3.06	2.71	5.03	3.00	1	Oxon	Mapledurham	Noke End	OX	2	2		D	Hedgerow			SU 688 768
mpl17	1	1	69	20	89	1979	1999	1999	2.99	1.92	2.32	2.75	1	Oxon	Mapledurham	Noke End	OX	2	2		D	Hedgerow			SU 688 768
mpl18	1		94	17	111	1982	1999	1999	3.61	2.14	3.89	3.38	1	Oxon	Mapledurham	Noke End	OX	2	1		D	Woodland			SU 688 768
mpl19	1	5	114	16	130	1983	1999	1999	1.77	2.02	1.35	1.80	1	Oxon	Mapledurham	Noke End	OX	2	2		D	Woodland			SU 688 768
mpl20	1	2	120	36	156	1963	1999	1999	2.26	0.44	0.65	1.84	1	Oxon	Mapledurham	Noke End	OX	2	4		D	Woodland			SU 688 768
mpl21	1	5	130	22	152	1977	1999	1999	1.88	1.96	0.58	1.89	1	Oxon	Mapledurham	Noke End	OX	2	17		D	Woodland			SU 688 768
mpl22	1	5	110	17	127	1982	1999	1999	2.83	2.43	2.24	2.78	1	Oxon	Mapledurham	Noke End	OX	2	1		D	Woodland			SU 688 768
mpl23	1	1	123	23	146	1976	1999	1999	2.33	2.66	1.12	2.39	1	Oxon	Mapledurham	Noke End	OX	2	1		D	Woodland			SU 688 768
mpl24	1	5	131	30	161	1969	1999	1999	1.59	1.40	0.63	1.55	1	Oxon	Mapledurham	Noke End	OX	2	13		D	Woodland			SU 688 768
mdmov1	1	1	57	20	77	1651	1671	1761	0.92	0.60	0.69	0.83	1	Oxon	Mapledurham	Old Vicarage	OX	0	0	W	D	misc			SU 670 767
pfb1	1	1	45	27	72	1694	1721	1722	2.48	1.19	1.70	2.00	1	Oxon	Mapledurham	Park Farm Barn	OX	0	0	Sp	D	tiebeam			SU 676 763
pfb2	1		30	14	44	1707	1721	1722	1.55	2.28	1.77	1.78	1	Oxon	Mapledurham	Park Farm Barn	OX	0	0	Su	D	brace			SU 676 763
pfb3	1		37	20	57	1702	1722	1722	2.35	1.61	2.04	2.09	1	Oxon	Mapledurham	Park Farm Barn	OX	0	0	W	D	purlin			SU 676 763
p01	1	2	24	6	30	1448	1454	1454	4.44	5.63	4.51	4.68	1	Oxon	Mapledurham	Pithouse	OX	0	0	W	D	purlin			SU 687 774
p02	1		60	14	74	1440	1454	1454	1.84	1.73	1.35	1.82	1	Oxon	Mapledurham	Pithouse	OX	0	0	W	D	cruck			SU 687 774
p03	1	10	19	9	28	1445	1454	1454	4.19	5.53	3.69	4.62	1	Oxon	Mapledurham	Pithouse	OX	0	0	W	D	plate			SU 687 774
p04	1	5	69	14	83	1440	1454	1454	2.45	2.39	2.33	2.44	1	Oxon	Mapledurham	Pithouse	OX	0	0	W	D	cruck			SU 687 774
p05	1	10	40	22	62	1432	1454	1454	2.36	1.98	1.34	2.22	1	Oxon	Mapledurham	Pithouse	OX	0	0	Sp	D	purlin			SU 687 774
p06	1	5	96	19	115	1435	1454	1454	1.73	0.87	1.60	1.59	1	Oxon	Mapledurham	Pithouse	OX	0	0	W	D	cruck			SU 687 774
p07	1		50	17	67	1437	1454	1454	2.85	0.97	1.39	2.37	1	Oxon	Mapledurham	Pithouse	OX	0	0	W	A	tiebeam			SU 687 774
rfb1	1	1	28	27	55	1716	1743	1743	1.55	0.72	1.10	1.14	1	Oxon	Mapledurham	Rose Farm Barn	OX	0	0	W	D		Agricultural	Low	SU 679 766
rfc1	1		45	23	68	1722	1745	1746	2.54	1.54	2.64	2.20	1	Oxon	Mapledurham	Rose Farm Cottage	OX	0	0	Su	D		Domestic	Low	SU 685 766
rfc2	1		37	17	54	1728	1745	1746	1.62	1.72	2.02	1.65	1	Oxon	Mapledurham	Rose Farm Cottage	OX	0	0	Su	D		Domestic	Low	SU 685 766
rfc3	1		11	22	33	1724	1746	1746	1.60	1.73	1.61	1.68	1	Oxon	Mapledurham	Rose Farm Cottage	OX	0	0	W	D		Domestic	Low	SU 685 766
rfc4	1		27	20	47	1726	1746	1746	1.40	1.06	1.24	1.25	1	Oxon	Mapledurham	Rose Farm Cottage	OX	0	0	W	D		Domestic	Low	SU 685 766
rose1	1	10	49	14	63	1599	1613	1613	3.06	2.27	2.39	2.88	1	Oxon	Mapledurham	Rose Farm House	OX			W	D	beam	Domestic	Low	SU 685 766
rose3	1	25	55	12	67	1597	1609	1613	3.70	3.02	2.91	3.58	1	Oxon	Mapledurham	Rose Farm House	OX			W	D	post	Domestic	Low	SU 685 766
mpl10	1	5	103	18	121	1981	1999	1999	2.65	1.81	2.45	2.53	1	Oxon	Mapledurham	Sandy Hill	OX	2	2		D	Woodland			SU 681 763
mpl11	1	10	95	14	109	1985	1999	1999	3.67	3.84	3.54	3.69	1	Oxon	Mapledurham	Sandy Hill	OX	2	1		D	Parkland			SU 681 763
mpl5	1	8	95	19	114	1980	1999	1999	2.47	2.08	2.25	2.40	1	Oxon	Mapledurham	Sandy Hill	OX	2	2		D	Hedgerow			SU 681 763
mpl6	1	4	106	12	118	1987	1999	1999	2.85	3.03	3.16	2.87	1	Oxon	Mapledurham	Sandy Hill	OX	2	2		D	Hedgerow			SU 681 763
mpl7	1	2	185	26	211	1973	1999	1999	1.39	1.07	0.81	1.35	1	Oxon	Mapledurham	Sandy Hill	OX	2	2		D	Woodland			SU 681 763
mpl8	1	5	98	23	121	1976	1999	1999	2.82	2.29	2.42	2.72	1	Oxon	Mapledurham	Sandy Hill	OX	2	1		D	Woodland			SU 681 763
mpl9	1	5	96	21	117	1978	1999	1999	2.58	1.93	1.83	2.46	1	Oxon	Mapledurham	Sandy Hill	OX	2	2		D	Woodland			SU 681 763

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
step1	1	5	40	20	60	1530	1550	1550	2.83	1.12	1.18	2.26	1	Oxon	Mapledurham	Step Cottage	OX	0	0	W	E		Domestic	Low	SU 676 773
step3	1		27	14	41	1536	1550	1550	2.64	2.05	2.11	2.44	1	Oxon	Mapledurham	Step Cottage	OX	0	0	Su	E		Domestic	Low	SU 676 773
step4	2		62	27	89	1783	1810	1810	0.78	0.94	0.76	0.83	1	Oxon	Mapledurham	Step Cottage	OX	0	0	W	D		Domestic	Low	SU 676 773
step5	2	20	74	27	101	1783	1810	1810	0.82	0.89	0.92	0.84	1	Oxon	Mapledurham	Step Cottage	OX	0	0	W	D		Domestic	Low	SU 676 773
step6	2	2	88	34	122	1776	1810	1810	0.98	0.64	0.51	0.89	1	Oxon	Mapledurham	Step Cottage	OX	0	0	W	D		Domestic	Low	SU 676 773
step7	2	5	36	18	54	1792	1810	1810	2.23	2.28	2.53	2.25	1	Oxon	Mapledurham	Step Cottage	OX	0	0	W	D		Domestic	Low	SU 676 773
step8	2	8	40	32	72	1778	1810	1810	1.65	0.43	0.84	1.11	1	Oxon	Mapledurham	Step Cottage	OX	0	0	W	A		Domestic	Low	SU 676 773
str1	1	8	172	19	191	1537	1556	1556	1.45	1.37	0.69	1.44	1	Oxon	Mapledurham	Stirrups	OX	0	0	Su	D	tiebeam			SU 673 781
str2	1		80	28	108	1528	1556	1556	1.31	1.10	2.96	1.25	1	Oxon	Mapledurham	Stirrups	OX	0	0	Sp	D	stud			SU 673 781
str3	1		93	10	103	1546	1556	1556	1.71	0.43	0.82	1.59	1	Oxon	Mapledurham	Stirrups	OX	0	0	Sp	A	post			SU 673 781
str4	1		74	23	97	1533	1556	1556	1.43	1.11	1.13	1.35	1	Oxon	Mapledurham	Stirrups	OX	0	0	Su	D	post			SU 673 781
both1	1	1	84	8	92	1611	1619	1619	2.87	2.80	3.41	2.87	1	Oxon	Mapledurham	The Bothy	OX	2	3	Sp	D		Domestic	Low	SU 670 768
both2	1	20	56	14	70	1605	1619	1619	2.10	2.65	3.40	2.21	1	Oxon	Mapledurham	The Bothy	OX	0	0	Sp	D		Domestic	Low	SU 670 768
both3	1	5	32	12	44	1607	1619	1619	3.37	3.78	3.18	3.48	1	Oxon	Mapledurham	The Bothy	OX	0	0	Su	A		Domestic	Low	SU 670 768
both5	1	30	38	8	46	1611	1619	1619	2.52	3.73	2.90	2.73	1	Oxon	Mapledurham	The Bothy	OX	0	0	Sp	A		Domestic	Low	SU 670 768
both6	1	15	65	10	75	1609	1619	1619	1.49	1.84	1.61	1.54	1	Oxon	Mapledurham	The Bothy	OX	0	0	Sp	D		Domestic	Low	SU 670 768
both7	2	15	55	15	70	1485	1500	0	1.95	2.44	2.14	2.05	1	Oxon	Mapledurham	The Bothy	OX	0	0	Sp	E		Domestic	Low	SU 670 768
maptree	2	1	202	24	226	1957	1981	1981	3.57	2.35	2.80	3.44	1	Oxon	Mapledurham	The Warren & parkland	OX	2	8		D	Parkland			SU 673 765
mpl35	1		133	24	157	1977	2001	2001	2.13	0.49	0.54	1.88	1	Oxon	Mapledurham	The Warren & parkland	OX	2	6		D	Parkland			SU 673 765
mpl37	1		167	24	191	1977	2001	2001	2.09	2.06	1.77	2.08	1	Oxon	Mapledurham	The Warren & parkland	OX	0	0		D	Hedgerow			SU 673 765
mpl38	1		134	23	157	1978	2001	2001	2.63	1.64	1.85	2.49	1	Oxon	Mapledurham	The Warren & parkland	OX	2	4		D	Hedgerow			SU 673 765
mpl39	1		129	18	147	1983	2001	2001	2.60	3.08	2.50	2.66	1	Oxon	Mapledurham	The Warren & parkland	OX	2	4		D	Parkland			SU 673 765
mpl40	1		117	19	136	1982	2001	2001	2.04	3.34	2.88	2.22	1	Oxon	Mapledurham	The Warren & parkland	OX	2	5		D	Hedgerow			SU 673 765
mpl42	1		111	26	137	1975	2001	2001	2.42	2.74	2.52	2.48	1	Oxon	Mapledurham	The Warren & parkland	OX	2	6		D	Parkland			SU 673 765
mpl43	1		140	16	156	1985	2001	2001	2.54	2.91	1.91	2.58	1	Oxon	Mapledurham	The Warren & parkland	OX	2	5		D	Hedgerow			SU 673 765
mpl44	1		91	16	107	1985	2001	2001	3.35	2.44	2.74	3.22	1	Oxon	Mapledurham	The Warren & parkland	OX	2	3		D	Parkland			SU 673 765
mpl45b	1		50	14	64	1987	2001	2001	6.50	3.53	6.61	5.85	1	Oxon	Mapledurham	The Warren & parkland	OX	0	0		D	Parkland			SU 673 765
mpl47	1		100	23	123	1978	2001	2001	2.99	1.60	1.87	2.73	1	Oxon	Mapledurham	The Warren & parkland	OX	2	2		D	Hedgerow			SU 673 765
mpl48	1		126	10	136	1991	2001	2001	2.60	3.36	1.40	2.66	1	Oxon	Mapledurham	The Warren & parkland	OX	2	4		D	Hedgerow			SU 673 765
mpl49	1		138	16	154	1985	2001	2001	3.02	2.79	2.83	3.00	1	Oxon	Mapledurham	The Warren & parkland	OX	2	2		D	Hedgerow			SU 673 765
mpl50	1	5	157	32	189	1969	2001	2001	2.44	1.29	2.02	2.25	1	Oxon	Mapledurham	The Warren & parkland	OX	2	1		D	Hedgerow			SU 673 765
mpl52	1		109	17	126	1984	2001	2001	1.90	1.63	1.28	1.87	1	Oxon	Mapledurham	The Warren & parkland	OX	2	2		D	Hedgerow			SU 673 765
mpl53	1	3	81	12	93	1989	2001	2001	4.60	7.22	7.52	4.94	1	Oxon	Mapledurham	The Warren & parkland	OX	2	2		D	Hedgerow			SU 673 765
mpl54	1	1	161	20	181	1981	2001	2001	2.03	1.88	1.72	2.01	1	Oxon	Mapledurham	The Warren & parkland	OX	2	4		D	Hedgerow			SU 673 765
mpl55	1		135	37	172	1960	1997	2001	1.75	0.76	0.86	1.54	1	Oxon	Mapledurham	The Warren & parkland	OX	2	1		D	Hedgerow			SU 673 765
twh3	1		31	25	56	1700	1725	1725	3.03	1.27	2.74	2.25	1	Oxon	Mapledurham	The White House	OX	0	0	Sp	D	tiebeam			SU 671 770
chimn2	1	0	87	28	115	1430	1458	1458	2.20	0.66	1.71	1.83	1	Oxon	Mapledurham	Three Chimneys, Jackson's Lane	OX	0	0	W	D		Domestic	Low	SU 694 764
chimn20	1	0	50	22	72	1437	1459	1458	0.88	1.23	0.69	0.99	1	Oxon	Mapledurham	Three Chimneys, Jackson's Lane	OX	0	0	W	D		Domestic	Low	SU 694 764
chimn34	1	0	71	22	93	1436	1458	1458	1.32	1.46	1.63	1.35	1	Oxon	Mapledurham	Three Chimneys, Jackson's Lane	OX	2	0	W	D		Domestic	Low	SU 694 764
wtl1	1	2	86	30	116	1440	1470	1471	1.24	0.76	0.76	1.12	1	Oxon	Mapledurham	Whittles Farmhouse	OX	0	0	Su	D	cruck			SU 671 784
wtl11	2	5	32	7	39	1405	1412	1412	3.26	5.03	3.42	3.57	1	Oxon	Mapledurham	Whittles Farmhouse	OX	0	0	Sp	A	plate			SU 671 784
wtl12	2	2	37	12	49	1400	1412	1412	3.19	2.54	3.38	3.03	1	Oxon	Mapledurham	Whittles Farmhouse	OX	0	0	W	A	plate			SU 671 784
wtl14	2	5	43	20	63	1392	1412	1412	3.00	3.00	2.74	3.00	1	Oxon	Mapledurham	Whittles Farmhouse	OX	0	0	W	D	tiebeam			SU 671 784
wtl15	2	10	31	23	54	1389	1412	1412	3.93	2.71	3.78	3.41	1	Oxon	Mapledurham	Whittles Farmhouse	OX	0	0	W	D	post			SU 671 784
wtl3	1	3	47	14	61	1456	1470	1471	2.62	1.99	3.16	2.48	1	Oxon	Mapledurham	Whittles Farmhouse	OX	0	0	Su	D	purlin			SU 671 784
wtl4	1	5	35	15	50	1456	1471	1471	3.91	2.41	3.41	3.46	1	Oxon	Mapledurham	Whittles Farmhouse	OX	0	0	W	D	purlin			SU 671 784

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
btnc1	1	10	102	16	118	1378	1394	1397	3.03	2.22	2.48	2.92	1	Oxon	Oxford	Bell Tower, New College	OX	2	1	Su	D		College	Gentry	SP 517 062
btnc3	1	5	61	31	92	1366	1397	1397	2.36	0.92	1.18	1.87	1	Oxon	Oxford	Bell Tower, New College	OX	0	0	Sp	D		College	Gentry	SP 517 062
btnc6	1	5	76	19	95	1375	1394	1397	2.58	1.71	2.09	2.40	1	Oxon	Oxford	Bell Tower, New College	OX	0	0	Su	D		College	Gentry	SP 517 062
bsn1	1		141	17	158	1982	1999	1999	2.55	2.00	2.06	2.49	1	Oxon	Oxford	Brasenose Wood	OX	2	6		D	Woodland			SP 560 052
bsn10	1	3	123	39	162	1960	1999	1999	2.05	1.04	0.99	1.81	1	Oxon	Oxford	Brasenose Wood	OX	2	4		D	Woodland			SP 560 052
bsn11	1	10	122	19	141	1980	1999	1999	2.88	1.81	1.85	2.74	1	Oxon	Oxford	Brasenose Wood	OX	2	3		D	Woodland			SP 560 052
bsn12	1	5	97	28	125	1971	1999	1999	2.89	1.12	2.14	2.50	1	Oxon	Oxford	Brasenose Wood	OX	2	1		D	Woodland			SP 560 052
bsn14	1	5	152	22	174	1977	1999	1999	1.92	1.11	1.34	1.81	1	Oxon	Oxford	Brasenose Wood	OX	2	2		D	Woodland			SP 560 052
bsn15	1	5	159	22	181	1977	1999	1999	2.04	1.74	1.64	2.00	1	Oxon	Oxford	Brasenose Wood	OX	2	4		D	Woodland			SP 560 052
bsn16	1	10	124	25	149	1974	1999	1999	2.52	0.94	1.27	2.25	1	Oxon	Oxford	Brasenose Wood	OX	0	0		D	Woodland			SP 560 052
bsn18	1	5	89	18	107	1981	1999	1999	3.19	1.96	2.26	2.98	1	Oxon	Oxford	Brasenose Wood	OX	2	2		D	Woodland			SP 560 052
bsn19	1		105	23	128	1976	1999	1999	3.19	2.00	1.93	2.98	1	Oxon	Oxford	Brasenose Wood	OX	2	12		D	Woodland			SP 560 052
bsn2	1	10	134	10	144	1989	1999	1999	3.09	1.24	1.58	2.96	1	Oxon	Oxford	Brasenose Wood	OX	0	0		D	Woodland			SP 560 052
bsn20	1		93	13	106	1986	1999	1999	3.81	3.21	2.83	3.74	1	Oxon	Oxford	Brasenose Wood	OX	0	0		D	Woodland			SP 560 052
bsn21	1		120	16	136	1983	1999	1999	3.02	2.55	2.94	2.97	1	Oxon	Oxford	Brasenose Wood	OX	2	3		D	Woodland			SP 560 052
bsn22a	1	5	84	14	98	1985	1999	1999	3.25	2.56	2.79	3.15	1	Oxon	Oxford	Brasenose Wood	OX	0	0		D	Woodland			SP 560 052
bsn23	1	15	120	16	136	1983	1999	1999	3.02	2.55	2.94	2.97	1	Oxon	Oxford	Brasenose Wood	OX	2	3		D	Woodland			SP 560 052
bsn25	1	10	160	23	183	1976	1999	1999	1.88	1.78	1.62	1.87	1	Oxon	Oxford	Brasenose Wood	OX	2	1		D	Woodland			SP 560 052
bsn3	1	2	166	18	184	1981	1999	1999	1.68	1.22	1.09	1.63	1	Oxon	Oxford	Brasenose Wood	OX	2	1		D	Woodland			SP 560 052
bsn4	1	2	172	18	190	1981	1999	1999	1.82	1.91	1.68	1.83	1	Oxon	Oxford	Brasenose Wood	OX	2	1		D	Woodland			SP 560 052
bsn5	1		116	23	139	1976	1999	1999	2.66	1.97	2.49	2.55	1	Oxon	Oxford	Brasenose Wood	OX	2	5		D	Woodland			SP 560 052
bsn6	1		113	19	132	1980	1999	1999	3.05	3.05	2.90	3.05	1	Oxon	Oxford	Brasenose Wood	OX	2	2		D	Woodland			SP 560 052
bsn9	1	10	154	23	177	1976	1999	1999	1.85	2.04	1.91	1.88	1	Oxon	Oxford	Brasenose Wood	OX	0	0		D	Woodland			SP 560 052
ccch1	1	5	94	23	117	1237	1260	1261	1.40	0.96	1.13	1.31	1	Oxon	Oxford	Chapter House, Christ Church	OX	2	1	W	D	rafter		Monastic	SP 515 059
ccch2	1	20	50	23	73	1237	1260	1261	1.84	1.20	1.83	1.63	1	Oxon	Oxford	Chapter House, Christ Church	OX	2	2	W	D	collar		Monastic	SP 515 059
ccch3	1	1	84	10	94	1250	1260	1261	1.08	0.33	0.59	1.00	1	Oxon	Oxford	Chapter House, Christ Church	OX			Sp	D	collar		Monastic	SP 515 059
ccch4	1	1	59	21	80	1238	1259	1261	1.96	1.27	1.42	1.78	1	Oxon	Oxford	Chapter House, Christ Church	OX	2	1	Sp	D	rafter		Monastic	SP 515 059
ccch5	1	5	61	13	74	1247	1260	1261	2.24	2.09	1.86	2.21	1	Oxon	Oxford	Chapter House, Christ Church	OX			Su	D	collar		Monastic	SP 515 059
ccch6	1	1	65	31	96	1228	1259	1261	1.14	0.62	0.87	0.97	1	Oxon	Oxford	Chapter House, Christ Church	OX			W	D	rafter		Monastic	SP 515 059
ccch8	1	10	102	15	117	1244	1259	1261	1.20	0.96	1.10	1.17	1	Oxon	Oxford	Chapter House, Christ Church	OX	3	8	Sp	D	rafter		Monastic	SP 515 059
ccch9	1	5	43	25	68	1234	1259	1261	2.30	1.40	1.68	1.97	1	Oxon	Oxford	Chapter House, Christ Church	OX	2	2	Sp	D	rafter		Monastic	SP 515 059
ccfh1	1	5	50	20	70	1403	1423	1424	2.14	1.46	1.57	1.95	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	W	D		Domestic	Middle	SP 536 027
ccfh11	1	10	53	26	79	1396	1422	1424	1.89	1.47	1.41	1.75	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	Sp	D		Domestic	Middle	SP 536 027
ccfh13	1	20	64	18	82	1405	1423	1424	1.83	1.27	1.23	1.71	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	Su	D		Domestic	Middle	SP 536 027
ccfh14	1	2	73	15	88	1408	1423	1424	1.63	1.77	1.20	1.65	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	Su	D		Domestic	Middle	SP 536 027
ccfh2ii	1	40	29	25	54	1399	1424	1424	1.65	1.77	1.36	1.71	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	W	D		Domestic	Middle	SP 536 027
ccfh3	1	5	76	15	91	1408	1423	1424	1.85	1.51	1.16	1.80	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	W	D		Domestic	Middle	SP 536 027
ccfh4	1	20	54	17	71	1407	1424	1424	1.80	2.27	1.17	1.91	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	W	A		Domestic	Middle	SP 536 027
ccfh5	1	30	47	23	70	1400	1423	1424	2.77	2.08	2.18	2.54	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	Sp	D		Domestic	Middle	SP 536 027
ccfh6	1	30	31	20	51	1403	1423	1424	2.44	1.34	1.80	2.01	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	Sp	A		Domestic	Middle	SP 536 027
ccfh7	1	35	25	20	45	1404	1424	1424	1.77	1.23	1.28	1.53	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	W	A		Domestic	Middle	SP 536 027
ccfh8	1	10	40	15	55	1409	1424	1424	2.80	2.29	2.11	2.66	1	Oxon	Oxford	Corpus Christi Farmhouse	OX	0	0	W	A		Domestic	Middle	SP 536 027
lcb1b	1	10	55	13	68	1424	1437	1437	1.29	1.27	1.16	1.29	1	Oxon	Oxford	Lincoln College Buttery	OX	0	0	W	A		College	Gentry	SP 515 063
lcb2	1		59	19	78	1418	1437	1437	1.22	1.31	1.62	1.24	1	Oxon	Oxford	Lincoln College Buttery	OX	0	0	W	D		College	Gentry	SP 515 063
lcb4	1	1	72	15	87	1422	1437	1437	1.53	1.44	1.14	1.52	1	Oxon	Oxford	Lincoln College Buttery	OX	0	0	W	D		College	Gentry	SP 515 063
lcb5	1		50	24	74	1413	1437	1437	1.45	1.18	0.89	1.36	1	Oxon	Oxford	Lincoln College Buttery	OX	0	0	W	D		College	Gentry	SP 515 063

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
lcb6	1	5	40	26	66	1411	1437	1437	1.58	0.86	0.95	1.30	1	Oxon	Oxford	Lincoln College Buttery	OX	0	0	W	A		College	Gentry	SP 515 063
mco1	1	10	133	27	160	1449	1476	1476	1.27	0.73	0.94	1.18	1	Oxon	Oxford	Magdalen College	OX	0	0	W	D	misc	College	Gentry	SP 521 062
mco10	1		96	31	127	1444	1475	1476	1.69	0.72	1.07	1.45	1	Oxon	Oxford	Magdalen College	OX	0	0	Su	D	misc	College	Gentry	SP 521 062
mco11	2	5	56	23	79	1801	1824	1824	1.61	1.39	1.21	1.55	1	Oxon	Oxford	Magdalen College	OX	0	0	W	D	brace	College	Gentry	SP 521 062
mco12	2	5	57	19	76	1803	1822	1824	1.80	0.91	0.80	1.57	1	Oxon	Oxford	Magdalen College	OX	0	0	W	D	brace	College	Gentry	SP 521 062
mco17	2		50	20	70	1802	1822	1824	2.07	1.36	1.54	1.87	1	Oxon	Oxford	Magdalen College	OX	0	0	W	D	brace	College	Gentry	SP 521 062
mco51	3	4	114	39	153	1695	1734	1734	1.14	1.07	1.27	1.12	1	Oxon	Oxford	Magdalen College	OX	0	0	Su	D	purlin	College	Gentry	SP 521 062
mco52	3		49	23	72	1711	1734	1734	2.49	1.29	1.57	2.11	1	Oxon	Oxford	Magdalen College	OX	0	0	Sp	D	principal	College	Gentry	SP 521 062
mco54	3	5	119	23	142	1711	1734	1734	1.10	1.22	1.14	1.12	1	Oxon	Oxford	Magdalen College	OX	0	0	Sp	D	beam	College	Gentry	SP 521 062
mco55	3	5	87	19	106	1714	1733	1734	1.13	1.53	1.51	1.20	1	Oxon	Oxford	Magdalen College	OX	0	0	Sp	D	purlin	College	Gentry	SP 521 062
mco56	3	2	67	22	89	1712	1734	1734	1.65	1.20	1.28	1.54	1	Oxon	Oxford	Magdalen College	OX	0	0	W	D	purlin	College	Gentry	SP 521 062
mco57	3		82	26	108	1707	1733	1734	1.16	1.17	1.07	1.16	1	Oxon	Oxford	Magdalen College	OX	0	0	Sp	D	stud	College	Gentry	SP 521 062
mco58	3		126	15	141	1719	1734	1734	1.30	1.22	1.18	1.29	1	Oxon	Oxford	Magdalen College	OX	0	0	Sp	D	purlin	College	Gentry	SP 521 062
mco59	3		75	26	101	1708	1734	1734	1.15	1.00	0.97	1.11	1	Oxon	Oxford	Magdalen College	OX	2	4	Sp	D	purlin	College	Gentry	SP 521 062
mco713	1	5	74	21	95	1454	1475	1476	2.18	1.06	1.40	1.93	1	Oxon	Oxford	Magdalen College	OX	2	0	W	D	misc	College	Gentry	SP 521 062
mco816	1	1	94	33	127	1443	1476	1476	1.63	0.83	0.89	1.42	1	Oxon	Oxford	Magdalen College	OX	2	2	Su	D	misc	College	Gentry	SP 521 062
mco9	1		87	26	113	1449	1475	1476	1.70	0.66	0.97	1.46	1	Oxon	Oxford	Magdalen College	OX	0	0	Sp	D	misc	College	Gentry	SP 521 062
mer12	1		138	18	156	1588	1606	1608	1.05	1.21	0.78	1.06	1	Oxon	Oxford	Merton College	OX	0	0	Su	D	purlin			SP 518 060
mer13	1		78	24	102	1584	1608	1608	1.43	1.25	0.95	1.39	1	Oxon	Oxford	Merton College	OX	0	0	Su	A	purlin			SP 518 060
mer14	1		61	30	91	1578	1608	1608	1.56	0.67	0.76	1.26	1	Oxon	Oxford	Merton College	OX	0	0	W	A	beam			SP 518 060
mer15	1	3	100	18	118	1590	1608	1608	2.16	0.88	1.39	1.96	1	Oxon	Oxford	Merton College	OX	0	0	Su	A	beam			SP 518 060
mer16	2		118	23	141	1670	1693	1693	0.88	0.67	0.62	0.85	1	Oxon	Oxford	Merton College	OX	0	0	Sp	D	post			SP 518 060
mer17	1		139	26	165	1580	1606	1608	0.81	0.59	0.62	0.78	1	Oxon	Oxford	Merton College	OX	2	1	Sp	D	rafter			SP 518 060
mer2	1		58	10	68	1597	1607	1608	3.14	2.16	2.40	3.00	1	Oxon	Oxford	Merton College	OX	0	0	Su	D	principal			SP 518 060
mer3	1	7	67	11	78	1596	1607	1608	3.46	1.56	1.92	3.19	1	Oxon	Oxford	Merton College	OX	0	0	Su	D	principal			SP 518 060
mer4	1		64	24	88	1584	1608	1608	2.00	1.11	1.25	1.76	1	Oxon	Oxford	Merton College	OX	0	0	Sp	D	purlin			SP 518 060
mer5	1		75	20	95	1588	1608	1608	1.66	1.76	1.55	1.68	1	Oxon	Oxford	Merton College	OX	0	0	Sp	D	principal			SP 518 060
mer6	1		100	35	135	1573	1608	1608	0.79	0.62	0.57	0.75	1	Oxon	Oxford	Merton College	OX	0	0	W	A	rafter			SP 518 060
mer7	1		93	22	115	1584	1606	1608	1.23	1.03	0.89	1.19	1	Oxon	Oxford	Merton College	OX	2	1	Su	D	stud			SP 518 060
rco11	1		29	20	49	1720	1740	1740	2.98	2.35	3.17	2.72	1	Oxon	Oxford	Radcliffe Camera	OX	0	0	W	D	stud			SP 517 062
rco13	1	1	62	18	80	1722	1740	1740	2.77	2.45	2.46	2.70	1	Oxon	Oxford	Radcliffe Camera	OX	0	0	W	D	principal			SP 517 062
rco1a	1		45	20	65	1717	1737	1740	1.61	1.29	1.01	1.51	1	Oxon	Oxford	Radcliffe Camera	OX	0	0	W	D	post			SP 517 062
rco4	1		49	13	62	1727	1740	1740	2.13	2.26	2.37	2.15	1	Oxon	Oxford	Radcliffe Camera	OX	0	0	W	D	principal			SP 517 062
rco6	1		45	18	63	1722	1740	1740	2.17	1.34	1.93	1.93	1	Oxon	Oxford	Radcliffe Camera	OX	0	0	W	D	purlin			SP 517 062
rco7	1	1	39	14	53	1726	1740	1740	2.93	1.53	3.17	2.56	1	Oxon	Oxford	Radcliffe Camera	OX	0	0	W	D	purlin			SP 517 062
sa307	1	1	31	12	43	638	650	0	1.83	1.73	1.59	1.80	1	Oxon	Oxford	Shire Lake Project	SH	0	0		E				SP 514 056
sa321	1		25	21	46	629	650	0	2.31	0.90	2.27	1.66	1	Oxon	Oxford	Shire Lake Project	SH	0	0	Su	E				SP 514 056
tms711	2		22	25	47	625	650	0	1.32	0.98	1.13	1.14	1	Oxon	Oxford	Shire Lake Project	SH	0	0	Su	E				SP 514 056
tms726	2	1	20	19	39	631	650	0	3.38	1.97	3.51	2.69	1	Oxon	Oxford	Shire Lake Project	SH	0	0	W	E				SP 514 056
bsn50	1	5	151	24	175	1975	1999	1999	2.15	1.45	1.18	2.06	1	Oxon	Oxford	Shotover Country Park	OX	2	1		D	Woodland			SP 569 058
bsn51	1	5	141	29	170	1970	1999	1999	1.59	1.13	1.27	1.51	1	Oxon	Oxford	Shotover Country Park	OX	2	4		D	Woodland			SP 569 058
bsn52	1	5	152	19	171	1980	1999	1999	1.43	1.48	1.67	1.44	1	Oxon	Oxford	Shotover Country Park	OX	2	3		D	Woodland			SP 569 058
bsn53	1		72	9	81	1990	1999	1999	4.48	3.24	4.30	4.34	1	Oxon	Oxford	Shotover Country Park	OX	0	0		D	Woodland			SP 569 058
bod1	3	3	164	23	187	1575	1598	1598	1.13	0.83	1.08	1.09	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064
bod11	2	15	75	23	98	1463	1486	1486	2.00	1.30	1.44	1.84	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064
bod13	2	10	83	14	97	1472	1486	1486	1.79	1.28	1.36	1.72	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064

Code	Phase	Pith	H Wd	S Wd	Rings	H S hdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
bod18	2	20	99	40	139	1446	1486	1486	1.68	0.41	0.50	1.31	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064
bod19	3	40	131	28	159	1569	1597	1598	1.14	0.89	1.97	1.10	1	Oxon	Oxford	The Bodleian Library	OX	0	0	W	D		College	Gentry	SP 515 064
bod2	3	5	167	14	181	1584	1598	1598	1.73	2.06	1.96	1.75	1	Oxon	Oxford	The Bodleian Library	OX	0	0	W	D		College	Gentry	SP 515 064
bod3	3	25	143	32	175	1566	1598	1598	1.76	1.12	1.88	1.65	1	Oxon	Oxford	The Bodleian Library	OX	0	0	W	D		College	Gentry	SP 515 064
bod4	1		58	21	79	1437	1458	1458	1.60	1.48	1.67	1.57	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064
bod5	1	5	67	13	80	1444	1457	1458	2.16	2.39	1.82	2.20	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Su	D		College	Gentry	SP 515 064
bod72	4	30	168	20	188	1590	1610	1611	1.26	1.32	1.38	1.27	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064
bod73	4	1	186	30	216	1581	1611	1611	1.12	0.99	1.52	1.11	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064
bod8	2		82	31	113	1455	1486	1486	1.50	0.99	0.84	1.36	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064
bod9	2		109	31	140	1455	1486	1486	1.04	0.57	0.54	0.93	1	Oxon	Oxford	The Bodleian Library	OX	0	0	Sp	D		College	Gentry	SP 515 064
zck1	1		57	17	74	1364	1381	1381	2.81	1.29	1.39	2.46	1	Oxon	Oxford	The New Inn, 26-8 Commarket St	OX	0	0	W	D	beam			SP 512 063
zck12	1		58	13	71	1368	1381	1381	0.94	1.82	1.74	1.10	1	Oxon	Oxford	The New Inn, 26-8 Commarket St	OX	0	0	W	A	rafter			SP 512 063
zck13	1		69	15	84	1366	1381	1381	0.75	0.65	0.35	0.73	1	Oxon	Oxford	The New Inn, 26-8 Commarket St	OX	0	0	W	A	rafter			SP 512 063
zck16	1		61	14	75	1367	1381	1381	2.91	1.82	1.67	2.71	1	Oxon	Oxford	The New Inn, 26-8 Commarket St	OX	0	0	Sp	A	plate			SP 512 063
zck18	2		24	15	39	1367	1382	1382	1.92	1.84	1.83	1.89	1	Oxon	Oxford	The New Inn, 26-8 Commarket St	OX	0	0	W	D	joist			SP 512 063
wyt10a	1	5	146	34	180	1965	1999	1999	2.33	1.28	1.10	2.13	1	Oxon	Oxford	Wytham Woods	OX	2	1		D	Woodland			SP 460 080
wyt11b	1	25	168	19	187	1980	1999	1999	1.76	0.92	0.70	1.67	1	Oxon	Oxford	Wytham Woods	OX	2	8		D	Woodland			SP 460 080
wyt12b	1	10	129	17	146	1982	1999	1999	2.06	1.48	0.92	1.99	1	Oxon	Oxford	Wytham Woods	OX	2	9		D	Woodland			SP 460 080
wyt13a	1	5	125	30	155	1969	1999	1999	1.87	1.16	1.23	1.73	1	Oxon	Oxford	Wytham Woods	OX	2	3		D	Woodland			SP 460 080
wyt14a	1	5	156	26	182	1973	1999	1999	2.01	0.87	0.76	1.85	1	Oxon	Oxford	Wytham Woods	OX	2	12		D	Woodland			SP 460 080
wyt15b	1	2	177	21	198	1978	1999	1999	1.97	0.94	1.20	1.86	1	Oxon	Oxford	Wytham Woods	OX	2	12		D	Woodland			SP 460 080
wyt16b	1	1	162	17	179	1982	1999	1999	1.82	1.76	1.43	1.81	1	Oxon	Oxford	Wytham Woods	OX	2	4		D	Woodland			SP 460 080
wyt17a	1		157	13	170	1986	1999	1999	2.33	1.76	1.86	2.29	1	Oxon	Oxford	Wytham Woods	OX	2	2		D	Woodland			SP 460 080
wyt18a	1	1	222	12	234	1987	1999	1999	1.47	1.68	1.18	1.48	1	Oxon	Oxford	Wytham Woods	OX	2	0		D	Woodland			SP 460 080
wyt19b	1	5	171	31	202	1968	1999	1999	2.16	1.46	1.38	2.06	1	Oxon	Oxford	Wytham Woods	OX	2	13		D	Woodland			SP 460 080
wyt1b	1		125	20	145	1979	1999	1999	2.81	2.22	2.48	2.73	1	Oxon	Oxford	Wytham Woods	OX	0	0		D	Woodland			SP 460 080
wyt20b	1	5	139	37	176	1962	1999	1999	2.17	0.66	0.65	1.85	1	Oxon	Oxford	Wytham Woods	OX	0	0		D	Woodland			SP 460 080
wyt21a	1		175	18	193	1981	1999	1999	1.94	0.82	0.95	1.83	1	Oxon	Oxford	Wytham Woods	OX	2	16		D	Woodland			SP 460 080
wyt22a	1		188	37	225	1962	1999	1999	1.89	0.54	0.86	1.67	1	Oxon	Oxford	Wytham Woods	OX	0	0		D	Woodland			SP 460 080
wyt23b	1		113	54	167	1945	1999	1999	3.27	0.53	1.82	2.38	1	Oxon	Oxford	Wytham Woods	OX	0	0		D	Woodland			SP 460 080
wyt24a	1		129	20	149	1979	1999	1999	2.68	1.18	2.13	2.48	1	Oxon	Oxford	Wytham Woods	OX	0	0		D	Woodland			SP 460 080
wyt25a	1		124	15	139	1984	1999	1999	2.84	2.97	3.01	2.86	1	Oxon	Oxford	Wytham Woods	OX	0	0		D	Woodland			SP 460 080
wyt2b	1		125	31	156	1968	1999	1999	1.90	1.33	2.31	1.79	1	Oxon	Oxford	Wytham Woods	OX	2	4		D	Woodland			SP 460 080
wyt3a	1	10	127	20	147	1979	1999	1999	2.49	2.09	2.30	2.44	1	Oxon	Oxford	Wytham Woods	OX	2	1		D	Woodland			SP 460 080
wyt4a	1	10	140	13	153	1986	1999	1999	2.08	1.36	1.57	2.02	1	Oxon	Oxford	Wytham Woods	OX	2	11		D	Woodland			SP 460 080
wyt5a	1	3	156	22	178	1977	1999	1999	2.17	1.84	1.49	2.13	1	Oxon	Oxford	Wytham Woods	OX	0	0		D	Woodland			SP 460 080
wyt6b	1	10	167	8	175	1991	1999	1999	1.87	1.43	1.77	1.85	1	Oxon	Oxford	Wytham Woods	OX	2	3		D	Woodland			SP 460 080
wyt7b	1		72	23	95	1976	1999	1999	3.88	3.11	2.12	3.69	1	Oxon	Oxford	Wytham Woods	OX	2	1		D	Woodland			SP 460 080
wyt8a	1	1	173	32	205	1967	1999	1999	1.47	0.62	1.11	1.34	1	Oxon	Oxford	Wytham Woods	OX	2	6		D	Woodland			SP 460 080
wyt9a	1		131	9	140	1990	1999	1999	2.91	1.58	1.94	2.82	1	Oxon	Oxford	Wytham Woods	OX	2	9		D	Woodland			SP 460 080
gct11	1		95	36	131	1542	1578	1578	1.75	0.63	0.96	1.44	1	Oxon	Rotherfield Greys	Greys Court - Cromwellian Stables	OX	0	0	Su	D		Domestic	Gentry	SU 725 833
gct12	1	10	111	31	142	1547	1578	1578	1.87	0.67	1.02	1.61	1	Oxon	Rotherfield Greys	Greys Court - Cromwellian Stables	OX	0	0	Su	D		Domestic	Gentry	SU 725 833
gct13	1	10	141	20	161	1558	1578	1578	0.89	0.84	1.18	0.88	1	Oxon	Rotherfield Greys	Greys Court - Cromwellian Stables	OX	0	0	Su	D		Domestic	Gentry	SU 725 833
gct1	3	20	43	19	62	1688	1707	1707	1.82	1.41	1.28	1.70	1	Oxon	Rotherfield Greys	Greys Court - Donkey Wheel House	OX	0	0	Su	D		Agricultural	Gentry	SU 725 833
gct2	1		67	27	94	1532	1559	1558	1.08	1.03	1.04	1.07	1	Oxon	Rotherfield Greys	Greys Court - Donkey Wheel House	OX	0	0	W	D		Agricultural	Gentry	SU 725 833
gct5	2	10	45	12	57	1574	1586	1586	3.15	1.98	1.88	2.90	1	Oxon	Rotherfield Greys	Greys Court - Donkey Wheel House	OX	0	0	Su	D		Agricultural	Gentry	SU 725 833

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
gct6	2		63	18	81	1569	1587	1586	1.31	1.54	1.13	1.36	1	Oxon	Rotherfield Greys	Greys Court - Donkey Wheel House	OX	0	0	W	D		Agricultural	Gentry	SU 725 833
gct7	2	20	136	31	167	1554	1585	1586	1.18	0.43	0.64	1.05	1	Oxon	Rotherfield Greys	Greys Court - Donkey Wheel House	OX	0	0	W	D		Agricultural	Gentry	SU 725 833
gct31	1	20	109	22	131	1428	1450	1451	1.71	0.72	0.99	1.55	1	Oxon	Rotherfield Greys	Greys Court - House	OX	2	15	Su	D		Domestic	Gentry	SU 725 833
gct34	1	5	31	18	49	1433	1451	1451	3.30	1.47	2.60	2.63	1	Oxon	Rotherfield Greys	Greys Court - House	OX	0	0	W	D		Domestic	Gentry	SU 725 833
gct37	1	10	47	25	72	1420	1445	1451	1.62	0.75	1.01	1.32	1	Oxon	Rotherfield Greys	Greys Court - House	OX	0	0	Sp	D		Domestic	Gentry	SU 725 833
gct39	1	10	40	18	58	1433	1451	1451	1.76	0.60	0.62	1.40	1	Oxon	Rotherfield Greys	Greys Court - House	OX	0	0	W	D		Domestic	Gentry	SU 725 833
gct41	2		74	30	104	1544	1574	1574	2.02	1.33	2.19	1.82	1	Oxon	Rotherfield Greys	Greys Court - House	OX	0	0	W	D		Domestic	Gentry	SU 725 833
gct45	2		76	29	105	1545	1574	1574	1.26	0.60	1.16	1.08	1	Oxon	Rotherfield Greys	Greys Court - House	OX	0	0	W	D		Domestic	Gentry	SU 725 833
gct47	2	10	97	30	127	1544	1574	1574	1.83	0.47	0.64	1.51	1	Oxon	Rotherfield Greys	Greys Court - House	OX	2	6	W	D		Domestic	Gentry	SU 725 833
gct21	1		58	29	87	1530	1559	1559	0.81	0.90	0.86	0.84	1	Oxon	Rotherfield Greys	Greys Court - The Keep	OX	0	0	Su	D		Domestic	Gentry	SU 725 833
gct22	1		65	24	89	1535	1559	1559	1.29	1.34	1.09	1.30	1	Oxon	Rotherfield Greys	Greys Court - The Keep	OX	0	0	Su	D		Domestic	Gentry	SU 725 833
gct25	2		55	21	76	1567	1588	1588	0.79	0.64	0.55	0.75	1	Oxon	Rotherfield Greys	Greys Court - The Keep	OX	0	0	Su	D		Domestic	Gentry	SU 725 833
gct27	2	20	100	27	127	1560	1587	1588	1.49	0.77	0.78	1.34	1	Oxon	Rotherfield Greys	Greys Court - The Keep	OX	0	0	Sp	D		Domestic	Gentry	SU 725 833
lfde2	1	5	48	29	77	1395	1424	1424	1.50	0.89	0.79	1.27	1	Oxon	Stanton Harcourt	Lower Farm, Duck End	OX	0	0	Sp	D	purlin	Domestic	Low	SP 420 062
lfde3	1	5	41	20	61	1404	1424	1424	1.66	1.21	0.80	1.51	1	Oxon	Stanton Harcourt	Lower Farm, Duck End	OX	0	0	Sp	A	purlin	Domestic	Low	SP 420 062
lfde4	1		45	20	65	1404	1424	1424	1.18	0.77	0.92	1.05	1	Oxon	Stanton Harcourt	Lower Farm, Duck End	OX	0	0	Sp	D	rafter	Domestic	Low	SP 420 062
lfde5	1	20	44	21	65	1403	1424	1424	1.36	0.69	1.03	1.14	1	Oxon	Stanton Harcourt	Lower Farm, Duck End	OX	0	0	Sp	D	rafter	Domestic	Low	SP 420 062
lfde6	1	1	35	20	55	1404	1424	1424	1.65	0.67	0.96	1.29	1	Oxon	Stanton Harcourt	Lower Farm, Duck End	OX	0	0	Sp	A	rafter	Domestic	Low	SP 420 062
lfde7	1	1	31	23	54	1401	1424	1424	1.75	0.52	0.55	1.23	1	Oxon	Stanton Harcourt	Lower Farm, Duck End	OX	0	0	Sp	A	rafter	Domestic	Low	SP 420 062
ssj1	1		102	19	121	1284	1303	1305	1.63	1.37	1.61	1.59	1	Oxon	Stanton St John	Manor Farm	OX	0	0	Sp	D		Domestic	Gentry	SP 577 095
ssj11	2	3	73	24	97	1451	1475	1475	1.82	1.19	1.82	1.66	1	Oxon	Stanton St John	Manor Farm	OX	2	0	Su	D		Domestic	Gentry	SP 577 095
ssj21	3	5	67	27	94	1609	1636	1636	1.20	0.59	0.73	1.03	1	Oxon	Stanton St John	Manor Farm	OX	0	0	W	D		Domestic	Gentry	SP 577 095
ssj24a	3	5	66	27	93	1609	1636	1636	1.13	0.44	0.81	0.93	1	Oxon	Stanton St John	Manor Farm	OX	0	0	Su	A		Domestic	Gentry	SP 577 095
ssj25	3	2	68	24	92	1612	1636	1636	1.02	0.40	0.87	0.86	1	Oxon	Stanton St John	Manor Farm	OX	0	0	Sp	A		Domestic	Gentry	SP 577 095
ssj3	1		72	19	91	1286	1305	1305	1.22	1.18	1.17	1.21	1	Oxon	Stanton St John	Manor Farm	OX	0	0	Sp	D		Domestic	Gentry	SP 577 095
ssj75	4		51	16	67	1583	1599	1599	2.99	2.42	2.28	2.86	1	Oxon	Stanton St John	Manor Farm	OX	0	0	W	D		Domestic	Gentry	SP 577 095
ssj41	1	3	91	16	107	1631	1647	1647	1.90	1.36	1.33	1.82	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj42	1		84	28	112	1619	1647	1647	1.01	0.70	0.58	0.94	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj44	1	5	70	30	100	1617	1647	1647	1.54	0.95	1.25	1.36	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	Sp	D		Agricultural	Middle	SP 577 095
ssj45	1	5	85	24	109	1623	1647	1647	1.83	1.22	1.43	1.70	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj51	2	0	69	22	91	1779	1801	1801	1.52	0.73	1.33	1.33	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	Sp	D		Agricultural	Middle	SP 577 095
ssj52	3	1	50	13	63	1337	1350	0	1.76	1.77	2.53	1.76	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj53	3	1	53	12	65	1337	1349	0	1.49	1.85	1.80	1.55	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj55	3	5	41	16	57	1334	1350	0	1.86	2.46	2.11	2.03	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj57	2	1	34	19	53	1782	1801	1801	1.76	1.42	1.07	1.64	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj61	1	5	145	22	167	1625	1647	1647	1.00	0.94	0.72	0.99	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj62	1	10	67	23	90	1624	1647	1647	1.96	1.24	1.31	1.77	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj63	1		73	25	98	1622	1647	1647	1.26	0.90	1.17	1.17	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj64	1	10	102	32	134	1614	1646	1647	0.99	0.77	0.73	0.94	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	Su	D		Agricultural	Middle	SP 577 095
ssj65	1		101	15	116	1632	1647	1647	1.41	1.21	0.78	1.38	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	Su	A		Agricultural	Middle	SP 577 095
ssj66	1	20	69	19	88	1628	1647	1647	2.23	1.90	2.57	2.16	1	Oxon	Stanton St John	Manor Farm buildings	OX	2	3	W	D		Agricultural	Middle	SP 577 095
ssj67	1		98	17	115	1630	1647	1647	1.59	0.65	0.76	1.45	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj68	1	10	70	33	103	1614	1647	1647	1.08	0.96	1.22	1.04	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	D		Agricultural	Middle	SP 577 095
ssj78	1	0	42	18	60	1629	1647	1647	2.02	1.44	0.95	1.85	1	Oxon	Stanton St John	Manor Farm buildings	OX	0	0	W	E		Agricultural	Middle	SP 577 095
pcs11	2	5	80	25	105	1419	1444	1444	2.93	0.98	2.53	2.47	1	Oxon	Steventon	Priory Cottages	OX	0	0	W	A		Domestic	Middle	SU 465 474
pcs12	2	10	92	15	107	1429	1444	1444	1.99	2.23	2.23	2.02	1	Oxon	Steventon	Priory Cottages	OX	0	0	W	D		Domestic	Middle	SU 465 474

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
pcs2	1		37	16	53	1447	1463	1463	2.44	2.13	1.92	2.34	1	Oxon	Steventon	Priory Cottages	OX	0	0	W	D		Domestic	Middle	SU 465 474
pcs21	3		59	19	78	1552	1571	1571	1.61	1.65	1.34	1.62	1	Oxon	Steventon	Priory Cottages	OX	0	0	Sp	D		Domestic	Middle	SU 465 474
pcs22	3	20	71	24	95	1547	1571	1571	1.72	1.34	1.40	1.62	1	Oxon	Steventon	Priory Cottages	OX	0	0	Sp	D		Domestic	Middle	SU 465 474
pcs23	3		45	27	72	1544	1571	1571	2.47	1.24	2.46	2.01	1	Oxon	Steventon	Priory Cottages	OX	0	0	Sp	A		Domestic	Middle	SU 465 474
mcsc01	1	0	75	21	96	1297	1318	1318	2.09	1.02	1.79	1.86	1	Oxon	Sutton Courtenay	Manor Cottage	OX	0	0	?	D		Domestic	Middle	SU 501 939
mcsc03	1	0	63	23	86	1295	1318	1318	2.98	1.58	1.95	2.60	1	Oxon	Sutton Courtenay	Manor Cottage	OX	0	0	W	D		Domestic	Middle	SU 501 939
mcsc21	1		77	29	106	1288	1317	1318	2.24	1.04	1.36	1.91	1	Oxon	Sutton Courtenay	Manor Cottage	OX	0	0	Su	D		Domestic	Middle	SU 501 939
mcsc23	1		69	15	84	1303	1318	1318	2.89	1.71	2.21	2.68	1	Oxon	Sutton Courtenay	Manor Cottage	OX	0	0	W	D		Domestic	Middle	SU 501 939
mcsc24	1	0	36	22	58	1296	1318	1318	1.84	1.19	1.80	1.59	1	Oxon	Sutton Courtenay	Manor Cottage	OX	0	0	Su	A		Domestic	Middle	SU 501 939
cgg11	2	10	48	20	68	1535	1555	1555	2.62	1.23	1.98	2.21	1	Oxon	Witney	Cogges Manor Farm	OX	0	0	W	D		Domestic	Middle	SP 363 096
cgg21	1	5	40	28	68	1526	1554	1554	2.59	1.41	2.02	2.10	1	Oxon	Witney	Cogges Manor Farm	OX	0	0	Su	D		Domestic	Middle	SP 363 096
cgg22	1	5	34	16	50	1538	1554	1554	2.93	1.92	2.78	2.60	1	Oxon	Witney	Cogges Manor Farm	OX	0	0	Su	A		Domestic	Middle	SP 363 096
cgg31	3		89	18	107	1610	1628	1628	2.27	1.26	1.45	2.10	1	Oxon	Witney	Cogges Manor Farm	OX	0	0	Sp	D		Domestic	Middle	SP 363 096
cgg32	3	5	48	35	83	1593	1628	1628	1.58	0.76	0.58	1.23	1	Oxon	Witney	Cogges Manor Farm	OX	0	0	Sp	A		Domestic	Middle	SP 363 096
cgg33	3	5	42	26	68	1602	1628	1628	2.83	1.45	2.26	2.30	1	Oxon	Witney	Cogges Manor Farm	OX	0	0	Sp	D		Domestic	Middle	SP 363 096
cgg1	1	1	108	18	126	1548	1566	1566	1.66	1.18	1.29	1.59	1	Oxon	Witney	Cogges Manor Farm, Dairy	OX	0	0	Su	D		Agricultural	Low	SP 363 096
cgg2	1	5	57	21	78	1545	1566	1566	2.49	0.75	1.76	2.02	1	Oxon	Witney	Cogges Manor Farm, Dairy	OX	0	0	Su	A		Agricultural	Low	SP 363 096
yel3	1	10	88	39	127	1460	1499	1500	2.35	1.19	1.85	2.00	1	Oxon	Yelford	Yelford Manor	OX	0	0	Sp	D		Domestic	Gentry	SP 359 048
yel5	1	20	90	18	108	1482	1500	1500	2.12	1.20	1.15	1.97	1	Oxon	Yelford	Yelford Manor	OX	0	0	Sp	D		Domestic	Gentry	SP 359 048
nf1	1		66	24	90	1470	1494	1494	1.88	1.11	1.80	1.68	7	S Yorks	Thorpe	Netherfold Farmhouse	SH	0	0	W	D				SK 384 952
nf2	1		86	22	108	1472	1494	1494	2.02	1.67	1.54	1.95	7	S Yorks	Thorpe	Netherfold Farmhouse	SH	0	0	W	D				SK 384 952
alc5	1		94	36	130	1521	1557	1557	1.11	0.60	0.75	0.97	6	Salop	Alcaston	Alcaston Manor	OX	2	4	Sp	D		Domestic	Middle	SO 458 872
alc6	1	1	111	24	135	1533	1557	1557	1.44	1.07	1.44	1.38	6	Salop	Alcaston	Alcaston Manor	OX	3	1	Sp	D		Domestic	Middle	SO 458 872
alc7	2		70	30	100	1674	1704	1704	2.57	1.31	1.14	2.19	6	Salop	Alcaston	Alcaston Manor	OX	0	0	Su	D		Domestic	Middle	SO 458 872
alc8	2		85	30	115	1674	1704	1704	2.24	1.01	1.85	1.92	6	Salop	Alcaston	Alcaston Manor	OX	0	0	Su	A		Domestic	Middle	SO 458 872
alc9	2		30	33	63	1671	1704	1704	5.15	1.18	3.86	3.07	6	Salop	Alcaston	Alcaston Manor	OX	0	0	W	A		Domestic	Middle	SO 458 872
ohf1	2		130	30	160	1600	1630	1631	1.03	0.76	1.76	0.98	6	Salop	All Stretton	Old Hall Farm	OX	0	0	Su	D		Domestic	Low	SO 461 953
ohf2	1		121	17	138	1515	1532	1532	1.05	0.99	0.99	1.04	6	Salop	All Stretton	Old Hall Farm	OX	0	0	Su	D		Domestic	Low	SO 461 953
ohf3	2	10	70	28	98	1603	1631	1631	2.80	1.41	1.41	2.41	6	Salop	All Stretton	Old Hall Farm	OX	2	0	W	D		Domestic	Low	SO 461 953
ohf4	2	1	152	30	182	1599	1629	1631	1.16	0.80	1.05	1.10	6	Salop	All Stretton	Old Hall Farm	OX	0	0	Su	D		Domestic	Low	SO 461 953
ohf5	3		133	27	160	1538	1565	1565	1.58	0.99	1.21	1.48	6	Salop	All Stretton	Old Hall Farm	OX	0	0	Sp	D		Domestic	Low	SO 461 953
bell1	1		95	30	125	1520	1550	1550	3.71	2.11	2.81	3.33	6	Salop	Alveley	The Bell Inn	OX	0	0	Sp	E		Domestic	Low	SO 760 845
bell5	1	5	29	18	47	1532	1550	1550	6.36	5.19	6.66	5.91	6	Salop	Alveley	The Bell Inn	OX	0	0	Su	E		Domestic	Low	SO 760 845
bell67	1	5	50	12	62	1538	1550	1550	4.99	3.55	3.32	4.71	6	Salop	Alveley	The Bell Inn	OX	2	1	Sp	E		Domestic	Low	SO 760 845
bell11	1	3	58	17	75	1737	1754	1754	4.22	3.97	3.01	4.16	6	Salop	Alveley	The Old Bell Inn Malthouse	OX	0	0	W	D		Agricultural	Low	SO 760 845
bell12	1	4	35	38	73	1716	1754	1754	4.11	2.05	2.97	3.04	6	Salop	Alveley	The Old Bell Inn Malthouse	OX	0	0	W	D		Agricultural	Low	SO 760 845
bell13	1	1	45	19	64	1735	1754	1754	3.78	3.17	2.39	3.60	6	Salop	Alveley	The Old Bell Inn Malthouse	OX	0	0	W	A		Agricultural	Low	SO 760 845
bell15	2		71	22	93	1802	1824	1824	2.27	1.34	1.26	2.05	6	Salop	Alveley	The Old Bell Inn Malthouse	OX	0	0	Su	A		Agricultural	Low	SO 760 845
bell17	2		41	24	65	1800	1824	1824	3.04	2.64	2.69	2.89	6	Salop	Alveley	The Old Bell Inn Malthouse	OX	0	0	Sp	D		Agricultural	Low	SO 760 845
bell18	2	5	44	21	65	1803	1824	1824	3.48	1.89	4.93	2.97	6	Salop	Alveley	The Old Bell Inn Malthouse	OX	0	0	Su	A		Agricultural	Low	SO 760 845
wor1	1		60	24	84	1436	1460	1460	2.51	1.47	1.93	2.21	6	Salop	Astley Abbots	Great Binnal	OX	0	0	Sp	D		Domestic	Low	SO 702 968
wor2	1		61	11	72	1448	1459	1460	2.43	2.72	2.16	2.48	6	Salop	Astley Abbots	Great Binnal	OX	0	0	W	D		Domestic	Low	SO 702 968
wor3	1		47	25	72	1435	1460	1460	2.08	1.21	1.53	1.78	6	Salop	Astley Abbots	Great Binnal	OX	0	0	Sp	D		Domestic	Low	SO 702 968
ae22	1	1	59	11	70	1459	1470	1470	3.12	3.47	2.76	3.17	6	Salop	Aston Eyre	Hall Farm	OX	0	0	Sp	E		Domestic	Gentry	SO 653 942
ae29a	1		45	19	64	1451	1470	1470	2.58	1.60	1.70	2.29	6	Salop	Aston Eyre	Hall Farm	OX	0	0	W	E		Domestic	Gentry	SO 653 942
ae42	2		104	58	162	1555	1613	1613	1.16	0.51	1.63	0.93	6	Salop	Aston Eyre	Hall Farm	OX	0	0	W	A		Domestic	Gentry	SO 653 942

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
ae43	2		71	60	131	1553	1613	1613	1.11	0.57	0.54	0.86	6	Salop	Aston Eyre	Hall Farm	OX	0	0	W	A		Domestic	Gentry	SO 653 942
ae44	2		191	50	241	1563	1613	1613	0.76	0.42	0.43	0.69	6	Salop	Aston Eyre	Hall Farm	OX	0	0	W	A		Domestic	Gentry	SO 653 942
ae45	2		130	13	143	1600	1613	1613	1.06	0.81	0.63	1.03	6	Salop	Aston Eyre	Hall Farm	OX	2	10	W	A		Domestic	Gentry	SO 653 942
ae49	2		88	35	123	1578	1613	1613	1.11	1.17	1.18	1.13	6	Salop	Aston Eyre	Hall Farm	OX	0	0	W	D		Domestic	Gentry	SO 653 942
hfa1	1		79	20	99	1366	1386	1386	2.08	1.56	1.51	1.97	6	Salop	Attingham	Home Farm	OX	0	0	W	A		Domestic	Middle	SJ 543 102
hfa2	1		35	13	48	1373	1386	1386	2.00	1.96	1.71	1.99	6	Salop	Attingham	Home Farm	OX	0	0	Sp	A		Domestic	Middle	SJ 543 102
hfa3	1	1	55	19	74	1366	1385	1386	1.34	1.05	1.23	1.26	6	Salop	Attingham	Home Farm	OX	0	0	W	D		Domestic	Middle	SJ 543 102
hfa45	1	1	36	11	47	1375	1386	1386	2.41	1.93	2.02	2.30	6	Salop	Attingham	Home Farm	OX	2	9	W	D		Domestic	Middle	SJ 543 102
phbc1	1		115	21	136	1543	1564	1565	2.34	1.52	1.69	2.21	6	Salop	Bishops Castle	The Porch House	OX	0	0	W	D	post	Domestic	Middle	SO 323 889
phbc2	1		64	20	84	1544	1564	1565	1.52	0.84	1.20	1.36	6	Salop	Bishops Castle	The Porch House	OX	0	0	W	A	stud	Domestic	Middle	SO 323 889
phbc3	1	5	85	30	115	1534	1564	1565	1.86	0.84	1.11	1.60	6	Salop	Bishops Castle	The Porch House	OX	0	0	W	D	stud	Domestic	Middle	SO 323 889
phbc4	1		77	33	110	1531	1564	1565	1.49	0.88	2.34	1.31	6	Salop	Bishops Castle	The Porch House	OX	0	0	W	D	stud	Domestic	Middle	SO 323 889
phbc5	1		65	42	107	1523	1565	1565	2.29	0.89	0.59	1.74	6	Salop	Bishops Castle	The Porch House	OX	0	0	Sp	D	post	Domestic	Middle	SO 323 889
led1	1	5	85	18	103	1445	1463	1463	0.87	0.79	0.72	0.86	6	Salop	Bitterley	Upper Ledwyche	OX	0	0	W	D		Domestic	Middle	SO 554 793
led2	1		51	12	63	1451	1463	1463	2.07	2.95	2.39	2.24	6	Salop	Bitterley	Upper Ledwyche	OX	0	0	Su	D		Domestic	Middle	SO 554 793
led3	1	4	70	18	88	1443	1461	1463	1.83	1.48	1.29	1.76	6	Salop	Bitterley	Upper Ledwyche	OX	0	0	W	D		Domestic	Middle	SO 554 793
led4	1	10	46	18	64	1445	1463	1463	2.31	2.19	1.55	2.27	6	Salop	Bitterley	Upper Ledwyche	OX	0	0	Sp	A		Domestic	Middle	SO 554 793
mees1	1	4	70	17	87	1485	1502	1502	3.26	2.23	2.29	3.06	6	Salop	Bolas Magna	Meeson Farm	OX	0	0	W	D	Cruck	Domestic	Middle	SJ 654 207
mees3	1		34	12	46	1490	1502	1502	3.02	1.59	2.85	2.65	6	Salop	Bolas Magna	Meeson Farm	OX	0	0	W	D	collar	Domestic	Middle	SJ 654 207
mees4	1	5	77	18	95	1484	1502	1502	1.68	1.49	2.10	1.65	6	Salop	Bolas Magna	Meeson Farm	OX	0	0	W	D	purlin	Domestic	Middle	SJ 654 207
me1	1	10	135	24	159	1613	1637	1637	1.55	0.70	1.10	1.42	6	Salop	Bolas Magna	Meeson Hall	OX	0	0	Sp	D		Domestic	Gentry	SJ 658 207
me2	1	8	54	20	74	1615	1635	1637	3.85	1.62	2.19	3.25	6	Salop	Bolas Magna	Meeson Hall	OX	0	0	Sp	D		Domestic	Gentry	SJ 658 207
me4	1	10	51	15	66	1622	1637	1637	2.28	1.15	2.06	2.03	6	Salop	Bolas Magna	Meeson Hall	OX	0	0	W	A		Domestic	Gentry	SJ 658 207
me5	1	7	77	29	106	1608	1637	1637	2.86	1.03	1.22	2.36	6	Salop	Bolas Magna	Meeson Hall	OX	0	0	W	A		Domestic	Gentry	SJ 658 207
me6	1		46	26	72	1611	1637	1637	2.54	1.22	0.73	2.07	6	Salop	Bolas Magna	Meeson Hall	OX	0	0	Sp	A		Domestic	Gentry	SJ 658 207
me7	1		54	16	70	1621	1637	1637	2.30	2.11	1.70	2.26	6	Salop	Bolas Magna	Meeson Hall	OX	0	0	Sp	A		Domestic	Gentry	SJ 658 207
me8	2	5	92	33	125	1611	1644	1644	1.94	0.72	0.81	1.62	6	Salop	Bolas Magna	Meeson Hall	OX	0	0	Sp	A		Domestic	Gentry	SJ 658 207
me9	2		140	18	158	1626	1644	1644	1.17	0.72	0.71	1.12	6	Salop	Bolas Magna	Meeson Hall	OX	0	0	Sp	D		Domestic	Gentry	SJ 658 207
home14	1	5	65	19	84	1439	1458	1458	2.04	1.21	1.51	1.85	6	Salop	Boraston	Homeside	OX	2	1	W	D		Domestic	Low	SO 615 699
home3	1	5	89	17	106	1441	1458	1458	2.13	2.11	2.26	2.12	6	Salop	Boraston	Homeside	OX	0	0	Su	D		Domestic	Low	SO 615 699
bn3	1		83	37	120	1469	1506	1506	1.33	0.93	0.61	1.21	6	Salop	Bridgnorth	15 Bridge Street	OX	0	0	Su	D	stud	Domestic	Middle	SO 718 931
afc4	1		75	24	99	1376	1400	1400	1.72	0.81	0.98	1.50	6	Salop	Bridgnorth	All Forces Club, 6 Bridge Street	OX	0	0	W	E	purlin	Domestic	Middle	SO 719 930
bld1	2		68	20	88	1528	1548	1548	2.09	1.32	1.62	1.91	6	Salop	Buildwas	Abbots Lodgings Buildwas Abbey	OX	0	0	W	D		Church	Monastic	SJ 642 044
bld11	2		67	25	92	1523	1548	1548	2.40	1.95	1.96	2.28	6	Salop	Buildwas	Abbots Lodgings Buildwas Abbey	OX	0	0	W	D		Church	Monastic	SJ 642 044
bld45	1		46	20	66	1357	1377	1377	2.72	1.67	1.81	2.40	6	Salop	Buildwas	Abbots Lodgings Buildwas Abbey	OX	2	4	Sp	D		Church	Monastic	SJ 642 044
shu1	1	5	87	15	102	1407	1422	1422	2.12	2.92	2.38	2.24	6	Salop	Cardington	Shootrough	OX	0	0	Su	D		Domestic	Low	SO 490 964
shu2	1	5	64	18	82	1404	1422	1422	3.11	2.46	2.08	2.97	6	Salop	Cardington	Shootrough	OX	2	2	Su	D		Domestic	Low	SO 490 964
shu3	1	1	36	10	46	1412	1422	1422	4.13	3.37	4.13	3.96	6	Salop	Cardington	Shootrough	OX	0	0	Sp	D		Domestic	Low	SO 490 964
shu4	2		60	24	84	1585	1609	1609	2.76	1.63	1.56	2.44	6	Salop	Cardington	Shootrough	OX	0	0	Su	A		Domestic	Low	SO 490 964
shu7	2	25	137	17	154	1592	1609	1609	1.18	1.13	1.39	1.18	6	Salop	Cardington	Shootrough	OX	0	0	Su	D		Domestic	Low	SO 490 964
crd1	1	20	65	25	90	1401	1426	1426	2.50	1.23	1.45	2.15	6	Salop	Cardington	The Barracks	OX	0	0	W	D		Domestic	Low	SO 506 953
cher11	1		201	49	250	1586	1635	1635	1.72	1.00	0.79	1.58	6	Salop	Cherrington	Cherrington Manor	OX	0	0	W	D	beam	Domestic	Gentry	SJ 666 201
cher12	1		118	28	146	1606	1634	1635	1.46	1.00	0.80	1.37	6	Salop	Cherrington	Cherrington Manor	OX	0	0	W	D	stud	Domestic	Gentry	SJ 666 201
cher16	1		73	22	95	1613	1635	1635	1.82	1.28	1.13	1.70	6	Salop	Cherrington	Cherrington Manor	OX	0	0	W	A	purlin	Domestic	Gentry	SJ 666 201
pent1	1	10	67	23	90	1441	1464	1464	1.01	0.80	1.28	0.96	6	Salop	Clun	Pentre Hodre, Chapel Lawn	OX	0	0	W	D	purlin	Domestic	Middle	SO 326 768
pent2	1		136	31	167	1430	1461	1464	1.21	0.88	0.77	1.15	6	Salop	Clun	Pentre Hodre, Chapel Lawn	OX	0	0	Sp	D	Cruck	Domestic	Middle	SO 326 768

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
pent3	1	10	55	31	86	1433	1464	1464	1.30	0.72	0.95	1.09	6	Salop	Clun	Pentre Hodre, Chapel Lawn	OX	0	0	W	D	stud	Domestic	Middle	SO 326 768
pent4	1	1	60	28	88	1437	1465	1464	1.38	1.56	2.01	1.43	6	Salop	Clun	Pentre Hodre, Chapel Lawn	OX	0	0	W	D	purlin	Domestic	Middle	SO 326 768
pent5	1	5	35	36	71	1428	1464	1464	1.80	1.11	1.00	1.45	6	Salop	Clun	Pentre Hodre, Chapel Lawn	OX	0	0	W	D	purlin	Domestic	Middle	SO 326 768
spoad1	1	21	59	27	86	1519	1546	1546	2.88	2.28	1.43	2.69	6	Salop	Clun	Spoad Farm	OX	2	0	Su	D		Domestic	Middle	SO 257 820
clun020	1		60	28	88	1466	1494	1494	1.39	0.98	1.12	1.26	6	Salop	Clunbury	Clunbury Church	SH	0	0	W	D	rafter			SO 371 807
clun023	1		87	38	125	1456	1494	1494	0.99	0.74	0.94	0.92	6	Salop	Clunbury	Clunbury Church	SH	0	0	W	D	rafter			SO 371 807
cgfa12	2	20	37	16	53	1530	1546	1546	1.90	2.39	2.10	2.05	6	Salop	Clungunford	Abcott Manor	OX			Su	D	rafter	Domestic	Middle	SO 392 787
cgfa13	2	20	56	24	80	1519	1543	1546	1.61	0.89	0.86	1.40	6	Salop	Clungunford	Abcott Manor	OX			Sp	D	rafter	Domestic	Middle	SO 392 787
cgfa14	2	25	89	23	112	1523	1546	1546	1.95	2.30	2.66	2.02	6	Salop	Clungunford	Abcott Manor	OX	2		Su	D	misc	Domestic	Middle	SO 392 787
cgfa2	1	10	79	22	101	1519	1541	1541	2.22	2.00	1.96	2.17	6	Salop	Clungunford	Abcott Manor	OX			Sp	D	collar	Domestic	Middle	SO 392 787
cgfc1	1	20	126	57	183	1596	1653	1653	1.25	0.55	0.57	1.03	6	Salop	Clungunford	Bird-in-the-Rock Tea Rooms	OX			W	D	post	Domestic	Low	SO 392 786
cgfc3	1	20	71	30	101	1623	1653	1653	1.34	0.87	1.13	1.20	6	Salop	Clungunford	Bird-in-the-Rock Tea Rooms	OX			Su	A	rail	Domestic	Low	SO 392 786
cgfc4	1	30	67	30	97	1623	1653	1653	1.25	1.05	1.23	1.19	6	Salop	Clungunford	Bird-in-the-Rock Tea Rooms	OX			Su	A	rail	Domestic	Low	SO 392 786
cgfd1	1	25	129	26	155	1572	1598	1598	1.25	1.10	0.98	1.23	6	Salop	Clungunford	Church Farm	OX	2	0	Su	D	stud	Domestic	Low	SO 395 786
scc11	1	40	136	40	176	1288	1328	1328	1.04	0.61	1.80	0.95	6	Salop	Clungunford	Church of St Cuthbert	OX			W	D	rafter	Church	Monastic	SO 394 787
scc2	2	1	39	21	60	1317	1338	1338	3.10	1.86	0.64	2.67	6	Salop	Clungunford	Church of St Cuthbert	OX			W	A	rafter	Church	Monastic	SO 394 787
scc4	2	40	107	41	148	1297	1338	1338	1.40	0.90	1.99	1.26	6	Salop	Clungunford	Church of St Cuthbert	OX	2	1	W	D	brace	Church	Monastic	SO 394 787
cgfb1	1	50	78	63	141	1528	1591	1591	1.00	0.69	0.70	0.86	6	Salop	Clungunford	Clungunford Farm	OX			W	D	post	Domestic	Middle	SO 397 787
cgfb3	2	1	298	58	356	1570	1628	1628	0.95	0.46	0.53	0.87	6	Salop	Clungunford	Clungunford Farm	OX	2	0	W	D	post	Domestic	Middle	SO 397 787
cgfb4	2	10	74	23	97	1604	1627	1628	2.02	1.57	2.08	1.91	6	Salop	Clungunford	Clungunford Farm	OX			W	D	tiebeam	Domestic	Middle	SO 397 787
cgfe1	1	20	100	25	125	1546	1571	1571	1.68	1.19	1.08	1.59	6	Salop	Clungunford	Rowton Grange	OX			W	D	tiebeam	Domestic	Middle	SO 409 802
cgfe2	1	10	113	28	141	1543	1571	1571	1.58	1.06	0.77	1.48	6	Salop	Clungunford	Rowton Grange	OX			Su	D	purlin	Domestic	Middle	SO 409 802
cgfe3	2	1	155	35	190	1561	1596	1598	1.33	0.75	0.90	1.22	6	Salop	Clungunford	Rowton Grange	OX			W	D	stud	Domestic	Middle	SO 409 802
cgfe4	2	25	64	23	87	1575	1598	1598	1.78	1.48	1.66	1.70	6	Salop	Clungunford	Rowton Grange	OX			Su	D	purlin	Domestic	Middle	SO 409 802
cgfe5	2	50	55	33	88	1565	1598	1598	1.37	1.21	1.12	1.31	6	Salop	Clungunford	Rowton Grange	OX			W	A	rafter	Domestic	Middle	SO 409 802
cgff2	1	50	187	31	218	1621	1652	1652	1.00	0.47	0.67	0.93	6	Salop	Clungunford	Sycamore Cottage	OX			W	D	post	Domestic	Low	SO 397 788
g1	1		98	31	129	1628	1659	1659	1.48	0.84	1.26	1.33	6	Salop	Cound	Golding Hall	OX	0	0	Sp	D	rail			SJ 544 035
g2	1	5	125	44	169	1615	1659	1659	1.74	0.69	0.49	1.47	6	Salop	Cound	Golding Hall	OX	0	0	Sp	D	post			SJ 544 035
g3	1	15	115	42	157	1617	1659	1659	1.03	0.57	0.96	0.91	6	Salop	Cound	Golding Hall	OX	0	0	W	D	post			SJ 544 035
g4	1		67	8	75	1651	1659	1659	1.21	1.79	1.95	1.27	6	Salop	Cound	Golding Hall	OX	0	0	Sp	A	stud			SJ 544 035
g6	2	8	125	27	152	1639	1666	1666	2.04	0.67	0.85	1.80	6	Salop	Cound	Golding Hall	OX	0	0	Su	D	principal			SJ 544 035
habm1	1	20	79	18	97	1558	1576	1576	2.36	1.66	1.65	2.23	6	Salop	Habberley	The Old Mill	OX	0	0	Su	D		Agricultural	Low	SJ 397 035
habm2	1	5	91	17	108	1559	1576	1576	2.02	1.41	1.38	1.92	6	Salop	Habberley	The Old Mill	OX	0	0	Sp	D		Agricultural	Low	SJ 397 035
erc10	1		119	44	163	1564	1608	1608	0.92	0.38	0.50	0.77	6	Salop	High Ercall	High Ercall Hall	OX	0	0	Sp	D		Domestic	Gentry	SJ 595 173
erc11	1		140	38	178	1570	1608	1608	1.13	0.53	0.78	1.00	6	Salop	High Ercall	High Ercall Hall	OX	0	0	W	D		Domestic	Gentry	SJ 595 173
erc14	1	10	87	28	115	1580	1608	1608	2.61	1.44	1.78	2.33	6	Salop	High Ercall	High Ercall Hall	OX	0	0	Sp	D		Domestic	Gentry	SJ 595 173
erc4	1		110	50	160	1558	1608	1608	1.63	0.56	0.60	1.29	6	Salop	High Ercall	High Ercall Hall	OX	0	0	Sp	D		Domestic	Gentry	SJ 595 173
erc56	1	10	197	21	218	1587	1608	1608	1.27	1.27	1.18	1.27	6	Salop	High Ercall	High Ercall Hall	OX	0	0	Sp	D		Domestic	Gentry	SJ 595 173
cath1	1		60	14	74	1472	1486	1486	2.70	1.64	1.80	2.50	6	Salop	Hopton Wafers	Catherton Cottage	OX	0	0	Sp	D		Domestic	Low	SO 654 783
cath2	1		72	22	94	1462	1484	1486	1.60	1.73	1.43	1.63	6	Salop	Hopton Wafers	Catherton Cottage	OX	0	0	Su	D		Domestic	Low	SO 654 783
cath3	1		14	21	35	1464	1485	1486	2.44	2.17	2.36	2.28	6	Salop	Hopton Wafers	Catherton Cottage	OX	0	0	Su	D		Domestic	Low	SO 654 783
hh1	1	5	38	10	48	1462	1472	1472	3.58	4.50	4.31	3.77	6	Salop	Humphreston	Humphreston Hall	OX	0	0	W	D		Domestic	Gentry	SJ 819 051
hh11	2	10	44	18	62	1458	1476	1476	3.14	1.55	1.67	2.68	6	Salop	Humphreston	Humphreston Hall	OX	0	0	W	A		Domestic	Gentry	SJ 819 051
hh12	2	3	52	17	69	1459	1476	1476	4.28	2.95	3.99	3.95	6	Salop	Humphreston	Humphreston Hall	OX	0	0	W	D		Domestic	Gentry	SJ 819 051
hh167	3		62	18	80	1481	1499	1499	2.11	0.99	1.95	1.85	6	Salop	Humphreston	Humphreston Hall	OX	2	2	Sp	D		Domestic	Gentry	SJ 819 051
hh18	2	5	107	18	125	1458	1476	1476	1.77	1.44	2.06	1.72	6	Salop	Humphreston	Humphreston Hall	OX	0	0	Sp	D		Domestic	Gentry	SJ 819 051

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
hh21	4	10	70	25	95	1451	1476	1476	1.99	0.97	1.51	1.72	6	Salop	Humphreston	Humphreston Hall	OX	3	3	Sp	E		Domestic	Gentry	SJ 819 051
hh23	4	3	91	18	109	1458	1476	1476	1.61	1.19	1.65	1.54	6	Salop	Humphreston	Humphreston Hall	OX	0	0	Sp	E		Domestic	Gentry	SJ 819 051
kemp1	1	10	87	28	115	1449	1477	1477	2.27	1.55	1.77	2.09	6	Salop	Kempton	No. 25	OX	2	2	W	D		Domestic	Low	SO 357 831
kemp2a	1	1	57	22	79	1455	1477	1477	1.26	1.14	1.07	1.23	6	Salop	Kempton	No. 25	OX	0	0	W	A		Domestic	Low	SO 357 831
kemp3	2		46	24	70	1554	1578	1578	2.29	1.06	2.00	1.87	6	Salop	Kempton	No. 25	OX	0	0	Sp	D		Domestic	Low	SO 357 831
hfl9	1		19	11	30	1348	1359	1359	3.96	3.44	4.31	3.77	6	Salop	Leighton	Home Farm	OX	2	1	W	D		Domestic	Middle	SJ 616 053
ludf2	1	5	57	18	75	1449	1467	1467	1.89	1.35	1.38	1.76	6	Salop	Ludlow	14-16 King Street	OX	0	0	Sp	D		Domestic	Middle	SO 513 746
ludf3	1		63	23	86	1444	1467	1467	1.49	1.00	0.89	1.36	6	Salop	Ludlow	14-16 King Street	OX	0	0	W	A		Domestic	Middle	SO 513 746
ludg1	2	20	89	22	111	1453	1475	1475	2.08	1.62	1.69	1.99	6	Salop	Ludlow	14-16 King Street	OX	0	0	W	D		Domestic	Middle	SO 513 746
ludg2	2		59	16	75	1458	1474	1475	2.77	1.68	1.67	2.54	6	Salop	Ludlow	14-16 King Street	OX	0	0	W	D		Domestic	Middle	SO 513 746
ludg3	2		45	18	63	1457	1475	1475	2.07	1.72	1.86	1.97	6	Salop	Ludlow	14-16 King Street	OX	0	0	Sp	D		Domestic	Middle	SO 513 746
ludi1	1	20	63	37	100	1423	1460	1460	1.48	0.93	0.95	1.27	6	Salop	Ludlow	53 Broad Street	OX	0	0	W	D		Domestic	Low	SO 512 745
ludi3	1	10	73	27	100	1433	1460	1460	1.45	0.76	0.78	1.27	6	Salop	Ludlow	53 Broad Street	OX	2	2	W	D		Domestic	Low	SO 512 745
ludi4	1	1	76	26	102	1434	1460	1460	1.81	0.95	1.29	1.59	6	Salop	Ludlow	53 Broad Street	OX	3	3	W	D		Domestic	Low	SO 512 745
ludh2	1	5	63	38	101	1413	1451	1451	1.22	0.52	1.04	0.96	6	Salop	Ludlow	Barnaby House, Ludlow College	OX	0	0	Su	A		Domestic	Middle	SO 511 743
ludh4	1	10	33	29	62	1422	1451	1451	2.11	0.81	1.32	1.50	6	Salop	Ludlow	Barnaby House, Ludlow College	OX	0	0	W	D		Domestic	Middle	SO 511 743
cull5	1		111	21	132	1549	1570	1570	1.10	0.44	0.65	1.00	6	Salop	Much Wenlock	14 Callaughton	OX	2	2	W	D		Domestic	Low	SO 618 974
dh1	1		83	17	100	1556	1573	1576	1.78	1.22	1.75	1.69	6	Salop	Neen Savage	Detton Hall	OX	0	0	Sp	D		Domestic	Middle	SO 666 795
dh1012	3	1	66	12	78	1768	1780	1780	2.96	2.34	2.99	2.86	6	Salop	Neen Savage	Detton Hall	OX	2	3	W	D		Domestic	Middle	SO 666 795
dh11	3	4	47	17	64	1763	1780	1780	2.98	2.32	2.34	2.81	6	Salop	Neen Savage	Detton Hall	OX	0	0	W	D		Domestic	Middle	SO 666 795
dh13	2		18	20	38	1555	1575	1575	2.78	2.35	2.72	2.55	6	Salop	Neen Savage	Detton Hall	OX	0	0	W	E		Domestic	Middle	SO 666 795
dh14	2		65	19	84	1556	1575	1575	2.18	1.97	1.93	2.13	6	Salop	Neen Savage	Detton Hall	OX	2	1	Sp	E		Domestic	Middle	SO 666 795
dh15	2	10	79	13	92	1562	1575	1575	2.49	2.08	1.68	2.43	6	Salop	Neen Savage	Detton Hall	OX	0	0	Sp	E		Domestic	Middle	SO 666 795
dh3	1		165	45	210	1531	1576	1576	1.16	0.83	0.94	1.09	6	Salop	Neen Savage	Detton Hall	OX	0	0	W	D		Domestic	Middle	SO 666 795
dh4	4		74	22	96	1578	1600	1600	2.18	1.54	1.52	2.03	6	Salop	Neen Savage	Detton Hall	OX	0	0	W	E		Domestic	Middle	SO 666 795
dh5	2		74	27	101	1548	1575	1575	0.98	0.78	1.20	0.93	6	Salop	Neen Savage	Detton Hall	OX	0	0	W	E		Domestic	Middle	SO 666 795
dh7	4		64	13	77	1587	1600	1600	2.86	2.75	3.41	2.84	6	Salop	Neen Savage	Detton Hall	OX	0	0	W	E		Domestic	Middle	SO 666 795
dh8	2		107	31	138	1544	1575	1575	1.94	1.28	1.37	1.79	6	Salop	Neen Savage	Detton Hall	OX	0	0	W	E		Domestic	Middle	SO 666 795
dh9c	5	15	42	26	68	1554	1580	1580	2.43	0.92	1.01	1.85	6	Salop	Neen Savage	Detton Hall	OX	0	0	Sp	E		Domestic	Middle	SO 666 795
pgp1	1	4	75	15	90	1453	1468	1468	1.20	0.34	0.36	1.06	6	Salop	Prees	Providence Grove	OX	0	0	Su	D		Domestic	Low	SJ 553 334
pgp2	1	2	52	21	73	1447	1468	1468	1.46	0.67	0.54	1.24	6	Salop	Prees	Providence Grove	OX	0	0	Sp	D		Domestic	Low	SJ 553 334
pgp3	1	1	16	10	26	1458	1468	1468	4.14	2.93	4.03	3.68	6	Salop	Prees	Providence Grove	OX	0	0	Sp	A		Domestic	Low	SJ 553 334
coat1	1	2	107	20	127	1466	1486	1486	2.05	1.30	1.43	1.93	6	Salop	Rushbury	Coats Farm	OX	2	4	Su	D		Domestic	Low	SO 525 926
coat2	1	10	76	16	92	1462	1478	1486	2.07	1.12	1.87	1.90	6	Salop	Rushbury	Coats Farm	OX	0	0	W	D		Domestic	Low	SO 525 926
lem1	1		104	28	132	1344	1372	1372	2.11	1.58	2.13	2.00	6	Salop	Shawbury	Lane End Cottage, Muckleton	OX	2	1	W	D		Domestic	Low	SJ 594 213
lem2	1	10	29	17	46	1355	1372	1372	2.50	1.71	2.22	2.21	6	Salop	Shawbury	Lane End Cottage, Muckleton	OX	0	0	Sp	A		Domestic	Low	SJ 594 213
lem4	1		64	21	85	1346	1367	1372	1.53	1.30	1.48	1.47	6	Salop	Shawbury	Lane End Cottage, Muckleton	OX	0	0	W	D		Domestic	Low	SJ 594 213
shif6	1	0	83	20	103	1569	1589	1589	1.80	1.36	5.29	1.71	6	Salop	Shifnal	8 Market Place	OX	0	0	Su	D		Domestic	Low	SJ 746 075
pch1	1	15	43	21	64	1387	1408	1408	3.17	1.93	1.87	2.76	6	Salop	Shrewsbury	18-21 Abbey Foregate	OX	0	0	Sp	D	post	Domestic	Middle	SJ 498 125
pch11	2	10	27	17	44	1413	1430	1431	4.54	1.75	2.69	3.46	6	Salop	Shrewsbury	18-21 Abbey Foregate	OX	0	0	W	D	brace	Domestic	Middle	SJ 498 125
pch13	2	10	80	31	111	1400	1431	1431	1.80	1.50	1.23	1.71	6	Salop	Shrewsbury	18-21 Abbey Foregate	OX	0	0	Su	D	Cruck	Domestic	Middle	SJ 498 125
pch14	2	5	100	31	131	1400	1431	1431	2.43	1.46	1.35	2.20	6	Salop	Shrewsbury	18-21 Abbey Foregate	OX	0	0	Su	D	Cruck	Domestic	Middle	SJ 498 125
pch17	2	40	85	26	111	1405	1431	1431	1.33	0.81	0.83	1.21	6	Salop	Shrewsbury	18-21 Abbey Foregate	OX	0	0	W	A	brace	Domestic	Middle	SJ 498 125
frk12	1		43	15	58	1432	1447	1447	3.03	1.71	2.73	2.69	6	Salop	Shrewsbury	91 Frankwell	OX	0	0	Su	D		Domestic	Low	SJ 488 129
ah02	1		28	17	45	1440	1457	1457	2.95	2.32	3.01	2.71	6	Salop	Shrewsbury	Abbot's House, Butcher Row	OX	0	0	Sp	D	brace			SJ 493 124
ah03	1	5	15	25	40	1432	1457	1457	2.32	1.35	2.39	1.71	6	Salop	Shrewsbury	Abbot's House, Butcher Row	OX	0	0	Sp	D	brace			SJ 493 124

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
ah04	1	2	53	20	73	1437	1457	1457	2.14	1.50	2.09	1.96	6	Salop	Shrewsbury	Abbot's House, Butcher Row	OX	0	0	Su	D	brace			SJ 493 124
clv5	1	40	103	28	131	1563	1591	1591	1.64	1.21	1.29	1.55	6	Salop	Shrewsbury	Clive House	OX	0	0	W	D		Domestic	Low	SJ 491 124
clv6	1	35	89	18	107	1573	1591	1591	1.97	1.57	1.60	1.90	6	Salop	Shrewsbury	Clive House	OX	0	0	Sp	D		Domestic	Low	SJ 491 124
hud1	1		58	30	88	1579	1609	1610	1.70	1.26	1.68	1.55	6	Salop	Shrewsbury	Lyth Hudson's, 127 Frankwell	OX	0	0	W	D	purlin	Domestic	Middle	SJ 488 128
hud2	1		83	16	99	1594	1610	1610	1.84	1.42	1.34	1.77	6	Salop	Shrewsbury	Lyth Hudson's, 127 Frankwell	OX	0	0	Sp	D	purlin	Domestic	Middle	SJ 488 128
hud4	1	20	51	15	66	1595	1610	1610	2.71	2.07	2.14	2.56	6	Salop	Shrewsbury	Lyth Hudson's, 127 Frankwell	OX	0	0	Sp	D	Principal	Domestic	Middle	SJ 488 128
hud5	1	10	65	12	77	1597	1609	1610	1.72	2.51	2.66	1.84	6	Salop	Shrewsbury	Lyth Hudson's, 127 Frankwell	OX	2	5	W	A	purlin	Domestic	Middle	SJ 488 128
hud6	1		69	15	84	1595	1610	1610	2.08	2.91	2.47	2.23	6	Salop	Shrewsbury	Lyth Hudson's, 127 Frankwell	OX	2	12	Sp	D	post	Domestic	Middle	SJ 488 128
bs10	2		107	15	122	1335	1350	1350	0.90	1.32	0.97	0.95	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	Sp	E		Domestic	Middle	SJ 493 125
bs13a	3	5	61	23	84	1554	1577	1577	1.98	0.92	1.62	1.69	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	W	D		Domestic	Middle	SJ 493 125
bs14	4	2	92	29	121	1579	1608	1608	1.20	0.71	0.78	1.08	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	W	D		Domestic	Middle	SJ 493 125
bs2	1	10	58	21	79	1580	1601	1601	1.39	0.84	1.12	1.24	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	Sp	A		Domestic	Middle	SJ 493 125
bs20	5	5	23	22	45	1337	1359	1359	1.69	1.27	0.99	1.49	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	Sp	A		Domestic	Middle	SJ 493 125
bs21a	5		84	21	105	1338	1359	1359	0.97	0.73	0.38	0.92	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	W	D		Domestic	Middle	SJ 493 125
bs3	1		93	30	123	1571	1601	1601	0.77	0.77	0.59	0.77	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	Sp	D		Domestic	Middle	SJ 493 125
bs4	1		80	13	93	1588	1601	1601	1.47	2.19	1.26	1.57	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	Sp	D		Domestic	Middle	SJ 493 125
bs5	1	1	99	13	112	1588	1601	1601	1.53	1.67	1.00	1.54	6	Salop	Shrewsbury	The Bear Steps	OX	2	0	W	D		Domestic	Middle	SJ 493 125
bs6	1		40	26	66	1575	1601	1601	1.47	1.02	1.43	1.30	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	W	A		Domestic	Middle	SJ 493 125
bs7	1	1	103	13	116	1588	1601	1601	1.77	1.52	0.85	1.75	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	Sp	D		Domestic	Middle	SJ 493 125
bs8	1	5	93	22	115	1579	1601	1601	1.29	1.01	0.74	1.24	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	Sp	A		Domestic	Middle	SJ 493 125
bs9	2		112	19	131	1331	1350	1350	1.15	0.90	0.80	1.11	6	Salop	Shrewsbury	The Bear Steps	OX	0	0	W	E		Domestic	Middle	SJ 493 125
ch11	1	5	113	20	133	1481	1501	1501	2.06	1.39	1.41	1.96	6	Salop	Shrewsbury	The Council House	OX	0	0	Sp	D		Domestic	Middle	SJ 495 127
ch12	1	10	85	18	103	1483	1501	1501	1.61	1.17	0.78	1.53	6	Salop	Shrewsbury	The Council House	OX	0	0	W	D		Domestic	Middle	SJ 495 127
sc11	2	10	73	17	90	1268	1285	1290	1.66	1.41	0.57	1.62	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Su	D		Domestic	Gentry	SO 436 817
sc12	2		33	15	48	1275	1290	1290	5.37	2.19	1.49	4.37	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	A		Domestic	Gentry	SO 436 817
sc14	2	2	25	11	36	1279	1290	1290	3.66	3.32	4.47	3.56	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	A		Domestic	Gentry	SO 436 817
sc15	2	20	102	49	151	1236	1285	1290	1.20	0.68	4.15	1.03	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Sp	D		Domestic	Gentry	SO 436 817
sc16	2	5	41	25	66	1260	1285	1290	2.64	1.89	0.44	2.35	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Sp	D		Domestic	Gentry	SO 436 817
sc17	2	5	21	14	35	1276	1290	1290	2.32	1.99	1.67	2.19	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	A		Domestic	Gentry	SO 436 817
sc19	2	1	27	15	42	1275	1290	1290	3.35	2.64	2.03	3.10	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	A		Domestic	Gentry	SO 436 817
sc20	2		95	23	118	1265	1288	1290	1.49	1.03	2.35	1.40	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Su	D		Domestic	Gentry	SO 436 817
sc21	2	1	173	32	205	1255	1287	1290	1.04	0.67	0.93	0.98	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Sp	D		Domestic	Gentry	SO 436 817
sc24	3		168	22	190	1619	1641	1641	1.24	1.38	0.59	1.26	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc29	4		48	34	82	1544	1578	1578	1.39	0.96	1.33	1.21	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	A		Domestic	Gentry	SO 436 817
sc31	2		87	29	116	1261	1290	1290	1.92	1.25	1.16	1.75	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Sp	D		Domestic	Gentry	SO 436 817
sc34	4		69	35	104	1543	1578	1578	2.22	1.00	1.44	1.81	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Su	D		Domestic	Gentry	SO 436 817
sc35	3		167	23	190	1616	1639	1641	1.40	0.96	1.86	1.35	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Su	D		Domestic	Gentry	SO 436 817
sc39	2		186	47	233	1242	1289	1290	1.08	0.67	0.80	1.00	6	Salop	Stokesay	Stokesay Castle	OX	2	2	Su	D		Domestic	Gentry	SO 436 817
sc4	8	15	31	11	42	1389	1400	1400	3.01	3.43	0.75	3.12	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	E		Domestic	Gentry	SO 436 817
sc41	2		72	20	92	1270	1290	1290	1.52	1.02	3.10	1.41	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Sp	D		Domestic	Gentry	SO 436 817
sc45	2		134	23	157	1266	1289	1290	1.63	0.93	0.75	1.53	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Su	D		Domestic	Gentry	SO 436 817
sc46	2	2	23	8	31	1282	1290	1290	5.93	2.68	0.98	5.09	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Sp	A		Domestic	Gentry	SO 436 817
sc47i	6		49	23	72	1640	1663	1663	1.81	1.67	6.27	1.77	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc5	8	25	89	35	124	1365	1400	1400	1.35	1.35	1.75	1.35	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Su	E		Domestic	Gentry	SO 436 817
sc51	5		87	20	107	1632	1652	1652	1.15	0.87	1.19	1.10	6	Salop	Stokesay	Stokesay Castle	OX	2	2	Su	D		Domestic	Gentry	SO 436 817
sc52	3		64	35	99	1605	1640	1641	1.82	1.58	0.67	1.73	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
sc53	3		68	18	86	1623	1641	1641	2.36	1.38	1.66	2.15	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	A		Domestic	Gentry	SO 436 817
sc54	3		36	34	70	1607	1641	1641	1.34	1.24	1.78	1.29	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc55	3		60	38	98	1603	1641	1641	1.11	1.09	1.22	1.10	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc56	3		143	41	184	1600	1641	1641	0.56	0.45	1.11	0.53	6	Salop	Stokesay	Stokesay Castle	OX	2	3	W	A		Domestic	Gentry	SO 436 817
sc57	3		105	31	136	1609	1640	1641	1.38	1.53	0.57	1.41	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc58	3		84	34	118	1607	1641	1641	1.72	1.58	1.62	1.68	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	A		Domestic	Gentry	SO 436 817
sc59	6	10	93	14	107	1649	1663	1663	2.11	1.67	1.62	2.06	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc60	6	3	103	13	116	1650	1663	1663	2.42	1.91	1.67	2.36	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc62	6	0	42	27	69	1635	1662	1663	2.04	1.48	2.25	1.82	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc63	1		99	31	130	1231	1262	1263	1.45	1.31	1.70	1.42	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc64	1	2	115	29	144	1234	1263	1263	1.46	1.05	1.49	1.38	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc69	6		41	28	69	1635	1663	1663	1.74	0.93	1.02	1.41	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	E		Domestic	Gentry	SO 436 817
sc7	2	50	150	30	180	1260	1290	1290	1.50	0.90	1.68	1.40	6	Salop	Stokesay	Stokesay Castle	OX	0	0	W	D		Domestic	Gentry	SO 436 817
sc8	2	20	96	31	127	1253	1284	1290	2.11	1.13	1.31	1.87	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Sp	D		Domestic	Gentry	SO 436 817
sc9	7		118	33	151	1572	1605	1605	1.54	0.87	1.44	1.39	6	Salop	Stokesay	Stokesay Castle	OX	0	0	Sp	D		Domestic	Gentry	SO 436 817
st1	1	3	46	17	63	1437	1454	1454	1.46	1.04	1.16	1.35	6	Salop	Stottesdon	Hall Farm	OX	0	0	Sp	D		Domestic	Midddle	SO 672 829
up13	1		83	23	106	1524	1547	1547	2.35	1.48	2.30	2.16	6	Salop	Westbury	Upper Lake	OX	0	0	Su	D	Crack	Domestic	Middle	SJ 371 068
up14	1		71	11	82	1534	1545	1547	0.97	0.68	0.69	0.93	6	Salop	Westbury	Upper Lake	OX	0	0	W	D	collar	Domestic	Middle	SJ 371 068
up15	1	20	90	28	118	1517	1545	1547	1.17	0.92	0.75	1.11	6	Salop	Westbury	Upper Lake	OX	0	0	Su	D	purlin	Domestic	Middle	SJ 371 068
up17	1	20	91	24	115	1521	1545	1547	1.67	1.37	1.36	1.61	6	Salop	Westbury	Upper Lake	OX	0	0	W	D	purlin	Domestic	Middle	SJ 371 068
up18	1	10	81	19	100	1527	1546	1547	1.35	0.93	0.71	1.27	6	Salop	Westbury	Upper Lake	OX	0	0	Sp	D	stud	Domestic	Middle	SJ 371 068
wch10	1		103	33	136	1560	1593	1597	2.02	0.67	1.01	1.69	6	Salop	Whitchurch	28 Watergate	OX	0	0	Sp	D	post	Domestic	Middle	SJ 543 414
wch5	1		51	21	72	1572	1593	1597	2.18	1.12	2.02	1.87	6	Salop	Whitchurch	28 Watergate	OX	0	0	Sp	D	stud	Domestic	Middle	SJ 543 414
wch6	1	25	64	23	87	1574	1597	1597	1.00	1.07	0.62	1.02	6	Salop	Whitchurch	28 Watergate	OX	0	0	Sp	D	stud	Domestic	Middle	SJ 543 414
alk5	1		52	20	72	1572	1592	1592	2.06	1.90	2.16	2.02	6	Salop	Whitchurch	Allington Farm	OX	0	0	W	D		Domestic	Gentry	SJ 531 393
jnb01	1		81	39	120	1517	1556	1566	2.75	0.80	2.22	2.12	6	Salop	Whitchurch	Ightfield Hall Barn	SH	0	0	Sp	D	post			SJ 601 394
jnb02	1		177	17	194	1539	1556	1566	1.82	0.93	0.90	1.74	6	Salop	Whitchurch	Ightfield Hall Barn	SH	0	0	Sp	D	post			SJ 601 394
jnb07	1	10	89	26	115	1540	1566	1566	1.67	0.77	0.52	1.47	6	Salop	Whitchurch	Ightfield Hall Barn	SH	0	0	W	D	brace			SJ 601 394
jnb09	1		89	28	117	1538	1566	1566	0.88	0.58	0.73	0.81	6	Salop	Whitchurch	Ightfield Hall Barn	SH	0	0	Sp	A	tiebeam			SJ 601 394
jnb10	1	10	51	17	68	1549	1566	1566	2.54	0.83	1.89	2.11	6	Salop	Whitchurch	Ightfield Hall Barn	SH	0	0	Sp	D	stud			SJ 601 394
jnb13	1	10	93	25	118	1541	1566	1566	1.94	0.62	1.03	1.66	6	Salop	Whitchurch	Ightfield Hall Barn	SH	0	0	Sp	D	plate			SJ 601 394
pfa1	1		78	21	99	1534	1555	1556	0.95	1.27	0.93	1.02	6	Salop	Whitchurch	Park Farm, Alkington	OX	0	0	W	D		Domestic	Low	SJ 523 389
pfa3	1		95	32	127	1524	1556	1556	1.88	0.99	1.06	1.65	6	Salop	Whitchurch	Park Farm, Alkington	OX	0	0	Sp	A		Domestic	Low	SJ 523 389
pfa4	1	5	59	26	85	1530	1556	1556	1.35	1.06	1.26	1.26	6	Salop	Whitchurch	Park Farm, Alkington	OX	0	0	Sp	D		Domestic	Low	SJ 523 389
raven1	1		84	28	112	1597	1625	1625	1.02	0.47	0.66	0.88	6	Salop	Whitchurch	The Raven, 17-23 Watergate	OX	0	0	W	A		Domestic	Middle	SJ 542 414
raven2	1		91	20	111	1605	1625	1625	0.86	0.62	0.88	0.82	6	Salop	Whitchurch	The Raven, 17-23 Watergate	OX	0	0	W	A		Domestic	Middle	SJ 542 414
raven3	1	20	57	30	87	1595	1625	1625	1.57	1.42	1.30	1.52	6	Salop	Whitchurch	The Raven, 17-23 Watergate	OX	0	0	Su	A		Domestic	Middle	SJ 542 414
raven4	1		179	21	200	1604	1625	1625	0.92	1.00	0.97	0.93	6	Salop	Whitchurch	The Raven, 17-23 Watergate	OX	0	0	Sp	D		Domestic	Middle	SJ 542 414
raven5	1		48	11	59	1614	1625	1625	1.85	1.67	1.46	1.82	6	Salop	Whitchurch	The Raven, 17-23 Watergate	OX	2	7	Sp	A		Domestic	Middle	SJ 542 414
raven8	1	10	39	18	57	1607	1625	1625	5.46	0.90	3.37	4.02	6	Salop	Whitchurch	The Raven, 17-23 Watergate	OX	0	0	W	A		Domestic	Middle	SJ 542 414
wor1	1	5	46	23	69	1464	1487	1487	2.19	1.59	1.89	1.99	6	Salop	Worfield	Bradney Farm	OX	0	0	W	A		Domestic	Low	SO 769 959
wor2	1	10	52	11	63	1476	1487	1487	2.23	1.41	1.36	2.09	6	Salop	Worfield	Bradney Farm	OX	0	0	W	A		Domestic	Low	SO 769 959
wor3	1	10	46	12	58	1475	1487	1487	3.08	3.08	2.84	3.08	6	Salop	Worfield	Bradney Farm	OX	0	0	Sp	D		Domestic	Low	SO 769 959
wor48	1	15	75	18	93	1469	1487	1487	1.53	1.33	1.35	1.49	6	Salop	Worfield	Bradney Farm	OX	2	3	W	D		Domestic	Low	SO 769 959
wor5	1		34	27	61	1460	1487	1487	2.17	1.52	2.11	1.88	6	Salop	Worfield	Bradney Farm	OX	0	0	Su	A		Domestic	Low	SO 769 959
wor6	1		71	11	82	1527	1545	1547	0.97	0.68	0.69	0.93	6	Salop	Worfield	Bradney Farm	OX	0	0	Sp	D		Domestic	Low	SO 769 959
wor7	1		83	23	106	1524	1547	1547	2.35	1.48	2.30	2.16	6	Salop	Worfield	Bradney Farm	OX	0	0	Sp	D		Domestic	Low	SO 769 959
wor8	1		118	33	151	1572	1605	1605	1.54	0.87	1.44	1.39	6	Salop	Worfield	Bradney Farm	OX	0	0	Sp	D		Domestic	Low	SO 769 959
wor9	1		118	33	151	1572	1605	1605	1.54	0.87	1.44	1.39	6	Salop	Worfield	Bradney Farm	OX	0	0	Sp	D		Domestic	Low	SO 769 959

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
worf6	1		12	26	38	1461	1487	1487	2.17	1.85	2.19	1.95	6	Salop	Worfield	Bradney Farm	OX	0	0	Sp	D		Domestic	Low	SO 769 959
lea4	1		60	31	91	1419	1450	1450	1.64	0.71	1.04	1.32	6	Salop	Wrockwardine	Leaton Grange	OX	2	1	Sp	E		Domestic	Middle	SJ 613 114
bal2	1		62	27	89	1313	1340	1340	2.19	0.60	1.49	1.70	3	Somerset	Baltonsborough	Bridge Farm, W Bradley	OX	2	2	Sp	E		Domestic	Middle	ST 552 363
ofs1c	1	40	14	27	41	1323	1350	1350	1.90	1.16	1.95	1.42	3	Somerset	Baltonsborough	Old Farm, Southwood	OX	0	0	W	E		Domestic	Middle	ST 558 332
ofs2	1	10	73	27	100	1323	1350	1350	2.26	0.93	2.76	1.90	3	Somerset	Baltonsborough	Old Farm, Southwood	OX	0	0	W	E		Domestic	Middle	ST 558 332
ofs3	1		30	22	52	1328	1350	1350	3.46	1.37	0.83	2.58	3	Somerset	Baltonsborough	Old Farm, Southwood	OX	0	0	W	E		Domestic	Middle	ST 558 332
goose1	1	25	73	14	87	1377	1391	1391	1.75	2.11	1.73	1.81	3	Somerset	Beckington	49 Goose Street	OX	0	0	Sp	D		Domestic	Low	ST 803 251
goose2	1	5	86	22	108	1369	1391	1391	1.37	1.12	1.02	1.32	3	Somerset	Beckington	49 Goose Street	OX	0	0	Sp	D		Domestic	Low	ST 803 251
dw02	1		155	30	185	1117	1147	1147	0.89	0.77	1.29	0.87	3	Somerset	Bristol	Dundas Wharf	SH	0	0		D				ST 589 727
dw03	1		98	22	120	1125	1147	1147	0.98	1.00	1.24	0.98	3	Somerset	Bristol	Dundas Wharf	SH	0	0		D				ST 589 727
dw04	1		199	32	231	1115	1147	1147	0.97	0.72	0.96	0.94	3	Somerset	Bristol	Dundas Wharf	SH	0	0		D				ST 589 727
dw21a	1		55	22	77	1128	1150	1147	1.26	0.76	0.70	1.12	3	Somerset	Bristol	Dundas Wharf	SH	0	0		E				ST 589 727
dw33a	1	10	33	27	60	1123	1150	1147	3.07	1.02	3.06	2.15	3	Somerset	Bristol	Dundas Wharf	SH	0	0		E				ST 589 727
dw36b	2		64	29	93	1153	1182	1182	2.08	1.55	2.06	1.91	3	Somerset	Bristol	Dundas Wharf	SH	0	0		D				ST 589 727
dw37	2		21	25	46	1157	1182	1182	3.58	3.11	3.61	3.33	3	Somerset	Bristol	Dundas Wharf	SH	0	0		D				ST 589 727
dw38	2		28	13	41	1169	1182	1182	2.86	2.69	2.95	2.81	3	Somerset	Bristol	Dundas Wharf	SH	0	0		D				ST 589 727
dw42	2		36	12	48	1170	1182	1182	2.54	2.51	2.73	2.53	3	Somerset	Bristol	Dundas Wharf	SH	0	0		D				ST 589 727
dw43	2		53	16	69	1166	1182	1182	1.79	2.20	2.31	1.88	3	Somerset	Bristol	Dundas Wharf	SH	0	0		D				ST 589 727
dw48	2	1	62	16	78	1134	1150	1182	1.27	1.59	1.28	1.34	3	Somerset	Bristol	Dundas Wharf	SH	0	0		E				ST 589 727
bru21	1	8	74	16	90	1438	1454	1454	1.45	1.68	1.11	1.49	3	Somerset	Bruton	16-18 High Street	OX	2	2	Sp	D		Domestic	Low	ST 683 348
bru22	1	10	64	16	80	1437	1453	1454	2.30	2.01	2.45	2.24	3	Somerset	Bruton	16-18 High Street	OX	2	1	Sp	D		Domestic	Low	ST 683 348
bru23	1	5	56	25	81	1428	1453	1454	1.84	0.89	1.21	1.55	3	Somerset	Bruton	16-18 High Street	OX	0	0	Sp	D		Domestic	Low	ST 683 348
bru24	1	5	74	16	90	1437	1453	1454	1.33	1.58	1.11	1.38	3	Somerset	Bruton	16-18 High Street	OX	2	1	Sp	D		Domestic	Low	ST 683 348
bru11	1	3	61	22	83	1440	1462	1462	1.93	0.92	1.11	1.66	3	Somerset	Bruton	20 High Street	OX	2	2	Sp	D		Domestic	Low	ST 683 348
bru15	1	1	70	22	92	1440	1462	1462	2.04	1.32	1.52	1.87	3	Somerset	Bruton	20 High Street	OX	2	1	Sp	D		Domestic	Low	ST 683 348
bru1	1	5	62	18	80	1412	1430	1430	2.90	1.70	2.59	2.63	3	Somerset	Bruton	24 High Street	OX	0	0	Su	D		Domestic	Low	ST 683 348
bru2	1	5	57	20	77	1410	1430	1430	2.97	1.66	1.65	2.63	3	Somerset	Bruton	24 High Street	OX	0	0	Su	D		Domestic	Low	ST 683 348
bru36	1	15	72	17	89	1437	1454	1454	2.03	1.30	1.08	1.89	3	Somerset	Bruton	31 High Street	OX	0	0	W	D		Domestic	Low	ST 682 348
but7	2	20	104	30	134	1275	1305	1305	2.10	0.67	1.74	1.78	3	Somerset	Butleigh	Bridge Farm	OX	0	0	Sp	D		Domestic	Middle	ST 523 337
but9	1		52	17	69	1247	1264	1264	2.38	2.15	1.43	2.32	3	Somerset	Butleigh	Bridge Farm	OX	2	1	W	D		Domestic	Middle	ST 523 337
scb1	1	4	45	23	68	1477	1500	1500	2.11	0.97	0.83	1.73	3	Somerset	Butleigh	Sycamore Cottage, Water Lane	OX	2	1	Sp	E		Domestic	Low	ST 521 336
scb2	1	3	59	6	65	1494	1500	1500	1.76	0.67	0.68	1.66	3	Somerset	Butleigh	Sycamore Cottage, Water Lane	OX	0	0	W	E		Domestic	Low	ST 521 336
lcf11	1	25	152	27	179	1423	1450	1450	1.09	0.92	0.49	1.07	3	Somerset	Castle Cary	Lower Cockhill Farm	OX	2	1	W	E		Agricultural	Middle	ST 625 312
lcf12	1	0	90	37	127	1413	1450	1450	0.71	0.44	0.37	0.63	3	Somerset	Castle Cary	Lower Cockhill Farm	OX	0	0	W	E		Agricultural	Middle	ST 625 312
lcf1	1	5	43	29	72	1406	1435	1435	2.55	1.17	1.85	2.00	3	Somerset	Castle Cary	Lower Cockhill Farmhouse	OX	2	4	Sp	A		Domestic	Middle	ST 625 312
lcf2	1	10	52	20	72	1415	1435	1435	1.72	1.13	0.96	1.55	3	Somerset	Castle Cary	Lower Cockhill Farmhouse	OX	2	1	W	A		Domestic	Middle	ST 625 312
lcf4	1	15	58	15	73	1420	1435	1435	2.24	1.81	1.20	2.15	3	Somerset	Castle Cary	Lower Cockhill Farmhouse	OX	0	0	Sp	D		Domestic	Middle	ST 625 312
lcf7	2	0	53	22	75	1528	1550	1550	1.04	1.38	1.08	1.14	3	Somerset	Castle Cary	Lower Cockhill Farmhouse	OX	0	0	W	E		Domestic	Middle	ST 625 312
hnm1	1		100	31	131	1311	1342	1342	1.17	1.02	1.27	1.13	3	Somerset	Cheddar	Hanam Manor	OX	2	1	W	D		Domestic	Middle	ST 457 532
chew1	1	25	24	16	40	1370	1386	1386	2.26	1.93	2.23	2.13	3	Somerset	Chew Stoke	Yew Tree Farm	OX	0	0	Su	A		Domestic	Middle	ST 557 616
chew2	1	5	74	27	101	1359	1386	1386	1.58	0.55	1.04	1.30	3	Somerset	Chew Stoke	Yew Tree Farm	OX	0	0	Sp	A		Domestic	Middle	ST 557 616
chew3	1	5	91	34	125	1352	1386	1386	1.34	1.20	0.86	1.30	3	Somerset	Chew Stoke	Yew Tree Farm	OX	0	0	Sp	D		Domestic	Middle	ST 557 616
chew5	1		79	40	119	1346	1386	1386	1.67	0.72	1.12	1.35	3	Somerset	Chew Stoke	Yew Tree Farm	OX	2	1	Sp	D		Domestic	Middle	ST 557 616
chew6	1	5	78	18	96	1368	1386	1386	1.29	0.92	0.75	1.22	3	Somerset	Chew Stoke	Yew Tree Farm	OX	0	0	Sp	D		Domestic	Middle	ST 557 616
slm1b	1	5	112	21	133	1383	1404	1404	1.27	1.38	1.38	1.29	3	Somerset	Fiddington	Stockton Lovel Manor Farm	OX	0	0	Sp	D		Domestic	Middle	ST 224 418
grr14	1	10	130	24	154	-4224	-4200	-4200	1.47	1.17	1.54	1.42	3	Somerset	Glastonbury	Relief road	SH	0	0	W	E				ST 493 389

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
anl	1	5	25	8	33	1442	1450	1450	3.94	5.00	2.65	4.20	3	Somerset	Goathurst	Andersfield Farmhouse	OX	0	0	Sp	E		Domestic	Low	ST 249 344
an3	1	3	42	20	62	1430	1450	1450	3.46	1.93	2.42	2.97	3	Somerset	Goathurst	Andersfield Farmhouse	OX	0	0	Su	E		Domestic	Low	ST 249 344
srfd2	1	5	46	25	71	1425	1450	1450	2.46	0.94	1.36	1.93	3	Somerset	Halse	Stofford	OX	2	5	Su	E		Domestic	Low	ST 144 288
srfd4	2	20	155	38	193	1570	1608	1608	1.11	0.75	1.24	1.04	3	Somerset	Halse	Stofford	OX	0	0	Sp	D		Domestic	Low	ST 144 288
hem	1	1	148	43	191	1448	1491	1491	1.27	0.69	0.44	1.14	3	Somerset	Hemington	Upper Row Farm	OX	4	13	Sp	D		Domestic	Low	ST 765 538
llm1	1		101	19	120	1462	1481	1481	1.27	0.83	0.76	1.20	3	Somerset	High Ham	Old Manor Farm House	OX	0	0	Su	A		Domestic	Middle	ST 432 292
llm2	1	5	72	17	89	1464	1481	1481	2.16	1.69	1.88	2.07	3	Somerset	High Ham	Old Manor Farm House	OX	2	2	Su	D		Domestic	Middle	ST 432 292
llm4	1		97	38	135	1443	1481	1481	1.28	0.50	0.81	1.06	3	Somerset	High Ham	Old Manor Farm House	OX	0	0	Su	D		Domestic	Middle	ST 468 259
lsc4	1	1	108	23	131	1305	1328	1328	1.43	0.81	0.77	1.32	3	Somerset	Long Sutton	The Court House	OX	2	1	Sp	D		Domestic	Middle	ST 468 259
POL	1	30	37	20	57	1417	1437	1437	1.55	1.49	1.59	1.53	3	Somerset	Luccombe	Post Office	OX	9	4	Su	D		Domestic	Low	SS 911 445
gw1b	1	0	40	12	52	1275	1287	1287	2.70	2.62	3.23	2.68	3	Somerset	Milverton	Garrivals Week	OX	0	0	Sp	A		Domestic	Middle	ST 136 255
gw3	1	3	70	20	90	1267	1287	1287	1.63	1.71	1.42	1.65	3	Somerset	Milverton	Garrivals Week	OX	2	3	Sp	D		Domestic	Middle	ST 136 255
mkc05	1		99	32	131	1369	1401	1401	1.21	0.81	0.98	1.11	3	Somerset	Muchelney	Muchelney Abbey	MB	0	0	Su	D				ST 428 248
ncc4	1	1	196	23	219	1566	1589	1589	0.95	0.69	0.75	0.92	3	Somerset	North Cadbury	North Cadbury Court	OX	3	2	Sp	D		Domestic	Gentry	ST 635 270
ncvh2	2	5	32	23	55	1419	1442	1442	2.79	1.37	1.98	2.19	3	Somerset	North Cadbury	Village Hall, 21 Woolston Road	OX	0	0	W	D		Domestic	Low	ST 635 272
ncvh3	2		22	12	34	1430	1442	1442	4.24	4.07	3.94	4.18	3	Somerset	North Cadbury	Village Hall, 21 Woolston Road	OX	0	0	W	A		Domestic	Low	ST 635 272
ncvh4	2	5	34	20	54	1422	1442	1442	3.24	1.91	2.00	2.75	3	Somerset	North Cadbury	Village Hall, 21 Woolston Road	OX	0	0	W	A		Domestic	Low	ST 635 272
ncvh5	1		51	32	83	1312	1344	1344	1.70	1.23	1.15	1.52	3	Somerset	North Cadbury	Village Hall, 21 Woolston Road	OX	2	1	Sp	D		Domestic	Low	ST 635 272
ncvh6	1	10	69	23	92	1321	1344	1344	1.53	1.29	0.91	1.47	3	Somerset	North Cadbury	Village Hall, 21 Woolston Road	OX	0	0	Su	D		Domestic	Low	ST 635 272
ncvh7	1		57	35	92	1309	1344	1344	1.41	0.92	0.60	1.22	3	Somerset	North Cadbury	Village Hall, 21 Woolston Road	OX	0	0	Sp	D		Domestic	Low	ST 635 272
wmn1	1		79	16	95	-2766	-2750	-2750	2.23	2.67	1.38	2.31	3	Somerset	North Moor	Lower Whites Farm	SH	0	0		E				ST 316 313
rode1	1	5	57	32	89	1396	1428	1429	1.44	0.93	1.06	1.26	3	Somerset	Rode	23 High Street	OX	0	0	W	D		Domestic	Low	ST 807 540
pns1	1	5	46	16	62	1496	1512	1512	2.58	1.75	2.25	2.37	3	Somerset	Pensford	Viaduct View	OX	0	0	Su	D		Domestic	Low	ST 622 637
wh1	1	5	136	25	161	1347	1372	1372	1.74	0.57	0.59	1.56	3	Somerset	North Moor	Wick Farm House	OX	0	0	W	D		Domestic	Low	ST 788 572
gi9	1	0	55	30	85	1400	1430	1432	1.44	0.69	0.78	1.18	3	Somerset	North Cadbury	The George Inn	OX	0	0	Sp	D		Domestic	Middle	ST 775 560
gi7b	1	0	123	17	140	1413	1430	1432	1.32	1.68	2.03	1.36	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	D		Domestic	Middle	ST 775 560
gi44	5	5	45	17	62	1460	1477	1478	3.19	2.09	2.79	2.89	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	D		Domestic	Middle	ST 775 560
gi43	5	10	79	20	99	1458	1478	1478	2.37	1.44	1.99	2.18	3	Somerset	North Cadbury	The George Inn	OX	0	0	W	D		Domestic	Middle	ST 775 560
gi42	6	5	70	23	93	1723	1746	1746	1.52	1.19	1.42	1.44	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	D		Domestic	Middle	ST 775 560
gi41	5	5	38	14	52	1464	1478	1478	2.76	1.86	1.68	2.52	3	Somerset	North Cadbury	The George Inn	OX	0	0	Sp	D		Domestic	Middle	ST 775 560
gi40	5	5	100	24	124	1453	1477	1478	1.80	1.50	1.82	1.74	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	D		Domestic	Middle	ST 775 560
gi39	5		93	20	113	1457	1477	1478	1.91	0.99	1.18	1.75	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	D		Domestic	Middle	ST 775 560
gi33	4	10	74	13	87	1445	1458	1458	2.14	1.67	1.56	2.07	3	Somerset	North Cadbury	The George Inn	OX	0	0	?	D		Domestic	Middle	ST 775 560
gi30	3	8	51	45	96	1408	1453	1453	1.41	0.73	1.10	1.09	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	A		Domestic	Middle	ST 775 560
gi29	3	5	53	29	82	1424	1453	1453	1.46	0.53	1.07	1.13	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	A		Domestic	Middle	ST 775 560
gi28	3	5	52	25	77	1428	1453	1453	1.48	0.84	1.30	1.27	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	A		Domestic	Middle	ST 775 560
gi27	3	3	72	21	93	1432	1453	1453	1.81	0.88	1.38	1.60	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	A		Domestic	Middle	ST 775 560
gi26	3	10	48	20	68	1433	1453	1453	1.97	1.37	1.25	1.79	3	Somerset	North Cadbury	The George Inn	OX	0	0	W	D		Domestic	Middle	ST 775 560
gi24	3	1	62	27	89	1426	1453	1453	1.13	0.74	0.97	1.01	3	Somerset	North Cadbury	The George Inn	OX	2	1	Su	A		Domestic	Middle	ST 775 560
gi23	3	5	50	26	76	1427	1453	1453	1.62	0.97	1.29	1.39	3	Somerset	North Cadbury	The George Inn	OX	0	0	Sp	A		Domestic	Middle	ST 775 560
gi22	3	5	56	22	78	1431	1453	1453	1.97	1.37	1.44	1.80	3	Somerset	North Cadbury	The George Inn	OX	0	0	Su	A		Domestic	Middle	ST 775 560
gi21a	3	15	51	20	71	1433	1453	1453	1.87	1.05	1.41	1.64	3	Somerset	North Cadbury	The George Inn	OX	0	0	Sp	D		Domestic	Middle	ST 775 560
gi16	1	0	120	34	154	1397	1431	1432	1.46	0.87	0.77	1.33	3	Somerset	North Cadbury	The George Inn	OX	0	0	Sp	D		Domestic	Middle	ST 775 560
gi15	1	0	90	33	123	1397	1430	1432	1.13	0.54	0.98	0.97	3	Somerset	North Cadbury	The George Inn	OX	0	0	Sp	D		Domestic	Middle	ST 775 560
gi11	1	0	44	15	59	1417	1432	1432	1.92	1.28	1.33	1.75	3	Somerset	North Cadbury	The George Inn	OX	2	3	?	D		Domestic	Middle	ST 775 560
wmn1	1		79	16	95	-2766	-2750	-2750	2.23	2.67	1.38	2.31	3	Somerset	North Moor	Lower Whites Farm	SH	0	0		E				ST 316 313
rcvh7	1		57	35	92	1309	1344	1344	1.41	0.92	0.60	1.22	3	Somerset	North Cadbury	Village Hall, 21 Woolston Road	OX	0	0	Sp	D		Domestic	Low	ST 635 272

Code	Phase	Path	H Wd	S Wd	Rings	H Sap	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
rode2	1	5	59	27	86	1402	1429	1429	1.86	0.88	1.14	1.55	3	Somerset	Rode	23 High Street	OX	0	0	Su	D		Domestic	Low	ST 807 540
rode3	1	5	61	24	85	1404	1428	1429	2.25	0.91	1.90	1.87	3	Somerset	Rode	23 High Street	OX	0	0	Sp	D		Domestic	Low	ST 807 540
rode4	1		37	21	58	1408	1429	1429	2.06	1.49	1.59	1.86	3	Somerset	Rode	23 High Street	OX	0	0	Su	A		Domestic	Low	ST 807 540
rode5	1	5	50	19	69	1410	1429	1429	2.34	1.12	1.69	2.01	3	Somerset	Rode	23 High Street	OX	0	0	W	A		Domestic	Low	ST 807 540
elc1	1	5	126	32	158	1283	1315	1315	1.30	1.12	0.95	1.27	3	Somerset	Selworthy	East Lynch Cottage	OX	0	0	Sp	D		Domestic	Low	SS 927 463
elc2x	1	15	98	30	128	1285	1315	1315	1.42	1.09	0.87	1.34	3	Somerset	Selworthy	East Lynch Cottage	OX	0	0	Sp	D		Domestic	Low	SS 927 463
elc34	1	5	101	30	131	1285	1315	1315	1.98	1.37	2.22	1.84	3	Somerset	Selworthy	East Lynch Cottage	OX	2	3	W	D		Domestic	Low	SS 927 463
elc5	1	1	30	68	98	1247	1315	1315	0.85	0.61	0.88	0.68	3	Somerset	Selworthy	East Lynch Cottage	OX	0	0	W	A		Domestic	Low	SS 927 463
shh1	1		94	25	119	1464	1489	1489	1.40	1.15	1.43	1.35	3	Somerset	Shapwick	Shapwick House Hotel	OX	2	0	Sp	D		Domestic	Gentry	ST 416 386
shh21	2	5	18	12	30	1416	1428	1428	3.70	2.45	0.98	3.20	3	Somerset	Shapwick	Shapwick House Hotel	OX	0	0	Sp	D		Domestic	Gentry	ST 416 386
shh24	2	8	33	14	47	1414	1428	1428	4.08	3.14	2.88	3.80	3	Somerset	Shapwick	Shapwick House Hotel	OX	0	0	Sp	D		Domestic	Gentry	ST 416 386
shh25	2	5	26	13	39	1415	1428	1428	5.42	3.87	4.18	4.90	3	Somerset	Shapwick	Shapwick House Hotel	OX	0	0	Sp	D		Domestic	Gentry	ST 416 386
mpsm1	1	10	79	26	105	1649	1675	1675	2.31	1.20	1.27	2.04	3	Somerset	Shepton Mallet	8 Market Place	OX	0	0	W	D		Domestic	Low	ST 619 436
mpsm13	2		57	31	88	1647	1678	1678	1.53	0.71	1.30	1.24	3	Somerset	Shepton Mallet	8 Market Place	OX	0	0	Sp	D		Domestic	Low	ST 619 436
mpsm2	1	10	73	39	112	1636	1675	1675	1.73	0.79	1.12	1.41	3	Somerset	Shepton Mallet	8 Market Place	OX	0	0	W	D		Domestic	Low	ST 619 436
mpsm4	1		89	18	107	1656	1674	1675	1.75	1.48	1.31	1.71	3	Somerset	Shepton Mallet	8 Market Place	OX	0	0	Su	D		Domestic	Low	ST 619 436
mpsm5	1	10	83	32	115	1643	1675	1675	0.93	0.88	1.04	0.92	3	Somerset	Shepton Mallet	8 Market Place	OX	2	1	W	D		Domestic	Low	ST 619 436
mpsm6	1		97	31	128	1644	1675	1675	1.18	0.96	1.15	1.13	3	Somerset	Shepton Mallet	8 Market Place	OX	2	1	Sp	D		Domestic	Low	ST 619 436
crane12	1		143	24	167	1314	1338	1338	1.16	0.91	0.94	1.12	3	Somerset	Somerton	Crane Farm	OX	2	6	Su	D	Cruck	Domestic	Middle	ST 490 284
crane3	1	10	40	16	56	1320	1336	1338	2.80	2.27	2.23	2.65	3	Somerset	Somerton	Crane Farm	OX	0	0	W	D	collar	Domestic	Middle	ST 490 284
crane4	1	3	36	13	49	1325	1338	1338	2.65	2.16	2.16	2.52	3	Somerset	Somerton	Crane Farm	OX	0	0	Su	A	purlin	Domestic	Middle	ST 490 284
crane5	1	5	61	12	73	1323	1335	1338	3.73	3.11	3.35	3.63	3	Somerset	Somerton	Crane Farm	OX	0	0	Sp	D	Cruck	Domestic	Middle	ST 490 284
wig1	1	2	115	23	138	1562	1585	1585	1.53	1.06	1.17	1.45	3	Somerset	South Petherton	Wigborough Manor House	OX	0	0	Sp	D		Domestic	Gentry	ST 448 151
wig2	1		79	14	93	1570	1584	1585	2.15	1.42	2.36	2.04	3	Somerset	South Petherton	Wigborough Manor House	OX	0	0	Sp	D		Domestic	Gentry	ST 448 151
wig5	1	10	79	26	105	1558	1584	1585	1.63	0.72	1.19	1.41	3	Somerset	South Petherton	Wigborough Manor House	OX	0	0	Sp	D		Domestic	Gentry	ST 448 151
wig6	1		66	40	106	1545	1585	1585	1.03	0.61	0.62	0.87	3	Somerset	South Petherton	Wigborough Manor House	OX	0	0	Sp	A		Domestic	Gentry	ST 448 151
wig7	1	10	35	31	66	1554	1585	1585	1.97	1.14	1.16	1.58	3	Somerset	South Petherton	Wigborough Manor House	OX	0	0	Sp	A		Domestic	Gentry	ST 448 151
hb2	1	2	16	22	38	1268	1290	1290	2.62	1.84	2.86	2.17	3	Somerset	Stoke St Mary	Higher Broughton Farmhouse	OX	0	0	W	E		Domestic	Low	ST 261 224
hb4	1	5	5	20	25	1270	1290	1290	3.60	1.83	3.60	2.19	3	Somerset	Stoke St Mary	Higher Broughton Farmhouse	OX	0	0	W	E		Domestic	Low	ST 261 224
ttt1	1	20	47	17	64	1307	1324	1323	2.58	2.44	2.52	2.54	3	Somerset	Taunton	Tudor Tavern	OX	0	0	W	D		Domestic	Middle	ST 228 244
ttt6	1	75	106	21	127	1303	1324	1323	0.88	0.66	0.99	0.84	3	Somerset	Taunton	Tudor Tavern	OX	0	0	W	D		Domestic	Middle	ST 228 244
lancin4m	1		49	16	65	1517	1533	1533	2.48	2.53	2.07	2.49	3	Somerset	Wambrook	Lancin Farmhouse	SH	0	0		D				ST 285 079
lancin5	1	5	54	18	72	1515	1533	1533	2.15	2.06	1.96	2.13	3	Somerset	Wambrook	Lancin Farmhouse	SH	0	0		D				ST 285 079
lancin6	1	5	65	20	85	1513	1533	1533	2.27	1.90	1.93	2.18	3	Somerset	Wambrook	Lancin Farmhouse	SH	0	0		D				ST 285 079
csw1	1	10	57	31	88	1413	1444	1444	1.83	0.83	0.95	1.48	3	Somerset	Wells	17 Chamberlain Street	OX	0	0	W	D	collar	Domestic	Middle	ST 548 458
csw24	1	10	68	13	81	1431	1444	1444	1.58	1.64	1.19	1.59	3	Somerset	Wells	17 Chamberlain Street	OX	2	4	Sp	D	purlin	Domestic	Middle	ST 548 458
csw35	1		40	25	65	1419	1444	1444	1.40	1.08	1.00	1.28	3	Somerset	Wells	17 Chamberlain Street	OX	2	5	Sp	D	rafter	Domestic	Middle	ST 548 458
csw6	1	10	55	19	74	1425	1444	1444	1.37	0.84	0.44	1.24	3	Somerset	Wells	17 Chamberlain Street	OX	0	0	Sp	D	Plate	Domestic	Middle	ST 548 458
vcw1	2		98	23	121	1443	1466	1466	1.56	0.69	0.74	1.39	3	Somerset	Wells	20 Vicars Close	OX	0	0	Su	D	Principal	Domestic	Middle	ST 551 460
vcw2	2	25	68	52	120	1414	1466	1466	1.08	0.49	0.89	0.82	3	Somerset	Wells	20 Vicars Close	OX	0	0	Su	D	brace	Domestic	Middle	ST 551 460
vcw3	2		34	20	54	1446	1466	1466	1.54	1.16	1.24	1.40	3	Somerset	Wells	20 Vicars Close	OX	0	0	Sp	D	brace	Domestic	Middle	ST 551 460
vcw4	1		51	41	92	1308	1349	1349	1.62	1.40	1.67	1.52	3	Somerset	Wells	20 Vicars Close	OX	2	1	Sp	D	joist	Domestic	Middle	ST 551 460
stsw5	1	25	90	47	137	1438	1485	1485	1.34	0.45	0.53	1.04	3	Somerset	Wells	28 St Thomas Street	OX	0	0	Su	D		Domestic	Low	ST 554 461
stsw14	1	3	84	37	121	1426	1463	1462	1.44	0.45	0.50	1.13	3	Somerset	Wells	43 St Thomas Street	OX	0	0	W	D		Domestic	Low	ST 554 462
khw1	2		85	16	101	1495	1511	1511	2.29	1.45	1.12	2.16	3	Somerset	Wells	Kings Head Hotel	OX	0	0	Sp	D		Domestic	Middle	ST 548 456
khw2	1		83	28	111	1291	1319	1319	1.34	1.24	1.61	1.31	3	Somerset	Wells	Kings Head Hotel	OX	0	0	W	D		Domestic	Middle	ST 548 456

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
sjp1	1		72	22	94	1292	1314	1315	1.92	2.07	1.83	1.95	3	Somerset	Wells	Priory of St John	OX	0	0	W	D		Domestic	Middle	ST 547 456
sjp2	1		84	26	110	1289	1315	1315	1.63	1.27	2.05	1.54	3	Somerset	Wells	Priory of St John	OX	2	2	W	D		Domestic	Middle	ST 547 456
sjp3	1	10	109	50	159	1265	1315	1315	0.99	0.40	0.44	0.80	3	Somerset	Wells	Priory of St John	OX	2	2	W	D		Domestic	Middle	ST 547 456
sjp5	1		119	13	132	1301	1314	1315	1.07	0.86	0.91	1.05	3	Somerset	Wells	Priory of St John	OX	0	0	W	D		Domestic	Middle	ST 547 456
sjp6	1		54	48	102	1263	1311	1315	1.14	0.67	1.09	0.92	3	Somerset	Wells	Priory of St John	OX	0	0	Sp	D		Domestic	Middle	ST 547 456
wls5	1	5	68	18	86	1195	1213	1214	1.10	1.18	1.64	1.12	3	Somerset	Wells	Wells Cathedral	OX	2	1	Su	D		Church	Monastic	ST 551 458
WLS-C04	1		52	14	66	1437	1451	1451	3.15	1.72	2.20	2.85	3	Somerset	Wells	Wells Cathedral	NT	0	0		D	purlin			ST 552 459
WLS-C14	1		82	14	96	1436	1450	1451	1.43	1.67	1.45	1.46	3	Somerset	Wells	Wells Cathedral	NT	0	0		D	purlin			ST 552 459
wstn6	1		38	22	60	1428	1450	1450	1.81	1.49	1.52	1.69	3	Somerset	Whitestaunton	Whitestaunton Manor	OX	0	0	Sp	E		Domestic	Gentry	ST 280 105
wef1	1		78	21	99	1257	1278	1279	1.16	1.53	1.23	1.24	3	Somerset	Winscombe	West End Farm	OX	0	0	Su	D		Domestic	Low	ST 394 568
wef2	1	1	92	20	112	1259	1279	1279	1.42	1.86	2.14	1.50	3	Somerset	Winscombe	West End Farm	OX	0	0	W	D		Domestic	Low	ST 394 568
wef3	1	1	157	40	197	1237	1277	1279	1.47	0.54	1.31	1.28	3	Somerset	Winscombe	West End Farm	OX	0	0	Sp	D		Domestic	Low	ST 394 568
bcc1	1	10	47	28	75	1414	1442	1442	1.89	0.70	1.26	1.44	3	Somerset	Yraxall	Birdcombe Court	OX	0	0	W	D		Domestic	Middle	ST 479 718
bcc2	1	20	127	34	161	1408	1442	1442	1.13	0.72	0.59	1.04	3	Somerset	Yraxall	Birdcombe Court	OX	0	0	W	D		Domestic	Middle	ST 479 718
bcc6	1		61	15	76	1426	1441	1442	1.52	1.61	1.65	1.54	3	Somerset	Yraxall	Birdcombe Court	OX	0	0	W	D		Domestic	Middle	ST 479 718
yat02	1		63	23	86	1668	1691	1691	1.14	0.76	1.18	1.04	3	Somerset	Yatton	St Mary's Church	SH	0	0	W	D				ST 431 654
yat03	1		70	25	95	1666	1691	1691	1.28	0.67	0.82	1.12	3	Somerset	Yatton	St Mary's Church	SH	0	0		D				ST 431 654
yat04	1		102	27	129	1664	1691	1691	1.12	0.69	0.83	1.03	3	Somerset	Yatton	St Mary's Church	SH	0	0	W	D				ST 431 654
yat07	1		88	31	119	1660	1691	1691	0.94	0.60	0.66	0.85	3	Somerset	Yatton	St Mary's Church	SH	0	0		A				ST 431 654
LVC-D11A	1		43	18	61	1432	1450	1450	2.20	1.15	1.84	1.89	6	Staffs	Lichfield	3 Vicar's Close	NT	0	0		E	post			SK 118 097
yat07	1		88	31	119	1660	1691	1691	0.94	0.60	0.66	0.85	3	Somerset	Yatton	St Mary's Church	SH	0	0		A				ST 431 654
drs01	1	1	55	30	85	1225	1255	1255	1.86	1.48	2.28	1.73	6	Staffs	Stafford	Eastgate Street	SH	0	0	W	D				SJ 920 230
drs04	1	1	81	9	90	1577	1586	1586	1.93	1.93	2.22	1.93	4	Suffolk	Dunkstone	Dunkstone postmill	MB	0	0	Sp	A				TL 964 622
drs05	1		66	16	82	1570	1586	1586	2.66	1.50	1.91	2.43	4	Suffolk	Dunkstone	Dunkstone postmill	MB	0	0		A				TL 964 622
eas01	1	1	55	30	85	1225	1255	1255	1.86	1.48	2.28	1.73	6	Staffs	Stafford	Eastgate Street	SH	0	0	W	D				SJ 920 230
eas15	1		17	7	24	1248	1255	1255	4.42	3.01	4.23	4.01	6	Staffs	Stafford	Eastgate Street	SH	0	0	Sp	A				SJ 920 230
eas16	1		20	7	27	1248	1255	1255	3.94	2.11	3.44	3.46	6	Staffs	Stafford	Eastgate Street	SH	0	0	Sp	A				SJ 920 230
eas28	1		18	7	25	1248	1255	1255	4.85	2.96	4.23	4.32	6	Staffs	Stafford	Eastgate Street	SH	0	0	Sp	A				SJ 920 230
sm02	1		39	24	63	1176	1200	1006	0.71	1.01	0.95	0.83	6	Staffs	Stafford	St Marys Grove	SH	0	0	W	E				SJ 920 230
sm09	1		80	25	105	981	1006	1006	0.97	0.99	1.22	0.98	6	Staffs	Stafford	St Marys Grove	SH	0	0	Sp	D				SJ 920 230
sm10	1		43	21	64	985	1006	1006	1.11	1.01	1.11	1.08	6	Staffs	Stafford	St Marys Grove	SH	0	0	Sp	D				SJ 920 230
sm11	1		100	22	122	984	1006	1006	0.96	0.82	0.91	0.94	6	Staffs	Stafford	St Marys Grove	SH	0	0	Sp	D				SJ 920 230
sm12	1		99	19	118	987	1006	1006	1.11	1.13	1.14	1.11	6	Staffs	Stafford	St Marys Grove	SH	0	0	Sp	D				SJ 920 230
sm18	1		69	22	91	984	1006	1006	0.93	1.14	1.30	0.98	6	Staffs	Stafford	St Marys Grove	SH	0	0	Sp	D				SJ 920 230
sm19	1		89	24	113	982	1006	1006	0.91	0.92	0.92	0.91	6	Staffs	Stafford	St Marys Grove	SH	0	0	Sp	D				SJ 920 230
WET-A01A	1		106	13	119	1617	1630	1630	1.88	1.35	1.99	1.82	6	Staffs	Wetton	St Margaret's Church	NT	0	0		D	rail			SK 108 553
WET-A02A	1		79	12	91	1618	1630	1630	2.10	1.84	2.26	2.06	6	Staffs	Wetton	St Margaret's Church	NT	0	0		D	rail			SK 108 553
WET-A05A	1		139	16	155	1614	1630	1630	1.42	0.82	1.21	1.36	6	Staffs	Wetton	St Margaret's Church	NT	0	0		D	rail			SK 108 553
WET-A08A	1		104	22	126	1608	1630	1630	1.23	0.75	0.92	1.15	6	Staffs	Wetton	St Margaret's Church	NT	0	0		D	brace			SK 108 553
WET-A09A	2		142	34	176	1556	1590	1590	1.34	0.78	0.91	1.23	6	Staffs	Wetton	St Margaret's Church	NT	0	0		D	beam			SK 108 553
WET-A10A	2		129	38	167	1552	1590	1590	1.19	0.72	0.92	1.08	6	Staffs	Wetton	St Margaret's Church	NT	0	0		D	beam			SK 108 553
WET-A11A	2		133	33	166	1557	1590	1590	1.66	0.77	1.25	1.48	6	Staffs	Wetton	St Margaret's Church	NT	0	0		D	beam			SK 108 553
WET-A14A	3		133	24	157	1476	1500	1500	1.42	0.62	0.33	1.30	6	Staffs	Wetton	St Margaret's Church	NT	0	0		E	beam			SK 108 553
floorbm	1	10	99	17	116	1599	1616	1616	1.83	1.14	1.17	1.73	4	Suffolk	Alpheton	Mill House	MB	0	0	Sp	D	beam			TL 879 492
SDS-A01A	1		83	17	100	1603	1620	1620	1.70	1.22	0.81	1.62	4	Suffolk	Debenham	Bucks Head Standing	NT	0	0		D	post			TM 173 632
SDS-A05A	1		75	19	94	1601	1620	1620	1.58	1.33	1.46	1.53	4	Suffolk	Debenham	Bucks Head Standing	NT	0	0		D	post			TM 173 632
SDS-A08B	1		50	13	63	1592	1605	1620	1.96	0.82	2.01	1.72	4	Suffolk	Debenham	Bucks Head Standing	NT	0	0		D	plate			TM 173 632
SDS-A10A	1		36	15	51	1605	1620	1620	1.52	1.72	0.67	1.58	4	Suffolk	Debenham	Bucks Head Standing	NT	0	0		A	tiebeam			TM 173 632

Code	Phase	Path	H Wd	S Wd	Rings	H S hdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
drs07	1		102	21	123	1565	1586	1586	2.22	1.54	2.03	2.11	4	Suffolk	Drinkstone	Drinkstone postmill	MB	0	0	W	D				TL 964 622
drs15	1		81	20	101	1566	1586	1586	2.73	1.49	1.80	2.49	4	Suffolk	Drinkstone	Drinkstone postmill	MB	0	0	W	A				TL 964 622
ahc04	1	1	70	17	87	1271	1288	1289	1.29	1.49	1.50	1.33	4	Suffolk	Gt Cornard	Abbas Hall	MB	0	0	Sp	D				TL 901 404
ahc06	1		42	24	66	1265	1289	1289	1.50	1.50	1.66	1.50	4	Suffolk	Gt Cornard	Abbas Hall	MB	0	0	W	D				TL 901 404
ahc07	1		39	17	56	1272	1289	1289	2.95	1.63	2.71	2.55	4	Suffolk	Gt Cornard	Abbas Hall	MB	0	0	W	D				TL 901 404
ahc11	2		111	17	128	1531	1548	1548	1.61	1.29	1.30	1.57	4	Suffolk	Gt Cornard	Abbas Hall	MB	0	0	W	D	beam			TL 901 404
hgr02	1		101	36	137	1499	1535	1535	1.54	0.41	0.73	1.24	4	Suffolk	Hengrave	Hengrave Hall	MB	0	0	Sp	D				TL 824 686
ias0257	1		82	34	116	766	800	800	0.92	0.62	0.65	0.83	4	Suffolk	Ipswich	Bridge Street	SH	0	0	W	E				TM 160 440
ias0324	1	1	40	29	69	771	800	800	0.90	0.70	0.59	0.81	4	Suffolk	Ipswich	Bridge Street	SH	0	0	W	E				TM 160 440
ias0369	1		82	35	117	765	800	800	0.92	0.63	0.57	0.84	4	Suffolk	Ipswich	Bridge Street	SH	0	0	W	E				TM 160 440
ias0381	1		77	44	121	756	800	800	0.82	0.55	0.66	0.72	4	Suffolk	Ipswich	Bridge Street	SH	0	0	W	E				TM 160 440
ilb02	2	5	67	10	77	1530	1540	1540	1.46	1.84	2.04	1.51	4	Suffolk	Ipswich	Isaac Lord Complex	MB	0	0		D				TM 168 441
ilb07	1		35	14	49	1526	1540	1540	1.47	1.86	1.35	1.58	4	Suffolk	Ipswich	Isaac Lord Complex	MB	0	0	Sp	E				TM 168 441
ili11	3		58	17	75	1570	1587	1587	2.32	1.55	1.84	2.14	4	Suffolk	Ipswich	Isaac Lord Complex	MB	0	0	Sp	D				TM 168 441
ili12	4		41	18	59	1617	1635	1635	1.48	1.34	1.26	1.43	4	Suffolk	Ipswich	Isaac Lord Complex	MB	0	0	Sp	D				TM 168 441
ili16	4	5	47	17	64	1618	1635	1635	2.06	1.79	1.93	1.99	4	Suffolk	Ipswich	Isaac Lord Complex	MB	0	0	Sp	D				TM 168 441
mlp06	1		61	32	93	1582	1614	1614	1.15	0.72	1.04	1.00	4	Suffolk	Linstead Magna	Model Farm	MB	0	0	Sp	D	post			TM 307 778
wrf4170m	1		95	40	135	-2040	-2000	-2000	0.55	0.43	0.42	0.51	4	Suffolk	Mildenhall	West Row Fen	SH	0	0		E				TL 680 760
oty04	1		37	13	50	1498	1511	1511	2.13	2.16	1.87	2.14	4	Suffolk	Otley	Otley Hall	MB	0	0	W	D				TM 207 563
oty06	2	10	84	47	131	1540	1587	1587	0.97	0.36	0.50	0.75	4	Suffolk	Otley	Otley Hall	MB	0	0	W	E				TM 207 563
otyC01	1		45	15	60	1496	1511	1511	2.72	1.38	2.03	2.38	4	Suffolk	Otley	Otley Hall	MB	0	0	W	D				TM 207 563
otyE01	1	10	53	20	73	1490	1510	1511	1.72	1.12	1.59	1.55	4	Suffolk	Otley	Otley Hall	MB	0	0	W	D				TM 207 563
wnb02	1	5	44	30	74	1497	1527	1527	3.23	0.92	2.14	2.29	4	Suffolk	Wingfield	Wingfield Barn	MB	0	0	W	D				TM 229 768
add01	1		61	15	76	1475	1490	1490	1.38	1.34	1.02	1.37	1	Surrey	Addington	Addington House	MB	0	0	W	D	collar			TQ 373 642
add05	1	10	36	14	50	1476	1490	1490	2.59	1.66	2.03	2.33	1	Surrey	Addington	Addington House	MB	0	0	W	A	stud			TQ 373 642
add08	1		106	16	122	1474	1490	1490	1.97	0.92	1.68	1.84	1	Surrey	Addington	Addington House	MB	0	0	W	D	post			TQ 373 642
che11	1	1	44	23	67	1618	1641	1641	2.02	1.48	2.09	1.84	1	Surrey	Charlwood	2 Old Rosemary Cottage	OX	0	0	W	E	misc	Domestic	Middle	TQ 244 412
che2	1	5	52	28	80	1613	1641	1641	2.43	0.78	1.31	1.85	1	Surrey	Charlwood	2 Old Rosemary Cottage	OX	0	0	W	D	post	Domestic	Middle	TQ 244 412
che3	1	10	21	11	32	1630	1641	1641	2.70	2.38	3.06	2.59	1	Surrey	Charlwood	2 Old Rosemary Cottage	OX	0	0	Su	A	misc	Domestic	Middle	TQ 244 412
che5	1	10	31	29	60	1612	1641	1641	2.75	1.96	2.25	2.37	1	Surrey	Charlwood	2 Old Rosemary Cottage	OX	0	0	W	A	tiebeam	Domestic	Middle	TQ 244 412
che7	1	10	55	22	77	1619	1641	1641	2.65	1.22	0.70	2.24	1	Surrey	Charlwood	2 Old Rosemary Cottage	OX	0	0	W	D	post	Domestic	Middle	TQ 244 412
chd1	1	2	48	20	68	1391	1411	1411	3.20	1.44	1.46	2.68	1	Surrey	Charlwood	Dormers Cottage	OX	0	0	W	D	tiebeam	Domestic	Middle	TQ 242 416
chd2	1	1	21	29	50	1382	1411	1411	2.92	0.76	2.57	1.67	1	Surrey	Charlwood	Dormers Cottage	OX	0	0	W	D	rafter	Domestic	Middle	TQ 242 416
chd5	1	2	36	13	49	1398	1411	1411	2.08	1.31	1.54	1.87	1	Surrey	Charlwood	Dormers Cottage	OX	0	0	W	D	misc	Domestic	Middle	TQ 242 416
chd6	1	2	21	14	35	1397	1411	1411	2.82	2.10	2.26	2.53	1	Surrey	Charlwood	Dormers Cottage	OX	0	0	W	A	rafter	Domestic	Middle	TQ 242 416
chd7	1	5	21	12	33	1399	1411	1411	2.12	2.06	1.84	2.10	1	Surrey	Charlwood	Dormers Cottage	OX	0	0	W	D	rafter	Domestic	Middle	TQ 242 416
chd9	2	5	39	18	57	1413	1431	1431	2.04	1.16	1.42	1.76	1	Surrey	Charlwood	Dormers Cottage	OX	0	0	W	D	rafter	Domestic	Middle	TQ 242 416
chc2	1	1	35	16	51	1417	1433	1436	3.02	2.35	2.95	2.81	1	Surrey	Charlwood	The Cottage, Norwood Hill Road	OX	0	0	Su	D	post	Domestic	Middle	TQ 242 417
chc3	1	1	30	18	48	1416	1434	1436	1.97	2.42	2.76	2.14	1	Surrey	Charlwood	The Cottage, Norwood Hill Road	OX	0	0	Sp	D	rafter	Domestic	Middle	TQ 242 417
chc4	1	1	54	15	69	1420	1435	1436	1.40	1.12	1.61	1.34	1	Surrey	Charlwood	The Cottage, Norwood Hill Road	OX	0	0	Su	D	rafter	Domestic	Middle	TQ 242 417
chc5	1	1	35	14	49	1421	1435	1436	2.09	1.33	1.19	1.87	1	Surrey	Charlwood	The Cottage, Norwood Hill Road	OX	0	0	Su	A	rafter	Domestic	Middle	TQ 242 417
chc7	1	5	45	21	66	1415	1436	1436	1.16	1.03	1.14	1.12	1	Surrey	Charlwood	The Cottage, Norwood Hill Road	OX	0	0	Su	D	joist	Domestic	Middle	TQ 242 417
cha1	2	5	57	14	71	1426	1440	1441	2.63	1.96	1.82	2.50	1	Surrey	Charlwood	The Cottage, The Street	OX	0	0	W	D	beam	Domestic	Middle	TQ 241 411
cha3	2	2	53	17	70	1422	1439	1441	1.66	1.18	1.33	1.55	1	Surrey	Charlwood	The Cottage, The Street	OX	0	0	W	D	rail	Domestic	Middle	TQ 241 411
cha4	2	10	53	25	78	1414	1439	1441	2.53	1.15	1.24	2.09	1	Surrey	Charlwood	The Cottage, The Street	OX	0	0	W	D	misc	Domestic	Middle	TQ 241 411
cha5	2	3	59	16	75	1425	1441	1441	2.42	1.97	1.99	2.32	1	Surrey	Charlwood	The Cottage, The Street	OX	0	0	Su	D	tiebeam	Domestic	Middle	TQ 241 411

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
chb1	1	3	53	19	72	1382	1401	1401	2.19	1.05	1.07	1.89	1	Surrey	Charlwood	The Cottage, The Street	OX	0	0	W	D	tiebeam	Domestic	Middle	TQ 241 411
chb2	1	1	54	12	66	1389	1401	1375	2.75	2.40	3.49	2.68	1	Surrey	Charlwood	The Cottage, The Street	OX	0	0	W	D	tiebeam	Domestic	Middle	TQ 241 411
lumb4	1	5	67	21	88	1354	1375	1375	2.19	1.27	1.73	1.97	1	Surrey	Chearn	Lumley Chapel	OX	2	1	Su	D		Church	Middle	TQ 242 639
lumb8	1	15	64	22	86	1352	1374	1375	1.91	1.04	1.71	1.69	1	Surrey	Chearn	Lumley Chapel	OX	2	0	Sp	D		Church	Middle	TQ 242 639
pcc2	1		53	17	70	1530	1547	1547	1.86	1.52	1.56	1.78	1	Surrey	Chobham	Old Pound Cottage	OX	0	0	W	D	rafter	Domestic	Middle	SU 975 621
pcc3	1		137	24	161	1523	1547	1547	0.85	0.94	0.82	0.87	1	Surrey	Chobham	Old Pound Cottage	OX	2	6	Su	A	Principal	Domestic	Middle	SU 975 621
pcc4	1		132	18	150	1529	1547	1547	1.36	0.64	0.41	1.28	1	Surrey	Chobham	Old Pound Cottage	OX	0	0	W	A	purlin	Domestic	Middle	SU 975 621
pcc5	1		72	26	98	1517	1543	1547	1.69	1.13	1.44	1.55	1	Surrey	Chobham	Old Pound Cottage	OX	2	1	W	D	collar	Domestic	Middle	SU 975 621
mtc1	1		51	21	72	1538	1559	1559	1.68	1.61	1.52	1.66	1	Surrey	Hambledon	Maytree Cottage	OX	0	0	W	D	rafter	Domestic	Middle	SU 965 384
mtc2	1		117	20	137	1539	1559	1559	0.58	0.80	0.38	0.61	1	Surrey	Hambledon	Maytree Cottage	OX	0	0	W	D	purlin	Domestic	Middle	SU 965 384
mtc3	1	10	113	21	134	1538	1559	1559	1.23	1.08	0.58	1.21	1	Surrey	Hambledon	Maytree Cottage	OX	0	0	W	D	Principal	Domestic	Middle	SU 965 384
mtc4	1		85	17	102	1542	1559	1559	2.43	2.03	1.64	2.36	1	Surrey	Hambledon	Maytree Cottage	OX	0	0	W	D	tiebeam	Domestic	Middle	SU 965 384
mtc5	1		116	14	130	1544	1558	1559	1.40	1.68	0.41	1.43	1	Surrey	Hambledon	Maytree Cottage	OX	0	0	W	D	tiebeam	Domestic	Middle	SU 965 384
mtc6	1	5	128	19	147	1540	1559	1559	1.66	0.79	0.94	1.55	1	Surrey	Hambledon	Maytree Cottage	OX	0	0	W	D	tiebeam	Domestic	Middle	SU 965 384
vann1	1		96	19	115	1523	1542	1542	1.09	1.01	0.69	1.08	1	Surrey	Hambledon	Vann	OX	0	0	W	D	purlin	Domestic	Middle	SU 983 375
vann11	2		85	14	99	1579	1593	1593	1.34	1.53	1.47	1.36	1	Surrey	Hambledon	Vann	OX	2	0	W	D	collar	Domestic	Middle	SU 983 375
vann24	1		79	22	101	1519	1541	1542	1.28	0.78	1.14	1.17	1	Surrey	Hambledon	Vann	OX	2	1	Su	D	stud	Domestic	Middle	SU 983 375
vann3	1		81	19	100	1521	1540	1542	1.25	0.96	1.22	1.19	1	Surrey	Hambledon	Vann	OX	0	0	Su	D	purlin	Domestic	Middle	SU 983 375
vann5	1	15	114	17	131	1525	1542	1542	1.04	1.15	0.77	1.06	1	Surrey	Hambledon	Vann	OX	0	0	Su	D	Principal	Domestic	Middle	SU 983 375
vann6	1		113	26	139	1516	1542	1542	0.84	0.68	1.08	0.81	1	Surrey	Hambledon	Vann	OX	0	0	W	D	collar	Domestic	Middle	SU 983 375
mtc1	1		38	17	55	1391	1408	1408	2.34	1.48	1.49	2.08	1	Surrey	Ascombe	Markwick Farm, Loxhill	OX	0	0	Sp	D	tiebeam	Domestic	Middle	SU 995 382
mtc11	1	10	53	12	65	1611	1623	1623	1.79	2.00	1.57	1.83	1	Surrey	Ascombe	Markwick Farm, Loxhill	OX	0	0	Sp	D	post	Agricultural	Middle	SU 995 382
mtc3	1	10	32	9	41	1399	1408	1408	1.92	1.58	1.33	1.84	1	Surrey	Ascombe	Markwick Farm, Loxhill	OX	0	0	Sp	D	collar	Domestic	Middle	SU 995 382
mtc4	1	20	34	17	51	1391	1408	1408	2.96	0.92	1.78	2.28	1	Surrey	Ascombe	Markwick Farm, Loxhill	OX	0	0	Sp	A	brace	Domestic	Middle	SU 995 382
mtc5	1	10	39	9	48	1399	1408	1408	2.16	2.06	1.55	2.14	1	Surrey	Ascombe	Markwick Farm, Loxhill	OX	0	0	Sp	D	collar	Domestic	Middle	SU 995 382
mtc6	1	3	58	21	79	1386	1407	1408	1.05	1.16	1.05	1.08	1	Surrey	Ascombe	Markwick Farm, Loxhill	OX	0	0	W	D	collar	Domestic	Middle	SU 995 382
mtc7	1	5	42	13	55	1394	1407	1408	1.55	1.60	1.30	1.56	1	Surrey	Ascombe	Markwick Farm, Loxhill	OX	0	0	Su	D	collar	Domestic	Middle	SU 995 382
mtc8	1	3	38	14	52	1394	1408	1408	2.25	2.32	2.42	2.27	1	Surrey	Ascombe	Markwick Farm, Loxhill	OX	0	0	Sp	D	collar	Domestic	Middle	SU 995 382
nde08	1	5	93	26	119	1457	1483	1483	2.11	0.91	0.85	1.85	1	Surrey	Newdigate	Home Farm	MB	0	0		D				TQ 207 407
ndh20r	2	5	65	18	83	1621	1639	1639	2.11	1.97	2.32	2.08	1	Surrey	Newdigate	Home Farm	MB	0	0	Su	D				TQ 207 407
nds03	3	5	49	16	65	1395	1411	1411	3.16	2.27	2.35	2.94	1	Surrey	Newdigate	Home Farm	MB	0	0	W	D				TQ 207 407
nds07	4	1	67	18	85	1590	1608	1608	2.13	1.39	1.80	1.97	1	Surrey	Newdigate	Home Farm	MB	0	0	W	D	plate			TQ 207 407
nds14	4		42	18	60	1590	1608	1608	4.31	2.66	3.10	3.82	1	Surrey	Newdigate	Home Farm	MB	0	0	W	D	post			TQ 207 407
nds15	4		44	9	53	1599	1608	1608	3.80	3.97	3.75	3.83	1	Surrey	Newdigate	Home Farm	MB	0	0	W	D	post			TQ 207 407
nds16	4		71	19	90	1589	1608	1608	1.55	0.93	1.24	1.42	1	Surrey	Newdigate	Home Farm	MB	0	0	W	D	plate			TQ 207 407
nds17	4	5	67	15	82	1593	1608	1608	2.32	1.74	2.12	2.21	1	Surrey	Newdigate	Home Farm	MB	0	0	W	D	tiebeam			TQ 207 407
nds22	4	1	90	14	104	1594	1608	1608	2.32	2.12	2.65	2.29	1	Surrey	Newdigate	Home Farm	MB	0	0	W	D	tiebeam			TQ 207 407
pirb1	1		101	29	130	1528	1557	1557	1.13	0.56	0.98	1.01	1	Surrey	Pirbright	Causeway Farm	OX	0	0	W	D	post	Domestic	Middle	SU 941 564
pirb11	1	20	110	32	142	1525	1557	1557	1.02	0.91	0.67	1.00	1	Surrey	Pirbright	Causeway Farm	OX	0	0	W	D	joist	Domestic	Middle	SU 941 564
pirb12	1		91	29	120	1528	1557	1557	1.01	0.95	1.04	1.00	1	Surrey	Pirbright	Causeway Farm	OX	0	0	W	D	joist	Domestic	Middle	SU 941 564
pirb2	1		129	25	154	1531	1556	1557	1.29	1.02	0.68	1.25	1	Surrey	Pirbright	Causeway Farm	OX	0	0	W	D	post	Domestic	Middle	SU 941 564
pirb3	1		115	14	129	1543	1557	1557	1.36	1.41	1.62	1.36	1	Surrey	Pirbright	Causeway Farm	OX	0	0	W	D	Plate	Domestic	Middle	SU 941 564
pirb4	1	5	69	20	89	1537	1557	1557	0.58	0.97	0.79	0.67	1	Surrey	Pirbright	Causeway Farm	OX	0	0	W	D	post	Domestic	Middle	SU 941 564
pirb5	1		70	19	89	1537	1556	1557	1.42	0.82	1.22	1.29	1	Surrey	Pirbright	Causeway Farm	OX	0	0	W	D	joist	Domestic	Middle	SU 941 564
pirb9	1	5	109	23	132	1534	1557	1557	1.65	1.09	0.81	1.55	1	Surrey	Pirbright	Causeway Farm	OX	0	0	Su	D	tiebeam	Domestic	Middle	SU 941 564
pura1	1		30	33	63	1478	1511	1511	1.31	1.30	1.07	1.30	1	Surrey	Pirbright	Vynes Cottage	OX	0	0	W	D	stud	Domestic	Middle	SU 946 559

Code	Phase	Pith	H Wd	S Wd	Rings	H'S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
pira3	1		75	33	108	1469	1502	1511	1.09	1.00	0.97	1.06	1	Surrey	Pirbright	Vynes Cottage	OX	0	0	Sp	D	stud	Domestic	Middle	SU 946 559
fgh1	1	5	75	15	90	1335	1350	0	2.26	0.76	0.78	2.01	1	Surrey	West End	Fellows Green House	OX	0	0	Su	E	post	Domestic	Middle	SU 950 606
fgh11	2		99	22	121	1533	1555	1555	1.30	1.22	1.17	1.28	1	Surrey	West End	Fellows Green House	OX	3	3	W	D	joist	Domestic	Middle	SU 950 606
fgh12	2	5	42	17	59	1538	1555	1555	3.27	2.70	3.18	3.11	1	Surrey	West End	Fellows Green House	OX	0	0	W	A	beam	Domestic	Middle	SU 950 606
fgh16	2		50	15	65	1540	1555	1555	1.39	1.44	1.75	1.40	1	Surrey	West End	Fellows Green House	OX	0	0	W	D	joist	Domestic	Middle	SU 950 606
fgh2	1		44	19	63	1331	1350	0	2.54	2.47	2.20	2.52	1	Surrey	West End	Fellows Green House	OX	0	0	W	E	brace	Domestic	Middle	SU 950 606
fgh3	1	5	47	11	58	1339	1350	0	2.32	1.71	2.35	2.20	1	Surrey	West End	Fellows Green House	OX	0	0	Sp	E	joist	Domestic	Middle	SU 950 606
fgh4	1	10	33	32	65	1318	1350	0	3.33	1.20	1.88	2.28	1	Surrey	West End	Fellows Green House	OX	0	0	W	E	joist	Domestic	Middle	SU 950 606
lms1	1	1	73	26	99	1510	1536	1537	1.28	1.15	1.09	1.24	1	Surrey	Woking	Langmans	OX	0	0	W	D	brace	Domestic	Middle	SU 987 582
lms2	1		48	15	63	1521	1536	1537	2.25	2.40	2.59	2.29	1	Surrey	Woking	Langmans	OX	0	0	W	A	Principal	Domestic	Middle	SU 987 582
lms5	1		44	20	64	1517	1537	1537	1.23	0.90	0.92	1.13	1	Surrey	Woking	Langmans	OX	0	0	W	D	collar	Domestic	Middle	SU 987 582
lms6	1	40	66	28	94	1508	1536	1537	0.98	0.69	0.75	0.90	1	Surrey	Woking	Langmans	OX	0	0	Su	D	rafter	Domestic	Middle	SU 987 582
lms7	1	5	81	21	102	1515	1536	1537	1.52	0.62	0.51	1.33	1	Surrey	Woking	Langmans	OX	0	0	W	A	collar	Domestic	Middle	SU 987 582
lms8	1		35	26	61	1496	1522	1537	1.28	1.18	1.07	1.24	1	Surrey	Woking	Langmans	OX	0	0	W	D	Principal	Domestic	Middle	SU 987 582
uck10	1		49	41	90	1394	1435	1436	2.85	0.77	1.24	1.90	1	Sussex	Uckfield	Bridge Cottage	MB	0	0	W	D				TQ 472 209
uck15	1		36	16	52	1419	1435	1436	1.99	1.87	1.88	1.95	1	Sussex	Uckfield	Bridge Cottage	MB	0	0		A				TQ 472 209
uck16	1		32	20	52	1416	1436	1436	2.74	1.82	2.75	2.38	1	Sussex	Uckfield	Bridge Cottage	MB	0	0		D				TQ 472 209
uck19	1		109	20	129	1416	1436	1436	0.93	0.92	0.37	0.93	1	Sussex	Uckfield	Bridge Cottage	MB	0	0		D				TQ 472 209
GSH-A04A	1		37	23	60	1448	1471	1471	3.19	0.88	1.68	2.31	9	Tyne & Wear	Gateshead	Gibside Hall	NT	0	0		A	lintel			NZ 176 589
GSH-A11A	1		38	15	53	1456	1471	1471	4.10	2.38	3.53	3.61	9	Tyne & Wear	Gateshead	Gibside Hall	NT	0	0		D	lintel			NZ 176 589
GSH-A13B	1		29	16	45	1455	1471	1471	2.77	1.25	1.93	2.23	9	Tyne & Wear	Gateshead	Gibside Hall	NT	0	0		A	beam			NZ 176 589
NWC-A01A	1		52	18	70	1506	1524	1524	2.24	1.65	1.62	2.09	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	tiebeam			NZ 253 640
NWC-A02A	1		27	19	46	1505	1524	1524	1.76	1.31	1.82	1.58	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	principal			NZ 253 640
NWC-A04A	1		48	18	66	1506	1524	1524	2.20	1.37	1.50	1.97	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	tiebeam			NZ 253 640
NWC-A08A	1		80	27	107	1497	1524	1524	1.59	1.09	0.81	1.47	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	tiebeam			NZ 253 640
NWC-A10A	1		58	17	75	1507	1524	1524	1.49	0.90	0.56	1.36	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	rafter			NZ 253 640
NWC-A11	1		39	16	55	1508	1524	1524	2.05	1.85	1.65	1.99	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	purlin			NZ 253 640
NWC-A12A	1		47	23	70	1501	1524	1524	1.66	1.28	1.31	1.53	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	rafter			NZ 253 640
NWC-A13A	1		47	17	64	1507	1524	1524	1.89	2.25	1.26	1.98	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	principal			NZ 253 640
NWC-A15A	1		82	19	101	1505	1524	1524	1.74	1.44	0.89	1.69	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	principal			NZ 253 640
NWC-A16A	1		109	19	128	1505	1524	1524	1.70	1.06	0.73	1.60	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	principal			NZ 253 640
NWC-A17A	1		67	18	85	1506	1524	1524	2.07	1.59	1.87	1.97	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	purlin			NZ 253 640
NWC-A18A	2		56	13	69	1436	1449	1449	2.79	1.87	2.11	2.62	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	beam			NZ 253 640
NWC-A19A	2		26	15	41	1434	1449	1449	5.59	3.59	4.28	4.86	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	beam			NZ 253 640
NWC-A20A	2		59	23	82	1426	1449	1449	2.77	1.28	1.37	2.35	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	beam			NZ 253 640
NWC-A21A	2		120	23	143	1426	1449	1449	1.36	0.82	1.13	1.28	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	joist			NZ 253 640
NWC-A23A	2		47	16	63	1433	1449	1449	2.27	2.12	1.38	2.23	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	joist			NZ 253 640
NWC-A24A	2		30	19	49	1430	1449	1449	2.96	2.44	2.78	2.76	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	joist			NZ 253 640
NWC-A26A	2		81	26	107	1423	1449	1449	1.46	0.96	0.65	1.34	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	joist			NZ 253 640
NWC-A27A	2		86	23	109	1426	1449	1449	1.23	0.84	0.93	1.14	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	joist			NZ 253 640
NWC-B04A	3		151	30	181	1153	1183	1183	0.76	0.61	0.43	0.74	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		D	beam			NZ 253 640
NWC-B07A	3		57	44	101	1139	1183	1183	1.52	0.69	0.95	1.16	9	Tyne & Wear	Newcastle	Trinity House	NT	0	0		A	brace			NZ 253 640
nsf1	1	5	66	17	83	1407	1424	1425	3.04	1.57	2.50	2.74	6	W Midlands	Sutton Coldfield	New Shipton Farm, Walmley	OX	0	0	Su	D		Agricultural	Low	SP 134 942
nsf2	1	8	68	24	92	1401	1425	1425	3.00	1.67	1.90	2.65	6	W Midlands	Sutton Coldfield	New Shipton Farm, Walmley	OX	0	0	Sp	D		Agricultural	Low	SP 134 942
nsf6	2	3	55	25	80	1575	1600	1600	2.56	1.03	0.83	2.08	6	W Midlands	Sutton Coldfield	New Shipton Farm, Walmley	OX	0	0	Sp	E		Agricultural	Low	SP 134 942
bos5	1	10	79	15	94	1391	1406	1406	1.52	1.07	1.39	1.44	1	W Sussex	Bosham	Holy Trinity Church - spire	OX	0	0	W	D		Church	Monastic	SU 804 039

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
bos7	1	5	76	17	93	1389	1406	1406	1.59	0.86	1.29	1.45	1	W Sussex	Bosham	Holy Trinity Church - spire	OX	0	0	Su	D		Church	Monastic	SU 804 039
bos8	1	5	43	29	72	1377	1406	1406	1.73	0.55	1.03	1.25	1	W Sussex	Bosham	Holy Trinity Church - spire	OX	0	0	Sp	A		Church	Monastic	SU 804 039
bos9	1	15	45	27	72	1379	1406	1406	2.07	1.24	1.65	1.76	1	W Sussex	Bosham	Holy Trinity Church - spire	OX	0	0	Su	A		Church	Monastic	SU 804 039
crl11	1	5	25	12	37	1461	1473	1473	3.50	2.50	3.11	3.18	1	W Sussex	Crawley	Vine Cottage, 16 High Street	OX	0	0	Sp	A		Domestic	Low	TQ 266 365
crl12	1	1	75	21	96	1452	1473	1473	1.44	0.90	0.88	1.32	1	W Sussex	Crawley	Vine Cottage, 16 High Street	OX	0	0	Sp	D		Domestic	Low	TQ 266 365
crl17	1	1	35	19	54	1454	1473	1473	2.15	1.72	1.73	2.00	1	W Sussex	Crawley	Vine Cottage, 16 High Street	OX	0	0	Sp	A		Domestic	Low	TQ 266 365
crl2	1	10	44	22	66	1451	1473	1473	1.20	0.80	0.77	1.07	1	W Sussex	Crawley	Vine Cottage, 16 High Street	OX	0	0	W	A		Domestic	Low	TQ 266 365
crl21b	1	1	23	15	38	1458	1473	1473	2.77	2.24	2.11	2.56	1	W Sussex	Crawley	Vine Cottage, 16 High Street	OX	0	0	Su	A		Domestic	Low	TQ 266 365
crl23	1	1	40	21	61	1452	1473	1473	1.57	0.68	1.28	1.27	1	W Sussex	Crawley	Vine Cottage, 16 High Street	OX	2	6	W	A		Domestic	Low	TQ 266 365
crl25	1		90	30	120	1443	1473	1473	1.35	0.82	0.95	1.21	1	W Sussex	Crawley	Vine Cottage, 16 High Street	OX	0	0	W	A		Domestic	Low	TQ 266 365
crl5	1	1	65	15	80	1457	1472	1473	1.34	0.94	0.88	1.26	1	W Sussex	Crawley	Vine Cottage, 16 High Street	OX	0	0	Su	D		Domestic	Low	TQ 266 365
egg1	1	10	31	16	47	1434	1450	1450	3.36	1.90	2.49	2.86	1	W Sussex	East Grinstead	22/24 High Street	OX	2	1	Sp	E	tiebeam	Domestic	Middle	TQ 395 379
egh1	1	1	51	20	71	1331	1351	1352	1.90	1.94	1.95	1.91	1	W Sussex	East Grinstead	34/40 High Street	OX	0	0	W	D	brace	Domestic	Middle	TQ 395 379
egh3	1	1	107	25	132	1327	1352	1352	1.57	0.82	1.67	1.43	1	W Sussex	East Grinstead	34/40 High Street	OX	0	0	Sp	D	post	Domestic	Middle	TQ 395 379
egh4	1	5	49	19	68	1332	1351	1352	2.62	1.37	1.57	2.27	1	W Sussex	East Grinstead	34/40 High Street	OX	0	0	W	D	stud	Domestic	Middle	TQ 395 379
egf1	2	20	70	18	88	1433	1451	1629	2.17	1.25	1.04	1.98	1	W Sussex	East Grinstead	4 High Street	OX	0	0	W	D	post	Domestic	Middle	TQ 395 379
egf11	2	10	71	24	95	1605	1629	1452	1.49	0.72	1.00	1.30	1	W Sussex	East Grinstead	4 High Street	OX	0	0	W	D	beam	Domestic	Middle	TQ 395 379
egi1	1	10	31	43	74	1332	1375	1376	2.42	0.64	1.81	1.39	1	W Sussex	East Grinstead	46 High Street	OX	0	0	W	E	rafter	Domestic	Middle	TQ 395 379
egi2	1	10	43	39	82	1336	1375	1376	1.86	0.69	1.37	1.30	1	W Sussex	East Grinstead	46 High Street	OX	0	0	W	E	rafter	Domestic	Middle	TQ 395 379
egi3	1	10	50	22	72	1353	1375	1376	2.01	1.35	2.34	1.81	1	W Sussex	East Grinstead	46 High Street	OX	0	0	W	E	rafter	Domestic	Middle	TQ 395 379
egi4	1	5	57	31	88	1344	1375	1376	1.42	0.76	0.87	1.18	1	W Sussex	East Grinstead	46 High Street	OX	0	0	Sp	E	rafter	Domestic	Middle	TQ 395 379
egi5	1	1	71	16	87	1359	1375	1376	1.30	1.70	1.26	1.38	1	W Sussex	East Grinstead	46 High Street	OX	0	0	Su	E	rafter	Domestic	Middle	TQ 395 379
egi6	1	10	43	15	58	1360	1375	1376	1.59	1.37	1.37	1.53	1	W Sussex	East Grinstead	46 High Street	OX	2	1	W	E	misc	Domestic	Middle	TQ 395 379
egd1	1	1	44	16	60	1434	1450	1450	1.80	1.29	1.16	1.67	1	W Sussex	East Grinstead	7,9, 11 High Street	OX	0	0	W	D	rafter	Domestic	Middle	TQ 395 479
egd2	1	10	27	19	46	1431	1450	1450	3.03	1.45	1.79	2.38	1	W Sussex	East Grinstead	7,9, 11 High Street	OX	0	0	W	D	rafter	Domestic	Middle	TQ 395 479
egd3	1	25	52	17	69	1433	1450	1450	1.18	0.32	0.33	0.97	1	W Sussex	East Grinstead	7,9, 11 High Street	OX	0	0	W	A	stave	Domestic	Middle	TQ 395 479
ege2	1	1	45	18	63	1434	1452	1451	1.85	0.53	0.94	1.47	1	W Sussex	East Grinstead	7,9, 11 High Street	OX	0	0	W	D	rafter	Domestic	Middle	TQ 395 479
ege3	1	1	45	13	58	1439	1452	1451	1.46	1.29	1.22	1.42	1	W Sussex	East Grinstead	7,9, 11 High Street	OX	0	0	W	A	rafter	Domestic	Middle	TQ 395 479
ege4	1	1	52	11	63	1441	1452	1451	1.92	1.70	1.49	1.88	1	W Sussex	East Grinstead	7,9, 11 High Street	OX	0	0	W	D	rafter	Domestic	Middle	TQ 395 479
ege5	1	10	39	14	53	1436	1450	1450	2.71	2.05	2.33	2.53	1	W Sussex	East Grinstead	7,9, 11 High Street	OX	0	0	W	A	joist	Domestic	Middle	TQ 395 479
ege7	1	5	36	17	53	1433	1450	1450	1.82	0.86	1.35	1.51	1	W Sussex	East Grinstead	7,9, 11 High Street	OX	0	0	W	D	joist	Domestic	Middle	TQ 395 479
egj10	1	10	65	22	87	1348	1370	1369	1.83	1.34	1.13	1.70	1	W Sussex	East Grinstead	Amhurst House, 68 High Street	OX	0	0	Sp	D		Domestic	Middle	TQ 396 379
egj3	1	5	30	14	44	1355	1369	1369	3.28	2.07	1.90	2.89	1	W Sussex	East Grinstead	Amhurst House, 68 High Street	OX	0	0	Su	D		Domestic	Middle	TQ 396 379
egj4	1	5	32	14	46	1355	1369	1369	3.03	1.41	1.50	2.54	1	W Sussex	East Grinstead	Amhurst House, 68 High Street	OX	0	0	Su	D		Domestic	Middle	TQ 396 379
egj5	1	5	33	22	55	1347	1369	1369	2.53	0.84	1.91	1.86	1	W Sussex	East Grinstead	Amhurst House, 68 High Street	OX	0	0	Su	D		Domestic	Middle	TQ 396 379
egc1	1	25	38	24	62	1423	1447	1447	1.58	1.61	2.05	1.59	1	W Sussex	East Grinstead	Judges Terrace	OX	0	0	Su	A	rail	Domestic	Middle	TQ 394 379
egc3	1	50	37	18	55	1429	1447	1447	1.73	1.40	1.26	1.62	1	W Sussex	East Grinstead	Judges Terrace	OX	0	0	W	D	joist	Domestic	Middle	TQ 394 379
ega2	1	10	62	19	81	1621	1640	1640	1.61	1.18	1.06	1.51	1	W Sussex	East Grinstead	Stone House, High Street	OX	0	0	W	A	rafter	Domestic	Middle	TQ 394 379
ega3	1	20	47	14	61	1626	1640	1640	1.92	1.20	1.43	1.76	1	W Sussex	East Grinstead	Stone House, High Street	OX	0	0	W	A	rafter	Domestic	Middle	TQ 394 379
ega5	1	5	51	18	69	1622	1640	1640	1.61	1.36	1.56	1.55	1	W Sussex	East Grinstead	Stone House, High Street	OX	0	0	W	D	rafter	Domestic	Middle	TQ 394 379
ega6	1	20	50	22	72	1618	1640	1640	1.98	1.09	1.97	1.71	1	W Sussex	East Grinstead	Stone House, High Street	OX	0	0	W	D	rafter	Domestic	Middle	TQ 394 379
frd03	1		65	12	77	1350	1362	1511	2.24	1.49	1.53	2.12	1	W Sussex	Ford	St Andrew's Church	MB	0	0	Sp	D	tiebeam			TQ 003 037
frd10	1		167	27	194	1480	1507	1511	0.72	0.53	0.43	0.70	1	W Sussex	Ford	St Andrew's Church	MB	0	0	W	D	post			TQ 003 037
frd12	1		135	23	158	1488	1511	1511	1.06	1.26	1.25	1.09	1	W Sussex	Ford	St Andrew's Church	MB	0	0	W	D	post			TQ 003 037
HAR-H09A	1		54	28	82	1329	1357	1357	1.41	0.62	1.37	1.14	1	W Sussex	Hardham	St Botolph's Church	NT	0	0		D	brace			TQ 039 176
hxw01	1		65	20	85	1793	1813	1813	2.87	1.37	1.64	2.52	1	W Sussex	Herstmonceux	Windmill	MB	0	0	W	D				TQ 647 121

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
hxw06	1		82	21	103	1792	1813	1813	3.22	1.55	2.01	2.88	1	W Sussex	Herstmonceux	Windmill	MB	0	0	W	D	post			TQ 647 121
hxw07	1	5	45	14	59	1798	1812	1813	2.90	2.70	2.57	2.86	1	W Sussex	Herstmonceux	Windmill	MB	0	0	W	D				TQ 647 121
hor07	1		30	29	59	1483	1512	1512	1.40	0.80	1.23	1.11	1	W Sussex	Horsham	11 Causeway	MB	0	0	Su	D				TQ 170 304
grtn1a	1		46	15	61	1565	1580	1580	2.27	1.45	1.36	2.07	1	W Sussex	Newdigate	Gaterounds	OX	0	0	Sp	A		Domestic	Middle	TQ 198 427
grtn2	1	1	48	19	67	1561	1580	1580	2.54	1.16	1.31	2.15	1	W Sussex	Newdigate	Gaterounds	OX	0	0	W	D		Domestic	Middle	TQ 198 427
grtn3	1		48	20	68	1560	1580	1580	2.96	2.06	3.39	2.70	1	W Sussex	Newdigate	Gaterounds	OX	0	0	W	D		Domestic	Middle	TQ 198 427
grtn4	1		61	18	79	1562	1580	1580	2.72	2.28	2.31	2.62	1	W Sussex	Newdigate	Gaterounds	OX	0	0	W	D		Domestic	Middle	TQ 198 427
wnm0209	5	5	222	23	245	1582	1605	1605	1.18	0.84	0.96	1.15	1	W Sussex	Rogate	Wenham Manor Farm	OX	2	1	Su	A		Agricultural	Middle	SU 788 235
wnm0301	5	5	86	27	113	1578	1605	1605	1.13	1.44	0.71	1.21	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	W	A		Agricultural	Middle	SU 788 235
wnm0307b	5	20	35	17	52	1588	1605	1605	2.44	2.36	2.75	2.42	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	W	D		Agricultural	Middle	SU 788 235
wnm0402	5		171	19	190	1586	1605	1605	1.02	1.22	0.73	1.04	1	W Sussex	Rogate	Wenham Manor Farm	OX	2	4	W	A		Agricultural	Middle	SU 788 235
wnm0410	5		77	21	98	1584	1605	1605	2.90	2.61	1.72	2.84	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	W	D		Agricultural	Middle	SU 788 235
wnm1243	3	20	150	35	185	1551	1586	1587	1.11	0.69	0.67	1.03	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	?	D		Agricultural	Middle	SU 788 235
wnm1322	4	1	97	23	120	1573	1596	1596	0.77	0.62	0.50	0.74	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	Su	A		Agricultural	Middle	SU 788 235
wnm1402	4		40	17	57	1579	1596	1596	1.96	1.75	1.33	1.90	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	W	A		Agricultural	Middle	SU 788 235
wnm1404	4	3	45	13	58	1583	1596	1596	2.48	1.63	2.06	2.29	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	Su	A		Agricultural	Middle	SU 788 235
wnm1405	4		71	24	95	1572	1596	1596	1.65	0.91	1.00	1.46	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	?	D		Agricultural	Middle	SU 788 235
wnm1510	5		99	33	132	1572	1605	1605	1.57	0.74	1.47	1.36	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	W	D		Agricultural	Middle	SU 788 235
wnm1609	3	10	156	33	189	1554	1587	1587	0.99	0.45	0.38	0.90	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	W	D		Agricultural	Middle	SU 788 235
wnm1735	1	10	39	24	63	1316	1340	1340	1.82	2.10	0.75	1.93	1	W Sussex	Rogate	Wenham Manor Farm	OX	0	0	Su	D		Agricultural	Middle	SU 788 235
wnm8598	2		218	47	265	1452	1499	1499	0.62	0.54	0.52	0.61	1	W Sussex	Rogate	Wenham Manor Farm	OX	2	12	W	D		Agricultural	Middle	SU 788 235
rdga113	2	2	88	23	111	1528	1551	1551	1.15	0.89	0.52	1.10	1	W Sussex	Rudgwick	Hoglands	OX	0	0	W	D		Domestic	Low	TQ 073 291
rdga2	1	1	64	10	74	1360	1370	1370	1.85	1.70	1.62	1.83	1	W Sussex	Rudgwick	Hoglands	OX	0	0	W	A		Domestic	Low	TQ 073 291
rdga3	1	3	60	20	80	1350	1370	1370	1.91	1.08	0.96	1.70	1	W Sussex	Rudgwick	Hoglands	OX	0	0	W	D		Domestic	Low	TQ 073 291
rdga4	1	5	47	18	65	1352	1370	1370	2.39	2.29	1.64	2.36	1	W Sussex	Rudgwick	Hoglands	OX	0	0	W	D		Domestic	Low	TQ 073 291
rdgb11	1	5	43	15	58	1322	1337	1338	4.67	3.61	4.51	4.40	1	W Sussex	Rudgwick	Snoxall	OX	0	0	Su	A		Domestic	Low	TQ 081 329
rdgb12	1		22	15	37	1323	1338	1338	2.62	1.60	2.66	2.20	1	W Sussex	Rudgwick	Snoxall	OX	0	0	W	D		Domestic	Low	TQ 081 329
rdgb13	1	3	27	18	45	1319	1337	1338	2.43	1.30	1.60	1.98	1	W Sussex	Rudgwick	Snoxall	OX	0	0	Su	D		Domestic	Low	TQ 081 329
rdgb14	1	10	7	15	22	1322	1337	1338	3.58	1.87	3.58	2.42	1	W Sussex	Rudgwick	Snoxall	OX	0	0	Su	D		Domestic	Low	TQ 081 329
rdgb2	1	1	43	11	54	1327	1338	1338	2.17	1.63	1.37	2.06	1	W Sussex	Rudgwick	Snoxall	OX	0	0	Su	D		Domestic	Low	TQ 081 329
rdgb3	1	5	32	18	50	1319	1337	1338	3.23	1.78	2.50	2.71	1	W Sussex	Rudgwick	Snoxall	OX	0	0	W	D		Domestic	Low	TQ 081 329
rdgb4	1	3	30	19	49	1318	1337	1338	2.22	2.06	1.99	2.16	1	W Sussex	Rudgwick	Snoxall	OX	0	0	Su	D		Domestic	Low	TQ 081 329
rdgb5	1	5	16	16	32	1321	1337	1338	3.75	2.35	3.99	3.05	1	W Sussex	Rudgwick	Snoxall	OX	0	0	Su	D		Domestic	Low	TQ 081 329
rdgb6	1	3	41	8	49	1329	1337	1338	1.81	3.95	1.41	2.16	1	W Sussex	Rudgwick	Snoxall	OX	0	0	Su	D		Domestic	Low	TQ 081 329
rdgb7	1	1	36	15	51	1323	1338	1338	2.44	2.38	2.32	2.43	1	W Sussex	Rudgwick	Snoxall	OX	0	0	Su	D		Domestic	Low	TQ 081 329
rdgc5	1		39	19	58	1550	1569	1569	2.32	2.45	2.51	2.37	1	W Sussex	Rudgwick	Swains Cottage	OX	0	0	W	D		Domestic	Low	TQ 066 328
gsk11	2		77	16	93	1540	1556	1556	2.37	1.66	1.84	2.25	1	W Sussex	Slinfold	Gaskyns	OX	0	0	Su	D		Domestic	Middle	TQ 121 308
gsk12	2	15	101	15	116	1541	1556	1556	1.56	1.18	1.60	1.51	1	W Sussex	Slinfold	Gaskyns	OX	0	0	Su	D		Domestic	Middle	TQ 121 308
gsk13	2		96	20	116	1536	1556	1556	2.01	1.99	1.85	2.00	1	W Sussex	Slinfold	Gaskyns	OX	0	0	Su	D		Domestic	Middle	TQ 121 308
gsk14	2	10	88	26	114	1530	1556	1556	1.98	1.24	1.86	1.81	1	W Sussex	Slinfold	Gaskyns	OX	0	0	Su	D		Domestic	Middle	TQ 121 308
gsk4	1	1	144	24	168	1465	1489	1489	0.76	0.54	0.49	0.73	1	W Sussex	Slinfold	Gaskyns	OX	0	0	Sp	D		Domestic	Middle	TQ 121 308
gsk5b	1	25	90	32	122	1457	1489	1489	0.65	0.39	0.36	0.59	1	W Sussex	Slinfold	Gaskyns	OX	0	0	Sp	A		Domestic	Middle	TQ 121 308
gsk6	1	15	107	45	152	1444	1489	1489	0.74	0.38	0.45	0.63	1	W Sussex	Slinfold	Gaskyns	OX	0	0	Sp	D		Domestic	Middle	TQ 121 308
st1	1		142	11	153	1393	1404	1405	1.44	2.58	1.69	1.53	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	0	0	W	D	post			TQ 169 118
st11	1	20	91	27	118	1377	1404	1405	1.27	0.80	0.78	1.16	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	0	0	W	D	brace			TQ 169 118
st12	1	5	141	12	153	1392	1404	1405	1.72	2.66	2.39	1.79	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	0	0	W	D	tiebeam			TQ 169 118

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
st13	1	5	143	32	175	1372	1404	1405	1.41	0.81	0.81	1.30	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	2	1	W	D	post			TQ 169 118
st14	1		93	18	111	1386	1404	1405	1.65	1.21	1.14	1.58	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	0	0	W	D	brace			TQ 169 118
st15	1	2	128	15	143	1389	1404	1405	1.18	1.02	0.86	1.17	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	2	3	W	D	plate			TQ 169 118
st16	1	5	126	17	143	1387	1404	1405	1.46	0.94	0.89	1.40	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	0	0	W	D	brace			TQ 169 118
st2	1	10	105	17	122	1387	1404	1405	1.21	1.66	1.16	1.27	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	0	0	W	D	purlin			TQ 169 118
st4	1	4	107	30	137	1375	1405	1405	1.09	0.75	0.83	1.02	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	0	0	W	D	post			TQ 169 118
st6	1	2	115	30	145	1374	1404	1405	1.62	0.72	0.61	1.43	1	W Sussex	Steyning	Charlton Court Farm Barn	OX	0	0	W	D	tiebeam			TQ 169 118
ter1	1	5	44	16	60	1767	1783	1783	2.33	2.64	2.45	2.41	1	W Sussex	Trotton	Terwick Mill	OX	0	0	W	E		Agricultural	Low	SU 830 220
ter2	1	1	62	16	78	1767	1783	1783	1.44	1.86	1.46	1.52	1	W Sussex	Trotton	Terwick Mill	OX	0	0	W	E		Agricultural	Low	SU 830 220
ter3	1	1	49	15	64	1768	1783	1783	1.45	1.07	1.48	1.36	1	W Sussex	Trotton	Terwick Mill	OX	0	0	Su	E		Agricultural	Low	SU 830 220
ter4	1	10	33	16	49	1767	1783	1783	1.51	1.30	1.07	1.44	1	W Sussex	Trotton	Terwick Mill	OX	0	0	W	E		Agricultural	Low	SU 830 220
ter5	1	2	43	12	55	1771	1783	1783	2.38	1.98	2.30	2.29	1	W Sussex	Trotton	Terwick Mill	OX	0	0	W	E		Agricultural	Low	SU 830 220
bh01	1	5	83	22	105	1582	1604	1604	2.04	1.29	1.16	1.88	7	W Yorks	Thornton	Upper Headley Hall	SH	0	0		D				SE 097 321
ba0l8a	1	10	29	26	55	349	375	375	2.07	0.98	1.46	1.55	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8b	1	10	40	17	57	358	375	375	1.41	0.75	0.77	1.21	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8c	1	10	31	14	45	361	375	375	1.95	1.00	1.47	1.66	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8d	1	1	42	18	60	357	375	375	1.93	1.00	1.64	1.65	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8e	1	1	32	16	48	359	375	375	2.13	1.25	1.61	1.83	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8f	1	1	16	20	36	355	375	375	2.80	0.84	2.59	1.71	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8g	1	1	37	13	50	362	375	375	1.83	0.87	1.27	1.58	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8h	1	1	19	20	39	355	375	375	1.98	1.26	2.01	1.61	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8j	1	1	29	24	53	351	375	375	1.67	0.76	1.25	1.26	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8k	1	1	43	17	60	358	375	375	1.91	1.10	1.54	1.68	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8l	1	1	34	26	60	349	375	375	1.95	0.92	1.31	1.51	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8m	1	10	30	25	55	350	375	375	1.68	0.90	1.22	1.32	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba0l8n	1	10	30	28	58	347	375	375	1.78	0.71	1.20	1.26	6	Warw	Alcester	Alcester gateway	SH	0	0		E				SP 088 574
ba0l8r	1	1	21	21	42	354	375	375	2.20	1.09	1.75	1.64	6	Warw	Alcester	Alcester gateway	SH	0	0	Sp	E				SP 088 574
ba11	3	5	51	27	78	1432	1459	1459	2.84	0.57	2.21	2.06	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	2	1	W	D		Domestic	Gentry	SP 200 715
ba22	3		44	21	65	1438	1459	1459	2.20	1.59	2.64	2.00	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	A		Domestic	Gentry	SP 200 715
ba31	4		60	16	76	1686	1702	1702	1.53	1.29	1.47	1.48	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Sp	D		Domestic	Gentry	SP 200 715
ba33	4	1	48	22	70	1680	1702	1702	3.09	0.93	3.14	2.41	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Sp	A		Domestic	Gentry	SP 200 715
ba4	1		64	22	86	1504	1526	1526	1.25	0.92	1.06	1.17	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	D		Domestic	Gentry	SP 200 715
ba40	5		115	38	153	1538	1576	1578	1.37	1.16	1.08	1.32	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Sp	D		Domestic	Gentry	SP 200 715
ba41	5		70	29	99	1548	1577	1578	1.33	0.69	0.49	1.14	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	D		Domestic	Gentry	SP 200 715
ba423	5		105	17	122	1557	1574	1578	1.22	0.83	0.68	1.17	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	2	0	Su	D		Domestic	Gentry	SP 200 715
ba47	5	5	51	24	75	1554	1578	1578	1.56	0.85	1.07	1.33	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	2	1	W	D		Domestic	Gentry	SP 200 715
ba49	5		51	46	97	1527	1573	1578	1.24	0.41	0.65	0.85	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	D		Domestic	Gentry	SP 200 715
ba5	2		56	20	76	1622	1642	1642	1.30	1.38	1.75	1.32	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	2	1	W	D		Domestic	Gentry	SP 200 715
ba50	5		65	23	88	1551	1574	1578	1.15	1.09	0.59	1.13	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	D		Domestic	Gentry	SP 200 715
ba53	6		50	20	70	1554	1574	1574	1.69	1.36	1.95	1.60	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Sp	D		Domestic	Gentry	SP 200 715
ba61	7		55	21	76	1609	1630	1630	1.48	0.94	1.11	1.33	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	D		Domestic	Gentry	SP 200 715
ba62	7		66	21	87	1609	1630	1630	1.35	1.00	1.02	1.27	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	D		Domestic	Gentry	SP 200 715
ba63	7		60	21	81	1609	1630	1630	1.48	1.05	1.05	1.37	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	D		Domestic	Gentry	SP 200 715
ba64	7		93	19	112	1611	1630	1630	0.98	1.27	1.00	1.03	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	Su	D		Domestic	Gentry	SP 200 715
ba72	8	15	84	28	112	1508	1536	1536	1.18	1.01	1.09	1.14	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	2	1	W	D		Domestic	Gentry	SP 200 715
ba74	8	15	75	18	93	1517	1535	1536	1.09	0.87	0.71	1.04	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	W	D		Domestic	Gentry	SP 200 715

Code	Phase	Path	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	Date Type	Member	Type	Status	NGR
bad81	9	3	38	24	62	1766	1790	1790	2.37	1.05	1.93	1.86	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	W	D		Domestic	Gentry	SP 200 715
bad82	9		52	25	77	1765	1790	1790	2.51	1.31	1.77	2.12	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	W	D		Domestic	Gentry	SP 200 715
bad83	9	1	54	25	79	1765	1790	1790	1.92	1.07	1.74	1.65	6	Warw	Baddesley Clinton	Baddesley Clinton	OX	0	0	W	D		Domestic	Gentry	SP 200 715
spon1	1	30	45	31	76	1423	1454	1455	1.57	0.92	1.05	1.31	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	Sp	D		Domestic	Middle	SP 325 790
spon10	1	1	98	27	125	1426	1453	1455	0.95	0.46	0.68	0.84	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	Sp	D		Domestic	Middle	SP 325 790
spon2	1	30	91	32	123	1422	1454	1455	1.61	0.92	0.94	1.43	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	Sp	D		Domestic	Middle	SP 325 790
spon3	1	20	92	35	127	1419	1454	1455	1.18	0.93	0.73	1.11	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	Sp	D		Domestic	Middle	SP 325 790
spon4	1	3	87	39	126	1415	1454	1455	1.41	0.55	0.78	1.14	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	Sp	D		Domestic	Middle	SP 325 790
spon5	1	30	90	42	132	1412	1454	1455	1.92	0.29	0.69	1.40	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	Sp	A		Domestic	Middle	SP 325 790
spon6	1	30	93	26	119	1429	1455	1455	0.82	0.74	0.67	0.80	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	W	D		Domestic	Middle	SP 325 790
spon7	1	5	94	23	117	1431	1454	1455	1.23	0.99	1.09	1.18	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	Sp	D		Domestic	Middle	SP 325 790
spon8	1	10	84	24	108	1430	1454	1455	1.29	1.06	0.93	1.24	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	Sp	D		Domestic	Middle	SP 325 790
spon9	1	1	63	38	101	1416	1454	1455	1.74	0.85	1.18	1.40	6	Warw	Coventry	119-23 Upper Spon Street	OX	0	0	W	A		Domestic	Middle	SP 325 790
prc1	1	2	82	16	98	1399	1415	1415	1.36	1.73	1.31	1.42	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	W	D		Domestic	Middle	SP 334 790
prc10	1	6	70	16	86	1398	1414	1415	1.56	1.92	1.42	1.63	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	Su	D		Domestic	Middle	SP 334 790
prc11	1		39	23	62	1392	1415	1415	2.94	1.58	2.33	2.44	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	W	A		Domestic	Middle	SP 334 790
prc12	1		63	15	78	1400	1415	1415	1.14	1.55	0.66	1.22	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	W	A		Domestic	Middle	SP 334 790
prc2	1	1	82	35	117	1380	1415	1415	1.79	0.73	0.80	1.47	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	W	A		Domestic	Middle	SP 334 790
prc3	1	4	64	38	102	1376	1414	1415	1.56	0.63	0.73	1.21	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	Su	D		Domestic	Middle	SP 334 790
prc4	1	1	68	38	106	1376	1414	1415	1.68	0.50	0.83	1.25	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	Sp	D		Domestic	Middle	SP 334 790
prc6	1	5	67	19	86	1396	1415	1415	1.70	1.09	0.96	1.57	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	W	D		Domestic	Middle	SP 334 790
prc7	1	3	77	18	95	1397	1415	1415	1.47	1.39	1.03	1.46	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	Sp	D		Domestic	Middle	SP 334 790
prc8	1	2	58	19	77	1396	1415	1415	1.38	1.32	1.39	1.37	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	W	A		Domestic	Middle	SP 334 790
prc9	1	8	43	17	60	1398	1415	1415	2.14	1.73	2.07	2.03	6	Warw	Coventry	Lychgate Cottages, Priory Row	OX	0	0	W	A		Domestic	Middle	SP 334 790
wfr11	2		99	25	124	1468	1493	1493	1.12	0.90	0.76	1.08	6	Warw	Coventry	Whitefriars	OX	0	0	Sp	D		Church	Monastic	SP 340 786
wfr13	2		46	22	68	1472	1494	1493	2.93	0.99	1.94	2.31	6	Warw	Coventry	Whitefriars	OX	0	0	W	A		Church	Monastic	SP 340 786
wfr15	3	10	80	22	102	1525	1547	1548	1.49	0.84	1.12	1.35	6	Warw	Coventry	Whitefriars	OX	0	0	Su	D		Church	Monastic	SP 340 786
wfr16	3		80	19	99	1529	1548	1548	1.55	1.74	2.11	1.58	6	Warw	Coventry	Whitefriars	OX	2	7	W	D		Church	Monastic	SP 340 786
wfr178	3		84	14	98	1534	1548	1548	1.60	1.40	1.37	1.57	6	Warw	Coventry	Whitefriars	OX	2	1	W	D		Church	Monastic	SP 340 786
wfr24	1	5	117	24	141	1451	1475	1475	1.14	0.62	0.57	1.05	6	Warw	Coventry	Whitefriars	OX	3	13	Sp	D		Church	Monastic	SP 340 786
wfr7	2	10	93	21	114	1471	1492	1493	1.11	1.07	0.99	1.10	6	Warw	Coventry	Whitefriars	OX	0	0	W	D		Church	Monastic	SP 340 786
wfr8	2	5	124	21	145	1473	1494	1493	1.39	1.83	0.65	1.45	6	Warw	Coventry	Whitefriars	OX	2	2	W	D		Church	Monastic	SP 340 786
hhc1	1		60	17	77	1328	1345	1345	2.61	2.14	2.69	2.51	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	D		Domestic	Low	SP 150 658
hhc14	3	5	45	12	57	1439	1451	1451	3.95	4.14	3.94	3.99	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	D		Domestic	Low	SP 150 658
hhc15	3		41	13	54	1438	1451	1451	2.99	2.39	2.36	2.85	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	D		Domestic	Low	SP 150 658
hhc21	4	15	43	24	67	1409	1433	1433	1.76	0.98	1.14	1.48	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	D		Domestic	Low	SP 150 658
hhc22	4	1	51	29	80	1404	1433	1433	1.49	1.08	1.11	1.35	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Su	D		Domestic	Low	SP 150 658
hhc25	4	4	47	30	77	1403	1433	1433	2.30	1.10	1.92	1.83	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	D		Domestic	Low	SP 150 658
hhc26	5		51	19	70	1452	1471	1471	1.79	1.04	1.17	1.58	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	A		Domestic	Low	SP 150 658
hhc27	5	5	42	22	64	1443	1465	1471	1.63	1.04	1.37	1.42	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Su	D		Domestic	Low	SP 150 658
hhc28	5	1	66	24	90	1447	1471	1471	1.22	0.81	0.90	1.11	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	D		Domestic	Low	SP 150 658
hhc29	5	10	41	21	62	1444	1465	1471	2.11	1.08	1.36	1.76	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	D		Domestic	Low	SP 150 658
hhc3	1	15	34	17	51	1328	1345	1345	2.12	1.94	1.81	2.06	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Sp	D		Domestic	Low	SP 150 658
hhc4	2	5	69	25	94	1412	1437	1440	1.36	0.72	1.15	1.19	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	W	D		Domestic	Low	SP 150 658
hhc5	2	4	120	27	147	1413	1440	1440	1.23	0.56	0.94	1.11	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	W	D		Domestic	Low	SP 150 658
hhc6	2	5	102	21	123	1419	1440	1440	1.08	1.02	1.03	1.07	6	Warw	Henley-in-Arden	150 High Street	OX	0	0	Su	D		Domestic	Low	SP 150 658

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
WAR-A01A	1		52	35	87	1415	1450	1450	1.46	0.49	0.60	1.07	6	Warw	Saltisford	Master's House	NT	0	0		E	joist			SP 277 654
WAR-A03A	1		26	23	49	1427	1450	1450	2.87	0.79	2.10	1.90	6	Warw	Saltisford	Master's House	NT	0	0		E	joist			SP 277 654
WAR-A04B	1		39	30	69	1420	1450	1450	1.31	0.74	0.79	1.06	6	Warw	Saltisford	Master's House	NT	0	0		E	joist			SP 277 654
pegg2	1	5	87	17	104	1652	1669	1669	1.11	0.66	1.20	1.04	6	Warw	Shustoke	Peggs Barn (Daw Mill Colliery)	OX	0	0	W	D		Domestic	Low	SP 261 902
pegg3	1	5	69	28	97	1641	1669	1669	1.62	0.44	1.14	1.28	6	Warw	Shustoke	Peggs Barn (Daw Mill Colliery)	OX	0	0	W	D		Domestic	Low	SP 261 902
pegg4a	1	1	62	46	108	1623	1669	1669	1.03	0.39	0.54	0.76	6	Warw	Shustoke	Peggs Barn (Daw Mill Colliery)	OX	0	0	W	D		Domestic	Low	SP 261 902
STO-I08	1		59	27	86	1786	1813	1813	1.33	0.80	0.79	1.16	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	rafter			SP 317 712
STO-I11	1		135	26	161	1787	1813	1813	1.36	0.69	0.85	1.25	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	post			SP 317 712
STO-I12	1		72	35	107	1777	1812	1813	1.51	0.75	1.48	1.26	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	stud			SP 317 712
STO-I13	1		81	25	106	1788	1813	1813	2.02	0.90	1.49	1.76	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	tiebeam			SP 317 712
STO-I20	1		19	35	54	1778	1813	1813	2.33	0.86	2.28	1.38	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		A	stud			SP 317 712
STO-I35	2		85	16	101	1759	1775	1775	2.26	1.55	2.12	2.15	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		E	principal			SP 317 712
STO-I37	2		53	18	71	1757	1775	1775	2.64	1.75	3.03	2.42	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		E	principal			SP 317 712
STO-I40	2		37	20	57	1755	1775	1775	2.22	1.76	1.90	2.06	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		E	principal			SP 317 712
STO-I53	3		75	28	103	1542	1570	1570	0.83	0.77	0.66	0.81	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	plate			SP 317 712
STO-I58	3		80	19	99	1551	1570	1570	1.19	1.01	1.18	1.16	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		A	rafter			SP 317 712
STO-I62	3		54	20	74	1548	1568	1570	1.05	1.22	0.88	1.10	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	rafter			SP 317 712
STO-I72	6		70	15	85	1752	1767	1767	1.04	1.39	1.13	1.10	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	joist			SP 317 712
STO-I73	5		90	21	111	1637	1658	1658	0.88	0.76	0.67	0.86	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	joist			SP 317 712
STO-I74	5		83	24	107	1634	1658	1658	1.02	0.81	0.82	0.97	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	joist			SP 317 712
STO-I78	5		114	31	145	1627	1658	1658	1.06	0.60	0.60	0.96	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	joist			SP 317 712
STO-I80	4		77	20	97	1574	1594	1594	0.94	1.41	1.18	1.04	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	post			SP 317 712
STO-I82	4		58	28	86	1566	1594	1594	0.80	0.91	0.79	0.84	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	stud			SP 317 712
STO-I84	4		127	11	138	1583	1594	1594	1.39	1.73	1.49	1.42	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D				SP 317 712
STO-I85	4		63	18	81	1576	1594	1594	1.15	1.99	1.55	1.34	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D				SP 317 712
STO-I86	5		54	28	82	1629	1657	1658	0.85	0.79	0.78	0.83	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	joist			SP 317 712
STO-I87	5		42	25	67	1632	1657	1658	0.82	0.93	0.72	0.86	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	joist			SP 317 712
STO-M01A	7		61	19	80	1979	1998	1998	1.61	0.58	0.97	1.36	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		A	Parkland			SP 317 712
STO-M02B	7		113	14	127	1984	1998	1998	2.20	1.08	1.11	2.08	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M03B	7		63	11	74	1987	1998	1998	4.07	4.27	3.77	4.10	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M04B	7		126	18	144	1980	1998	1998	2.30	2.32	1.36	2.31	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M05A	7		180	30	210	1968	1998	1998	1.55	0.91	0.72	1.45	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M08B	7		153	15	168	1983	1998	1998	2.47	1.74	2.78	2.40	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M09A	7		150	22	172	1976	1998	1998	2.42	1.83	1.46	2.34	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M10A	7		152	19	171	1979	1998	1998	2.46	1.15	1.35	2.31	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M11B	7		145	19	164	1979	1998	1998	1.24	3.07	1.50	1.46	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M12A	7		137	17	154	1981	1998	1998	1.45	1.10	1.17	1.41	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M13B	7		151	25	176	1973	1998	1998	1.74	1.24	1.21	1.67	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M15A	7		271	32	303	1966	1998	1998	1.27	1.28	1.00	1.27	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		A	Parkland			SP 317 712
STO-M16B	7		76	36	112	1962	1998	1998	0.71	0.69	0.79	0.70	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M17B	7		280	18	298	1980	1998	1998	1.01	0.88	0.71	1.00	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M18A	7		171	20	191	1978	1998	1998	1.65	1.60	1.76	1.64	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M19A	7		166	23	189	1975	1998	1998	1.42	1.30	1.89	1.41	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M20A	7		177	20	197	1978	1998	1998	1.52	2.14	0.90	1.58	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M21A	7		114	26	140	1972	1998	1998	1.21	0.52	0.78	1.08	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		A	Parkland			SP 317 712
STO-M22A	7		80	30	110	1968	1998	1998	1.48	1.00	1.03	1.35	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		A	Parkland			SP 317 712

Code	Phase	Path	H Wd	S Wd	Rings	H Sbdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
STO-M23B	7		157	25	182	1973	1998	1998	1.58	1.51	1.87	1.57	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		A	Parkland			SP 317 712
STO-M24	7		221	50	271	1948	1998	1998	1.26	1.21	1.39	1.25	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
STO-M25A	7		144	18	162	1980	1998	1998	1.07	1.08	1.00	1.07	6	Warw	Soneleigh	Stoneleigh Abbey	NT	0	0		D	Parkland			SP 317 712
hc-14567	1	10	159	25	184	1588	1613	1613	0.99	1.00	0.74	0.99	6	Warw	Stratford-on-Avon	Halls Croft	OX	4	5	W	D		Domestic	Middle	SP 200 545
hc-I1	1		160	17	177	1596	1613	1613	0.72	0.70	0.50	0.71	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	A		Domestic	Middle	SP 200 545
hc-I11	1		19	21	40	1592	1613	1613	1.04	1.28	1.24	1.16	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-I12	1		127	15	142	1598	1613	1613	1.28	0.70	0.67	1.22	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-I13	1	10	146	19	165	1594	1613	1613	1.01	1.14	0.61	1.03	6	Warw	Stratford-on-Avon	Halls Croft	OX	2	3	W	D		Domestic	Middle	SP 200 545
hc-I16	1	10	163	21	184	1592	1613	1613	0.97	1.25	0.52	1.00	6	Warw	Stratford-on-Avon	Halls Croft	OX	2	1	W	D		Domestic	Middle	SP 200 545
hc-I2	1		118	19	137	1594	1613	1613	1.02	1.26	1.09	1.06	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-I3	1	10	148	31	179	1582	1613	1613	1.14	0.57	0.61	1.04	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-I4	1	1	87	24	111	1589	1613	1613	1.36	1.06	1.03	1.29	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-I5	1		114	21	135	1592	1613	1613	0.72	1.07	0.72	0.78	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-I6910	1	10	102	19	121	1594	1613	1613	2.14	1.82	1.84	2.09	6	Warw	Stratford-on-Avon	Halls Croft	OX	3	4	W	D		Domestic	Middle	SP 200 545
hc-I7	1		142	27	169	1586	1613	1613	0.77	0.62	0.31	0.74	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	A		Domestic	Middle	SP 200 545
hc-I8	1		140	29	169	1584	1613	1613	0.84	0.71	0.46	0.82	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-II1	2		104	25	129	1589	1614	1614	0.96	1.06	1.09	0.98	6	Warw	Stratford-on-Avon	Halls Croft	OX	3	3	W	D		Domestic	Middle	SP 200 545
hc-V1	3		157	19	176	1612	1631	1631	0.80	1.81	0.86	0.91	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-V2	3	10	166	27	193	1604	1631	1631	0.99	1.29	0.93	1.04	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-V3	3	1	50	24	74	1607	1631	1631	2.65	0.85	1.70	2.07	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	A		Domestic	Middle	SP 200 545
hc-V4	3		167	18	185	1613	1631	1631	1.38	1.63	1.57	1.41	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	Sp	D		Domestic	Middle	SP 200 545
hc-V5	3		121	30	151	1601	1631	1631	1.06	1.02	1.02	1.05	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	W	D		Domestic	Middle	SP 200 545
hc-V6	3		179	21	200	1610	1631	1631	0.72	0.35	0.42	0.68	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	Su	D		Domestic	Middle	SP 200 545
hc-VI2	4	5	33	11	44	1639	1650	1650	2.25	2.37	2.24	2.28	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	Sp	E		Domestic	Middle	SP 200 545
hc-VI3	4	5	45	21	66	1629	1650	1650	1.97	0.76	0.92	1.59	6	Warw	Stratford-on-Avon	Halls Croft	OX	0	0	Su	E		Domestic	Middle	SP 200 545
mbt10	2	5	82	17	99	1543	1560	1560	1.48	1.10	1.55	1.41	6	Warw	Tanworth-in-Arden	Bell Cottages, The Green	OX	0	0	W	A	stud	Domestic	Middle	SP 114 706
mbt3	1	5	61	21	82	1426	1447	1448	1.54	0.96	0.85	1.39	6	Warw	Tanworth-in-Arden	Bell Cottages, The Green	OX	0	0	W	D	stud	Domestic	Middle	SP 114 706
mbt5	1		20	15	35	1431	1446	1448	2.09	1.75	2.16	1.95	6	Warw	Tanworth-in-Arden	Bell Cottages, The Green	OX	0	0	W	D	Plate	Domestic	Middle	SP 114 706
mbt6	1	1	40	35	75	1413	1448	1448	1.04	0.50	0.83	0.79	6	Warw	Tanworth-in-Arden	Bell Cottages, The Green	OX	0	0	W	D	rafter	Domestic	Middle	SP 114 706
mbt8	1		29	20	49	1426	1446	1448	3.23	1.24	2.80	2.42	6	Warw	Tanworth-in-Arden	Bell Cottages, The Green	OX	0	0	W	D	purlin	Domestic	Middle	SP 114 706
mbt9	2	25	126	21	147	1539	1560	1560	0.76	0.66	0.94	0.75	6	Warw	Tanworth-in-Arden	Bell Cottages, The Green	OX	0	0	W	D	collar	Domestic	Middle	SP 114 706
wel1	1		65	20	85	1619	1639	1639	1.36	1.51	1.82	1.39	6	Warw	Wellesbourne	Granary, Chapel Street	OX	0	0	W	A		Agricultural	Low	SP 279 551
wel29	1	20	179	29	208	1610	1639	1639	1.24	1.02	1.19	1.21	6	Warw	Wellesbourne	Granary, Chapel Street	OX	2	6	Su	D		Agricultural	Low	SP 279 551
wel4	1	1	51	20	71	1619	1639	1639	1.66	1.21	0.81	1.54	6	Warw	Wellesbourne	Granary, Chapel Street	OX	0	0	W	A		Agricultural	Low	SP 279 551
wel5x	1	20	65	30	95	1609	1639	1639	1.10	0.81	0.57	1.01	6	Warw	Wellesbourne	Granary, Chapel Street	OX	0	0	Su	A		Agricultural	Low	SP 279 551
wel6	1	1	42	18	60	1621	1639	1639	1.98	2.32	1.11	2.08	6	Warw	Wellesbourne	Granary, Chapel Street	OX	0	0	Sp	A		Agricultural	Low	SP 279 551
wel8	1	20	105	27	132	1612	1639	1639	1.60	1.15	1.52	1.51	6	Warw	Wellesbourne	Granary, Chapel Street	OX	0	0	W	D		Agricultural	Low	SP 279 551
ardn3	1		41	17	58	1496	1513	1513	1.86	2.00	1.76	1.90	6	Warw	Wilmcote	Glebe Farm	OX	0	0	W	D	collar	Domestic	Middle	SP 163 581
ardn7	1		52	17	69	1495	1512	1513	1.78	1.12	1.60	1.62	6	Warw	Wilmcote	Glebe Farm	OX	0	0	W	D	Plate	Domestic	Middle	SP 163 581
ardn8	1		17	19	36	1494	1513	1513	1.96	2.22	2.13	2.10	6	Warw	Wilmcote	Glebe Farm	OX	0	0	W	A	Plate	Domestic	Middle	SP 163 581
ardn17	1	20	115	22	137	1546	1568	1568	0.91	0.82	0.85	0.89	6	Warw	Wilmcote	Palmers Farm	OX	0	0	W	D	rail	Domestic	Middle	SP 164 581
ardn21	2	20	53	29	82	1550	1579	1579	1.60	1.16	1.81	1.45	6	Warw	Wilmcote	Palmers Farm	OX	0	0	Su	D	purlin	Domestic	Middle	SP 164 581
ardn22	2		43	24	67	1555	1579	1579	2.66	1.83	2.36	2.36	6	Warw	Wilmcote	Palmers Farm	OX	0	0	W	D	tiebeam	Domestic	Middle	SP 164 581
ardn237	2	15	71	30	101	1549	1579	1579	1.57	1.14	1.51	1.44	6	Warw	Wilmcote	Palmers Farm	OX	2	0	W	D	Plate	Domestic	Middle	SP 164 581
ardn24	2	1	55	14	69	1565	1579	1579	1.58	2.33	1.14	1.73	6	Warw	Wilmcote	Palmers Farm	OX	0	0	W	A	purlin	Domestic	Middle	SP 164 581
ardn26	2	5	18	35	53	1544	1579	1579	1.93	1.47	1.78	1.63	6	Warw	Wilmcote	Palmers Farm	OX	0	0	W	D	stud	Domestic	Middle	SP 164 581

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
arch312	3		99	32	131	1548	1580	1580	1.40	0.85	1.03	1.27	6	Warw	Wilmcote	Palmers Farm	OX	2	6	W	D	post	Domestic	Middle	SP 164 581
arch33	3	20	90	21	111	1559	1580	1580	1.68	1.35	2.09	1.62	6	Warw	Wilmcote	Palmers Farm	OX	0	0	W	D	stud	Domestic	Middle	SP 164 581
arch34	3	3	71	26	97	1553	1579	1580	0.95	0.84	0.89	0.92	6	Warw	Wilmcote	Palmers Farm	OX	0	0	W	D	Plate	Domestic	Middle	SP 164 581
arch35	3	15	70	15	85	1565	1580	1580	1.75	2.00	2.79	1.79	6	Warw	Wilmcote	Palmers Farm	OX	0	0	W	A	stud	Domestic	Middle	SP 164 581
ptc1	1		86	17	103	1662	1679	1679	1.58	0.82	0.90	1.45	6	Warw	Wilmcote	Pear Tree Cottage	OX	2	0	W	D		Domestic	Low	SP 164 580
lai1	1	15	50	27	77	1438	1465	1465	2.31	1.18	1.97	1.91	3	Wilts	Latton	Church	OX	0	0	Sp	D		Church	Middle	SU 093 958
lai8	1	0	53	19	72	1445	1464	1465	2.16	1.31	1.63	1.93	3	Wilts	Latton	Church	OX	0	0	Su	D		Church	Middle	SU 093 958
sax16	1	30	54	31	85	1456	1487	1487	1.34	0.90	1.42	1.18	3	Wilts	Malmesbury	Saxon House, 37-41 High Stfreet	OX	0	0	Sp	D		Domestic	Middle	ST 932 870
wil6	1		55	20	75	1580	1600	1600	2.00	1.15	1.32	1.77	3	Wilts	Newton Tony	Wilbury House	OX	0	0	Sp	E		Domestic	Middle	SU 222 414
ewp1	2	1	95	23	118	1377	1400	1600	1.92	1.02	1.03	1.74	3	Wilts	Potterne	Eastwell House	OX	0	0	Su	E		Domestic	Gentry	ST 992 579
ewp10	2	1	40	34	74	1546	1580	1580	2.69	0.35	1.49	1.62	3	Wilts	Potterne	Eastwell House	OX	0	0	W	E		Domestic	Gentry	ST 992 579
ewp11	1	5	22	33	55	1719	1752	1755	1.74	0.95	1.46	1.27	3	Wilts	Potterne	Eastwell House	OX	0	0	W	D		Domestic	Gentry	ST 992 579
ewp123	2	30	67	16	83	1564	1580	0	1.34	1.19	1.13	1.31	3	Wilts	Potterne	Eastwell House	OX	2	2	Su	E		Domestic	Gentry	ST 992 579
ewp16	2	30	63	16	79	1564	1580	0	2.20	1.65	1.19	2.09	3	Wilts	Potterne	Eastwell House	OX	0	0	Su	E		Domestic	Gentry	ST 992 579
ewp17	1	5	55	10	65	1749	1759	1755	1.60	1.11	1.32	1.53	3	Wilts	Potterne	Eastwell House	OX	2	3	W	D		Domestic	Gentry	ST 992 579
ewp18	2	30	46	23	69	1557	1580	0	1.57	0.87	1.13	1.33	3	Wilts	Potterne	Eastwell House	OX	0	0	Su	E		Domestic	Gentry	ST 992 579
ewp20	2	30	41	18	59	1562	1580	0	1.65	1.60	2.38	1.63	3	Wilts	Potterne	Eastwell House	OX	2	0	Su	E		Domestic	Gentry	ST 992 579
ewp22	2	30	43	21	64	1559	1580	0	1.37	0.91	0.76	1.22	3	Wilts	Potterne	Eastwell House	OX	0	0	Su	E		Domestic	Gentry	ST 992 579
ewp4	2	5	43	13	56	1567	1580	0	3.52	2.51	2.53	3.29	3	Wilts	Potterne	Eastwell House	OX	0	0	Sp	E		Domestic	Gentry	ST 992 579
bps22	1	20	70	28	98	1287	1315	1315	1.60	1.24	1.48	1.50	3	Wilts	Salisbury	Bishop's Palace	OX	5	2	W	D	brace	Church	Gentry	SU 144 294
bps28	7		92	20	112	1730	1750	1750	2.57	2.16	2.50	2.50	3	Wilts	Salisbury	Bishop's Palace	OX	0	0	Su	E	beam	Church	Gentry	SU 144 294
bps29	7		54	13	67	1737	1750	1750	2.26	2.02	1.86	2.21	3	Wilts	Salisbury	Bishop's Palace	OX	2	0	Su	E		Church	Gentry	SU 144 294
bps30	6	5	106	14	120	1721	1735	1735	1.52	1.92	1.49	1.57	3	Wilts	Salisbury	Bishop's Palace	OX	2	0	W	D	Plate	Church	Gentry	SU 144 294
bps33	5	15	75	25	100	1637	1662	1662	1.65	0.85	1.10	1.45	3	Wilts	Salisbury	Bishop's Palace	OX	2	3	Su	D	purlin	Church	Gentry	SU 144 294
bps35	6	5	86	23	109	1712	1735	1736	2.04	1.04	1.46	1.83	3	Wilts	Salisbury	Bishop's Palace	OX	0	0	W	D	Principal	Church	Gentry	SU 144 294
bps37	6	1	79	36	115	1700	1736	1736	1.60	0.55	0.46	1.27	3	Wilts	Salisbury	Bishop's Palace	OX	0	0	Sp	D	Principal	Church	Gentry	SU 144 294
bps39	5	10	64	28	92	1633	1661	1662	2.04	1.19	1.50	1.78	3	Wilts	Salisbury	Bishop's Palace	OX	0	0	W	D	purlin	Church	Gentry	SU 144 294
bps4	4		96	24	120	1546	1570	1570	0.90	0.92	0.80	0.91	3	Wilts	Salisbury	Bishop's Palace	OX	0	0	Sp	D	rafter	Church	Gentry	SU 144 294
bps45	3		119	22	141	1519	1541	1541	1.88	1.12	1.23	1.76	3	Wilts	Salisbury	Bishop's Palace	OX	3	1	Su	D	tiebeam	Church	Gentry	SU 144 294
bps5	2	15	118	33	151	1487	1520	1520	1.00	0.67	0.65	0.93	3	Wilts	Salisbury	Bishop's Palace	OX	0	0	Sp	D	rafter	Church	Gentry	SU 144 294
bps6	2		144	31	175	1488	1519	1520	1.04	0.67	0.70	0.97	3	Wilts	Salisbury	Bishop's Palace	OX	0	0	Sp	D	rafter	Church	Gentry	SU 144 294
sarum5a	4	10	77	27	104	1635	1662	1663	2.10	1.00	1.05	1.82	3	Wilts	Salisbury	Salisbury Cathedral	OX	9	10	Sp	D	misc	Church	Monastic	SU 144 294
sarum5b	4		60	24	84	1638	1662	1663	1.50	1.20	1.42	1.42	3	Wilts	Salisbury	Salisbury Cathedral	OX	3	5	W	D	board	Church	Monastic	SU 144 294
sarum5c	4		61	27	88	1636	1663	1663	1.91	0.73	1.32	1.55	3	Wilts	Salisbury	Salisbury Cathedral	OX	4	7	Sp	D	board	Church	Monastic	SU 144 294
sarum5d	4		45	28	73	1632	1660	1663	2.20	1.38	1.40	1.89	3	Wilts	Salisbury	Salisbury Cathedral	OX	6	16	W	D	board	Church	Monastic	SU 144 294
sarum6	5		52	13	65	1656	1669	1669	1.89	1.29	2.15	1.77	3	Wilts	Salisbury	Salisbury Cathedral	OX	2	0	Sp	D	board	Church	Monastic	SU 144 294
scec11	1	5	52	21	73	1201	1222	1222	1.69	1.32	1.19	1.58	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	W	A	stud	Church	Monastic	SU 144 294
sc168	6		15	22	37	1714	1736	1736	1.92	1.96	0.72	1.95	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Sp	D	board	Church	Monastic	SU 144 294
sc176	4		9	18	27	1643	1661	1663	1.80	1.97	1.76	1.92	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	W	D	board	Church	Monastic	SU 144 294
sc185	4		22	23	45	1639	1662	1663	1.12	0.68	1.80	0.89	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Sp	A	board	Church	Monastic	SU 144 294
sc18992	6		49	15	64	1721	1736	1736	1.73	1.78	1.08	1.74	3	Wilts	Salisbury	Salisbury Cathedral	OX	2	14	Sp	D	board	Church	Monastic	SU 144 294
sc190	6		23	23	46	1713	1736	1736	1.41	1.38	1.34	1.39	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Sp	D	board	Church	Monastic	SU 144 294
sc191	6		31	20	51	1716	1736	1736	1.10	1.67	1.19	1.32	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Sp	D	board	Church	Monastic	SU 144 294
sc193	6		30	14	44	1722	1736	1736	1.19	2.25	1.06	1.53	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Sp	D	board	Church	Monastic	SU 144 294
sc196100	3	20	29	19	48	1731	1750	0	3.33	2.33	1.49	2.93	3	Wilts	Salisbury	Salisbury Cathedral	OX	5	2	Sp	E	board	Church	Monastic	SU 144 294
scmt05	2	20	95	19	114	1235	1254	1254	1.40	1.09	3.49	1.35	3	Wilts	Salisbury	Salisbury Cathedral	OX	4	11	W	D	misc	Church	Monastic	SU 144 294

Code	Phase	Pith	H Wd	S Wd	Rings	H S hdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	Date Type	Member	Type	Status	NGR
scnt24	3	20	68	17	85	1733	1750	0	1.87	1.65	1.14	1.83	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Sp	E	misc	Church	Monastic	SU 144 294
scnt35	4	10	58	23	81	1639	1662	1663	1.70	0.93	1.62	1.48	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Sp	D	misc	Church	Monastic	SU 144 294
scnt42	7	20	46	24	70	1212	1236	0	2.10	1.15	0.93	1.77	3	Wilts	Salisbury	Salisbury Cathedral	OX	3	4	Su	D	rafter	Church	Monastic	SU 144 294
scnt436	2	20	57	23	80	1228	1251	1254	2.27	0.93	1.46	1.88	3	Wilts	Salisbury	Salisbury Cathedral	OX	2	1	W	D	rafter	Church	Monastic	SU 144 294
scnt47ii	2	47	50	32	82	1219	1251	1254	0.91	0.66	1.58	0.81	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Su	A	brace	Church	Monastic	SU 144 294
scnt49	2	15	25	19	44	1232	1251	1254	2.28	1.43	0.94	1.91	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	W	A	stud	Church	Monastic	SU 144 294
scnt51	3		72	17	89	1733	1750	0	1.32	0.89	1.50	1.24	3	Wilts	Salisbury	Salisbury Cathedral	OX	0	0	Su	E	misc	Church	Monastic	SU 144 294
chu1	1		69	22	91	1554	1576	1576	1.98	1.02	1.11	1.74	3	Wilts	Upper Chute	Gable End	OX	0	0	Su	A		Agricultural	Low	SU 429 153
chu1011	1	1	40	20	60	1556	1576	1576	2.20	1.47	2.02	1.96	3	Wilts	Upper Chute	Gable End	OX	2	2	W	A		Agricultural	Low	SU 429 153
chu2	1	3	83	22	105	1554	1576	1576	1.54	1.45	1.40	1.52	3	Wilts	Upper Chute	Gable End	OX	0	0	W	D		Agricultural	Low	SU 429 153
chu3	1		74	19	93	1557	1576	1576	2.34	2.00	2.13	2.27	3	Wilts	Upper Chute	Gable End	OX	0	0	W	D		Agricultural	Low	SU 429 153
chu5b	1		46	34	80	1542	1576	1576	1.35	0.48	0.64	0.98	3	Wilts	Upper Chute	Gable End	OX	0	0	W	A		Agricultural	Low	SU 429 153
chu67	1	5	80	22	102	1554	1576	1576	1.92	1.37	1.17	1.80	3	Wilts	Upper Chute	Gable End	OX	2	4	Sp	D		Agricultural	Low	SU 429 153
wlsf2	1	25	109	18	127	1290	1308	1308	1.76	1.07	1.13	1.66	3	Wilts	Wilsford	18 Wilsford	OX		0	W	D	collar	Domestic	Low	SU 100 571
wlsf3	1	25	73	18	91	1290	1308	1308	1.82	1.93	1.26	1.84	3	Wilts	Wilsford	18 Wilsford	OX	2		Su	D	brace	Domestic	Low	SU 100 571
wlsf4	1	30	99	23	122	1285	1308	1308	1.96	0.78	2.72	1.73	3	Wilts	Wilsford	18 Wilsford	OX			Su	A	misc	Domestic	Low	SU 100 571
wh02m	1		62	34	96	1602	1636	1636	1.89	0.83	0.71	1.51	3	Wilts	Wilton	Wilton House	SH	0	0	Su	D				SU 100 320
wh04	1		71	15	86	1621	1636	1636	1.43	0.95	1.43	1.35	3	Wilts	Wilton	Wilton House	SH	0	0		A				SU 100 320
wh10	1		66	20	86	1615	1635	1636	1.44	0.79	0.96	1.29	3	Wilts	Wilton	Wilton House	SH	0	0	W	D				SU 100 320
bay12	1	5	105	27	132	1482	1509	1509	0.30	0.26	0.29	0.29	6	Worcs	Bayton	Old School House	MB	0	0	W	D				SO 692 733
bay23	1		53	15	68	1494	1509	1509	0.69	0.63	1.00	0.68	6	Worcs	Bayton	Old School House	MB	0	0	W	D	cruck			SO 692 733
bay39a	1		47	23	70	1486	1509	1509	0.56	0.42	0.63	0.51	6	Worcs	Bayton	Old School House	MB	0	0	W	D	joist			SO 692 733
glb1	1	10	74	25	99	1600	1625	1625	2.83	1.18	1.83	2.42	6	Worcs	Bransford	Gilberts Farm	OX	0	0	W	A		Domestic	Low	SO 801 519
glb2	1	15	50	6	56	1619	1625	1625	2.69	2.85	1.34	2.71	6	Worcs	Bransford	Gilberts Farm	OX	0	0	Sp	A		Domestic	Low	SO 801 519
glb4	1	4	61	34	95	1591	1625	1625	0.93	0.54	0.67	0.79	6	Worcs	Bransford	Gilberts Farm	OX	2	22	Sp	D		Domestic	Low	SO 801 519
glb5	1	4	70	42	112	1583	1625	1625	0.72	0.52	0.52	0.64	6	Worcs	Bransford	Gilberts Farm	OX	2	2	Sp	D		Domestic	Low	SO 801 519
ccb09	1	10	43	32	75	1557	1589	1589	3.01	0.98	2.18	2.14	6	Worcs	Crowle	Crowle Court Barn	SH	0	0	W	D				SO 921 559
ifd2	1	30	135	20	155	1593	1613	1613	0.94	0.75	0.26	0.92	6	Worcs	Doddershill	Impney Farm	OX	0	0	Su	D		Domestic	Low	SO 906 767
dr1055	1	1	47	11	58	1639	1650	1650	1.84	2.34	1.92	1.94	6	Worcs	Droitwich	Upwich	SH	0	0	W	E				SO 901 635
dr1201	1	1	21	9	30	1641	1650	1650	2.85	2.14	2.91	2.63	6	Worcs	Droitwich	Upwich	SH	0	0	W	E				SO 901 635
bce01	1		62	16	78	1562	1578	1578	1.35	1.16	0.89	1.31	6	Worcs	Elmbridge	Badge Court	MB	0	0	Sp	A				SO 905 699
bce10	1		84	45	129	1533	1578	1578	1.33	1.18	1.00	1.28	6	Worcs	Elmbridge	Badge Court	MB	0	0	Sp	A				SO 905 699
bce22	1		95	32	127	1546	1578	1578	1.09	0.66	0.76	0.98	6	Worcs	Elmbridge	Badge Court	MB	0	0	Sp	D				SO 905 699
wsn03	1		84	24	108	1474	1498	1498	1.34	0.82	0.82	1.22	6	Worcs	Warndon	St Nicholas	SH	0	0	W	D				SO 887 568
wsn04	1		52	23	75	1474	1497	1498	1.28	1.35	1.42	1.30	6	Worcs	Warndon	St Nicholas	SH	0	0	W	D				SO 887 568
wsn05	1		41	32	73	1465	1497	1498	1.71	0.86	1.41	1.33	6	Worcs	Warndon	St Nicholas	SH	0	0	W	D				SO 887 568
wsn07	1		32	26	58	1472	1498	1498	1.16	1.15	1.42	1.16	6	Worcs	Warndon	St Nicholas	SH	0	0	W	A				SO 887 568
wsn09	1		10	21	31	1477	1498	1498	1.55	1.55	1.55	1.55	6	Worcs	Warndon	St Nicholas	SH	0	0	W	A				SO 887 568
WOR-B28B	4		127	14	141	1639	1653	1653	1.20	1.26	1.04	1.21	6	Worcs	Worcester	Cathedral	NT	0	0		D	beam			SO 850 545
WOR-B30A	3		47	17	64	1707	1724	1724	2.01	1.47	1.46	1.87	6	Worcs	Worcester	Cathedral	NT	0	0		D	post			SO 850 545
WOR-B42B	5		67	28	95	1698	1726	1726	1.74	1.17	1.34	1.57	6	Worcs	Worcester	Cathedral	NT	0	0		D	post			SO 850 545
WOR-B44A	5		48	24	72	1701	1725	1726	0.97	0.99	0.98	0.98	6	Worcs	Worcester	Cathedral	NT	0	0		D	rafter			SO 850 545
WOR-C02B	1		53	16	69	1711	1727	1727	3.28	2.78	2.69	3.16	6	Worcs	Worcester	Cathedral	NT	0	0		D	principal			SO 850 545
WOR-C04A	1		46	28	74	1699	1727	1727	3.54	1.87	2.50	2.91	6	Worcs	Worcester	Cathedral	NT	0	0		D	principal			SO 850 545
WOR-C13B	2		223	17	240	1712	1729	1729	0.67	0.49	0.36	0.65	6	Worcs	Worcester	Cathedral	NT	0	0		A	beam			SO 850 545
WOR-C14A	2		39	28	67	1701	1729	1729	1.35	1.00	1.28	1.21	6	Worcs	Worcester	Cathedral	NT	0	0		D	post			SO 850 545

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
WOR-C23B	4		191	19	210	1633	1652	1653	0.85	0.62	0.52	0.83	6	Worcs	Worcester	Cathedral	NT	0	0		D	beam			SO 850 545
WOR-C24A	4		167	26	193	1624	1650	1653	0.67	0.39	0.35	0.63	6	Worcs	Worcester	Cathedral	NT	0	0		D	stud			SO 850 545
WOR-E82A	1		39	20	59	1705	1725	1727	2.72	2.26	2.25	2.56	6	Worcs	Worcester	Cathedral	NT	0	0		D	principal			SO 850 545
WORC101A	1		34	19	53	1727	1746	1746	3.56	2.80	2.82	3.29	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	purlin			SO 850 545
WORC102A	1		49	16	65	1727	1743	1746	2.47	2.08	1.75	2.37	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	tiebeam			SO 850 545
WORC104A	1		38	19	57	1724	1743	1746	3.13	1.82	1.99	2.69	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	purlin			SO 850 545
WORC105A	1		53	24	77	1719	1743	1746	2.62	1.14	2.06	2.16	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	purlin			SO 850 545
WORC109A	1		82	24	106	1722	1746	1746	1.52	1.19	0.94	1.45	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		A	rafter			SO 850 545
WORC111A	1		48	22	70	1721	1743	1746	2.85	1.11	1.97	2.30	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	purlin			SO 850 545
WORC128A	2		40	22	62	1721	1743	1746	2.36	1.88	2.56	2.19	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	rafter			SO 850 545
WORC129A	2		35	19	54	1727	1746	1746	3.49	1.60	2.91	2.82	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	rafter			SO 850 545
WORC130A	2		29	16	45	1730	1746	1746	3.44	2.37	3.26	3.06	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	rafter			SO 850 545
WORC131A	2		23	15	38	1731	1746	1746	4.55	3.06	4.15	3.96	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		A	rafter			SO 850 545
WORC132A	2		29	16	45	1730	1746	1746	3.64	2.20	3.28	3.13	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	rafter			SO 850 545
WORC144A	3		60	20	80	1752	1772	1772	2.39	2.78	2.45	2.49	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	purlin			SO 850 545
WORC145A	3		64	18	82	1754	1772	1772	2.79	2.24	2.07	2.67	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	post			SO 850 545
WORC146A	3		77	23	100	1749	1772	1772	1.79	1.47	1.81	1.72	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	principal			SO 850 545
WORC148A	3		49	18	67	1754	1772	1772	2.53	1.86	2.08	2.35	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		A	stud			SO 850 545
WORC151A	3		44	20	64	1752	1772	1772	2.55	1.18	1.58	2.12	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	rafter			SO 850 545
WORC153A	3		37	17	54	1755	1772	1772	2.51	1.86	2.27	2.31	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	rafter			SO 850 545
WORC173	3		37	20	57	1752	1772	1772	2.06	1.94	1.83	2.02	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		A	rafter			SO 850 545
WORC174A	3		52	12	64	1760	1772	1772	0.90	2.10	1.47	1.13	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		A	rafter			SO 850 545
WORC186A	3		42	12	54	1760	1772	1772	2.48	2.61	2.72	2.51	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		A	post			SO 850 545
WORC188A	4		46	16	62	1726	1742	1742	2.99	1.79	1.56	2.68	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	principal			SO 850 545
WORC192A	4		85	13	98	1714	1727	1742	1.02	1.67	1.75	1.11	6	Worcs	Worcester	Worcester Cathedral	NT	0	0		D	brace			SO 850 545
pb04	1	10	122	28	150	1959	1987	1987	1.24	0.46	0.47	1.10	7	Yorks	Sheffield	Porter Brook	SH	0	0		D				SK 300 848
pb08	1	10	111	37	148	1950	1987	1987	1.41	0.47	0.56	1.18	7	Yorks	Sheffield	Porter Brook	SH	0	0		D				SK 300 848
pb09	1		110	24	134	1963	1987	1987	1.17	1.82	1.25	1.28	7	Yorks	Sheffield	Porter Brook	SH	0	0		D				SK 300 848
bret01	1		49	14	63	1970	1984	1984	0.86	1.74	1.74	1.06	7	Yorks	Wakefield	Bretton Lakes	SH	0	0		D				SE 281 124
bret03	1	1	95	17	112	1967	1984	1984	1.28	1.58	1.15	1.32	7	Yorks	Wakefield	Bretton Lakes	SH	0	0		D				SE 281 124
bret04	1	10	91	21	112	1963	1984	1984	0.94	0.76	0.54	0.91	7	Yorks	Wakefield	Bretton Lakes	SH	0	0		D				SE 281 124
bret05	1		74	22	96	1962	1984	1984	0.76	0.79	0.69	0.77	7	Yorks	Wakefield	Bretton Lakes	SH	0	0		D				SE 281 124
bret10	1		63	30	93	1954	1984	1984	1.34	0.84	0.48	1.18	7	Yorks	Wakefield	Bretton Lakes	SH	0	0		D				SE 281 124
bret15	1	1	63	40	103	1944	1984	1984	1.49	0.43	0.83	1.08	7	Yorks	Wakefield	Bretton Lakes	SH	0	0		D				SE 281 124
qhy028	1	1	47	8	55	1023	1031	1031	2.11	2.74	2.16	2.21	7	Yorks	York	Queens Hotel	SH	0	0	Su	A				SE 600 520
qhy113	1	1	21	27	48	1004	1031	1031	3.03	1.87	3.11	2.38	7	Yorks	York	Queens Hotel	SH	0	0	Sp	A				SE 600 520
qhy272	1		47	22	69	1009	1031	1031	4.10	3.15	3.56	3.80	7	Yorks	York	Queens Hotel	SH	0	0	W	D				SE 600 520
qhy273	1		44	10	54	1021	1031	1031	3.75	2.78	3.24	3.57	7	Yorks	York	Queens Hotel	SH	0	0	W	D				SE 600 520
tr013	1	5	21	12	33	188	200	200	2.15	1.84	1.83	2.04	7	Yorks	York	Tanner Row	SH	0	0		E				SE 600 520
tr023	1		37	16	53	184	200	200	3.91	2.31	3.14	3.43	7	Yorks	York	Tanner Row	SH	0	0		E				SE 600 520
tr051	1	5	29	12	41	188	200	200	3.81	2.33	2.83	3.37	7	Yorks	York	Tanner Row	SH	0	0		E				SE 600 520
tr061	1	5	24	13	37	187	200	200	2.29	1.56	2.09	2.03	7	Yorks	York	Tanner Row	SH	0	0		E				SE 600 520
tr062	1		35	15	50	185	200	200	2.24	1.57	1.91	2.04	7	Yorks	York	Tanner Row	SH	0	0		E				SE 600 520
tr200	1	5	21	13	34	187	200	200	2.31	1.78	1.95	2.11	7	Yorks	York	Tanner Row	SH	0	0		E				SE 600 520
broc01	1	1	45	14	59	1970	1984	1984	1.79	1.35	1.11	1.68	7	Yorks		Brockadale	SH	0	0		D				SE 507 168
broc03	1	10	42	14	56	1970	1984	1984	2.08	1.56	1.75	1.95	7	Yorks		Brockadale	SH	0	0		D				SE 507 168

Code	Phase	Path	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
broc04	1	1	117	24	141	1960	1984	1984	0.82	1.11	0.94	0.87	7	Yorks		Brockadale	SH	0	0		D				SE 507 168
broc06	1		44	9	53	1975	1984	1984	2.46	3.72	1.87	2.67	7	Yorks		Brockadale	SH	0	0		D				SE 507 168
broc07	1		29	29	58	1955	1984	1984	2.94	0.92	2.16	1.93	7	Yorks		Brockadale	SH	0	0		D				SE 507 168
broc08	1	1	46	15	61	1969	1984	1984	2.68	1.89	2.15	2.48	7	Yorks		Brockadale	SH	0	0		D				SE 507 168
broc09	1		29	19	48	1965	1984	1984	2.22	1.60	1.20	1.97	7	Yorks		Brockadale	SH	0	0		D				SE 507 168
ab456m	1		74	60	134	-2560	-2500	-2878	0.62	0.53	0.86	0.58	10	WALES	Abercynafon	Abercynafon	SH	0	0		E				SO 076 173
aber660	1	1	29	70	99	-2948	-2878	-2878	0.54	0.59	0.45	0.58	10	WALES	Abercynafon	Abercynafon	SH	0	0	W	D				SO 076 173
aber855	1	1	82	28	110	-2528	-2500	-2878	0.99	0.90	0.98	0.97	10	WALES	Abercynafon	Abercynafon	SH	0	0	W	E				SO 076 173
aber858	1		137	41	178	-2541	-2500	-2878	0.74	0.53	0.83	0.70	10	WALES	Abercynafon	Abercynafon	SH	0	0	W	E				SO 076 173
aber885m	1	1	97	44	141	-2544	-2500	-2878	0.65	0.50	0.51	0.61	10	WALES	Abercynafon	Abercynafon	SH	0	0		E				SO 076 173
bre1		10	89	30	119	1481	1511	1511	1.60	0.84	0.91	1.41	10	WALES	Brecon	Brecon Cathedral	OX	0	0	W	A		Church	Monastic	SO 044 289
bre2		5	43	22	65	1489	1511	1511	1.89	1.11	1.19	1.63	10	WALES	Brecon	Brecon Cathedral	OX	0	0	W	A		Church	Monastic	SO 044 289
bre3		5	60	26	86	1485	1511	1511	1.71	1.73	1.41	1.72	10	WALES	Brecon	Brecon Cathedral	OX	0	0	Sp	A		Church	Monastic	SO 044 289
bre4		2	62	24	86	1487	1511	1511	1.99	1.07	1.47	1.73	10	WALES	Brecon	Brecon Cathedral	OX	0	0	W	D		Church	Monastic	SO 044 289
bre5		5	48	21	69	1490	1511	1511	1.86	0.80	0.79	1.54	10	WALES	Brecon	Brecon Cathedral	OX	0	0	W	D		Church	Monastic	SO 044 289
tm1	1		36	19	55	1441	1460	1460	3.13	2.48	2.58	2.91	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	Sp	D	misc	Domestic	Middle	SJ 173 043
tm11	2		152	19	171	1575	1594	1594	1.47	1.41	1.24	1.46	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	Sp	D	beam	Domestic	Middle	SJ 173 043
tm12	2		34	26	60	1568	1594	1594	1.75	1.15	1.83	1.49	10	WALES	Castell Caereinion	Ty Mawr	OX	2	2	W	A	beam	Domestic	Middle	SJ 173 043
tm13	2		68	23	91	1571	1594	1594	1.12	1.18	1.12	1.14	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	A	joist	Domestic	Middle	SJ 173 043
tm15	2		84	19	103	1574	1593	1594	1.24	1.43	1.26	1.27	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	Su	D	joist	Domestic	Middle	SJ 173 043
tm16	2	1	66	32	98	1562	1594	1594	1.19	0.70	1.14	1.03	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	A	beam	Domestic	Middle	SJ 173 043
tm17	2		55	24	79	1570	1594	1594	1.86	1.34	2.82	1.70	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	A	post	Domestic	Middle	SJ 173 043
tm18	2		60	42	102	1552	1594	1594	2.24	0.61	1.08	1.56	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	A	post	Domestic	Middle	SJ 173 043
tm2	1		68	24	92	1436	1460	1460	4.54	1.75	3.46	3.81	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	Sp	D	misc	Domestic	Middle	SJ 173 043
tm22	3	1	86	23	109	1607	1630	1630	1.74	0.66	0.76	1.51	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	D	beam	Domestic	Middle	SJ 173 043
tm23	3		48	14	62	1616	1630	1630	1.06	1.19	1.31	1.09	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	A	post	Domestic	Middle	SJ 173 043
tm24	3		55	32	87	1598	1630	1630	1.41	0.36	0.77	1.02	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	D	stud	Domestic	Middle	SJ 173 043
tm3	1	1	23	12	35	1446	1458	1460	4.76	4.68	4.00	4.73	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	Su	A	collar	Domestic	Middle	SJ 173 043
tm31	4	10	41	14	55	1794	1808	1808	2.54	1.36	2.65	2.24	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	A	misc	Domestic	Middle	SJ 173 043
tm32	4	1	81	21	102	1787	1808	1808	1.23	1.03	1.09	1.19	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	D	purlin	Domestic	Middle	SJ 173 043
tm33	4	1	98	28	126	1780	1808	1808	0.73	1.03	0.29	0.80	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	A	brace	Domestic	Middle	SJ 173 043
tm34	4	1	62	23	85	1785	1808	1808	1.23	1.55	1.51	1.32	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	D	purlin	Domestic	Middle	SJ 173 043
tm35	4	1	64	25	89	1783	1808	1808	2.06	0.91	1.08	1.74	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	D	misc	Domestic	Middle	SJ 173 043
tm36	4	5	55	29	84	1779	1808	1808	1.89	0.83	0.80	1.52	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	W	D	misc	Domestic	Middle	SJ 173 043
tm4	1		44	10	54	1448	1458	1460	3.09	1.23	4.15	2.75	10	WALES	Castell Caereinion	Ty Mawr	OX	0	0	Su	D	collar	Domestic	Middle	SJ 173 043
ach1	1	1	29	14	43	1406	1420	1420	3.85	2.55	4.99	3.43	10	WALES	Conwy	Aberconwy House	OX	0	0	Sp	D	joist	Domestic	Middle	SH 782 776
ach10	1	1	46	18	64	1400	1418	1420	2.15	3.21	1.71	2.45	10	WALES	Conwy	Aberconwy House	OX	3	4	W	D	joist	Domestic	Middle	SH 782 776
ach13	1	3	23	8	31	1410	1418	1420	4.47	3.81	4.85	4.30	10	WALES	Conwy	Aberconwy House	OX	0	0	W	D	joist	Domestic	Middle	SH 782 776
ach2	1	5	22	15	37	1402	1417	1420	2.53	1.85	2.63	2.25	10	WALES	Conwy	Aberconwy House	OX	0	0	W	D	joist	Domestic	Middle	SH 782 776
ach3	1	1	41	14	55	1404	1418	1420	4.83	3.21	4.75	4.41	10	WALES	Conwy	Aberconwy House	OX	0	0	W	D	beam	Domestic	Middle	SH 782 776
ach4	1	1	39	20	59	1400	1420	1420	2.35	1.95	2.58	2.21	10	WALES	Conwy	Aberconwy House	OX	0	0	Su	A	joist	Domestic	Middle	SH 782 776
ach5	1	5	11	10	21	1407	1417	1420	4.25	3.79	4.23	4.03	10	WALES	Conwy	Aberconwy House	OX	0	0	W	D	joist	Domestic	Middle	SH 782 776
ach6	1	5	44	14	58	1404	1418	1420	4.13	2.87	3.40	3.83	10	WALES	Conwy	Aberconwy House	OX	0	0	W	D	beam	Domestic	Middle	SH 782 776
ach8	1	1	36	13	49	1405	1418	1420	3.12	1.93	2.53	2.80	10	WALES	Conwy	Aberconwy House	OX	2	2	W	D	beam	Domestic	Middle	SH 782 776
ach9	1	1	41	15	56	1403	1418	1420	3.51	1.88	2.23	3.08	10	WALES	Conwy	Aberconwy House	OX	2	0	W	D	beam	Domestic	Middle	SH 782 776
g016	2	4	26	11	37	1574	1585	1585	2.60	2.77	3.20	2.65	10	WALES	Conwy	Plas Mawr	OX	0	0	Sp	E		Domestic	Gentry	SH 780 776

Code	Phase	Pith	H'Wd	S'Wd	Rings	H'S bdy	LMR Date	Phase	H'Wd MRW	S'Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
g063	2		16	18	34	1567	1585	1585	2.68	1.39	3.08	2.00	10	WALES	Conwy	Plas Mawr	OX	0	0	Sp	E		Domestic	Gentry	SH 780 776
g085	2	20	37	24	61	1561	1585	1585	2.25	1.46	1.66	1.94	10	WALES	Conwy	Plas Mawr	OX	0	0	Sp	E		Domestic	Gentry	SH 780 776
g0956	2	4	76	35	111	1550	1585	1585	1.07	0.82	1.02	0.99	10	WALES	Conwy	Plas Mawr	OX	2	5	Sp	E		Domestic	Gentry	SH 780 776
pmh123	1	0	90	23	113	1555	1578	1578	1.39	1.16	1.38	1.34	10	WALES	Conwy	Plas Mawr	OX	0	0	W	D		Domestic	Gentry	SH 780 776
pmh124	1	0	110	39	149	1539	1578	1578	2.15	0.76	1.59	1.79	10	WALES	Conwy	Plas Mawr	OX	0	0	Sp	A		Domestic	Gentry	SH 780 776
pmh1b	1		85	20	105	1555	1575	1578	1.08	0.94	1.06	1.06	10	WALES	Conwy	Plas Mawr	OX	0	0	W	D		Domestic	Gentry	SH 780 776
pmh2	1		103	30	133	1548	1578	1578	1.49	0.91	0.97	1.36	10	WALES	Conwy	Plas Mawr	OX	0	0	Su	D		Domestic	Gentry	SH 780 776
pmh4	1		68	39	107	1538	1577	1578	1.75	0.77	1.46	1.39	10	WALES	Conwy	Plas Mawr	OX	0	0	Su	D		Domestic	Gentry	SH 780 776
pmh5	1	5	88	27	115	1547	1574	1578	1.29	0.78	0.93	1.17	10	WALES	Conwy	Plas Mawr	OX	0	0	Sp	D		Domestic	Gentry	SH 780 776
pmh6	1	10	96	27	123	1549	1576	1578	1.48	0.49	0.42	1.26	10	WALES	Conwy	Plas Mawr	OX	0	0	Su	D		Domestic	Gentry	SH 780 776
uhd2	1	15	94	62	156	1469	1531	1536	1.41	0.56	0.89	1.08	10	WALES	Discoed	Upper House	OX	2	2	W	D		Domestic	Middle	SO 276 647
uhd3	1	10	38	25	63	1511	1536	1536	1.94	1.28	1.89	1.68	10	WALES	Discoed	Upper House	OX	0	0	Sp	D		Domestic	Middle	SO 276 647
eln1	1	10	78	16	94	1484	1500	1500	2.00	2.79	2.81	2.13	10	WALES	Elan Valley, Brecs	Llannerch-y-cawr	OX	0	0	Sp	E		Domestic	Middle	SN 902 614
eln2	1	30	57	16	73	1484	1500	1500	2.10	1.59	1.57	1.99	10	WALES	Elan Valley, Brecs	Llannerch-y-cawr	OX	0	0	Sp	E		Domestic	Middle	SN 902 614
eln35	1	25	65	19	84	1481	1500	1500	1.32	1.10	0.96	1.27	10	WALES	Elan Valley, Brecs	Llannerch-y-cawr	OX	0	0	W	E		Domestic	Middle	SN 902 614
eln4	1	2	28	15	43	1485	1500	1500	1.79	2.25	2.39	1.95	10	WALES	Elan Valley, Brecs	Llannerch-y-cawr	OX	0	0	W	E		Domestic	Middle	SN 902 614
eln7	2	25	88	30	118	1529	1559	1559	1.21	0.99	0.88	1.15	10	WALES	Elan Valley, Brecs	Llannerch-y-cawr	OX	0	0	W	D		Domestic	Middle	SN 902 614
brfa1	1	10	61	20	81	1467	1487	1487	1.68	1.13	1.36	1.54	10	WALES	Evenjobb	Old Burfa	OX	0	0	W	D		Domestic	Middle	SO 279 613
brfa3	2	3	88	32	120	1470	1502	1502	1.51	0.91	0.85	1.35	10	WALES	Evenjobb	Old Burfa	OX	2	2	Sp	D		Domestic	Middle	SO 279 613
brfa6	2		82	38	120	1464	1502	1502	1.84	0.82	1.17	1.51	10	WALES	Evenjobb	Old Burfa	OX	0	0	W	A		Domestic	Middle	SO 279 613
brfa7	3		111	27	138	1617	1644	1643	1.23	1.32	1.14	1.25	10	WALES	Evenjobb	Old Burfa	OX	0	0	W	D		Domestic	Middle	SO 279 613
brfa9	3	2	139	17	156	1627	1644	1643	1.12	1.32	2.44	1.14	10	WALES	Evenjobb	Old Burfa	OX	0	0	W	D		Domestic	Middle	SO 279 613
lhg1	1	20	107	28	135	1464	1492	1492	1.47	1.03	1.50	1.38	10	WALES	Gladestry, Rads	Lower Hengoed	OX	2	1	W	D		Domestic	Low	SO 266 533
gc7001	1		39	16	55	-289	-273	-271	1.61	1.96	1.88	1.71	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	Sp	D				ST 366 823
gc7009	1		49	13	62	-286	-273	-271	2.24	2.72	2.68	2.34	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	Sp	D				ST 366 823
gc7015	1		38	16	54	-289	-273	-271	2.14	2.53	2.02	2.25	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	Sp	D				ST 366 823
gc7026	1		51	18	69	-291	-273	-271	1.57	1.54	1.51	1.56	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	Sp	D				ST 366 823
gc7050	1		36	27	63	-298	-271	-271	1.22	1.27	1.15	1.24	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	Sp	D				ST 366 823
gc7083	1		40	15	55	-288	-273	-271	1.84	2.34	2.27	1.98	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	W	D				ST 366 823
gc7097	1		47	30	77	-301	-271	-271	1.28	1.05	0.82	1.19	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	Sp	D				ST 366 823
gc7105	1		48	14	62	-287	-273	-271	2.09	2.41	1.68	2.16	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	Sp	D				ST 366 823
gc7128	1		42	30	72	-301	-271	-271	1.42	1.08	1.24	1.28	10	Gwent	Goldcliff	Goldcliff bldg 6	SH	0	0	Sp	D				ST 366 823
rcw3	1	50	123	37	160	1533	1570	1572	1.29	0.56	1.20	1.12	10	WALES	Gwyddelwern	The Rose & Crown, Gwyddelwern	OX	0	0	W	D	rafter	Domestic	Middle	SJ 075 467
rcw5	1	35	103	13	116	1559	1572	1572	1.86	1.19	1.71	1.79	10	WALES	Gwyddelwern	The Rose & Crown, Gwyddelwern	OX	0	0	Su	D	post	Domestic	Middle	SJ 075 467
rcw7	1	10	91	11	102	1561	1572	1572	2.81	1.03	1.15	2.61	10	WALES	Gwyddelwern	The Rose & Crown, Gwyddelwern	OX	0	0	Sp	A	post	Domestic	Middle	SJ 075 467
tdm1	2	35	98	28	126	1613	1641	1641	1.12	0.52	0.46	0.99	10	WALES	Llanarmon	Ty-Draw, Mynydd Mawr, Denby	OX	3	1	Su	D		Domestic	Low	SJ 128 279
tdm10	1	5	27	12	39	1468	1480	1479	2.24	2.72	1.65	2.39	10	WALES	Llanarmon	Ty-Draw, Mynydd Mawr, Denby	OX	0	0	Su	A		Domestic	Low	SJ 128 279
tdm2	2	15	108	23	131	1619	1642	1641	1.33	0.65	0.58	1.21	10	WALES	Llanarmon	Ty-Draw, Mynydd Mawr, Denby	OX	0	0	W	D		Domestic	Low	SJ 128 279
tdm3	1	3	37	21	58	1459	1480	1479	3.21	1.90	2.49	2.73	10	WALES	Llanarmon	Ty-Draw, Mynydd Mawr, Denby	OX	0	0	W	D		Domestic	Low	SJ 128 279
tdm7	1	30	61	17	78	1460	1477	1479	2.12	3.17	2.18	2.35	10	WALES	Llanarmon	Ty-Draw, Mynydd Mawr, Denby	OX	2	9	Su	D		Domestic	Low	SJ 128 279
tdm9	1	30	40	23	63	1457	1480	1479	2.37	0.77	1.59	1.79	10	WALES	Llanarmon	Ty-Draw, Mynydd Mawr, Denby	OX	0	0	Su	A		Domestic	Low	SJ 128 279
bmr2	1	10	45	18	63	1606	1624	1624	2.73	1.22	2.79	2.30	10	WALES	Llandegley	Bailey Mawr	OX	0	0	W	E		Domestic	Low	SO 124 632
bmr3	1	10	16	10	26	1614	1624	1624	3.49	1.71	3.60	2.81	10	WALES	Llandegley	Bailey Mawr	OX	0	0	Su	E		Domestic	Low	SO 124 632
abr1	1	2	20	23	43	1427	1450	1450	2.36	1.15	1.70	1.71	10	WALES	Llandeilo	Aberdeunant, Llansadwrn	OX	0	0	W	E		Domestic	Low	SN 671 307
abr11	2	5	43	30	73	1764	1794	1796	2.20	0.75	1.11	1.61	10	WALES	Llandeilo	Aberdeunant, Llansadwrn	OX	2	1	W	D		Domestic	Low	SN 671 307
abr13	2	5	51	13	64	1781	1794	1796	2.51	1.21	1.93	2.25	10	WALES	Llandeilo	Aberdeunant, Llansadwrn	OX	0	0	Sp	D		Domestic	Low	SN 671 307

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
abr14	2		26	23	49	1771	1794	1796	2.94	2.10	3.33	2.55	10	WALES	Llandeilo	Aberdeunant, Llansadwrn	OX	0	0	W	D		Domestic	Low	SN 671 307
abr17	2	5	42	18	60	1778	1796	1796	3.51	2.32	2.08	3.15	10	WALES	Llandeilo	Aberdeunant, Llansadwrn	OX	0	0	Sp	D		Domestic	Low	SN 671 307
abr4b	1	5	32	19	51	1431	1450	1450	2.58	1.71	1.83	2.26	10	WALES	Llandeilo	Aberdeunant, Llansadwrn	OX	0	0	Sp	E		Domestic	Low	SN 671 307
abg1	1	10	56	14	70	1757	1771	1771	2.74	2.60	2.81	2.71	10	WALES	Llandeilo	Aberglasney House	OX	0	0	Sp	D		Domestic	Gentry	SN 581 221
abg2	1	1	70	12	82	1759	1771	1771	2.81	2.63	2.52	2.79	10	WALES	Llandeilo	Aberglasney House	OX	0	0	Sp	D		Domestic	Gentry	SN 581 221
abg3	1	5	57	19	76	1752	1771	1771	1.97	1.08	1.86	1.75	10	WALES	Llandeilo	Aberglasney House	OX	0	0	Sp	D		Domestic	Gentry	SN 581 221
abg4	1		63	17	80	1754	1771	1771	2.72	2.38	3.23	2.65	10	WALES	Llandeilo	Aberglasney House	OX	0	0	Sp	D		Domestic	Gentry	SN 581 221
abg5	1	5	55	16	71	1755	1771	1771	2.14	1.52	1.33	2.00	10	WALES	Llandeilo	Aberglasney House	OX	0	0	Sp	D		Domestic	Gentry	SN 581 221
abg6	1	5	60	19	79	1752	1771	1771	1.75	1.87	0.97	1.78	10	WALES	Llandeilo	Aberglasney House	OX	0	0	Sp	D		Domestic	Gentry	SN 581 221
llyn1	1	40	75	16	91	1536	1552	1552	2.34	2.49	2.20	2.36	10	WALES	Llandrinio	Llwyn	OX	0	0	Su	D		Domestic	Low	SJ 246 168
llyn2	1	30	90	24	114	1528	1552	1552	1.48	1.41	1.56	1.47	10	WALES	Llandrinio	Llwyn	OX	2	12	Sp	D		Domestic	Low	SJ 246 168
llyn3	1	10	94	19	113	1533	1552	1552	1.71	1.16	1.11	1.62	10	WALES	Llandrinio	Llwyn	OX	0	0	Su	D		Domestic	Low	SJ 246 168
llyn4	1	2	106	30	136	1519	1549	1552	1.33	0.68	0.53	1.18	10	WALES	Llandrinio	Llwyn	OX	0	0	Sp	D		Domestic	Low	SJ 246 168
llyn5	1	25	78	22	100	1530	1552	1552	1.56	0.78	0.91	1.39	10	WALES	Llandrinio	Llwyn	OX	0	0	Su	D		Domestic	Low	SJ 246 168
lnym6a2	1	50	135	29	164	1584	1613	1613	1.04	0.51	0.65	0.94	10	WALES	Llanidloes	Old Market Hall	OX	0	0	W	E		Public	Middle	SN 954 845
lnyc14	1	5	107	21	128	1517	1538	1538	1.28	0.94	0.95	1.23	10	WALES	Llanidloes	Parish Church	OX	3	2	Su	D		Church	Middle	SN 953 846
lnyc21	2	10	124	38	162	1555	1593	1593	0.75	0.73	1.06	0.75	10	WALES	Llanidloes	Parish Church	OX	0	0	Su	D		Church	Middle	SN 953 846
lnyc24	2	15	176	34	210	1560	1594	1593	1.37	0.79	1.21	1.28	10	WALES	Llanidloes	Parish Church	OX	0	0	W	D		Church	Middle	SN 953 846
lnyc25	2	15	32	13	45	1581	1594	1593	3.31	2.10	2.71	2.96	10	WALES	Llanidloes	Parish Church	OX	0	0	W	A		Church	Middle	SN 953 846
thg1	2		170	52	222	1596	1648	1648	1.46	0.44	0.89	1.22	10	WALES	Llansantfraidd	Tu Hwnt Ir Gain	OX	0	0	W	D		Domestic	Low	SJ 222 193
thg3	2		66	35	101	1613	1648	1648	1.05	0.48	1.32	0.85	10	WALES	Llansantfraidd	Tu Hwnt Ir Gain	OX	0	0	W	D		Domestic	Low	SJ 222 193
thg4	1		159	23	182	1588	1611	1612	0.83	1.32	0.67	0.89	10	WALES	Llansantfraidd	Tu Hwnt Ir Gain	OX	2	1	Su	D		Domestic	Low	SJ 222 193
thg7	1		84	33	117	1579	1612	1612	1.60	0.98	1.31	1.42	10	WALES	Llansantfraidd	Tu Hwnt Ir Gain	OX	0	0	W	A		Domestic	Low	SJ 222 193
thg8	1		50	44	94	1568	1612	1612	1.98	0.83	1.89	1.44	10	WALES	Llansantfraidd	Tu Hwnt Ir Gain	OX	0	0	Su	D		Domestic	Low	SJ 222 193
hfd1	1	30	70	22	92	1409	1431	1432	1.71	0.85	0.80	1.51	10	WALES	Llansilin	Hafod	OX	2	1	W	D		Domestic	Middle	SJ 205 321
hfd2	1	40	77	16	93	1414	1430	1432	1.46	0.79	1.19	1.35	10	WALES	Llansilin	Hafod	OX	0	0	W	D		Domestic	Middle	SJ 205 321
hfd3	1	40	44	25	69	1407	1432	1432	1.94	1.59	2.06	1.81	10	WALES	Llansilin	Hafod	OX	0	0	Sp	D		Domestic	Middle	SJ 205 321
hfd4	1	40	64	22	86	1409	1431	1432	1.89	1.30	1.27	1.74	10	WALES	Llansilin	Hafod	OX	0	0	Sp	D		Domestic	Middle	SJ 205 321
hfd5	1	20	32	26	58	1406	1432	1432	2.04	2.06	2.40	2.05	10	WALES	Llansilin	Hafod	OX	0	0	Sp	D		Domestic	Middle	SJ 205 321
hfd6	1	30	41	25	66	1407	1432	1432	2.57	1.65	2.26	2.22	10	WALES	Llansilin	Hafod	OX	2	0	Sp	D		Domestic	Middle	SJ 205 321
tydc1	1	5	92	31	123	1440	1471	1472	1.56	1.25	1.19	1.48	10	WALES	Llansilin, Denby	Tyddyncynnar	OX	2	2	Su	D		Domestic	Low	SJ 212 304
tydc12	2	25	110	33	143	1576	1609	1609	1.47	0.32	0.31	1.21	10	WALES	Llansilin, Denby	Tyddyncynnar	OX	0	0	W	D		Domestic	Low	SJ 212 304
tydc13	2	15	125	26	151	1584	1610	1609	1.76	0.70	0.68	1.57	10	WALES	Llansilin, Denby	Tyddyncynnar	OX	0	0	W	D		Domestic	Low	SJ 212 304
tydc23	1	40	76	27	103	1445	1472	1472	1.07	0.79	1.30	1.00	10	WALES	Llansilin, Denby	Tyddyncynnar	OX	2	1	Su	D		Domestic	Low	SJ 212 304
tydc4	1	10	86	29	115	1441	1470	1472	1.45	1.04	1.50	1.34	10	WALES	Llansilin, Denby	Tyddyncynnar	OX	0	0	Su	D		Domestic	Low	SJ 212 304
wbn1	1	50	93	30	123	1645	1675	1674	0.78	0.36	0.48	0.68	10	WALES	Llanynys, Denby	Pant-Glas-Isaf	OX	0	0	W	D		Agricultural	Low	SJ 092 595
afh1	1	1	80	32	112	1409	1441	1441	1.07	1.32	1.01	1.14	10	WALES	Merioneth	Cymmer Abbey, Llanelltyd	OX	0	0	W	A		Domestic	Monastic	SH 720 195
afh2	1	5	28	15	43	1426	1441	1441	3.42	2.17	2.91	2.98	10	WALES	Merioneth	Cymmer Abbey, Llanelltyd	OX	0	0	Sp	D		Domestic	Monastic	SH 720 195
afh3	1	5	25	16	41	1425	1441	1441	3.69	2.17	3.01	3.09	10	WALES	Merioneth	Cymmer Abbey, Llanelltyd	OX	0	0	Sp	D		Domestic	Monastic	SH 720 195
afh4	2		99	15	114	1492	1507	1507	1.44	0.83	1.26	1.36	10	WALES	Merioneth	Cymmer Abbey, Llanelltyd	OX	2	10	Sp	D		Domestic	Monastic	SH 720 195
afh5	1		101	33	134	1407	1440	1441	1.12	0.55	0.65	0.98	10	WALES	Merioneth	Cymmer Abbey, Llanelltyd	OX	0	0	Su	D		Domestic	Monastic	SH 720 195
uch1	1		55	28	83	1407	1435	1435	2.03	1.71	1.80	1.92	10	WALES	Merioneth	Plas-ucha, Llangar	OX	0	0	Su	D		Domestic	Middle	SJ 052 427
gwe1	1		99	30	129	1522	1552	1552	1.18	1.88	0.93	1.35	10	WALES	Montgomeryshire	Gwernfyda, Llannugan	OX	0	0	Su	D		Domestic	Low	SJ 045 017
gwe2	1	3	117	25	142	1527	1552	1552	0.94	0.98	0.88	0.95	10	WALES	Montgomeryshire	Gwernfyda, Llannugan	OX	0	0	Su	D		Domestic	Low	SJ 045 017
gwe3	1		93	35	128	1517	1552	1552	1.15	1.13	1.26	1.15	10	WALES	Montgomeryshire	Gwernfyda, Llannugan	OX	0	0	Su	D		Domestic	Low	SJ 045 017
neu1	1	5	53	16	69	1491	1507	1507	2.83	1.70	2.57	2.56	10	WALES	Montgomeryshire	Neuadd Cynhinfa, Llangynyw	OX	0	0	Su	D		Domestic	Low	SJ 086 124

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
neu2	1	10	83	14	97	1493	1507	1507	1.36	1.50	1.35	1.38	10	WALES	Montgomeryshire	Neuadd Cynhinfa, Llangynyw	OX	0	0	Su	A		Domestic	Low	SJ 086 124
neu3	1	10	43	15	58	1492	1507	1507	3.33	1.80	2.29	2.93	10	WALES	Montgomeryshire	Neuadd Cynhinfa, Llangynyw	OX	0	0	Su	D		Domestic	Low	SJ 086 124
pen1	1	4	104	25	129	1525	1550	1551	1.74	1.10	1.50	1.61	10	WALES	Montgomeryshire	Peniarth-uchaf, Meifod	OX	0	0	Su	D		Domestic	Low	SJ 145 154
pen2	1	10	138	27	165	1523	1550	1551	1.58	1.41	1.51	1.55	10	WALES	Montgomeryshire	Peniarth-uchaf, Meifod	OX	0	0	Su	D		Domestic	Low	SJ 145 154
pen3	1		94	24	118	1527	1551	1551	1.48	1.29	1.17	1.44	10	WALES	Montgomeryshire	Peniarth-uchaf, Meifod	OX	0	0	W	D		Domestic	Low	SJ 145 154
tydn1	1	1	142	27	169	1527	1554	1554	1.34	0.83	0.88	1.26	10	WALES	Montgomeryshire	Tyddyn-Llwydion	OX	0	0	Sp	D		Domestic	Low	SJ 017 259
tydn2	2		108	17	125	1585	1602	1602	1.30	0.69	0.67	1.21	10	WALES	Montgomeryshire	Tyddyn-Llwydion	OX	0	0	Su	D		Domestic	Low	SJ 017 259
cefn1	1		74	12	86	1438	1450	1450	2.01	1.86	1.14	1.99	10	WALES	Nantmel	Cefn-ceido	OX	0	0	W	E		Domestic	Low	SN 982 682
cefn2	1	1	96	24	120	1426	1450	1450	1.54	1.53	1.51	1.54	10	WALES	Nantmel	Cefn-ceido	OX	0	0	Su	E		Domestic	Low	SN 982 682
cefn7	2	15	51	25	76	1475	1500	1500	1.36	0.62	1.17	1.11	10	WALES	Nantmel	Cefn-ceido	OX	0	0	Sp	E		Domestic	Low	SN 982 682
mns1	1	30	87	23	110	1533	1556	1556	1.41	1.20	1.02	1.37	10	WALES	Nantmel, Rads	Middle Nant-Serth	OX	0	0	W	D		Domestic	Low	SN 969 699
mns2	1	25	55	13	68	1543	1556	1556	2.29	2.13	2.17	2.26	10	WALES	Nantmel, Rads	Middle Nant-Serth	OX	0	0	Su	A		Domestic	Low	SN 969 699
mns3	1	1	32	20	52	1536	1556	1556	3.31	2.98	1.54	3.18	10	WALES	Nantmel, Rads	Middle Nant-Serth	OX	0	0	W	A		Domestic	Low	SN 969 699
mns4	1	10	66	21	87	1535	1556	1556	3.27	1.63	1.11	2.87	10	WALES	Nantmel, Rads	Middle Nant-Serth	OX	2	3	W	A		Domestic	Low	SN 969 699
oin1	1	1	43	30	73	1442	1472	1471	1.97	0.85	1.22	1.51	10	WALES	Norton	Old Impton	OX	0	0	W	D		Domestic	Middle	SO 292 670
oin12	2		57	23	80	1519	1542	1543	1.83	2.03	1.53	1.88	10	WALES	Norton	Old Impton	OX	0	0	Su	D		Domestic	Middle	SO 292 670
oin5	2	5	97	20	117	1523	1543	1543	1.38	1.56	1.45	1.41	10	WALES	Norton	Old Impton	OX	0	0	W	A		Domestic	Middle	SO 292 670
oin6	2	1	72	56	128	1487	1543	1543	1.03	0.65	1.28	0.86	10	WALES	Norton	Old Impton	OX	0	0	W	D		Domestic	Middle	SO 292 670
oin911	2		89	30	119	1513	1543	1543	1.57	1.31	1.39	1.51	10	WALES	Norton	Old Impton	OX	2	2	W	D		Domestic	Middle	SO 292 670
ccp1	1		79	22	101	1504	1526	1526	1.77	1.73	1.56	1.76	10	WALES	Pennal, Gwynedd	Cefn-caer	OX	0	0	W	D		Domestic	Middle	SH 704 001
ccp11	2		115	52	167	1606	1658	1660	1.24	0.63	0.54	1.05	10	WALES	Pennal, Gwynedd	Cefn-caer	OX	0	0	Su	D		Domestic	Middle	SH 704 001
ccp12b	2		90	60	150	1600	1660	1660	1.06	0.54	0.37	0.85	10	WALES	Pennal, Gwynedd	Cefn-caer	OX	0	0	Su	D		Domestic	Middle	SH 704 001
ccp13	2		19	17	36	1643	1660	1660	2.68	1.83	1.59	2.28	10	WALES	Pennal, Gwynedd	Cefn-caer	OX	0	0	W	E		Domestic	Middle	SH 704 001
ccp2	1	10	58	22	80	1504	1526	1526	1.24	1.31	1.12	1.26	10	WALES	Pennal, Gwynedd	Cefn-caer	OX	0	0	W	D		Domestic	Middle	SH 704 001
ccp4	1		81	27	108	1499	1526	1526	1.14	0.81	0.84	1.06	10	WALES	Pennal, Gwynedd	Cefn-caer	OX	0	0	W	D		Domestic	Middle	SH 704 001
ccp5	1	2	90	24	114	1501	1525	1526	1.92	1.32	1.53	1.80	10	WALES	Pennal, Gwynedd	Cefn-caer	OX	0	0	Sp	D		Domestic	Middle	SH 704 001
ccp6	1	1	93	29	122	1497	1526	1526	1.69	1.24	1.99	1.59	10	WALES	Pennal, Gwynedd	Cefn-caer	OX	0	0	Sp	D		Domestic	Middle	SH 704 001
tan1	1	5	44	18	62	1418	1436	1436	2.30	1.50	1.47	2.07	10	WALES	Presteigne, Rads	Tan House	OX	0	0	Sp	A		Domestic	Low	SO 316 645
tan2	1	10	71	15	86	1421	1436	1436	1.81	1.13	1.45	1.69	10	WALES	Presteigne, Rads	Tan House	OX	0	0	W	D		Domestic	Low	SO 316 645
tan3	1	1	71	27	98	1409	1436	1436	1.74	1.04	1.66	1.55	10	WALES	Presteigne, Rads	Tan House	OX	0	0	Sp	D		Domestic	Low	SO 316 645
whl1	1	10	81	29	110	1433	1462	1463	1.25	0.92	1.08	1.16	10	WALES	Presteigne, Rads	White Hall	OX	0	0	Sp	D		Domestic	Middle	SO 314 643
whl2	1	20	57	25	82	1438	1463	1463	1.51	1.03	1.04	1.36	10	WALES	Presteigne, Rads	White Hall	OX	0	0	Sp	A		Domestic	Middle	SO 314 643
whl3	1	5	24	12	36	1451	1463	1463	3.53	2.25	2.79	3.10	10	WALES	Presteigne, Rads	White Hall	OX	0	0	W	A		Domestic	Middle	SO 314 643
whl4	1	25	35	20	55	1443	1463	1463	2.01	1.83	1.53	1.94	10	WALES	Presteigne, Rads	White Hall	OX	0	0	Sp	D		Domestic	Middle	SO 314 643
whl6	1	10	59	26	85	1437	1463	1463	1.60	1.18	1.36	1.47	10	WALES	Presteigne, Rads	White Hall	OX	0	0	W	D		Domestic	Middle	SO 314 643
whl7	1	10	17	30	47	1433	1463	1463	1.47	1.51	1.50	1.50	10	WALES	Presteigne, Rads	White Hall	OX	0	0	Sp	A		Domestic	Middle	SO 314 643
whl8	1	25	11	24	35	1439	1463	1463	2.45	2.10	2.35	2.21	10	WALES	Presteigne, Rads	White Hall	OX	0	0	Su	D		Domestic	Middle	SO 314 643
whl9	1	25	39	27	66	1436	1463	1463	1.98	1.26	1.77	1.69	10	WALES	Presteigne, Rads	White Hall	OX	0	0	W	D		Domestic	Middle	SO 314 643
sker10	1	15	60	16	76	1607	1623	1623	2.65	2.62	2.20	2.65	10	WALES	Pyle & Kenfig	Sker House, Porthcawl	OX	0	0	W	A	rafter	Domestic	Gentry	SS 795 798
sker13	2	1	52	10	62	1829	1839	1839	1.77	1.28	1.16	1.69	10	WALES	Pyle & Kenfig	Sker House, Porthcawl	OX	0	0	Sp	A	purlin	Domestic	Gentry	SS 795 798
sker14	2	1	133	62	195	1777	1839	1839	1.09	0.44	0.72	0.88	10	WALES	Pyle & Kenfig	Sker House, Porthcawl	OX	2	20	W	D	purlin	Domestic	Gentry	SS 795 798
sker7	1		61	28	89	1595	1623	1623	1.73	1.16	1.96	1.55	10	WALES	Pyle & Kenfig	Sker House, Porthcawl	OX	0	0	W	D	rafter	Domestic	Gentry	SS 795 798
sker8	1		26	18	44	1605	1623	1623	2.26	2.12	1.81	2.20	10	WALES	Pyle & Kenfig	Sker House, Porthcawl	OX	0	0	W	A	rafter	Domestic	Gentry	SS 795 798
sker9	1		54	22	76	1601	1623	1623	2.32	2.11	2.44	2.26	10	WALES	Pyle & Kenfig	Sker House, Porthcawl	OX	0	0	W	D	rafter	Domestic	Gentry	SS 795 798
bry1	1	10	94	39	133	1397	1436	1436	2.75	1.27	1.28	2.31	10	WALES	Radnorshire	Bryndrynaenog, Beguildy	OX	0	0	Sp	D		Domestic	Gentry	SO 204 785
bry2	2		163	38	201	1577	1615	1615	1.23	0.82	0.79	1.15	10	WALES	Radnorshire	Bryndrynaenog, Beguildy	OX	0	0	Su	D		Domestic	Gentry	SO 204 785

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
bwl1	1	1	97	29	126	1493	1522	1522	1.50	1.38	1.61	1.47	10	WALES	Radnorshire	Bwlch, Llananno	OX	2	3	Sp	D		Domestic	Low	SO 085 747
bwl2	1	5	41	27	68	1495	1522	1522	2.50	1.60	1.67	2.14	10	WALES	Radnorshire	Bwlch, Llananno	OX	0	0	W	A		Domestic	Low	SO 085 747
bwl3	1		93	15	108	1507	1522	1522	2.56	2.16	2.39	2.50	10	WALES	Radnorshire	Bwlch, Llananno	OX	0	0	W	A		Domestic	Low	SO 085 747
lsy1	2		104	26	130	1580	1606	1606	1.07	0.74	0.60	1.00	10	WALES	Radnorshire	Llanshay, Knighton	OX	0	0	Sp	D		Domestic	Low	SO 296 718
lsy2	1	3	84	23	107	1408	1431	1433	1.86	1.50	2.33	1.78	10	WALES	Radnorshire	Llanshay, Knighton	OX	0	0	W	D		Domestic	Low	SO 296 718
lsy3	1	2	91	23	114	1410	1433	1433	1.25	1.01	0.86	1.20	10	WALES	Radnorshire	Llanshay, Knighton	OX	0	0	W	D		Domestic	Low	SO 296 718
lsy4	1	4	81	12	93	1421	1433	1433	0.74	0.86	0.86	0.75	10	WALES	Radnorshire	Llanshay, Knighton	OX	0	0	W	D		Domestic	Low	SO 296 718
nan1	1		82	20	102	1536	1556	1556	1.42	1.42	1.51	1.42	10	WALES	Radnorshire	Nannerth-Ganol, Cwmdeuddwr	OX	0	0	W	D		Domestic	Low	SN 132 429
nan2	1	5	68	33	101	1522	1555	1556	2.72	0.67	2.13	2.05	10	WALES	Radnorshire	Nannerth-Ganol, Cwmdeuddwr	OX	0	0	Su	D		Domestic	Low	SN 132 429
nan3	1	2	64	18	82	1538	1556	1556	2.03	2.16	1.52	2.06	10	WALES	Radnorshire	Nannerth-Ganol, Cwmdeuddwr	OX	2	3	Sp	A		Domestic	Low	SN 132 429
nan4	1	8	60	25	85	1531	1556	1556	1.85	1.31	1.59	1.69	10	WALES	Radnorshire	Nannerth-Ganol, Cwmdeuddwr	OX	0	0	W	A		Domestic	Low	SN 132 429
nan5	2	5	99	31	130	1602	1633	1633	1.52	0.85	1.08	1.36	10	WALES	Radnorshire	Nannerth-Ganol, Cwmdeuddwr	OX	0	0	Su	D		Domestic	Low	SN 132 429
nan6	2	3	63	21	84	1612	1633	1633	3.88	1.49	2.44	3.28	10	WALES	Radnorshire	Nannerth-Ganol, Cwmdeuddwr	OX	0	0	Su	A		Domestic	Low	SN 132 429
nan7	1	25	106	30	136	1526	1556	1556	1.38	0.45	0.49	1.17	10	WALES	Radnorshire	Nannerth-Ganol, Cwmdeuddwr	OX	0	0	Su	A		Domestic	Low	SN 132 429
tgh1	1	5	70	20	90	1429	1449	1450	2.57	1.46	1.74	2.33	10	WALES	Radnorshire	The Great House, Newchurch	OX	0	0	Su	D		Domestic	Middle	SO 216 506
tgh2	1	10	70	16	86	1434	1450	1450	3.22	2.29	2.79	3.05	10	WALES	Radnorshire	The Great House, Newchurch	OX	0	0	W	D		Domestic	Middle	SO 216 506
tgh3	1	15	95	19	114	1431	1450	1450	1.61	0.98	0.70	1.51	10	WALES	Radnorshire	The Great House, Newchurch	OX	0	0	W	D		Domestic	Middle	SO 216 506
sta1	1	1	90	19	109	1484	1503	1503	1.90	1.63	1.55	1.85	10	WALES	St Asaph, Flints	Waen	OX	0	0	Sp	D		Domestic	Low	SJ 064 733
sta2	1	20	42	32	74	1368	1400	1503	1.44	1.77	1.24	1.58	10	WALES	St Asaph, Flints	Waen	OX	0	0	Sp	E		Domestic	Low	SJ 064 733
sta3	2	50	134	34	168	1626	1660	1660	0.91	0.74	1.03	0.88	10	WALES	St Asaph, Flints	Waen	OX	0	0	Sp	D		Domestic	Low	SJ 064 733
gilfach1	1	25	71	13	84	1537	1550	1550	1.37	2.66	2.50	1.57	10	WALES	St Harmon, Rads	Gilfach	OX	0	0	Sp	E		Domestic	Low	SN 965 717
caer01	1	5	105	19	124	53	72	72	1.36	1.14	1.56	1.33	10	WALES	Usk	Caerleon Museum Site 1983-5	SH	0	0	W	A				ST 330 910
caer09	1	5	90	29	119	43	72	72	0.87	0.52	0.94	0.79	10	WALES	Usk	Caerleon Museum Site 1983-5	SH	0	0		D				ST 330 910
caer12	1	5	24	31	55	41	72	72	1.73	1.72	0.84	1.72	10	WALES	Usk	Caerleon Museum Site 1983-5	SH	0	0	W	A				ST 330 910
caer14	1	1	9	25	34	47	72	72	1.76	0.96	1.76	1.17	10	WALES	Usk	Caerleon Museum Site 1983-5	SH	0	0	W	A				ST 330 910
rc1a	1	0	62	22	84	1478	1500	1500	1.05	0.93	0.76	1.02	10	WALES	Wrexham	Cruck	OX	0	0	Sp	E		Domestic	Low	SJ 340 500
haf19	1	1	109	32	141	1676	1708	1708	1.08	0.58	0.60	0.96	10	WALES		Hafoty	SH	0	0	W	D				SH 562 781
bul19	1	1	18	17	35	597	614	614	1.82	1.47	1.64	1.65	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bul20	1	1	23	15	38	599	614	614	1.80	1.04	1.03	1.50	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bul28	1	1	29	31	60	583	614	614	1.68	0.73	1.11	1.19	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bul34	1	5	16	20	36	594	614	614	3.36	1.88	2.96	2.54	11	Scotland	Buiston	Crannog	SC	0	0	Su	A				NS 416 433
bul38	1	1	23	18	41	595	613	614	1.77	1.29	1.55	1.56	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bul62	1	1	45	20	65	594	614	614	1.66	1.00	1.35	1.46	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bul72	1	1	21	20	41	594	614	614	1.09	0.95	0.98	1.02	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bul82	1	1	21	18	39	596	614	614	1.05	1.04	1.19	1.05	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bul85	1	1	17	13	30	601	614	614	2.42	1.65	2.52	2.09	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bul92	1	5	40	18	58	596	614	614	2.46	0.82	1.50	1.95	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu223	1	1	24	13	37	601	614	614	1.68	1.39	1.24	1.58	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu291	1	1	25	14	39	600	614	614	1.70	1.06	0.82	1.47	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu300	1	1	32	23	55	591	614	614	1.45	0.67	0.82	1.12	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu311	1	5	19	12	31	602	614	614	2.97	1.74	2.88	2.50	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu313	1	1	20	12	32	602	614	614	2.67	1.70	2.23	2.31	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu326	1	1	25	12	37	602	614	614	1.65	3.09	1.47	2.12	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu333	1	5	26	19	45	595	614	614	1.84	1.56	1.48	1.72	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu334	1	5	114	22	136	592	614	614	0.50	0.48	0.31	0.49	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu335	1	1	28	12	40	602	614	614	1.59	1.55	2.01	1.58	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
bu336	1	1	22	11	33	603	614	1.23	3.57	1.73	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu337	1	5	12	25	37	589	614	3.42	1.59	3.68	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu342	1	5	32	9	41	605	614	1.87	2.21	2.78	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu344	1	1	40	13	53	601	614	1.74	1.33	1.61	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu346	1	1	26	19	45	595	614	0.98	0.86	0.70	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu348	1	1	28	10	38	604	614	1.42	1.52	1.09	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu349	1	1	20	16	36	598	614	1.64	0.85	1.18	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu350	1	1	26	13	39	601	614	1.66	1.06	1.09	11	Scotland	Buiston	Crannog	SC	0	0	Su	A					NS 416 433
bu351	1	1	35	12	47	602	614	1.62	0.81	1.18	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu358	1	1	26	15	41	599	614	1.67	1.63	1.03	11	Scotland	Buiston	Crannog	SC	0	0	Su	A					NS 416 433
bu359	1	1	36	15	51	599	614	1.59	1.09	1.38	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu370	1		136	40	176	574	614	0.54	0.54	0.52	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu389	1	1	21	12	33	602	614	2.65	1.84	2.74	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu392	1	1	44	18	62	596	614	0.77	1.05	0.69	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu394	1	1	63	14	77	600	614	0.70	1.43	1.40	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu396	1	1	28	23	51	591	614	1.09	0.54	0.97	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu397	1	1	36	15	51	599	614	0.74	0.97	0.61	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu399	1	1	36	20	56	594	614	0.82	1.05	0.48	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu400	1	1	27	23	50	591	614	0.90	0.64	0.36	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu401	1	1	32	21	53	593	614	0.96	1.26	0.89	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu403	1	1	45	13	58	601	614	0.57	1.06	0.52	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu404	1	1	44	23	67	591	614	0.73	0.40	0.35	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu40414	1	1	16	17	33	597	614	1.55	0.77	1.32	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu40415	1	1	14	19	33	595	614	1.67	1.05	1.72	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu40420	1	1	31	17	48	597	614	1.28	0.82	0.87	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu40423	1	1	14	17	31	597	614	1.79	1.21	1.66	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu40424	1	1	18	16	34	598	614	1.54	1.26	1.09	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4046	1	1	21	9	30	605	614	1.80	2.04	1.64	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4047	1	1	38	9	47	620	629	1.08	1.80	1.60	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4048	1	1	30	25	55	604	629	0.83	1.02	0.46	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D					NS 416 433
bu4410	1	1	27	27	54	587	614	2.10	1.26	1.26	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4411	1	1	20	15	35	599	614	1.58	2.25	1.87	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4412	1	5	32	13	45	601	614	1.23	1.85	2.34	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4413	1	1	31	13	44	601	614	1.24	1.66	1.22	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4415	1	1	23	13	36	601	614	1.16	2.08	2.17	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4417	1	1	26	16	42	597	613	1.76	1.44	1.59	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D					NS 416 433
bu4418	1	1	33	21	54	592	613	1.77	0.59	1.45	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D					NS 416 433
bu4427	1	1	39	16	55	600	616	1.40	0.94	0.89	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D					NS 416 433
bu4434	1	1	40	17	57	597	614	1.85	1.11	0.98	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4435	1	1	37	18	55	597	615	1.53	0.95	0.76	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4436	1	1	29	10	39	604	614	1.65	1.51	1.24	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D					NS 416 433
bu4441	1	5	45	17	62	597	614	1.60	0.65	0.91	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A					NS 416 433
bu4442	1	1	29	29	58	586	615	1.49	0.85	1.13	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D					NS 416 433
bu4444	1	1	43	10	53	605	615	1.41	1.21	0.81	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D					NS 416 433
bu4447	1		95	40	135	575	615	0.83	0.80	0.74	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D					NS 416 433
bu451	1		49	11	60	605	616	1.56	1.98	1.06	11	Scotland	Buiston	Crannog	SC	0	0	Su	D					NS 416 433

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
bu452	1	1	38	16	54	599	615	614	1.42	0.88	0.79	1.26	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu455	1	5	52	22	74	528	550	614	0.52	0.97	0.61	0.65	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu495	1	1	43	20	63	588	608	614	2.38	0.68	1.69	1.84	11	Scotland	Buiston	Crannog	SC	0	0		D				NS 416 433
bu496	1	5	49	15	64	599	614	614	3.06	1.97	2.87	2.81	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu522	1	1	38	14	52	600	614	614	1.49	1.39	1.27	1.46	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu529	1	1	40	17	57	599	616	614	1.21	0.63	0.91	1.04	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu530	1	1	33	20	53	595	615	614	1.38	0.59	1.02	1.08	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu545	1	1	22	20	42	594	614	614	2.83	1.83	2.36	2.35	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu547	1	1	25	11	36	583	594	614	2.00	1.60	1.91	1.88	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu548	1	1	19	17	36	597	614	614	2.69	1.74	1.91	2.24	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu550	1	1	30	18	48	596	614	614	2.19	1.50	2.00	1.93	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu551	1	1	29	10	39	603	613	614	3.02	2.43	3.18	2.87	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu552	1	5	17	25	42	589	614	614	1.68	0.65	1.38	1.07	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu602	1	1	13	18	31	596	614	614	2.13	1.45	1.72	1.73	11	Scotland	Buiston	Crannog	SC	0	0	Su	A				NS 416 433
bu605	1	1	23	7	30	607	614	614	1.59	2.49	1.55	1.80	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu606	1	1	18	18	36	596	614	614	2.54	0.96	2.33	1.75	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu608	1	1	24	16	40	598	614	614	1.20	0.61	0.73	0.96	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu610	1	1	34	12	46	602	614	614	2.09	2.13	2.28	2.10	11	Scotland	Buiston	Crannog	SC	0	0	Su	A				NS 416 433
bu613	1	1	24	12	36	617	629	614	0.93	1.22	1.23	1.02	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu615	1		18	37	55	577	614	614	1.46	0.69	1.66	0.94	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu616	1	1	16	16	32	598	614	614	1.51	1.44	1.72	1.48	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu618	1	10	42	17	59	597	614	614	1.12	0.96	1.34	1.07	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu641	1	1	26	12	38	582	594	614	2.83	2.41	3.27	2.70	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu642	1	5	34	16	50	578	594	614	2.34	1.15	1.55	1.96	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu643	1	5	42	23	65	591	614	614	1.22	1.47	1.14	1.31	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu644	1	1	37	15	52	579	594	614	1.99	1.42	2.03	1.82	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu645	1	1	29	22	51	572	594	614	2.55	1.34	2.07	2.03	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu647	1	1	24	20	44	594	614	614	1.88	1.46	1.82	1.69	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu648	1	5	24	19	43	575	594	614	2.04	1.83	1.76	1.95	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu649	1	5	24	13	37	601	614	614	1.52	1.57	2.30	1.54	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu650	1	5	19	24	43	590	614	614	1.38	0.54	1.44	0.91	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu651	1	5	30	15	45	599	614	614	2.04	1.73	3.06	1.94	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu653	1	1	34	17	51	597	614	614	1.28	0.87	1.33	1.14	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu654	1	1	36	22	58	592	614	614	1.46	0.65	0.68	1.15	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu657	1	5	16	26	42	588	614	614	1.55	2.26	2.17	1.99	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu669	1	5	66	23	89	571	594	614	1.39	1.49	1.23	1.41	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu673	1	10	107	22	129	572	594	614	1.14	1.15	1.19	1.14	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu679	1		96	9	105	605	614	614	1.04	2.01	1.50	1.12	11	Scotland	Buiston	Crannog	SC	0	0	Sp	A				NS 416 433
bu680	1		99	25	124	593	618	614	1.03	0.78	1.04	0.98	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
bu681	1		173	28	201	592	620	614	0.70	0.61	0.65	0.69	11	Scotland	Buiston	Crannog	SC	0	0	Sp	D				NS 416 433
Q6753M	1		114	21	135	1362	1383	1383	0.65	0.68	0.68	0.66	11	Scotland	Darnaway	Darnaway Castle	BF	0	0		D				
Q6756	1		198	34	232	1349	1383	1383	0.31	0.22	0.25	0.29	11	Scotland	Darnaway	Darnaway Castle	BF	0	0		A				
Q6760m	1		137	39	176	1339	1378	1383	0.31	0.28	0.24	0.30	11	Scotland	Darnaway	Darnaway Castle	BF	0	0		D	brace			
Q6761m	1		106	23	129	1355	1378	1383	0.45	0.52	0.52	0.46	11	Scotland	Darnaway	Darnaway Castle	BF	0	0	Su	D				
Q2851	3		149	42	191	1329	1371	1371	1.02	0.24	0.44	0.85	11	Scotland	Dumfries & Galloway	Caerlaverock Castle	BF	0	0		D				NY 025 656
Q2852	2		240	21	261	1312	1333	1333	0.52	0.45	0.55	0.52	11	Scotland	Dumfries & Galloway	Caerlaverock Castle	BF	0	0	Sp	D	post			NY 025 656

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
Q2853	2		205	30	235	1303	1333	1333	0.52	0.35	0.38	0.50	11	Scotland	Dumfries & Galloway	Caerlaverock Castle	BF	0	0	Sp	D				NY 025 656
Q2866	2		138	24	162	1309	1333	1333	0.37	0.31	0.39	0.36	11	Scotland	Dumfries & Galloway	Caerlaverock Castle	BF	0	0	Sp	D				NY 025 656
Q2869	4		47	17	64	1383	1400	1400	0.61	0.31	0.75	0.53	11	Scotland	Dumfries & Galloway	Caerlaverock Castle	BF	0	0		E				NY 025 656
Q4348	1		176	34	210	1195	1229	1229	0.62	0.46	0.56	0.60	11	Scotland	Dumfries & Galloway	Caerlaverock Castle	BF	0	0		D				NY 025 656
Q2553	1		199	17	216	1941	1958	1992	0.19	0.22	0.24	0.19	11	Scotland	Dumfries & Galloway	Lockwood	BF	0	0	Sp	D				NT 092 972
Q8692	1		32	26	58	1966	1992	1992	0.93	0.71	0.89	0.83	11	Scotland	Dumfries & Galloway	Lockwood	BF	0	0		D				NT 092 972
Q8693	1		29	26	55	1966	1992	1992	0.94	0.66	0.84	0.80	11	Scotland	Dumfries & Galloway	Lockwood	BF	0	0		D				NT 092 972
Q8694	1		46	34	80	1958	1992	1992	0.47	0.49	0.38	0.48	11	Scotland	Dumfries & Galloway	Lockwood	BF	0	0		D				NT 092 972
Q8695	1		41	21	62	1971	1992	1992	0.61	0.60	0.78	0.61	11	Scotland	Dumfries & Galloway	Lockwood	BF	0	0		D				NT 092 972
Q3047	1		77	20	97	1427	1447	1447	0.70	0.76	0.68	0.71	11	Scotland	Dumfries & Galloway	Threave Castle	BF	0	0		D				NX 739 622
Q3051	1		76	20	96	1427	1447	1447	0.71	0.75	0.71	0.71	11	Scotland	Dumfries & Galloway	Threave Castle	BF	0	0		D				NX 739 622
Q3052	1		105	21	126	1425	1446	1447	0.23	0.26	0.28	0.23	11	Scotland	Dumfries & Galloway	Threave Castle	BF	0	0	Sp	D				NX 739 622
Q3053	1		118	29	147	1418	1447	1447	0.30	0.24	0.15	0.29	11	Scotland	Dumfries & Galloway	Threave Castle	BF	0	0		A	post			NX 739 622
Q8683	1		73	21	94	1971	1992	1992	0.71	0.40	0.73	0.64	11	Scotland	Dumfries & Galloway	Woodlands - A75	BF	0	0		D				
Q8684	1		30	15	45	1977	1992	1992	1.29	1.40	1.24	1.33	11	Scotland	Dumfries & Galloway	Woodlands - A75	BF	0	0		D				
Q8685	1		35	15	50	1977	1992	1992	1.24	1.01	0.95	1.17	11	Scotland	Dumfries & Galloway	Woodlands - A75	BF	0	0		D				
Q8686	1		34	22	56	1970	1992	1992	1.25	0.66	1.08	1.02	11	Scotland	Dumfries & Galloway	Woodlands - A75	BF	0	0		D				
Q8687	1		52	25	77	1967	1992	1992	0.67	0.44	0.64	0.59	11	Scotland	Dumfries & Galloway	Woodlands - A75	BF	0	0		D				
Q8688	1		26	24	50	1968	1992	1992	1.51	0.68	0.80	1.11	11	Scotland	Dumfries & Galloway	Woodlands - A75	BF	0	0		D				
Q8689	1		43	24	67	1968	1992	1992	1.04	0.42	0.69	0.82	11	Scotland	Dumfries & Galloway	Woodlands - A75	BF	0	0		D				
Q8690	1		21	20	41	1972	1992	1992	1.56	1.28	1.29	1.42	11	Scotland	Dumfries & Galloway	Woodlands - A75	BF	0	0		D				
Q5102	1		185	18	203	1961	1979	1979	0.50	0.62	1.01	0.51	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5103	1		59	21	80	1958	1979	1979	0.97	0.60	1.37	0.87	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5104	1		212	23	235	1956	1979	1979	0.43	0.85	0.86	0.47	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5253	2		159	17	176	1966	1983	1983	0.61	1.02	1.00	0.65	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5254	2		43	15	58	1968	1983	1983	0.47	0.78	0.48	0.55	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5255b	2		34	31	65	1952	1983	1983	0.23	0.35	0.28	0.29	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5256	2		76	25	101	1958	1983	1983	0.30	0.75	0.62	0.41	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5257	2		15	30	45	1953	1983	1983	0.36	0.40	0.39	0.39	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5258	2		16	43	59	1940	1983	1983	0.36	0.48	0.44	0.45	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5259	2	47	67	29	96	1954	1983	1983	0.48	0.73	0.93	0.56	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5260	2		59	25	84	1958	1983	1983	0.26	0.53	0.47	0.34	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5261b	2	170	39	33	72	1950	1983	1983	0.15	0.23	0.17	0.18	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5262	2		140	17	157	1966	1983	1983	0.37	0.40	0.44	0.37	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5263	2		138	23	161	1960	1983	1983	0.43	0.60	0.61	0.45	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5264	2		87	29	116	1954	1983	1983	0.53	0.50	0.58	0.52	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5265	2		46	40	86	1943	1983	1983	0.30	0.40	0.38	0.35	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5266	2		180	19	199	1964	1983	1983	0.47	0.69	0.63	0.49	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5267	2		181	19	200	1964	1983	1983	0.53	1.02	0.90	0.58	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5268	2		54	14	68	1969	1983	1983	0.67	0.83	0.86	0.70	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5269	2	62	158	39	197	1944	1983	1983	0.30	0.40	0.30	0.32	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5335	3		201	20	221	1964	1984	1984	0.76	0.36	0.65	0.72	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5340	3		110	42	152	1942	1984	1984	0.66	0.37	0.27	0.58	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5343	3		162	27	189	1957	1984	1984	0.53	0.48	0.70	0.52	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5344	3		174	28	202	1956	1984	1984	0.51	0.73	0.78	0.55	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q5346	3		198	45	243	1939	1984	1984	0.49	0.39	0.33	0.47	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H/Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
Q5349	3		194	16	210	1968	1984	1984	0.53	0.86	0.85	0.55	11	Scotland	Dumfries & Galloway	Woodlands - Cadzow Forest	BF	0	0		D				
Q3743	1		82	31	113	1947	1978	1978	0.71	0.33	0.64	0.61	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3744	1		49	27	76	1951	1978	1978	1.17	1.10	1.17	1.14	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3745	1		47	15	62	1963	1978	1978	1.15	1.24	1.12	1.18	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3746	1		74	22	96	1956	1978	1978	1.02	0.63	0.95	0.93	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3747	1		64	24	88	1954	1978	1978	1.05	0.71	1.28	0.96	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3748	1		66	33	99	1945	1978	1978	0.86	0.74	0.60	0.82	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3749	1		64	24	88	1954	1978	1978	1.19	0.59	1.27	1.02	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3750	1		64	29	93	1949	1978	1978	0.81	0.54	0.79	0.72	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3751	1		93	22	115	1956	1978	1978	0.90	0.68	0.50	0.85	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3752	1		152	29	181	1949	1978	1978	0.59	0.30	0.27	0.55	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3753	1		86	26	112	1952	1978	1978	0.82	0.76	0.84	0.80	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3754	1		96	26	122	1952	1978	1978	0.66	0.96	0.65	0.73	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3755	1		103	20	123	1958	1978	1978	0.81	0.71	0.85	0.80	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
Q3756	1		140	38	178	1940	1978	1978	0.51	0.31	0.47	0.47	11	Scotland	Dumfries & Galloway	Woodlands - Glenluce	BF	0	0		D				
elgint2	1		325	33	358	1269	1302	1302	0.60	0.55	0.61	0.59	11	Scotland	Elgin	Well	SC	0	0		D				NJ 214 627
glasgow1	1	10	168	34	202	1157	1191	1191	1.18	0.88	0.94	1.13	11	Scotland	Glasgow	High Street	SC	0	0		D				NJ 598 650
glasgow2	1	10	166	37	203	1154	1191	1191	1.11	0.77	0.75	1.05	11	Scotland	Glasgow	High Street	SC	0	0		D				NJ 598 650
Q10327	1		43	22	65	1980	2002	2001	0.46	0.32	0.75	0.41	11	Scotland	Malliag	Woodlands - Malliag	BF	0	0	Sp	D				
Q10331	1		29	32	61	1970	2002	2001	0.90	0.54	0.81	0.71	11	Scotland	Malliag	Woodlands - Malliag	BF	0	0		D				
Q10332	1		28	22	50	1980	2002	2001	0.64	0.59	0.55	0.62	11	Scotland	Malliag	Woodlands - Malliag	BF	0	0	Sp	D				
Q3185	2		52	13	65	1180	1193	1193	1.18	1.25	0.98	1.20	11	Scotland	Perth	High Street	BF	0	0	W	D	board			
Q3187	1		90	28	118	1123	1151	1151	0.44	0.37	0.36	0.42	11	Scotland	Perth	High Street	BF	0	0	W	D				
Q3903	1		114	27	141	1124	1151	1151	0.54	0.37	0.43	0.51	11	Scotland	Perth	High Street	BF	0	0	W	D				
Q3905	1		70	23	93	1128	1151	1151	0.19	0.16	0.13	0.18	11	Scotland	Perth	High Street	BF	0	0	W	D				
Q10320	2		16	34	50	1968	2002	2001	0.72	0.63	0.68	0.66	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q10321	2		19	33	52	1969	2002	2001	0.76	0.40	0.63	0.53	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q10322	2		32	22	54	1980	2002	2001	0.42	0.52	0.38	0.46	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q10323	2		30	19	49	1983	2002	2001	0.61	0.43	0.47	0.54	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q10324	2		29	37	66	1965	2002	2001	0.44	0.31	0.50	0.36	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q10325	2		22	28	50	1974	2002	2001	0.78	0.29	0.66	0.51	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q10326	2		15	24	39	1978	2002	2001	0.94	0.67	1.03	0.77	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q8292	1		113	32	145	1957	1989	1988	0.90	0.51	0.80	0.81	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q8293	1		95	35	130	1953	1988	1988	1.23	0.63	0.77	1.07	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q8294	1		98	25	123	1964	1989	1988	1.02	0.62	0.69	0.94	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0	Sp	D				
Q8295	1		110	33	143	1955	1988	1988	0.83	0.83	0.89	0.83	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q8296	1		85	32	117	1956	1988	1988	0.61	0.41	0.60	0.56	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9141	3		126	25	151	1970	1995	1996	0.90	0.16	0.43	0.78	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9142	3		78	20	98	1975	1995	1996	1.06	0.15	0.27	0.87	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9143	3		30	21	51	1974	1995	1996	0.98	0.85	0.83	0.93	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9264	3		35	12	47	1984	1996	1996	0.99	1.24	1.13	1.06	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9266	3		71	21	92	1975	1996	1996	0.52	0.34	0.35	0.48	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9268	3		12	32	44	1964	1996	1996	1.02	0.48	0.99	0.63	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9270	3		85	19	104	1977	1996	1996	0.50	1.13	0.85	0.62	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9271	3		100	34	134	1962	1996	1996	0.37	0.51	0.34	0.41	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				
Q9272	3		44	24	68	1972	1996	1996	0.62	0.66	0.29	0.63	11	Scotland	Strathclyde	Woodlands - Loch Lomond	BF	0	0		D				

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
lochg002	1		51	11	62	289	300	300	1.28	0.98	1.09	1.22	11	Scotland		Loch Glashan	SC	0	0		E				NR 915 924
30280019	1	10	169	37	206	1960	1997	1977	1.62	0.46	0.79	1.41		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280029	1		157	13	170	1984	1997	1977	1.95	1.41	1.54	1.91		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280039	1		182	25	207	1972	1997	1977	1.77	0.92	0.87	1.67		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280049	1		175	13	188	1984	1997	1977	1.84	0.91	1.09	1.77		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280059	1		136	13	149	1984	1997	1977	3.06	1.79	1.87	2.95		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280069	1		181	24	205	1973	1997	1977	2.65	1.21	1.42	2.48		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280079	1	10	141	13	154	1984	1997	1977	3.08	2.54	2.55	3.03		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280089	1	10	168	16	184	1981	1997	1977	1.86	1.61	1.36	1.84		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280099	1		183	18	201	1979	1997	1977	2.49	1.52	1.40	2.40		DENMARK	Corselitze	Corselitze Skovd	NB	0	0	W	D				
30280109	1	5	205	16	221	1981	1997	1977	2.50	1.67	1.51	2.44		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
30280119	1	1	208	17	225	1980	1997	1977	2.55	1.42	1.25	2.47		DENMARK	Corselitze	Corselitze Skovd	NB	0	0		D				
21250019	1		175	14	189	1983	1997	1997	2.02	2.76	2.19	2.07		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250029	1		143	26	169	1971	1997	1997	2.01	0.77	1.48	1.82		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250039	1		165	14	179	1983	1997	1997	1.97	2.31	2.18	1.99		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250049	1		192	19	211	1978	1997	1997	1.45	1.75	1.52	1.48		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250059	1		180	15	195	1982	1997	1997	2.61	2.54	2.51	2.61		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250069	1		170	19	189	1978	1997	1997	1.66	1.30	0.90	1.63		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250079	1	5	202	14	216	1983	1997	1997	1.62	1.41	1.14	1.60		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250089	1		179	18	197	1979	1997	1997	1.74	1.85	1.72	1.75		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250099	1		196	18	214	1979	1997	1997	1.59	2.18	1.63	1.64		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250109	1		171	22	193	1975	1997	1997	1.89	1.02	1.15	1.79		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250119	1		162	11	173	1986	1997	1997	1.82	3.26	2.87	1.92		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250129	1	10	198	14	212	1983	1997	1997	1.50	1.70	1.56	1.51		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250139	1		175	15	190	1982	1997	1997	1.74	1.92	1.66	1.76		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250149	1		151	26	177	1971	1997	1997	1.67	0.66	0.86	1.52		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250159	1		183	15	198	1982	1997	1997	2.44	1.54	1.38	2.38		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21250169	1		185	23	208	1974	1997	1997	1.67	1.55	1.86	1.66		DENMARK	Jaegersbg	Jaegersby Dyrehave	NB	0	0		D				
21251019	1		190	22	212	1975	1997	1997	1.56	1.22	1.00	1.52		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251029	1		174	15	189	1982	1997	1997	1.73	2.19	2.01	1.76		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251039	1		197	22	219	1975	1997	1997	1.50	1.90	1.39	1.54		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251049	1		216	14	230	1983	1997	1997	1.39	1.34	1.24	1.39		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251059	1	5	214	24	238	1973	1997	1997	2.17	2.14	2.12	2.16		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251069	1	5	232	13	245	1984	1997	1997	2.07	2.65	3.16	2.10		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251079	1		146	24	170	1973	1997	1997	1.93	1.54	1.41	1.87		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251089	1		164	15	179	1982	1997	1997	1.91	1.86	1.75	1.90		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251099	1	10	192	13	205	1984	1997	1997	1.51	2.28	2.20	1.56		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251109	1	10	216	12	228	1985	1997	1997	1.22	1.59	1.79	1.24		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251119	1		105	16	121	1981	1997	1997	1.64	1.58	1.64	1.63		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21251129	1		208	18	226	1979	1997	1997	1.17	1.33	0.97	1.18		DENMARK	Jaegersborg	Jaegersborg Dyrehave	NB	0	0		D				
21230019	1	10	144	15	159	1982	1997	1997	2.02	1.59	1.34	1.98		DENMARK	Stensby	Stensby Skov	NB	0	0	W	D				
21230029	1		148	17	165	1980	1997	1997	1.99	2.39	1.72	2.03		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230039	1	5	155	18	173	1979	1997	1997	1.44	0.94	0.71	1.38		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230049	1	10	146	13	159	1984	1997	1997	2.18	1.95	2.17	2.16		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230059	1	5	150	20	170	1977	1997	1997	2.40	2.25	1.34	2.39		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230069	1	5	155	15	170	1982	1997	1997	2.00	1.54	1.05	1.96		DENMARK	Stensby	Stensby Skov	NB	0	0		D				

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
21230079	1		132	14	146	1983	1997	1997	2.24	2.10	2.15	2.23		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230089	1	10	158	15	173	1982	1997	1997	2.63	1.39	1.38	2.52		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230099	1	5	141	34	175	1963	1997	1997	2.01	0.93	1.06	1.80		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230109	1	5	170	12	182	1985	1997	1997	2.46	1.87	1.45	2.42		DENMARK	Stensby	Stensby Skov	NB	0	0	W	D				
21230119	1		87	11	98	1986	1997	1997	1.79	2.04	1.90	1.82		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230129	1	10	153	12	165	1985	1997	1997	2.14	1.44	1.89	2.09		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21230139	1	10	141	18	159	1979	1997	1997	1.91	1.38	1.00	1.85		DENMARK	Stensby	Stensby Skov	NB	0	0		D				
21240019	1	5	151	12	163	1985	1997	1997	1.95	1.41	1.06	1.91		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240029	1	5	127	16	143	1981	1997	1997	2.31	1.24	1.44	2.19		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240039	1	10	145	14	159	1983	1997	1997	2.24	1.75	2.25	2.20		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240049	1	10	147	12	159	1985	1997	1997	2.34	1.16	1.11	2.25		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240059	1		137	10	147	1987	1997	1997	2.30	3.11	3.23	2.36		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240069	1	5	147	15	162	1982	1997	1997	1.95	1.62	1.99	1.92		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240079	1	10	147	13	160	1984	1997	1997	1.66	1.36	1.76	1.64		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240089	1	1	148	18	166	1979	1997	1997	2.16	1.13	1.46	2.05		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240099	1		136	14	150	1983	1997	1997	1.72	1.29	1.43	1.68		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240109	1	10	147	13	160	1984	1997	1997	2.27	1.72	1.73	2.22		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
21240119	1		138	14	152	1983	1997	1997	2.00	1.61	1.39	1.97		DENMARK	Viemose	Viemose Skov	NB	0	0		D				
bov6	1	1	135	11	146	1460	1471	1471	1.17	1.09	0.96	1.16		FRANCE	Grosbot	Bas-Arsac, Bovex	OX	0	0	Sp	D				
cgor11	1	2	89	25	114	1475	1500	1500	1.67	0.76	1.61	1.47		FRANCE	Grosbot	Chez Goreau Ronsenac	OX	0	0	Su	E				
cgor12	1	3	77	18	95	1482	1500	1500	2.48	1.95	1.27	2.38		FRANCE	Grosbot	Chez Goreau Ronsenac	OX	0	0	Su	E				
cgor21	1	10	105	45	150	1455	1500	1500	0.93	0.36	0.37	0.76		FRANCE	Grosbot	Chez Goreau Ronsenac	OX	0	0	W	E				
ga4	1	5	50	15	65	1485	1500	1500	1.59	1.47	1.40	1.57		FRANCE	Grosbot	L'Abbey	OX	0	0	W	E				
ga5a	1	1	55	16	71	1484	1500	1500	2.10	1.13	1.55	1.88		FRANCE	Grosbot	L'Abbey	OX	0	0	W	E				
ga6a	1	1	64	17	81	1483	1500	1500	2.64	2.38	2.42	2.58		FRANCE	Grosbot	L'Abbey	OX	0	0	W	E				
Ga7b	1	1	69	14	83	1486	1500	1500	2.18	2.21	2.02	2.18		FRANCE	Grosbot	L'Abbey	OX	0	0	W	E				
b17	1	10	128	27	155	1457	1484	1538	1.05	1.10	0.75	1.06		FRANCE	Grosbot	L'Abbey Charras Charente	OX	0	0		D				
b18	1	10	96	14	110	1470	1484	1538	2.09	1.88	2.17	2.06		FRANCE	Grosbot	L'Abbey Charras Charente	OX	0	0		D				
b25	1	1	102	30	132	1508	1538	1538	0.99	0.66	0.53	0.91		FRANCE	Grosbot	L'Abbey Le Grand Nadaud	OX	0	0	Sp	D				
gilo2	1	1	62	16	78	1534	1550	1550	3.06	2.11	1.59	2.87		FRANCE	Grosbot	Le Petin Gilon, Javerlac	OX	0	0	Su	E				
riovs3	1	1	238	18	256	1587	1605	1605	0.99	1.70	1.20	1.04		FRANCE	Grosbot	Ronsenac	OX	0	0	W	D				
souf4	1	3	42	19	61	1481	1500	1500	5.01	2.36	3.12	4.18		FRANCE	Grosbot	Souffrignac	OX	0	0	W	E				
eih1	1		69	29	98	1471	1500	1500	0.86	0.63	0.72	0.79		FRANCE	Orbec	Phildar	OX	0	0	Su	E				
eih10	1	10	58	26	84	1474	1500	1500	1.79	0.91	0.95	1.52		FRANCE	Orbec	Phildar	OX	0	0	Su	E				
eih6	1	2	80	28	108	1472	1500	1500	1.55	0.83	0.98	1.37		FRANCE	Orbec	Phildar	OX	0	0	Sp	E				
eih7x	1	5	73	30	103	1470	1500	1500	1.76	1.42	1.04	1.66		FRANCE	Orbec	Phildar	OX	0	0	Su	E				
eih8	1	10	68	36	104	1464	1500	1500	1.21	0.27	0.45	0.88		FRANCE	Orbec	Phildar	OX	0	0	W	E				
eih9	1		52	12	64	1488	1500	1500	1.68	1.77	1.78	1.70		FRANCE	Orbec	Phildar	OX	0	0	W	E				
rum13	2		159	31	190	1373	1404	1404	1.32	1.05	0.84	1.28		FRANCE	Rumesnil	Grange-aux-Dimes	OX	0	0		D				
rum2x	1		66	18	84	1349	1367	1367	3.46	1.49	3.23	3.03		FRANCE	Rumesnil	Grange-aux-Dimes	OX	0	0	W	D	post			
ho1000	1	1	17	6	23	-3917	-3911	-3906	2.89	2.24	2.72	2.72		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho114	1	1	13	8	21	-3920	-3912	-3906	3.03	3.21	2.70	3.10		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1170	1	1	6	14	20	-3925	-3911	-3906	1.31	1.79	1.31	1.65		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1235	1	1	12	11	23	-3922	-3911	-3906	3.68	3.00	3.88	3.36		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1350	1	1	10	11	21	-3921	-3910	-3906	2.11	2.77	2.11	2.45		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1351	1	1	13	7	20	-3917	-3910	-3906	2.06	2.50	2.29	2.21		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			

Code	Phase	Pith	H/Wd	SWd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	SWd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
ho1352	1	1	12	8	20	-3918	-3910	-3906	2.40	2.16	2.75	2.31		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho137	1	1	14	7	21	-3919	-3912	-3906	3.22	3.67	3.22	3.37		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1382	1	1	14	7	21	-3918	-3911	-3906	3.13	3.40	3.24	3.22		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1383	1	1	11	8	19	-3919	-3911	-3906	1.77	1.75	1.85	1.76		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1388	1	1	12	7	19	-3919	-3912	-3906	3.07	2.91	2.97	3.01		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1422	1	1	20	9	29	-3920	-3911	-3906	2.10	2.93	2.16	2.36		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1431	1	1	14	7	21	-3917	-3910	-3906	2.47	2.30	2.57	2.42		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1439	1	1	4	16	20	-3927	-3911	-3906	1.60	1.43	1.60	1.47		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1452	1	1	14	9	23	-3920	-3911	-3906	1.74	1.63	1.70	1.70		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1453	1	1	12	8	20	-3919	-3911	-3906	1.98	2.23	2.09	2.08		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1459	1	1	11	9	20	-3920	-3911	-3906	2.60	1.42	2.52	2.07		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1474	1	1	3	17	20	-3928	-3911	-3906	1.74	1.52	1.74	1.55		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1480	1	1	11	7	18	-3918	-3911	-3906	4.56	2.65	4.80	3.82		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1497	1	1	7	8	15	-3919	-3911	-3906	2.45	2.12	2.45	2.27		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho1528	1	1	17	9	26	-3915	-3906	-3906	2.72	1.50	3.04	2.30		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0	Su	D	pile			
ho1600	1	1	14	10	24	-3916	-3906	-3906	2.30	1.21	2.34	1.84		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0	Su	D	pile			
ho1617	1	1	11	12	23	-3919	-3907	-3906	1.69	1.34	1.73	1.51		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0	Sp	D	pile			
ho2047	1	1	27	9	36	-3921	-3912	-3906	1.65	1.43	1.71	1.59		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0	Sp	D	pile			
ho2050	1	1	21	12	33	-3923	-3911	-3906	1.69	1.41	1.53	1.59		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0	Sp	D	pile			
ho2051	1	1	23	8	31	-3919	-3911	-3906	1.74	1.70	1.86	1.73		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho2052	1	1	28	11	39	-3922	-3911	-3906	1.33	1.83	1.56	1.47		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0	Su	D	pile			
ho2072	1	1	23	10	33	-3921	-3911	-3906	1.45	1.71	1.76	1.53		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho212	1	1	16	8	24	-3919	-3911	-3906	1.78	1.78	1.57	1.78		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho229	1	1	8	13	21	-3923	-3910	-3906	2.69	2.68	2.69	2.68		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho233	1	1	21	8	29	-3918	-3910	-3906	1.89	2.34	2.09	2.02		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho235	1	1	12	9	21	-3919	-3910	-3906	2.47	2.03	2.32	2.28		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho240	1	1	10	8	18	-3919	-3911	-3906	3.77	3.18	3.77	3.51		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho243	1	1	15	14	29	-3925	-3911	-3906	2.21	1.16	2.09	1.70		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho304	1	1	18	11	29	-3921	-3910	-3906	2.13	2.10	2.37	2.12		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho309	1	1	9	12	21	-3922	-3910	-3906	1.60	1.77	1.60	1.69		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho31	1	1	6	15	21	-3925	-3910	-3906	1.45	1.34	1.45	1.37		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho32	1	1	14	8	22	-3918	-3910	-3906	1.64	1.43	1.69	1.56		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho322	1	1	11	11	22	-3921	-3910	-3906	1.90	1.07	1.65	1.49		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho329	1	1	13	8	21	-3919	-3911	-3906	3.15	2.81	3.28	3.02		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho330	1	1	11	15	26	-3925	-3910	-3906	2.13	2.15	2.16	2.14		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho331	1	1	12	7	19	-3918	-3911	-3906	2.26	2.01	2.50	2.17		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho332	1	1	8	12	20	-3922	-3910	-3906	1.88	2.02	1.88	1.96		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho335	1	1	9	8	17	-3919	-3911	-3906	3.56	2.56	3.56	3.09		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho356	1	1	8	11	19	-3922	-3911	-3906	3.21	1.76	3.20	2.37		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho377	1	1	10	10	20	-3921	-3911	-3906	2.18	2.01	2.17	2.09		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho389	1	1	15	7	22	-3918	-3911	-3906	3.38	3.36	2.95	3.37		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho390	1	1	12	10	22	-3921	-3911	-3906	2.73	2.08	2.80	2.44		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho450	1	1	13	11	24	-3922	-3911	-3906	1.72	1.15	1.42	1.46		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho457	1	1	15	11	26	-3921	-3910	-3906	1.50	1.78	1.41	1.62		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho463	1	1	15	9	24	-3919	-3910	-3906	1.60	1.72	1.64	1.65		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			
ho473	1	1	15	16	31	-3926	-3910	-3906	1.52	0.99	1.22	1.25		GERMANY	Lake Constance	Hornstaad-Hornle I	AB	0	0		D	pile			

Code	Phase	Path	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
ho483	1	1	11	11	22	-3921	-3910	-3906	2.24	1.64	1.96	1.94		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho531	1	1	12	8	20	-3920	-3912	-3906	3.27	3.09	3.03	3.20		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho534	1	1	18	9	27	-3921	-3912	-3906	2.29	2.29	1.84	2.29		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho539	1	1	19	8	27	-3920	-3912	-3906	2.32	1.98	2.12	2.22		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho545	1	1	15	8	23	-3919	-3911	-3906	1.76	2.58	1.82	2.05		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho567	1	1	11	8	19	-3919	-3911	-3906	3.34	2.48	2.99	2.98		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho568	1	1	14	7	21	-3917	-3910	-3906	2.00	1.70	2.09	1.90		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho570	1	1	9	13	22	-3923	-3910	-3906	2.04	1.67	2.04	1.82		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho575	1	1	12	9	21	-3919	-3910	-3906	2.76	1.55	2.59	2.24		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho578	1	1	7	13	20	-3924	-3911	-3906	1.63	1.40	1.63	1.48		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho585	1	1	9	12	21	-3922	-3910	-3906	1.47	2.06	1.47	1.81		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho597	1	1	12	9	21	-3919	-3910	-3906	2.64	2.25	2.62	2.47		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho605	1		16	11	27	-3921	-3910	-3906	1.19	1.40	1.11	1.28		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho642	1	1	11	8	19	-3919	-3911	-3906	2.40	2.81	2.41	2.57		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho660	1	1	16	12	28	-3922	-3910	-3906	1.59	2.30	1.82	1.89		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho780	1	1	15	10	25	-3919	-3909	-3906	2.61	2.63	2.70	2.62		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho797	1	1	4	11	15	-3921	-3910	-3906	3.12	2.26	3.12	2.49		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho810	1	1	15	5	20	-3916	-3911	-3906	2.92	3.29	2.72	3.01		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho814	1	1	10	8	18	-3921	-3913	-3906	2.19	2.74	2.18	2.43		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho83	1	1	20	16	36	-3922	-3906	-3906	1.50	1.10	1.41	1.32		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho870	1	1	13	7	20	-3919	-3912	-3906	2.29	2.73	2.11	2.44		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho892	1	1	9	8	17	-3920	-3912	-3906	3.67	3.30	3.67	3.50		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho897	1	1	16	8	24	-3919	-3911	-3906	1.51	2.23	1.51	1.75		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho904	1	1	12	9	21	-3920	-3911	-3906	2.32	1.35	2.08	1.90		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho909	1	1	13	10	23	-3921	-3911	-3906	2.03	1.30	1.81	1.71		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho916	1	1	14	10	24	-3921	-3911	-3906	2.53	2.41	2.63	2.48		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho923	1	1	14	7	21	-3918	-3911	-3906	2.53	3.47	2.51	2.84		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho925	1	1	11	11	22	-3922	-3911	-3906	2.53	1.64	2.36	2.08		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho930	1	1	13	9	22	-3920	-3911	-3906	3.17	2.31	3.11	2.81		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho931	1	1	11	9	20	-3920	-3911	-3906	3.44	3.63	3.57	3.52		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho932	1	1	15	6	21	-3917	-3911	-3906	2.61	3.30	2.69	2.81		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho970	1	1	14	6	20	-3917	-3911	-3906	2.85	2.70	2.90	2.80		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho971	1	1	15	12	27	-3923	-3911	-3906	2.07	0.97	1.81	1.58		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho974	1	1	10	9	19	-3921	-3912	-3906	2.64	2.92	2.64	2.77		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho982	1	1	22	14	36	-3920	-3906	-3906	1.50	1.36	1.26	1.44		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho986	1	1	16	10	26	-3921	-3911	-3906	2.16	1.76	2.11	2.01		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho992	1	1	14	10	24	-3921	-3911	-3906	2.89	2.23	2.65	2.62		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho994	1	1	14	9	23	-3920	-3911	-3906	3.73	2.94	3.44	3.42		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho995	1	1	13	8	21	-3919	-3911	-3906	2.65	2.57	2.46	2.62		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho997	1	1	13	6	19	-3917	-3911	-3906	2.71	2.57	2.76	2.66		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
ho998	1	1	13	16	29	-3927	-3911	-3906	1.78	1.81	1.77	1.80		GERMANY	Lake Constance	Hornstaad-Hornle I		AB	0	0		D	pile			
si1007	1	1	36	15	51	-2896	-2881	-2880	1.36	0.87	0.90	1.21		GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si1016	1	1	42	19	61	-2912	-2893	-2880	2.29	0.70	1.62	1.80		GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0		D				
si1073	1	1	58	20	78	-2913	-2893	-2880	1.24	0.71	0.77	1.10		GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si13	1	1	52	30	82	-2917	-2887	-2880	1.42	0.60	0.95	1.12		GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0		D				
si132	1	1	23	15	38	-2918	-2903	-2880	1.56	1.27	0.98	1.45		GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0		D				

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
si139	1	1	29	13	42	-2916	-2903	-2880	1.68	1.10	1.42	1.50		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si140	1	1	38	18	56	-2921	-2903	-2880	1.69	0.83	0.91	1.41		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si155	1	1	52	24	76	-2905	-2881	-2880	1.01	0.47	0.70	0.84		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1587	1	1	65	15	80	-2916	-2901	-2880	0.95	0.69	0.54	0.90		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1598	1	1	39	14	53	-2917	-2903	-2880	1.48	0.98	1.39	1.35		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1599	1	1	66	14	80	-2887	-2873	-2880	1.13	0.72	0.70	1.06		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si163	1	1	57	16	73	-2897	-2881	-2880	1.98	0.86	1.06	1.74		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1647	1	1	32	16	48	-2917	-2901	-2880	1.06	0.86	1.16	0.99		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1687	1	1	26	19	45	-2922	-2903	-2880	1.41	0.73	0.97	1.12		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1726	1	1	43	18	61	-2918	-2900	-2880	1.43	0.89	1.16	1.27		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1732	1	1	72	25	97	-2890	-2865	-2880	1.04	0.41	0.43	0.88		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1739	1	1	49	27	76	-2916	-2889	-2880	1.32	0.39	0.49	0.99		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1771	1	1	33	15	48	-2896	-2881	-2880	1.09	0.96	0.94	1.05		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si178	1	1	45	18	63	-2911	-2893	-2880	2.02	0.70	1.41	1.65		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si18	1	1	64	17	81	-2892	-2875	-2880	1.59	0.83	0.85	1.43		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1809	1	1	65	20	85	-2900	-2880	-2880	0.92	0.39	0.38	0.79		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1810	1	1	63	18	81	-2891	-2873	-2880	1.40	0.52	0.58	1.21		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1818	1	1	50	16	66	-2889	-2873	-2880	0.92	0.51	0.36	0.82		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1834	1	1	36	26	62	-2920	-2894	-2880	1.62	0.51	0.87	1.15		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1853	1	1	55	18	73	-2879	-2861	-2880	1.99	1.78	2.12	1.94		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Sp	D				
si1861	1	1	78	15	93	-2895	-2880	-2880	1.39	0.67	0.58	1.27		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1867	1	1	35	15	50	-2909	-2894	-2880	1.27	0.63	0.95	1.08		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1871	1	1	109	32	141	-2898	-2866	-2880	1.03	0.37	0.41	0.88		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Sp	D				
si1884	1	1	64	21	85	-2901	-2880	-2880	1.08	0.41	0.48	0.91		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1887	1	1	44	15	59	-2888	-2873	-2880	1.56	0.82	0.92	1.37		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1906	1	1	60	19	79	-2915	-2896	-2880	1.04	0.69	0.64	0.96		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1909	1	1	59	19	78	-2892	-2873	-2880	1.20	0.46	0.60	1.02		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1915	1	1	58	16	74	-2912	-2896	-2880	1.46	0.79	0.79	1.31		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1917	1	1	76	17	93	-2897	-2880	-2880	0.95	0.46	0.43	0.86		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1920	1	1	78	19	97	-2885	-2866	-2880	1.15	0.46	0.49	1.01		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1921	1	1	28	15	43	-2911	-2896	-2880	2.23	1.39	1.65	1.94		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1932	1	1	30	13	43	-2902	-2889	-2880	1.83	1.32	1.49	1.68		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Sp	D				
si1939	1	1	41	11	52	-2892	-2881	-2880	1.45	1.22	1.33	1.40		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1946	1	1	45	28	73	-2908	-2880	-2880	1.69	0.51	0.83	1.24		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1948	1	1	49	15	64	-2888	-2873	-2880	1.78	0.98	0.88	1.59		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si1951	1	1	27	39	66	-2919	-2880	-2880	1.29	0.33	1.12	0.72		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1963	1	1	15	49	64	-2922	-2873	-2880	0.78	0.39	0.55	0.49		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1975	1	1	31	14	45	-2894	-2880	-2880	1.62	0.97	1.17	1.42		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1984	1	1	49	13	62	-2904	-2891	-2880	1.70	1.07	1.09	1.56		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1986	1	1	63	21	84	-2901	-2880	-2880	1.37	0.76	0.91	1.22		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1987	1	1	51	21	72	-2901	-2880	-2880	0.66	0.21	0.34	0.53		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si1994	1	1	52	14	66	-2894	-2880	-2880	0.94	1.21	0.85	1.00		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2010	1	1	135	19	154	-2880	-2861	-2880	1.12	0.73	0.77	1.07		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2016	1	1	32	22	54	-2916	-2894	-2880	1.57	0.76	1.30	1.24		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2018	1	1	28	17	45	-2911	-2894	-2880	1.49	0.81	1.41	1.23		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2036	1	1	40	33	73	-2907	-2874	-2880	1.13	0.24	0.40	0.73		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
si2041	1	1	29	16	45	-2910	-2894	-2880	1.87	0.81	1.47	1.49		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si206	1	1	74	19	93	-2883	-2864	-2880	1.30	0.65	0.81	1.16		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si21	1	1	49	18	67	-2908	-2890	-2880	1.67	0.68	1.11	1.41		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2112	1	1	45	22	67	-2916	-2894	-2880	1.19	0.58	0.70	0.99		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2118	1	1	35	16	51	-2910	-2894	-2880	1.31	0.58	0.98	1.08		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2119	1	1	45	29	74	-2923	-2894	-2880	0.83	0.21	0.35	0.59		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2147	1	1	50	16	66	-2907	-2891	-2880	1.43	0.67	0.69	1.25		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2148	1	1	32	11	43	-2928	-2917	-2880	1.85	1.89	1.81	1.86		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2154	1	1	57	16	73	-2888	-2872	-2880	1.49	1.15	1.19	1.42		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2178	1	1	36	20	56	-2909	-2889	-2880	1.44	0.78	1.02	1.21		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2179	1	1	56	16	72	-2880	-2864	-2880	1.38	0.77	0.98	1.25		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si218	1	1	31	12	43	-2929	-2917	-2880	2.44	3.03	2.86	2.61		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2190	1	1	44	15	59	-2912	-2897	-2880	0.96	0.76	0.81	0.91		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si22	1	1	58	18	76	-2893	-2875	-2880	2.39	1.58	1.77	2.20		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2202	1	1	69	18	87	-2901	-2883	-2880	0.80	0.46	0.27	0.73		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2214	1	1	69	15	84	-2895	-2880	-2880	0.90	0.43	0.42	0.82		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2215	1	1	82	12	94	-2892	-2880	-2880	1.23	0.62	0.46	1.15		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2217	1	1	44	15	59	-2888	-2873	-2880	1.90	1.10	1.46	1.70		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2223	1	1	77	15	92	-2895	-2880	-2880	0.96	0.41	0.44	0.87		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2227	1	1	68	21	89	-2901	-2880	-2880	1.11	0.73	0.76	1.02		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2228	1	1	49	22	71	-2895	-2873	-2880	1.13	0.40	0.60	0.91		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2230	1	1	58	32	90	-2912	-2880	-2880	1.06	0.26	0.55	0.78		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2231	1	1	60	17	77	-2897	-2880	-2880	1.23	0.53	0.57	1.08		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2247	1	1	38	14	52	-2908	-2894	-2880	1.59	0.81	1.25	1.38		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2248	1	1	40	15	55	-2906	-2891	-2880	1.92	1.13	1.56	1.71		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2252	1	1	55	19	74	-2913	-2894	-2880	1.34	0.52	0.47	1.13		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2256	1	1	44	17	61	-2911	-2894	-2880	1.35	0.58	0.93	1.14		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si2272	1	1	78	20	98	-2885	-2865	-2880	1.06	0.69	0.62	0.98		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2273	1	1	45	22	67	-2913	-2891	-2880	1.31	0.84	1.31	1.16		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si23	1	1	63	15	78	-2890	-2875	-2880	0.97	0.79	0.69	0.93		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2575	1	1	40	14	54	-2925	-2911	-2880	1.67	1.02	1.39	1.51		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2582	1	1	81	16	97	-2891	-2875	-2880	1.24	1.00	0.95	1.20		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2603	1	1	45	25	70	-2905	-2880	-2880	1.34	0.27	0.69	0.96		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2605	1	1	55	16	71	-2905	-2889	-2880	1.73	0.95	1.47	1.56		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si2619	1	1	48	20	68	-2908	-2888	-2880	1.50	0.70	0.93	1.26		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Sp	D				
si2838	1	1	16	28	44	-2920	-2892	-2880	1.43	0.54	1.27	0.86		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si287	1	1	42	11	53	-2906	-2895	-2880	2.39	2.41	2.30	2.39		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si316	1	1	42	20	62	-2911	-2891	-2880	1.78	0.93	1.50	1.51		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si324	1	1	42	12	54	-2912	-2900	-2880	1.41	1.18	1.33	1.35		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si340	1	1	50	12	62	-2900	-2888	-2880	1.35	1.18	1.23	1.32		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si353	1	1	63	15	78	-2890	-2875	-2880	0.88	0.78	0.56	0.86		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0	Su	D				
si372	1	1	70	14	84	-2899	-2885	-2880	1.06	0.50	0.65	0.96		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si378	1	1	52	14	66	-2899	-2885	-2880	1.89	1.26	1.47	1.76		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si380	1	1	22	15	37	-2914	-2899	-2880	2.44	1.64	2.41	2.11		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si381	1	1	31	22	53	-2922	-2900	-2880	1.69	0.50	0.85	1.19		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				
si383	1	1	26	12	38	-2901	-2889	-2880	1.95	1.55	1.46	1.82		GERMANY	Lake Constance	Sipplingen-Osthafen	AB	0	0		D				

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	Date Type	Member	Type	Status	NGR
si384	1	1	25	24	49	-2929	-2905	-2880	1.82	0.33	1.17	1.09		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si385	1	1	49	17	66	-2902	-2885	-2880	1.04	0.67	0.58	0.94		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si391	1	1	21	15	36	-2921	-2906	-2880	1.26	0.77	1.13	1.05		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si393	1	1	20	23	43	-2923	-2900	-2880	1.58	0.54	1.31	1.02		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si405	1	1	50	30	80	-2915	-2885	-2880	1.21	0.28	0.64	0.86		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si415	1	1	25	23	48	-2914	-2891	-2880	1.29	0.41	1.50	0.87		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si437	1	1	59	21	80	-2911	-2890	-2880	1.36	1.08	1.42	1.29		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si443	1	1	46	20	66	-2909	-2889	-2880	1.83	0.94	1.39	1.56		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si444	1	1	44	36	80	-2924	-2888	-2880	1.36	0.38	0.65	0.92		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si450	1	1	45	21	66	-2910	-2889	-2880	1.85	1.01	1.43	1.58		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si454	1	1	31	21	52	-2921	-2900	-2880	1.71	0.46	0.88	1.20		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si464	1	1	28	14	42	-2918	-2904	-2880	2.59	2.24	2.30	2.47		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0	Sp	D				
si466	1	1	66	17	83	-2883	-2866	-2880	0.92	0.68	0.59	0.87		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si468	1	1	33	26	59	-2917	-2891	-2880	2.02	0.86	1.20	1.51		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si470	1	1	54	24	78	-2890	-2866	-2880	1.21	0.75	0.91	1.07		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si474	1	1	34	22	56	-2913	-2891	-2880	1.64	0.95	1.41	1.37		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si481	1	1	65	15	80	-2906	-2891	-2880	1.07	0.89	0.82	1.03		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si486	1	1	40	15	55	-2900	-2885	-2880	1.93	1.08	1.52	1.70		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si488	1	1	39	19	58	-2910	-2891	-2880	1.70	1.03	1.52	1.48		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si492	1	1	40	16	56	-2883	-2867	-2880	1.53	1.45	1.52	1.51		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si495	1	1	24	22	46	-2913	-2891	-2880	2.52	1.27	1.98	1.92		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si5	1	1	61	19	80	-2885	-2866	-2880	1.34	1.12	0.76	1.29		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si501	1	1	63	15	78	-2908	-2893	-2880	1.08	0.45	0.51	0.96		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si503	1	1	34	9	43	-2919	-2910	-2880	2.37	1.49	1.75	2.19		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si506	1	1	64	18	82	-2879	-2861	-2880	0.90	0.98	1.05	0.92		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si508	1	1	63	21	84	-2910	-2889	-2880	1.07	0.61	0.57	0.96		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		E				
si524	1	1	39	19	58	-2900	-2881	-2880	1.48	0.71	0.77	1.23		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0	Sp	D				
si526	1	1	42	11	53	-2923	-2912	-2880	1.16	0.75	0.81	1.07		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si528	1	1	37	29	66	-2922	-2893	-2880	1.37	0.32	0.68	0.91		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si532	1	1	38	21	59	-2928	-2907	-2880	1.39	0.65	1.00	1.12		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si534	1	1	67	18	85	-2900	-2882	-2880	1.01	0.90	0.78	0.99		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si538	1	1	48	19	67	-2910	-2891	-2880	1.45	0.99	1.47	1.32		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si541	1	1	61	14	75	-2905	-2891	-2880	1.25	0.94	0.68	1.19		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si548	1	1	50	9	59	-2900	-2891	-2880	1.34	1.73	0.60	1.40		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si554	1	1	40	12	52	-2903	-2891	-2880	1.51	0.85	0.78	1.36		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si580	1	1	33	26	59	-2917	-2891	-2880	1.84	0.78	1.29	1.37		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si590	1	1	36	17	53	-2910	-2893	-2880	1.68	1.17	1.48	1.52		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si601	1	1	24	23	47	-2915	-2892	-2880	2.92	0.74	2.38	1.85		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si603	1	1	45	14	59	-2917	-2903	-2880	1.79	0.95	1.36	1.59		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si609	1	1	36	16	52	-2919	-2903	-2880	2.42	1.92	2.60	2.27		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si612	1	1	32	18	50	-2921	-2903	-2880	1.78	1.08	1.67	1.53		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si615	1	1	47	17	64	-2898	-2881	-2880	1.73	0.94	1.08	1.52		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si616	1	1	76	19	95	-2900	-2881	-2880	1.22	0.89	1.10	1.15		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si617	1	1	45	12	57	-2915	-2903	-2880	1.65	1.23	1.51	1.56		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si623	1	1	23	16	39	-2919	-2903	-2880	1.92	1.26	1.50	1.65		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				
si627	1	1	32	28	60	-2895	-2867	-2880	1.73	0.66	0.87	1.23		GERMANY	Lake Constance	Sipplingen-Ostlaren	AB	0	0		D				

Code	Phase	Path	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
si642	1	1	84	16	100	-2897	-2881	-2880	1.14	0.60	0.71	1.05	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0		D				
si652	1	1	35	17	52	-2920	-2903	-2880	1.43	0.91	1.06	1.26	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si676	1	1	34	20	54	-2923	-2903	-2880	1.48	0.63	0.79	1.17	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si679	1	1	40	17	57	-2920	-2903	-2880	0.91	1.04	0.91	0.95	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si681	1	1	37	15	52	-2918	-2903	-2880	1.58	0.95	1.22	1.40	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si715	1	1	33	26	59	-2917	-2891	-2880	1.51	0.61	1.08	1.12	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si716	1	1	31	21	52	-2904	-2883	-2880	1.30	0.47	0.73	0.97	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si735	1	1	36	16	52	-2919	-2903	-2880	1.90	0.88	1.60	1.59	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si743	1	1	25	16	41	-2919	-2903	-2880	1.68	1.05	1.56	1.44	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si748	1	1	59	17	76	-2883	-2866	-2880	1.05	1.21	0.80	1.09	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si751	1	1	61	33	94	-2914	-2881	-2880	1.50	0.62	0.73	1.19	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si767	1	1	50	11	61	-2916	-2905	-2880	1.13	1.15	1.14	1.13	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si770	1	1	46	15	61	-2920	-2905	-2880	1.52	0.92	1.19	1.37	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si776	1	1	28	20	48	-2925	-2905	-2880	1.36	0.96	1.50	1.19	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si786	1	1	56	18	74	-2903	-2885	-2880	1.43	0.86	0.81	1.29	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si793	1	1	27	21	48	-2910	-2889	-2880	1.62	0.99	1.05	1.34	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si8	1	1	57	20	77	-2895	-2875	-2880	2.22	1.11	1.50	1.93	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0		D				
si801	1	1	55	17	72	-2922	-2905	-2880	1.11	0.35	0.51	0.93	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si802	1	1	46	21	67	-2926	-2905	-2880	1.08	0.52	0.73	0.90	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si805	1	1	28	17	45	-2909	-2892	-2880	1.11	0.70	0.88	0.96	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0		D				
si808	1	1	61	22	83	-2919	-2897	-2880	0.96	0.58	0.56	0.86	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si828	1	1	30	11	41	-2924	-2913	-2880	1.63	1.00	1.37	1.46	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si847	1	1	43	21	64	-2914	-2893	-2880	1.22	0.49	0.66	0.98	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si954	1	1	110	16	126	-2882	-2866	-2880	0.88	0.62	0.57	0.85	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si978	1	1	27	15	42	-2918	-2903	-2880	2.08	1.34	1.56	1.82	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si981	1	1	35	15	50	-2918	-2903	-2880	1.73	1.07	1.54	1.53	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Su	D				
si989	1	1	44	21	65	-2912	-2891	-2880	1.41	0.89	1.06	1.24	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
si992	1	1	28	20	48	-2913	-2893	-2880	1.96	0.84	1.79	1.49	GERMANY	Lake Constance	Sipplingen-Osthafen		AB	0	0	Sp	D				
sf1	1		23	21	44	1602	1623	1623	2.58	1.85	1.47	2.23	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	W	E	lintel			
sf12	1	1	53	17	70	1606	1623	1623	2.18	1.70	2.37	2.06	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	Su	E	misc			
sf2	1	5	21	19	40	1604	1623	1623	3.01	2.01	2.77	2.54	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	Sp	E				
sf4	1		95	37	132	1586	1623	1623	0.62	0.45	2.72	0.57	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	Sp	E	joist			
sf42	1	25	135	24	159	1599	1623	1623	0.83	0.83	0.57	0.83	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	Sp	D				
sf43	1		145	23	168	1600	1623	1623	0.84	0.94	1.01	0.85	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	Sp	D				
sf44	1	25	172	22	194	1601	1623	1623	0.69	1.03	0.95	0.72	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	Sp	A				
sf7b	1		117	25	142	1598	1623	1623	1.17	0.98	0.66	1.14	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	W	E	beam			
sf8	1	5	49	18	67	1605	1623	1623	2.03	1.79	0.51	1.96	Guernsey	St Martin	Saints Farm, Icart Rd		OX	0	0	Sp	E	beam			
bor1	1	10	32	21	53	1409	1430	1430	1.65	0.93	1.12	1.37	Guernsey	Vale	Bordeaux House		OX	0	0		E	joist			
Q1001	2		108	32	140	1625	1657	1657	3.27	3.47	4.93	3.32	IRELAND	Antrim	Beech House, Lisburn		BF	0	0	W	D		Domestic	Low	
q993	1		145	32	177	1598	1630	1630	1.51	0.57	0.75	1.34	IRELAND	Antrim	Beech House, Lisburn		BF	0	0	Sp	D		Domestic	Low	
q1021	1		153	32	185	1679	1711	1717	0.11	0.06	0.08	0.10	IRELAND	Antrim	Gloverston House		BF	0	0	Sp	D		Domestic	Middle	
q1022	1		65	24	89	1692	1716	1717	0.28	0.22	0.26	0.26	IRELAND	Antrim	Gloverston House		BF	0	0	W	D		Domestic	Middle	
q1023	1		50	29	79	1687	1716	1717	0.42	0.25	0.40	0.36	IRELAND	Antrim	Gloverston House		BF	0	0	W	D		Domestic	Middle	
q1024	1		59	34	93	1682	1716	1717	0.25	0.20	0.21	0.23	IRELAND	Antrim	Gloverston House		BF	0	0	W	D		Domestic	Middle	
q1025	1		107	36	143	1681	1717	1717	0.24	0.11	0.12	0.21	IRELAND	Antrim	Gloverston House		BF	0	0	W	D		Domestic	Middle	
q1029	1		70	24	94	1693	1717	1717	0.25	0.19	0.28	0.23	IRELAND	Antrim	Gloverston House		BF	0	0	W	D		Domestic	Middle	

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
q1030	1		64	32	96	1685	1717	1717	0.29	0.20	0.20	0.26		IRELAND	Antrim	Gloverston House	BF	0	0	W	D		Domestic	Middle	
q8216	1		97	50	147	1619	1669	1669	0.36	0.24	0.12	0.32		IRELAND	Antrim	Magheralane House	BF	0	0	W	D		Domestic	Middle	
Q3261b	1		190	27	217	796	823	823	0.53	0.29	0.50	0.50		IRELAND	Antrim	Rasharkin Horizontal Mill	BF	0	0	W	D				
q4302	1		100	45	145	1610	1655	1655	0.35	0.13	0.11	0.28		IRELAND	Antrim	Seacash House	BF	0	0	Sp	D	post	Domestic	Low	
q1987	1		105	24	129	1593	1617	1618	1.26	1.33	1.24	1.27		IRELAND	Antrim	Shaws Bridge	BF	0	0	W	D		Public	Misc	
q2049	1		33	20	53	1598	1618	1618	1.16	0.91	1.21	1.07		IRELAND	Antrim	Shaws Bridge	BF	0	0	W	D		Public	Misc	
q2050	2		85	43	128	1587	1630	1631	1.47	0.66	1.18	1.20		IRELAND	Antrim	Shaws Bridge	BF	0	0	Sp	D		Public	Misc	
q2060b	1		38	47	85	1572	1619	1618	0.59	0.38	0.62	0.47		IRELAND	Antrim	Shaws Bridge	BF	0	0	W	D		Public	Misc	
q2066	2		95	34	129	1597	1631	1631	1.15	0.45	0.55	0.96		IRELAND	Antrim	Shaws Bridge	BF	0	0	Sp	D		Public	Misc	
q7580	1		89	34	123	1633	1667	1667	0.51	0.22	0.37	0.43		IRELAND	Antrim	White House	BF	0	0	W	D		Domestic	Low	
Q10085	1		29	25	54	1975	2000	2001	2.45	2.05	2.21	2.26		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10156	1	1	95	17	112	1979	1996	2001	1.71	1.37	0.97	1.66		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10171	1	20	115	21	136	1980	2001	2001	1.44	0.60	0.62	1.31		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10172M	1		95	17	112	1984	2001	2001	1.18	1.25	1.22	1.19		IRELAND	Armagh	The Mall - Observatory	BF	2	1		D				
Q10173	1		59	11	70	1990	2001	2001	2.12	1.47	2.52	2.02		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10174	1	20	126	13	139	1988	2001	2001	0.89	0.90	0.80	0.89		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10175	1		83	16	99	1985	2001	2001	1.58	1.72	1.46	1.61		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10176	1		120	24	144	1977	2001	2001	1.34	0.84	0.57	1.26		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10177	1		137	20	157	1981	2001	2001	0.78	0.48	0.39	0.74		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10178	1		120	23	143	1978	2001	2001	1.02	0.84	0.50	0.99		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10179	1		111	17	128	1984	2001	2001	1.12	0.84	1.07	1.08		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10180	1		108	17	125	1984	2001	2001	0.94	0.85	0.86	0.93		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10181	1		127	23	150	1978	2001	2001	1.41	0.97	0.66	1.34		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10182	1		128	24	152	1977	2001	2001	1.08	0.58	0.64	1.00		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10183	1		122	26	148	1975	2001	2001	1.05	0.93	0.64	1.03		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10184	1		83	19	102	1982	2001	2001	1.78	1.52	1.52	1.73		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10185	1		51	8	59	1993	2001	2001	2.27	2.60	3.20	2.31		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q10186	1	1	47	12	59	1989	2001	2001	2.23	1.41	2.78	2.06		IRELAND	Armagh	The Mall - Observatory	BF	0	0		D				
Q3644	1		79	22	101	821	843	843	0.53	0.75	0.91	0.57		IRELAND	Cork	Keelaraheen Horizontal Mill	BF	0	0	Sp	D				
Q10362	1		110	72	182	1032	1104	1104	0.93	0.19	0.37	0.64		IRELAND	Cork	South Main St	BF	0	0	Sp	D				
Q9452	1		229	24	253	1121	1145	1145	0.62	0.42	0.24	0.60		IRELAND	Cork	Tuckey Street	BF	0	0	W	D				
Q9453	1		146	43	189	1097	1140	1145	0.53	0.26	0.37	0.47		IRELAND	Cork	Tuckey Street	BF	0	0	W	D				
Q9454	1		125	41	166	1098	1139	1145	0.59	0.41	0.59	0.55		IRELAND	Cork	Tuckey Street	BF	0	0	Sp	D				
q8873	1		137	31	168	1639	1670	1671	0.39	0.21	0.23	0.36		IRELAND	Down	Cultra House	BF	0	0	Sp	D	principal	Domestic	Low	
q8880	1		67	20	87	1647	1667	1671	0.90	0.99	1.38	0.92		IRELAND	Down	Cultra House	BF	0	0	W	D	purlin	Domestic	Low	
q9033	1		89	35	124	1632	1667	1667	0.68	0.33	0.53	0.58		IRELAND	Down	Main Street, Waringstown	BF	0	0	W	D		Misc	Low	
Q10013	1		147	42	189	576	618	620	0.53	0.24	0.16	0.46		IRELAND	Down	Nendrum Tidal Mill	BF	0	0		D				
Q10019	1		71	51	122	569	620	620	1.10	0.39	0.70	0.80		IRELAND	Down	Nendrum Tidal Mill	BF	0	0		D				
Q10213	1	1	65	60	125	560	620	620	0.47	0.25	0.25	0.36		IRELAND	Down	Nendrum Tidal Mill	BF	0	0		A				
Q10214	1	20	118	19	137	602	621	620	0.38	0.56	0.52	0.41		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	W	D				
Q10215	1	1	69	35	104	585	620	620	0.45	0.39	0.50	0.43		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	Sp	D				
Q10216	1	1	102	39	141	581	620	620	0.48	0.28	0.34	0.43		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	W	D				
Q10217	1	1	61	44	105	575	619	620	0.56	0.24	0.64	0.43		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	Sp	D				
Q10226	1	1	102	42	144	578	620	620	0.38	0.19	0.11	0.33		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	Sp	D				
Q10227	1		56	36	92	583	619	620	0.73	0.25	0.39	0.54		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	Sp	D				
Q10228	1		133	26	159	593	619	620	0.40	0.41	0.30	0.40		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	Sp	D				

Code	Phase	Path	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
Q10446	1	1	103	37	140	582	619	620	0.95	0.79	0.63	0.91		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	W	D				
Q9803M	1	1	82	32	114	757	789	620	0.37	0.23	0.22	0.33		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	W	D				
Q9914	1	1	42	28	70	591	619	620	0.98	0.79	0.79	0.90		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	Sp	D				
Q9917m	1	20	88	33	121	587	620	620	0.61	0.28	0.33	0.52		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	Sp	D				
Q9918	1		105	31	136	588	619	620	0.45	0.33	0.29	0.42		IRELAND	Down	Nendrum Tidal Mill	BF	0	0	Sp	D				
Q9931	1	20	109	51	160	567	618	620	0.46	0.23	0.26	0.39		IRELAND	Down	Nendrum Tidal Mill	BF	0	0		D				
Q9932	1	20	103	36	139	584	620	620	0.37	0.27	0.22	0.35		IRELAND	Down	Nendrum Tidal Mill	BF	0	0		D				
q1122	1		221	29	250	1631	1660	1659	0.16	0.11	0.12	0.15		IRELAND	Down	Waringstown Grange	BF	0	0	W	D		Domestic	Middle	
Q8594		1	59	15	74	1970	1985	1992	1.67	1.10	1.25	1.56		IRELAND	Down	Woodlands - Ballygrainey	BF	0	0	W	D				
Q8595		10	60	23	83	1968	1991	1992	1.22	1.26	0.94	1.23		IRELAND	Down	Woodlands - Ballygrainey	BF	0	0		D				
Q8596			60	13	73	1978	1991	1992	1.55	1.48	1.54	1.54		IRELAND	Down	Woodlands - Ballygrainey	BF	0	0		D				
Q8597		10	58	18	76	1973	1991	1992	0.94	0.74	0.78	0.89		IRELAND	Down	Woodlands - Ballygrainey	BF	0	0		D				
Q8598		10	40	24	64	1967	1991	1992	1.37	0.43	0.46	1.02		IRELAND	Down	Woodlands - Ballygrainey	BF	0	0		D				
Q8599		10	64	13	77	1978	1991	1992	0.61	0.57	0.46	0.60		IRELAND	Down	Woodlands - Ballygrainey	BF	0	0		D				
Q8600		10	55	17	72	1974	1991	1992	0.84	0.95	0.77	0.86		IRELAND	Down	Woodlands - Ballygrainey	BF	0	0		D				
Q7547	1		135	33	168	1953	1986	1990	2.30	1.10	1.26	2.06		IRELAND	Down	Woodlands - Saintfield House	BF	0	0		D				
Q8279	1	20	158	20	178	1970	1990	1990	0.95	0.84	0.87	0.94		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
Q8280	1	1	144	34	178	1956	1990	1990	0.58	0.87	0.71	0.64		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
Q8281	1	20	156	22	178	1968	1990	1990	0.72	0.89	0.62	0.74		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
Q8282	1	1	141	38	179	1952	1990	1990	0.80	0.26	0.32	0.68		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
Q8283	1	1	185	30	215	1960	1990	1990	0.79	0.84	1.36	0.79		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
Q8284	1	1	162	39	201	1951	1990	1990	0.74	0.43	0.40	0.68		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
Q8285	1		140	51	191	1939	1990	1990	0.59	0.32	0.29	0.52		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
Q8286	1	20	162	38	200	1952	1990	1990	0.59	0.30	0.42	0.53		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
Q8287	1		157	33	190	1957	1990	1990	0.62	0.29	0.40	0.56		IRELAND	Down	Woodlands - Saintfield House	BF	0	0	Sp	D				
q10100	1		172	56	228	1212	1268	1268	0.27	0.20	0.19	0.26		IRELAND	Dublin	John Dillon Street	BF	0	0	W	D	board	Domestic	Low	
q10101	1		175	58	233	1210	1268	1268	0.34	0.20	0.31	0.31		IRELAND	Dublin	John Dillon Street	BF	0	0	W	D	board	Domestic	Low	
q3180	1		207	31	238	1649	1680	1680	0.27	0.27	0.23	0.27		IRELAND	Dublin	Oldbawn House	BF	0	0	Sp	D	beam	Domestic	Middle	
Q8122	1		162	44	206	1158	1202	1202	0.57	0.39	0.32	0.53		IRELAND	Dublin	Patrick Street	BF	0	0		D				
Q8124	1		204	34	238	1168	1202	1202	0.47	0.28	0.27	0.44		IRELAND	Dublin	Patrick Street	BF	0	0		D				
q9176	1		131	22	153	1561	1583	1584	0.51	0.62	0.37	0.53		IRELAND	Dublin	Rathfarnham Castle	BF	0	0	Sp	D	rafter	Domestic	Gentry	
q9177	1	20	141	42	183	1542	1584	1584	0.51	0.22	0.38	0.44		IRELAND	Dublin	Rathfarnham Castle	BF	0	0	W	D	rafter	Domestic	Gentry	
q9178	1	20	129	26	155	1558	1584	1584	0.44	0.56	0.49	0.46		IRELAND	Dublin	Rathfarnham Castle	BF	0	0	W	D	rafter	Domestic	Gentry	
q9180m	1	20	73	20	93	1563	1583	1584	0.75	0.41	0.81	0.68		IRELAND	Dublin	Rathfarnham Castle	BF	2	2	Sp	D	tiebeam	Domestic	Gentry	
q9181	1	20	149	32	181	1551	1583	1584	0.37	0.34	0.55	0.37		IRELAND	Dublin	Rathfarnham Castle	BF	0	0	Sp	D	rafter	Domestic	Gentry	
q9183	1		52	32	84	1552	1584	1584	1.07	0.33	0.84	0.79		IRELAND	Dublin	Rathfarnham Castle	BF	0	0	W	D	purlin	Domestic	Gentry	
q9184m	1	20	148	22	170	1562	1584	1584	0.53	0.26	0.33	0.50		IRELAND	Dublin	Rathfarnham Castle	BF	0	0	W	D	rafter	Domestic	Gentry	
q9186	1		153	28	181	1556	1584	1584	0.60	0.41	0.49	0.57		IRELAND	Dublin	Rathfarnham Castle	BF	0	0	W	D	joist	Domestic	Gentry	
q8642	1	0	148	54	202	1246	1300	1300	0.30	0.22	0.18	0.28		IRELAND	Dublin	St Audoen's Church, High Street	BF	0	0	W	D		Church	Monastic	
q9599	1	1	239	36	275	1620	1656	1656	0.62	0.63	0.61	0.62		IRELAND	Dublin	Townsend Street	BF	0	0	W	D		Misc	Low	
q9600	1		116	24	140	1631	1655	1656	0.80	0.98	1.55	0.83		IRELAND	Dublin	Townsend Street	BF	0	0	W	D		Misc	Low	
q3016	1		90	28	118	1322	1350	1350	0.61	0.44	0.66	0.57		IRELAND	Fermanagh	Corban Lough	BF	0	0	W	E	pile	Misc	Low	
q9374m	1	1	55	26	81	1612	1638	1638	0.68	0.40	0.25	0.59		IRELAND	Galway	Clonfert House	BF	2	11	W	D		Domestic	Middle	
q9375	1	1	75	12	87	1626	1638	1638	0.49	0.48	0.27	0.49		IRELAND	Galway	Clonfert House	BF	0	0	W	D		Domestic	Middle	
q9379	1	1	60	23	83	1615	1638	1638	0.53	0.41	0.39	0.50		IRELAND	Galway	Clonfert House	BF	0	0	W	D		Domestic	Middle	
q9380	1	1	65	16	81	1622	1638	1638	0.51	0.57	0.67	0.53		IRELAND	Galway	Clonfert House	BF	0	0	W	D		Domestic	Middle	

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
Q9490	1		44	19	63	1978	1997	1997	1.01	1.06	0.70	1.02		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9491	1		75	28	103	1969	1997	1997	0.94	0.70	1.00	0.88		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9492a	1	1	111	40	151	1956	1996	1997	0.47	0.37	0.37	0.44		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9493	1		93	29	122	1964	1993	1997	0.60	0.79	0.46	0.64		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9494	1	20	98	27	125	1970	1997	1997	0.83	0.38	0.35	0.73		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9495	1	20	122	35	157	1962	1997	1997	0.78	0.15	0.25	0.64		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9496	1		120	35	155	1962	1997	1997	0.49	0.26	0.42	0.44		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9497	1	20	123	24	147	1973	1997	1997	0.57	0.39	0.37	0.54		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9498	1		111	37	148	1960	1997	1997	0.58	0.25	0.27	0.50		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9499	1		116	22	138	1975	1997	1997	0.68	0.43	0.32	0.64		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9500	1		77	31	108	1966	1997	1997	0.84	0.66	0.67	0.79		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9501	1		97	26	123	1971	1997	1997	1.08	0.58	0.34	0.97		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9502	1		94	30	124	1967	1997	1997	1.41	0.98	1.16	1.30		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9503	1		88	35	123	1962	1997	1997	0.79	0.44	0.92	0.69		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9504	1		72	24	96	1973	1997	1997	1.54	1.46	1.22	1.52		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9505	1		28	17	45	1980	1997	1997	1.04	0.97	0.97	1.01		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9506	1		130	15	145	1982	1997	1997	0.64	1.29	0.74	0.71		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9507	1		79	29	108	1968	1997	1997	0.77	0.87	1.08	0.79		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9508	1		109	17	126	1980	1997	1997	0.64	1.11	0.65	0.71		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9509	1	20	104	30	134	1964	1994	1997	0.88	0.34	0.86	0.76		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q9510	1	1	121	20	141	1977	1997	1997	0.84	0.61	0.76	0.81		IRELAND	Galway	Garryland Wood	BF	0	0		D				
Q6416	1		44	14	58	-1497	-1483	-1483	0.40	0.60	0.42	0.44		IRELAND	Kildare	Timahoe	BF	0	0	Sp	D				
q9771	1	20	72	33	105	1492	1525	1526	0.82	0.39	0.41	0.68		IRELAND	Kilkenny	Clowmantagh Castle	BF	0	0	Sp	D		Domestic	Gentry	
q10457	1	1	204	20	224	1610	1630	1630	1.08	0.64	0.70	1.04		IRELAND	Kilkenny	John's Bridge	BF	0	0	W	D		Public	Misc	
Q10246	1		25	24	49	1978	2002	2002	0.64	0.61	0.51	0.62		IRELAND	Leithrim	Glencar	BF	0	0	Sp	D				
Q10247	1		22	37	59	1965	2002	2002	0.79	0.39	0.64	0.54		IRELAND	Leithrim	Glencar	BF	0	0	W	D				
Q10248	1		60	33	93	1969	2002	2002	0.31	0.30	0.22	0.30		IRELAND	Leithrim	Glencar	BF	0	0	Sp	D				
Q10249	1		18	33	51	1969	2002	2002	0.61	0.41	0.56	0.48		IRELAND	Leithrim	Glencar	BF	0	0	W	D				
Q10250	1		34	27	61	1975	2002	2002	0.48	0.43	0.41	0.46		IRELAND	Leithrim	Glencar	BF	0	0	W	D				
Q10251	1		8	37	45	1965	2002	2002	0.67	0.47	0.67	0.51		IRELAND	Leithrim	Glencar	BF	0	0	Sp	D				
Q10252	1		31	30	61	1972	2002	2002	0.39	0.45	0.32	0.42		IRELAND	Leithrim	Glencar	BF	0	0	Sp	D				
Q10381	1		141	28	169	798	826	826	0.73	0.92	0.85	0.77		IRELAND	Leithrim	Gortermone Lough	BF	0	0						
q4363	1		147	38	185	1636	1674	1675	0.63	0.26	0.29	0.55		IRELAND	Londonderry	Coleraine (New Row)	BF	0	0	Sp	D		Misc	Low	
q8947	1	1	70	31	101	1630	1661	1661	0.52	0.57	0.52	0.54		IRELAND	Londonderry	Drumnacanon	BF	0	0	Sp	D	beam	Misc	Low	
q9787m	1		118	34	152	1606	1640	1640	0.71	0.38	0.56	0.64		IRELAND	Londonderry	Loughinsholin	BF	0	0	W	D		Misc	Low	
q940	1		60	26	86	1640	1666	1666	0.44	0.28	0.34	0.39		IRELAND	Londonderry	Pottagh House	BF	0	0	Su	D		Domestic	Low	
q1043	1		79	28	107	1669	1697	1698	0.26	0.21	0.26	0.24		IRELAND	Londonderry	Springhill House	BF	0	0	W	D	beam	Domestic	Middle	
q1054	1		88	41	129	1657	1698	1698	0.18	0.11	0.16	0.16		IRELAND	Londonderry	Springhill House	BF	0	0	W	D	stud	Domestic	Middle	
Q5631	1		117	34	151	-182	-148	-148	0.35	0.36	0.29	0.35		IRELAND	Longford	Corlea	BF	0	0		D				
Q5634	1		126	21	147	-169	-148	-148	0.63	0.73	0.68	0.64		IRELAND	Longford	Corlea	BF	0	0		D				
Q5635	1		51	27	78	-175	-148	-148	0.64	0.38	0.49	0.55		IRELAND	Longford	Corlea	BF	0	0		D				
Q5639	1		66	23	89	-171	-148	-148	0.53	0.47	0.44	0.51		IRELAND	Longford	Corlea	BF	0	0		D				
Q5640	1		60	26	86	-174	-148	-148	0.47	0.17	0.28	0.38		IRELAND	Longford	Corlea	BF	0	0		D				
Q5642	1		33	19	52	-167	-148	-148	1.22	0.85	0.95	1.09		IRELAND	Longford	Corlea	BF	0	0		D				
Q5645	1		81	24	105	-172	-148	-148	0.60	0.49	0.42	0.57		IRELAND	Longford	Corlea	BF	0	0		D				
Q10276	1	20	233	18	251	-1626	-1608	-1608	0.47	0.25	0.24	0.45		IRELAND	Longford	Derringdiff	BF	0	0	W	D	board			

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
Q8498m	1		160	31	191	-1005	-974	-974	0.32	0.15	0.23	0.29		IRELAND	Longford	Derrynaskea Trackway	BF	0	0	W	D				
Q7486	1	20	147	26	173	-945	-919	-919	0.74	0.56	0.46	0.71		IRELAND	Longford	Derryoghil	BF	0	0	Sp	D				
Q6833M	1	1	72	42	114	607	649	649	0.62	0.28	0.41	0.49		IRELAND	Lynn	Deer Park Farms	BF	0	0	W	D	stud			
Q6848	1	1	71	41	112	608	649	649	0.49	0.42	0.56	0.46		IRELAND	Lynn	Deer Park Farms	BF	0	0	W	D	stud			
Q7885	1		178	30	208	579	609	609	0.54	0.28	0.26	0.50		IRELAND	Mayo	Levallinree Lough	BF	0	0		D				
Q7946	1	1	65	29	94	719	748	748	1.10	0.65	0.38	0.96		IRELAND	Meath	Moynagh Lough	BF	0	0		D				
Q8768	1	1	181	43	224	1159	1202	1204	0.57	0.17	0.20	0.49		IRELAND	Meath	Trim Castle	BF	0	0		D				
Q8769	1		198	20	218	1175	1195	1204	0.49	0.40	0.50	0.48		IRELAND	Meath	Trim Castle	BF	0	0		D				
Q8771	1	1	130	48	178	1156	1204	1204	0.27	0.16	0.28	0.24		IRELAND	Meath	Trim Castle	BF	0	0	Sp	D				
Q8859m	1		49	26	75	1178	1204	1204	1.15	0.78	1.10	1.02		IRELAND	Meath	Trim Castle	BF	0	0	Sp	D				
Q8860	1	1	48	26	74	1178	1204	1204	0.63	0.57	0.39	0.61		IRELAND	Meath	Trim Castle	BF	0	0	Sp	D				
Q8938	1	20	67	34	101	1170	1204	1204	0.63	0.33	0.41	0.53		IRELAND	Meath	Trim Castle	BF	0	0	Sp	D				
Q8496m	1		331	27	358	-913	-886	-886	0.40	0.39	0.32	0.40		IRELAND	Offaly	Clonfinlough	BF	0	0		D				
Q9132	1	1	110	29	139	776	805	804	0.81	0.27	0.40	0.70		IRELAND	Offaly	Clonmacnoise Bridge	BF	0	0	W	D				
Q10132	1	1	200	51	251	494	545	545	0.27	0.12	0.30	0.24		IRELAND	Offaly	Daingean Bog	BF	0	0	W	D				
Q9791	1		62	28	90	-1168	-1140	-1140	0.67	0.55	0.68	0.63		IRELAND	Offaly	Drinagh	BF	0	0	W	D				
Q10350	2	1	174	38	212	506	544	544	0.32	0.22	0.19	0.31		IRELAND	Offaly	Mountlucas	BF	0	0	W	D				
Q10351	1	1	173	27	200	-699	-672	-672	0.52	0.39	0.28	0.50		IRELAND	Offaly	Mountlucas	BF	0	0	W	D				
Q9697	1		149	44	193	-975	-931	-931	0.28	0.17	0.13	0.25		IRELAND	Tipperary	Killoran	BF	0	0	W	D				
q4853	1		168	24	192	1643	1667	1676	0.35	0.40	0.39	0.36		IRELAND	Tyrone	Belleville House	BF	0	0	W	D		Domestic	Low	
Q8967M	1	1	93	18	111	1976	1994	1994	1.70	0.99	0.89	1.59		IRELAND	Tyrone	Caledon Deer Park	BF	4	9		D				
Q8968	1	10	93	17	110	1977	1994	1994	1.42	1.18	1.08	1.38		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8969	1	1	61	56	117	1938	1994	1994	1.64	0.79	1.09	1.23		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8970	1	1	90	23	113	1971	1994	1994	0.98	0.34	0.54	0.85		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8971	1	1	93	17	110	1977	1994	1994	1.60	0.78	0.94	1.47		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8972	1	1	76	16	92	1978	1994	1994	1.36	1.37	1.13	1.37		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8973	1	1	88	15	103	1979	1994	1994	1.29	1.14	1.85	1.27		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8974	1	1	81	21	102	1973	1994	1994	0.94	0.52	0.65	0.85		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8975	1	1	91	11	102	1983	1994	1994	1.06	1.48	1.12	1.11		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8976	1		84	23	107	1971	1994	1994	1.49	0.47	1.42	1.27		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8977	1		80	19	99	1975	1994	1994	0.89	0.51	0.55	0.81		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8979	1	20	100	30	130	1964	1994	1994	1.36	0.64	0.75	1.20		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
Q8980	1	1	106	29	135	1965	1994	1994	1.57	0.86	1.58	1.42		IRELAND	Tyrone	Caledon Deer Park	BF	0	0		D				
q1717	1		116	45	161	1238	1283	1283	0.29	0.20	0.24	0.26		IRELAND	Tyrone	Castlecaulfield House	BF	0	0	W	D	joist	Domestic	Gentry	
q31	1		80	23	103	1573	1596	1596	0.23	0.19	0.24	0.23		IRELAND	Tyrone	Clough House	BF	0	0	W	D	misc	Domestic	Middle	
Q5687	8		45	35	80	590	625	625	0.52	0.23	0.40	0.40		IRELAND	Tyrone	Island McHugh	BF	0	0	W	E				
Q5692	5		171	31	202	583	614	614	0.40	0.28	0.25	0.38		IRELAND	Tyrone	Island McHugh	BF	0	0	W	D				
Q5693	3		112	42	154	567	609	609	0.43	0.53	0.60	0.46		IRELAND	Tyrone	Island McHugh	BF	0	0	Sp	D				
Q5695	5		108	19	127	595	614	614	0.55	0.52	0.60	0.54		IRELAND	Tyrone	Island McHugh	BF	0	0	W	D				
Q6141	2		85	18	103	586	604	604	0.33	0.73	0.26	0.40		IRELAND	Tyrone	Island McHugh	BF	0	0	Sp	D				
Q6142	4		192	51	243	560	611	611	0.30	0.16	0.26	0.27		IRELAND	Tyrone	Island McHugh	BF	0	0	W	D				
Q6145	6		120	21	141	598	619	619	0.35	0.77	0.49	0.41		IRELAND	Tyrone	Island McHugh	BF	0	0	W	D				
Q6147	7		44	17	61	626	643	643	0.87	0.53	0.61	0.78		IRELAND	Tyrone	Island McHugh	BF	0	0	W	D				
Q6148	7		272	55	327	588	643	643	0.31	0.26	0.14	0.30		IRELAND	Tyrone	Island McHugh	BF	0	0	W	D				
Q6151	3		67	24	91	585	609	609	0.70	0.75	1.09	0.72		IRELAND	Tyrone	Island McHugh	BF	0	0	Sp	D				
Q6152	1		112	29	141	574	603	602	0.34	0.27	0.20	0.32		IRELAND	Tyrone	Island McHugh	BF	0	0	W	D				

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
Q10021	1	1	59	12	71	1605	1617	1617	0.44	0.51	0.44	0.45		IRELAND	Tyrone	Newtown Stewart Castle	BF	0	0	W	D		Domestic	Gentry	
q10022	1	1	39	13	52	1604	1617	1617	0.79	0.91	0.95	0.82		IRELAND	Tyrone	Newtown Stewart Castle	BF	0	0	W	A		Domestic	Gentry	
q10107	1		78	20	98	1675	1695	1659	0.61	0.70	1.01	0.63		IRELAND	Tyrone	Stabane Bridge	BF	0	0	W	D	pile	Public	Misc	
Q8721	1		74	32	106	1960	1992	1992	1.12	0.89	1.05	1.05		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0	W	D				
Q8722b	1	100	17	40	57	1952	1992	1992	0.87	0.74	0.84	0.78		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8723	1	20	130	51	181	1941	1992	1992	1.12	0.51	0.45	0.95		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8724	1		121	33	154	1959	1992	1992	1.45	0.84	1.20	1.32		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8725	1		146	37	183	1955	1992	1992	0.86	0.25	0.44	0.73		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8726	1	20	168	23	191	1969	1992	1992	0.66	0.50	0.72	0.64		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8727	1		130	32	162	1960	1992	1992	1.22	0.79	0.74	1.14		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8728	1	20	147	28	175	1964	1992	1992	1.11	0.76	0.59	1.05		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8729	1		160	25	185	1967	1992	1992	1.15	0.75	0.60	1.10		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8730	1	20	154	33	187	1959	1992	1992	0.81	0.50	0.47	0.75		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8732	1		125	34	159	1958	1992	1992	1.23	0.73	0.76	1.13		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8733	1	20	153	37	190	1955	1992	1992	0.78	0.24	0.32	0.67		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8734	1	1	116	32	148	1960	1992	1992	1.44	0.72	0.75	1.29		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q8735	1		149	80	229	1912	1992	1992	0.74	0.35	0.48	0.60		IRELAND	Tyrone	Woodlands - Barons Court	BF	0	0		D				
Q7634	1		87	30	117	1043	1073	1073	0.70	0.30	0.29	0.60		IRELAND	Waterford	Bakehouse Lane	BF	0	0	Sp	D	beam			
q9676	1		210	30	240	1249	1279	1279	0.56	0.29	0.31	0.53		IRELAND	Wexford	New Ross	BF	0	0	W	D	board	Church	Low	
q5495	1		160	28	188	1542	1570	1570	0.47	0.67	0.67	0.50		IRELAND	Wexford	Tintern Abbey	BF	0	0	W	D		Church	Monastic	
q5496	1		182	20	202	1550	1570	1570	0.52	1.02	0.80	0.57		IRELAND	Wexford	Tintern Abbey	BF	0	0	W	D		Church	Monastic	
q5498	1		160	26	186	1544	1570	1570	0.52	0.41	0.62	0.50		IRELAND	Wexford	Tintern Abbey	BF	0	0	W	D		Church	Monastic	
Q9531	1		111	34	145	-889	-855	-855	0.25	0.21	0.29	0.24		IRELAND	Wicklow	Ballynattin	BF	0	0	W	D				
Q356	1		122	35	157	-1560	-1525	-1525	0.14	0.12	0.13	0.14		IRELAND		Cullyhanna Lodge	BF	0	0	W	D	misc			
scec1	1	25	147	22	169	1200	1222	1222	1.06	1.00	0.95	1.06		IRELAND		Salisbury Cath Irish Imports	OX	0	0	Sp	D	collar			
scec2	1	25	123	24	147	1198	1222	1222	1.06	0.73	1.49	1.00		IRELAND		Salisbury Cath Irish Imports	OX	0	0	Sp	D	rafter			
scec4	1	25	86	26	112	1196	1222	1222	1.20	0.89	0.85	1.13		IRELAND		Salisbury Cath Irish Imports	OX	0	0	Sp	D	rafter			
moc2	1	5	64	16	80	1684	1700	1700	3.10	1.73	3.31	2.83		Jersey	Gouray	Mont Orgueil Castle	OX	0	0	Sp	E	beam			
cfj11	1	20	97	21	118	1545	1566	1566	1.21	0.87	1.92	1.15		Jersey	St Helier	Chestnut Farm	OX	0	0	Su	D	joist			
cfj15	1	10	112	19	131	1547	1566	1566	1.78	0.74	1.19	1.63		Jersey	St Helier	Chestnut Farm	OX	0	0	W	A	beam			
mar1	1	1	82	21	103	1654	1675	1675	1.45	1.09	0.61	1.37		Jersey	St John	Le Marinal	OX	0	0	W	A	beam			
mar2	1	20	104	49	153	1626	1675	1675	0.89	0.59	0.94	0.79		Jersey	St John	Le Marinal	OX	0	0	Sp	D	joist			
mar6	1	15	79	29	108	1646	1675	1675	1.09	0.75	0.47	1.00		Jersey	St John	Le Marinal	OX	0	0	W	A	joist			
sv2	1		82	27	109	1573	1600	1600	1.17	0.82	0.96	1.08		Jersey	St Lawrence	Seaview	OX	0	0		E	joist			
sv3	1		118	37	155	1563	1600	1600	0.97	0.31	0.76	0.81		Jersey	St Lawrence	Seaview	OX	0	0	Su	E				
rm12	1		145	21	166	1981	2002	2002	2.43	2.02	2.70	2.38		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
rm13	1		170	22	192	1980	2002	2002	2.05	0.87	1.89	1.91		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
rm14	1		135	34	169	1968	2002	2002	1.91	1.11	1.68	1.75		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
rm1x	1		146	11	157	1991	2002	2002	2.10	0.80	1.30	2.01		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
rm2	1		149	17	166	1985	2002	2002	2.56	1.63	1.68	2.46		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
rm3	1		123	30	153	1972	2002	2002	2.67	0.83	1.32	2.31		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
rm4	1		147	20	167	1982	2002	2002	2.13	0.45	0.97	1.93		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
rm8a	1		92	21	113	1981	2002	2002	1.65	0.99	1.14	1.53		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
rm9	1	1	138	17	155	1985	2002	2002	2.12	1.65	3.08	2.07		Jersey	St Martin	La Manoir de Rosel	OX	0	0		D				
elms13	1	5	38	24	62	1726	1750	1750	1.48	1.08	1.31	1.33		Jersey	St Mary	The Elms	OX	0	0	W	E				
elms5a	1	5	27	23	50	1727	1750	1750	2.51	1.10	1.90	1.86		Jersey	St Mary	The Elms	OX	0	0	Sp	E				

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
elms9	1	1	37	44	81	1706	1750	1750	1.83	0.34	1.87	1.02		Jersey	St Mary	The Elms	OX	0	0	W	E				
som10	1		193	34	227	1968	2002	2002	1.88	0.99	1.16	1.75		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som11	1	10	135	23	158	1979	2002	2002	2.17	1.20	1.23	2.03		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som12	1		125	26	151	1976	2002	2002	2.41	1.30	1.16	2.22		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som2	1		84	12	96	1990	2002	2002	3.76	2.78	1.44	3.64		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som3	1	1	70	25	95	1977	2002	2002	2.53	2.01	2.72	2.40		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som4	1		56	12	68	1990	2002	2002	4.22	4.07	4.74	4.19		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som5	1	1	85	14	99	1988	2002	2002	2.54	1.22	2.60	2.35		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som6	1		57	13	70	1989	2002	2002	4.11	2.04	4.10	3.72		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som7	1		213	16	229	1986	2002	2002	1.83	2.06	3.47	1.85		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
som8	1		222	16	238	1986	2002	2002	1.67	1.96	2.03	1.69		Jersey	St Ouen	Le Manoir de St Ouen	OX	0	0		D				
L1OF2c	1	1	41	14	55	-814	-800	-800	0.87	0.31	0.61	0.72		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	Sp	E	pile			
L2P1	2		20	20	40	-820	-800	-800	1.91	1.48	2.27	1.70		LITHUANIA	Lake Luokesas	Lake dwellings	OX	2	2	W	E	pile			
L2P2	2		22	19	41	-819	-800	-800	1.79	0.65	0.84	1.26		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	W	E	pile			
L2P3	2		21	22	43	-822	-800	-800	1.65	0.94	1.23	1.29		LITHUANIA	Lake Luokesas	Lake dwellings	OX	2	2	W	E	pile			
L2P4	2	1	20	10	30	-810	-800	-800	2.97	2.19	2.93	2.71		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	Su	E	pile			
L2P5	2		22	9	31	-809	-800	-800	2.20	1.11	1.92	1.88		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	W	E	pile			
L2P6b	2		27	16	43	-816	-800	-800	1.73	0.65	1.36	1.33		LITHUANIA	Lake Luokesas	Lake dwellings	OX	2	1	W	E	pile			
L2P7	2	1	28	21	49	-821	-800	-800	1.16	0.89	1.32	1.05		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	W	E	pile			
L2P8	2	1	24	16	40	-816	-800	-800	1.14	0.97	0.82	1.07		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	W	E	pile			
L2PW10	2	1	11	18	29	-818	-800	-800	3.82	1.13	3.79	2.15		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	W	E	pile			
L2PW11	2		13	21	34	-821	-800	-800	1.66	1.22	1.31	1.39		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	W	E	pile			
L2PW9	2	1	16	5	21	-805	-800	-800	3.34	3.68	3.63	3.42		LITHUANIA	Lake Luokesas	Lake dwellings	OX	0	0	W	E	pile			
P834009b	1		39	12	51	890	902	902	2.46	0.86	1.29	2.08		POLAND	Bialogard	Bialogard	TW	0	0		D				
P831023a	1		102	12	114	814	826	826	2.41	2.45	1.84	2.41		POLAND	Bochen	Bochen	TW	0	0		D				
P831026a	1		107	12	119	814	826	826	2.15	1.72	1.60	2.10		POLAND	Bochen	Bochen	TW	0	0		D				
P8270020	1		155	10	165	1751	1761	1761	1.21	0.58	0.50	1.17		POLAND	Chlopice	Chlopice Church	TW	0	0		D				
P805001c	1		85	24	109	1563	1587	1587	1.77	0.51	0.82	1.49		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0		D				
P805002c	1		71	24	95	1563	1587	1587	1.65	0.47	0.67	1.35		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0		D				
P805003c	1		68	11	79	1575	1586	1587	1.70	1.23	0.97	1.63		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0		D				
P805004c	1		66	10	76	1576	1586	1587	1.82	1.30	1.33	1.75		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0		D				
P805005c	2		136	19	155	1651	1670	1671	0.95	0.70	0.79	0.92		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0	Sp	D				
P8050080	2		93	18	111	1652	1670	1671	1.02	0.87	0.82	0.99		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0		D				
P805009c	2		81	12	93	1659	1671	1671	1.92	0.89	0.80	1.78		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0	Sp	A				
P805010c	2		176	16	192	1652	1668	1671	1.12	1.26	1.13	1.13		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0	Sp	D				
P805011c	2		97	15	112	1656	1671	1671	0.99	1.01	0.84	1.00		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0	Sp	D				
P805012c	1		113	14	127	1573	1587	1587	1.14	1.16	0.94	1.14		POLAND	Darlowo	Darlowo SW Gertruda Church	TW	0	0		D				
06710070	1		234	26	260	1255	1281	1300	1.00	0.51	0.80	0.95		POLAND	Elblag	Elblag	OX	0	0		D				
0671008a	1		115	14	129	1236	1250	1300	1.94	1.31	0.88	1.87		POLAND	Elblag	Elblag	OX	0	0		D				
0671012a	1		127	9	136	1240	1249	1300	1.99	1.81	1.08	1.98		POLAND	Elblag	Elblag	OX	0	0		D				
0671014a	1		84	24	108	1272	1296	1300	0.90	0.31	0.26	0.77		POLAND	Elblag	Elblag	OX	0	0		D				
0671017a	1		181	17	198	1279	1296	1300	1.13	0.66	0.88	1.09		POLAND	Elblag	Elblag	OX	0	0		D				
0671019a	1		83	16	99	1243	1259	1300	1.28	1.46	1.13	1.31		POLAND	Elblag	Elblag	OX	0	0		D				
0671021a	1		145	14	159	1246	1260	1300	1.42	1.11	0.97	1.40		POLAND	Elblag	Elblag	OX	0	0		D				
0671311a	1		244	29	273	1250	1279	1300	1.32	0.66	0.68	1.25		POLAND	Elblag	Elblag	OX	0	0		D				
0671313a	1		225	29	254	1251	1280	1300	1.14	0.46	0.55	1.06		POLAND	Elblag	Elblag	OX	0	0		D				

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Path	H.Wd	S.Wd	Rings	H.S bdy	LMR Date	Phase	H.Wd MRW	S.Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Status	Type	NGR
p671328a	1		125	17	142	1279	1296	1300	1.08	0.51	0.56	1.01		POLAND	Elblag	Elblag	OX	0	0		D				
p671329a	1		105	14	119	1282	1296	1300	0.59	1.01	0.70	0.64		POLAND	Elblag	Elblag	OX	0	0		D				
p671330a	1		90	12	102	1284	1296	1300	1.00	1.20	1.37	1.02		POLAND	Elblag	Elblag	OX	0	0		D				
p671331a	1		145	14	159	1282	1296	1300	0.67	1.16	1.44	0.72		POLAND	Elblag	Elblag	OX	0	0		D				
p671345a	1		229	17	246	1263	1280	1300	1.34	0.79	0.93	1.30		POLAND	Elblag	Elblag	OX	0	0		D				
p671467a	1		150	18	168	1334	1352	1300	0.99	0.57	0.52	0.95		POLAND	Elblag	Elblag	OX	0	0		D				
p671500a	1		128	16	144	1277	1293	1300	1.17	0.46	0.56	1.09		POLAND	Elblag	Elblag	OX	0	0		D				
p671668a	1		80	17	97	1283	1300	1300	1.16	0.86	0.82	1.11		POLAND	Elblag	Elblag	OX	0	0		D				
p671687a	1		187	16	203	1280	1296	1300	0.64	1.01	0.80	0.67		POLAND	Elblag	Elblag	OX	0	0		D				
p671698a	1		103	26	129	1285	1311	1300	1.37	0.49	0.77	1.19		POLAND	Elblag	Elblag	OX	0	0		D				
p671873a	1		214	13	227	1263	1276	1300	1.68	1.31	1.38	1.65		POLAND	Elblag	Elblag	OX	0	0		D				
p671885a	1		172	16	188	1262	1278	1300	1.79	1.44	1.64	1.76		POLAND	Elblag	Elblag	OX	0	0		D				
p671016a	1		227	11	238	1275	1286	1300	1.11	0.89	1.11	1.10		POLAND	Elblag	Elblag	OX	0	0		D				
p671037b	1		54	20	74	1240	1260	1300	1.74	0.92	1.11	1.52		POLAND	Elblag	Elblag	OX	0	0		D				
p671038a	1		110	21	131	1234	1255	1300	0.82	0.64	0.59	0.79		POLAND	Elblag	Elblag	OX	0	0		D				
p671057a	1		114	20	134	1238	1258	1300	1.86	1.73	2.20	1.84		POLAND	Elblag	Elblag	OX	0	0		D				
p671059a	1		171	13	184	1242	1255	1300	1.36	1.14	1.13	1.35		POLAND	Elblag	Elblag	OX	0	0		D				
p671060a	1		60	14	74	1236	1250	1300	1.54	0.91	1.05	1.42		POLAND	Elblag	Elblag	OX	0	0		D				
p671659a	1		85	19	104	1277	1296	1300	0.72	0.32	0.44	0.65		POLAND	Elblag	Elblag	OX	0	0		D				
p671780a	1		130	14	144	1283	1297	1300	1.30	0.52	0.90	1.23		POLAND	Elblag	Elblag	OX	0	0		D				
p671781a	1		125	15	140	1282	1297	1300	1.30	0.58	0.67	1.23		POLAND	Elblag	Elblag	OX	0	0		D				
p671788a	1		144	20	164	1281	1301	1300	0.83	0.26	0.27	0.76		POLAND	Elblag	Elblag	OX	0	0		D				
p671782a	1		115	10	125	1297	1307	1300	1.29	1.79	2.00	1.33		POLAND	Elblag	Elblag	OX	0	0		D				
p671878a	1		143	15	158	1296	1311	1300	0.89	0.67	0.76	0.87		POLAND	Elblag	Elblag	OX	0	0		D				
p671882a	1		95	15	110	1281	1296	1300	1.62	0.93	1.19	1.52		POLAND	Elblag	Elblag	OX	0	0		D				
p671892a	1		115	18	133	1242	1260	1300	1.49	0.74	1.04	1.39		POLAND	Elblag	Elblag	OX	0	0		D				
p671895a	1		69	10	79	1275	1285	1300	1.51	0.96	0.91	1.44		POLAND	Elblag	Elblag	OX	0	0		D				
p671002a	1		189	19	208	1277	1296	1300	0.80	0.57	0.55	0.78		POLAND	Elblag	Elblag	OX	0	0		D				
p671623a	1		75	9	84	1304	1313	1300	0.54	0.59	0.67	0.55		POLAND	Elblag	Elblag	OX	0	0		D				
p671632a	1		118	13	131	1297	1310	1300	0.66	0.78	0.55	0.67		POLAND	Elblag	Elblag	OX	0	0		D				
p671642a	1		91	20	111	1270	1290	1300	0.97	0.76	0.78	0.93		POLAND	Elblag	Elblag	OX	0	0		D				
p671646a	1		65	11	76	1264	1275	1300	1.72	1.09	1.47	1.63		POLAND	Elblag	Elblag	OX	0	0		D				
p671675a	1		173	13	186	1288	1301	1300	1.17	0.55	0.41	1.12		POLAND	Elblag	Elblag	OX	0	0		D				
p671677a	1		103	26	129	1275	1301	1300	1.07	0.56	0.62	0.97		POLAND	Elblag	Elblag	OX	0	0		D				
p671678a	1	1	181	10	191	1291	1301	1300	1.09	0.71	0.61	1.07		POLAND	Elblag	Elblag	OX	0	0		D				
p671680a	1		76	19	95	1277	1296	1300	1.67	1.02	1.90	1.54		POLAND	Elblag	Elblag	OX	0	0		D				
p671681a	1	1	97	8	105	1288	1296	1300	1.29	1.10	2.15	1.27		POLAND	Elblag	Elblag	OX	0	0		D				
p671683a	1		105	10	115	1300	1310	1300	1.02	1.80	1.50	1.09		POLAND	Elblag	Elblag	OX	0	0		D				
p671685a	1		117	14	131	1297	1311	1300	1.10	1.16	0.58	1.11		POLAND	Elblag	Elblag	OX	0	0		D				
p671689a	1		77	14	91	1297	1311	1300	1.50	1.74	1.22	1.53		POLAND	Elblag	Elblag	OX	0	0		D				
p671691a	1		108	19	127	1292	1311	1300	0.97	0.53	0.57	0.90		POLAND	Elblag	Elblag	OX	0	0		D				
p671693a	1		112	25	137	1286	1311	1300	0.69	0.60	0.57	0.67		POLAND	Elblag	Elblag	OX	0	0		D				
p671702a	1		104	20	124	1290	1310	1300	1.65	0.95	1.28	1.53		POLAND	Elblag	Elblag	OX	0	0		D				
p671703a	1	1	102	17	119	1294	1311	1300	1.28	0.66	0.65	1.19		POLAND	Elblag	Elblag	OX	0	0		D				
p671728a	1	1	117	18	135	1293	1311	1300	0.97	0.99	0.97	0.97		POLAND	Elblag	Elblag	OX	0	0		D				
p671737b	1		84	16	100	1278	1294	1300	1.09	0.77	0.34	1.04		POLAND	Elblag	Elblag	OX	0	0		D				

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
P771738a	1	1	100	10	110	1286	1296	1300	1.36	2.21	1.20	1.43		POLAND	Elblag	Elblag	OX	0	0		D				
P771740a	1	1	91	15	106	1279	1294	1300	1.30	0.91	0.53	1.25		POLAND	Elblag	Elblag	OX	0	0		D				
P771763a	1		189	17	206	1273	1290	1300	1.73	1.00	1.09	1.67		POLAND	Elblag	Elblag	OX	0	0		D				
P771775b	1		130	19	149	1291	1310	1300	1.12	0.55	0.62	1.05		POLAND	Elblag	Elblag	OX	0	0		D				
P771789a	1	1	108	12	120	1289	1301	1300	0.69	0.65	0.63	0.69		POLAND	Elblag	Elblag	OX	0	0		D				
P771794a	1		114	17	131	1277	1294	1300	1.19	0.72	0.35	1.12		POLAND	Elblag	Elblag	OX	0	0		D				
P771803a	1		97	11	108	1298	1309	1300	1.21	1.04	1.15	1.19		POLAND	Elblag	Elblag	OX	0	0		D				
P771817a	1		94	23	117	1273	1296	1300	1.11	0.46	0.38	0.99		POLAND	Elblag	Elblag	OX	0	0		D				
P771819a	1		197	20	217	1237	1257	1300	0.55	0.57	0.36	0.55		POLAND	Elblag	Elblag	OX	0	0		D				
P771822a	1		81	12	93	1284	1296	1300	0.98	0.40	0.66	0.90		POLAND	Elblag	Elblag	OX	0	0		D				
P771823a	1		97	9	106	1287	1296	1300	1.22	1.32	1.47	1.23		POLAND	Elblag	Elblag	OX	0	0		D				
P771824a	1	1	159	14	173	1297	1311	1300	0.90	1.01	0.80	0.91		POLAND	Elblag	Elblag	OX	0	0		D				
P771826a	1		113	17	130	1291	1308	1300	1.15	0.55	0.44	1.07		POLAND	Elblag	Elblag	OX	0	0		D				
P771828a	1		120	13	133	1298	1311	1300	1.04	0.65	0.41	1.00		POLAND	Elblag	Elblag	OX	0	0		D				
P771829a	1		142	11	153	1300	1311	1300	0.86	0.80	1.02	0.86		POLAND	Elblag	Elblag	OX	0	0		D				
P771831a	1		121	22	143	1289	1311	1300	0.72	0.48	0.76	0.69		POLAND	Elblag	Elblag	OX	0	0		D				
P771833a	1		102	19	121	1277	1296	1300	0.80	0.45	0.48	0.74		POLAND	Elblag	Elblag	OX	0	0		D				
P771846a	1		95	23	118	1272	1295	1300	0.94	0.45	0.39	0.84		POLAND	Elblag	Elblag	OX	0	0		D				
P771870a	1		147	10	157	1346	1356	1300	0.79	0.86	0.63	0.79		POLAND	Elblag	Elblag	OX	0	0		D				
P771879a	1		106	17	123	1279	1296	1300	0.83	0.54	0.66	0.79		POLAND	Elblag	Elblag	OX	0	0		D				
P773123a	1		98	7	105	1318	1325	1300	1.49	1.60	1.72	1.50		POLAND	Elblag	Elblag	OX	0	0		D				
P773125a	1		80	10	90	1247	1257	1300	1.37	1.78	1.38	1.41		POLAND	Elblag	Elblag	OX	0	0		D				
P773129a	1		161	14	175	1315	1329	1300	0.90	0.76	0.81	0.89		POLAND	Elblag	Elblag	OX	0	0		D				
P773130a	1		96	14	110	1273	1287	1300	2.33	0.75	1.08	2.13		POLAND	Elblag	Elblag	OX	0	0		D				
P773138a	1		96	20	116	1229	1249	1300	1.05	0.97	0.95	1.04		POLAND	Elblag	Elblag	OX	0	0		D				
P773147a	1		94	16	110	1263	1279	1300	1.00	0.61	0.82	0.95		POLAND	Elblag	Elblag	OX	0	0		D				
P773149a	1		52	10	62	1239	1249	1300	2.56	1.68	2.14	2.42		POLAND	Elblag	Elblag	OX	0	0		D				
P773153a	1		110	19	129	1250	1269	1300	0.70	0.49	0.55	0.67		POLAND	Elblag	Elblag	OX	0	0		D				
P773183a	1		95	11	106	1280	1291	1300	0.84	0.81	0.89	0.83		POLAND	Elblag	Elblag	OX	0	0		D				
P773219a	1		110	13	123	1272	1285	1300	0.90	0.70	0.65	0.88		POLAND	Elblag	Elblag	OX	0	0		D				
P773229a	1	1	108	17	125	1271	1288	1300	1.41	1.14	1.11	1.37		POLAND	Elblag	Elblag	OX	0	0		D				
P773236a	1		90	13	103	1249	1262	1300	1.89	1.53	1.22	1.85		POLAND	Elblag	Elblag	OX	0	0		D				
P773251a	1		162	21	183	1332	1353	1300	0.67	0.55	0.56	0.66		POLAND	Elblag	Elblag	OX	0	0		D				
P773264a	1		121	12	133	1285	1297	1300	0.99	0.92	0.57	0.99		POLAND	Elblag	Elblag	OX	0	0		D				
P773265a	1		41	12	53	1285	1297	1300	1.04	0.90	1.38	1.01		POLAND	Elblag	Elblag	OX	0	0		D				
P773266a	1		143	19	162	1279	1298	1300	0.79	0.34	0.38	0.74		POLAND	Elblag	Elblag	OX	0	0		D				
P773274a	1		115	19	134	1275	1294	1300	1.06	0.56	0.73	0.99		POLAND	Elblag	Elblag	OX	0	0		D				
P773275a	1		91	18	109	1273	1291	1300	1.17	0.89	0.96	1.12		POLAND	Elblag	Elblag	OX	0	0		D				
P773276b	1		332	25	357	1245	1270	1300	0.59	0.37	0.29	0.58		POLAND	Elblag	Elblag	OX	0	0		D				
P773277a	1		100	15	115	1279	1294	1300	1.26	0.57	0.61	1.17		POLAND	Elblag	Elblag	OX	0	0		D				
P773283a	1	1	98	10	108	1280	1290	1300	1.99	1.47	1.49	1.94		POLAND	Elblag	Elblag	OX	0	0		D				
P773286a	1		63	12	75	1274	1286	1300	1.16	0.90	0.99	1.12		POLAND	Elblag	Elblag	OX	0	0		D				
P773291a	1		128	24	152	1294	1318	1300	0.77	0.36	0.44	0.71		POLAND	Elblag	Elblag	OX	0	0		D				
P773300a	1		152	13	165	1236	1249	1300	0.83	0.45	0.46	0.80		POLAND	Elblag	Elblag	OX	0	0		D				
P773312a	1		41	23	64	1223	1246	1300	2.17	0.51	0.95	1.58		POLAND	Elblag	Elblag	OX	0	0		D				
P773313a	1		163	18	181	1277	1295	1300	1.12	0.51	0.45	1.06		POLAND	Elblag	Elblag	OX	0	0		D				

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
P773316a	1		83	16	99	1270	1286	1300	1.80	0.77	0.90	1.64		POLAND	Elblag	Elblag	OX	0	0		D				
P773317a	1		213	20	233	1311	1331	1300	0.84	0.49	0.48	0.81		POLAND	Elblag	Elblag	OX	0	0		D				
P773326a	1		76	11	87	1281	1292	1300	1.83	2.30	2.80	1.89		POLAND	Elblag	Elblag	OX	0	0		D				
P773364a	1		92	17	109	1251	1268	1300	0.83	0.35	0.39	0.75		POLAND	Elblag	Elblag	OX	0	0		D				
P773382a	1		54	18	72	1267	1285	1300	2.07	0.81	1.08	1.76		POLAND	Elblag	Elblag	OX	0	0		D				
P773384a	1		102	11	113	1253	1264	1300	0.85	0.85	0.91	0.85		POLAND	Elblag	Elblag	OX	0	0		D				
P773434a	1		130	15	145	1281	1296	1300	0.86	0.54	0.56	0.83		POLAND	Elblag	Elblag	OX	0	0		D				
P773435a	1		189	16	205	1253	1269	1300	1.13	0.66	0.97	1.10		POLAND	Elblag	Elblag	OX	0	0		D				
P773446a	1	1	60	16	76	1266	1282	1300	1.44	1.13	1.30	1.37		POLAND	Elblag	Elblag	OX	0	0		D				
P773450a	1		122	13	135	1276	1289	1300	1.72	0.92	1.07	1.65		POLAND	Elblag	Elblag	OX	0	0		D				
P773453a	1		185	22	207	1341	1363	1300	0.87	0.41	0.46	0.82		POLAND	Elblag	Elblag	OX	0	0		D				
P773456a	1		152	16	168	1266	1282	1300	1.49	0.96	1.13	1.44		POLAND	Elblag	Elblag	OX	0	0		D				
P773467a	1		131	20	151	1283	1303	1300	0.73	0.31	0.46	0.67		POLAND	Elblag	Elblag	OX	0	0		D				
P773469a	1		251	19	270	1269	1288	1300	0.87	0.76	0.73	0.86		POLAND	Elblag	Elblag	OX	0	0		D				
P773470a	1		125	13	138	1277	1290	1300	1.82	1.09	1.03	1.75		POLAND	Elblag	Elblag	OX	0	0		D				
P773474a	1		99	13	112	1298	1311	1300	1.18	0.72	0.82	1.13		POLAND	Elblag	Elblag	OX	0	0		D				
P773480a	1		78	14	92	1268	1282	1300	1.35	0.59	0.64	1.24		POLAND	Elblag	Elblag	OX	0	0		D				
P773485a	1		108	14	122	1245	1259	1300	1.12	0.48	0.59	1.05		POLAND	Elblag	Elblag	OX	0	0		D				
P773494a	1		95	16	111	1297	1313	1300	1.12	0.66	0.74	1.06		POLAND	Elblag	Elblag	OX	0	0		D				
P773502a	1		219	36	255	1495	1531	1300	1.40	0.76	0.79	1.31		POLAND	Elblag	Elblag	OX	0	0		D				
P773512a	1		152	18	170	1284	1302	1300	0.84	0.81	0.95	0.83		POLAND	Elblag	Elblag	OX	0	0	Sp	D				
P773533a	1	1	109	13	122	1279	1292	1300	1.33	1.30	0.86	1.33		POLAND	Elblag	Elblag	OX	0	0		D				
P773574a	1		72	21	93	1266	1287	1300	1.36	0.72	0.73	1.22		POLAND	Elblag	Elblag	OX	0	0		D				
P773575a	1		104	16	120	1299	1315	1300	0.95	0.76	0.89	0.93		POLAND	Elblag	Elblag	OX	0	0		D				
P773576a	1		87	14	101	1223	1237	1300	1.89	1.29	1.21	1.81		POLAND	Elblag	Elblag	OX	0	0		D				
P773999a	1		159	17	176	1116	1133	1300	0.70	0.44	0.49	0.67		POLAND	Elblag	Elblag	OX	0	0		D				
P774003a	1	1	122	12	134	1276	1288	1300	0.68	1.10	0.90	0.72		POLAND	Elblag	Elblag	OX	0	0		D				
P774047a	1		111	13	124	1257	1270	1300	0.98	0.57	0.55	0.93		POLAND	Elblag	Elblag	OX	0	0		D				
P774048a	1		185	27	212	1233	1260	1300	0.94	0.56	0.73	0.89		POLAND	Elblag	Elblag	OX	0	0		D				
P774064a	1		79	12	91	1238	1250	1300	3.44	1.40	1.51	3.17		POLAND	Elblag	Elblag	OX	0	0		D				
P774070a	1		166	16	182	1239	1255	1300	1.12	0.28	0.30	1.04		POLAND	Elblag	Elblag	OX	0	0		D				
P774112a	1		142	15	157	1245	1260	1300	2.24	2.40	1.69	2.25		POLAND	Elblag	Elblag	OX	0	0		D				
P774627a	1		127	15	142	1325	1340	1300	0.98	0.57	0.82	0.94		POLAND	Elblag	Elblag	OX	0	0		D				
P774629a	1		205	18	223	1327	1345	1300	1.00	0.80	0.89	0.98		POLAND	Elblag	Elblag	OX	0	0		D				
P774635a	1		60	18	78	1272	1290	1300	2.35	1.23	1.62	2.09		POLAND	Elblag	Elblag	OX	0	0		D				
P774648a	1		103	12	115	1285	1297	1300	0.76	1.22	0.78	0.81		POLAND	Elblag	Elblag	OX	0	0		D				
P774684a	1	1	185	16	201	1281	1297	1300	1.08	0.81	1.15	1.06		POLAND	Elblag	Elblag	OX	0	0		D				
P774696a	1		115	12	127	1261	1273	1300	0.82	0.57	0.57	0.79		POLAND	Elblag	Elblag	OX	0	0		D				
P774705a	1		248	16	264	1264	1280	1300	1.30	1.15	1.07	1.29		POLAND	Elblag	Elblag	OX	0	0		D				
P774713a	1		94	18	112	1262	1280	1300	1.46	0.81	1.08	1.36		POLAND	Elblag	Elblag	OX	0	0		D				
P774715a	1		138	14	152	1277	1291	1300	1.01	0.80	0.80	0.99		POLAND	Elblag	Elblag	OX	0	0		D				
P774719a	1		135	15	150	1333	1348	1300	1.19	1.06	1.05	1.18		POLAND	Elblag	Elblag	OX	0	0		D				
P774721a	1	1	111	13	124	1290	1303	1300	1.14	0.98	1.07	1.12		POLAND	Elblag	Elblag	OX	0	0		D				
P774722a	1	1	97	13	110	1290	1303	1300	1.27	1.13	1.01	1.25		POLAND	Elblag	Elblag	OX	0	0		D				
P774767a	1		87	15	102	1307	1322	1300	0.80	1.18	0.81	0.86		POLAND	Elblag	Elblag	OX	0	0		D				
P774769a	1		110	18	128	1273	1291	1300	0.86	0.77	0.67	0.84		POLAND	Elblag	Elblag	OX	0	0		D				

Code	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
P774770a	112	17	129	1274	1291	1300	1.09	1.04	1.07	1.08		POLAND	Elblag	Elblag	OX	0	0		D				
P774771a	83	11	94	1280	1291	1300	1.58	1.06	1.05	1.52		POLAND	Elblag	Elblag	OX	0	0		D				
P774774a	145	23	168	1268	1291	1300	0.86	0.42	0.59	0.80		POLAND	Elblag	Elblag	OX	0	0		D				
P774775a	90	11	101	1281	1292	1300	1.11	1.58	1.79	1.16		POLAND	Elblag	Elblag	OX	0	0		D				
P774776b	89	16	105	1324	1340	1300	0.83	0.51	0.59	0.78		POLAND	Elblag	Elblag	OX	0	0		D				
P774778a	74	13	87	1279	1292	1300	0.82	1.06	1.06	0.86		POLAND	Elblag	Elblag	OX	0	0		D				
P774779a	79	13	92	1279	1292	1300	0.78	1.06	1.14	0.82		POLAND	Elblag	Elblag	OX	0	0		D				
P774783a	68	13	81	1265	1278	1300	1.53	1.42	1.62	1.51		POLAND	Elblag	Elblag	OX	0	0		D				
P774793a	96	18	114	1270	1288	1300	1.44	0.68	0.85	1.32		POLAND	Elblag	Elblag	OX	0	0		D				
P774794a	126	20	146	1271	1291	1300	1.30	0.41	0.52	1.18		POLAND	Elblag	Elblag	OX	0	0		D				
P774795a	87	23	110	1267	1290	1300	1.20	1.02	1.06	1.16		POLAND	Elblag	Elblag	OX	0	0	Sp	D				
P774801a	97	11	108	1265	1276	1300	1.36	0.56	1.08	1.28		POLAND	Elblag	Elblag	OX	0	0		D				
P774805a	102	12	114	1277	1289	1300	1.39	0.76	0.80	1.33		POLAND	Elblag	Elblag	OX	0	0		D				
P774840a	84	11	95	1267	1278	1300	1.47	1.06	1.18	1.42		POLAND	Elblag	Elblag	OX	0	0		D				
P774845a	87	20	107	1270	1290	1300	1.20	0.46	0.59	1.06		POLAND	Elblag	Elblag	OX	0	0		D				
P774846a	89	15	104	1276	1291	1300	1.22	0.83	1.06	1.17		POLAND	Elblag	Elblag	OX	0	0		D				
P774848a	94	12	106	1277	1289	1300	0.99	0.75	0.82	0.96		POLAND	Elblag	Elblag	OX	0	0		D				
P774849a	47	12	59	1279	1291	1300	1.70	1.22	1.56	1.60		POLAND	Elblag	Elblag	OX	0	0		D				
P774854a	96	13	109	1236	1249	1300	1.08	0.67	0.68	1.03		POLAND	Elblag	Elblag	OX	0	0		D				
P774862a	125	17	142	1286	1303	1300	1.02	0.99	0.93	1.01		POLAND	Elblag	Elblag	OX	0	0		D				
P774863a	183	8	191	1295	1303	1300	1.02	0.40	0.30	0.99		POLAND	Elblag	Elblag	OX	0	0		D				
P774866a	147	21	168	1270	1291	1300	0.87	1.10	1.00	0.90		POLAND	Elblag	Elblag	OX	0	0		D				
P774876a	186	17	203	1221	1238	1300	1.25	0.97	1.23	1.23		POLAND	Elblag	Elblag	OX	0	0		D				
P774912a	47	11	58	1225	1236	1300	3.70	1.40	1.70	3.27		POLAND	Elblag	Elblag	OX	0	0		D				
P774914a	165	20	185	1271	1291	1300	1.06	0.93	0.92	1.04		POLAND	Elblag	Elblag	OX	0	0		D				
P774915a	160	18	178	1273	1291	1300	0.80	0.72	0.72	0.80		POLAND	Elblag	Elblag	OX	0	0		D				
P775250a	156	20	176	1255	1275	1300	1.28	0.77	0.87	1.23		POLAND	Elblag	Elblag	OX	0	0		D				
P775270a	73	11	84	1249	1260	1300	1.86	1.03	1.46	1.75		POLAND	Elblag	Elblag	OX	0	0		D				
P775285a	138	18	156	1268	1286	1300	1.90	0.83	1.15	1.77		POLAND	Elblag	Elblag	OX	0	0		D				
P775287a	138	15	153	1271	1286	1300	1.51	0.77	0.63	1.43		POLAND	Elblag	Elblag	OX	0	0		D				
P775291a	85	15	100	1279	1294	1300	1.14	0.24	0.67	1.01		POLAND	Elblag	Elblag	OX	0	0		D				
P775301a	124	15	139	1250	1265	1300	1.77	0.74	1.01	1.66		POLAND	Elblag	Elblag	OX	0	0	Sp	D				
P775305a	115	15	130	1295	1310	1300	1.11	0.84	0.70	1.08		POLAND	Elblag	Elblag	OX	0	0		D				
P775307a	60	12	72	1237	1249	1300	2.29	1.21	1.09	2.11		POLAND	Elblag	Elblag	OX	0	0		D				
P775310a	59	14	73	1238	1252	1300	1.69	0.60	0.93	1.48		POLAND	Elblag	Elblag	OX	0	0		D				
P775328a	163	11	174	1321	1332	1300	1.12	0.99	1.18	1.11		POLAND	Elblag	Elblag	OX	0	0		D				
P775331a	84	17	101	1259	1276	1300	1.44	0.76	1.25	1.32		POLAND	Elblag	Elblag	OX	0	0		D				
P775344a	115	14	129	1271	1285	1300	1.68	1.01	1.17	1.61		POLAND	Elblag	Elblag	OX	0	0	Sp	D				
P775345a	113	14	127	1271	1285	1300	1.25	0.79	0.63	1.20		POLAND	Elblag	Elblag	OX	0	0		D				
P775346a	123	14	137	1278	1292	1300	1.18	0.94	0.83	1.15		POLAND	Elblag	Elblag	OX	0	0		D				
P775412a	66	13	79	1243	1256	1300	1.41	0.64	0.77	1.28		POLAND	Elblag	Elblag	OX	0	0		D				
P775453a	100	11	111	1282	1293	1300	1.00	1.09	1.87	1.01		POLAND	Elblag	Elblag	OX	0	0		D				
P775489a	89	12	101	1281	1293	1300	0.96	1.80	1.79	1.06		POLAND	Elblag	Elblag	OX	0	0	Sp	D				
P775495O	131	18	149	1526	1544	1300	1.04	1.00	0.99	1.03		POLAND	Elblag	Elblag	OX	0	0		D				
P876015b	63	13	76	1236	1249	1300	2.27	0.88	1.07	2.03		POLAND	Elblag	Elblag	OX	0	0		D				
P876019a	77	17	94	1230	1247	1300	1.24	0.62	0.65	1.13		POLAND	Elblag	Elblag	OX	0	0		D				

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
p876032a	1		191	20	211	1262	1282	1300	1.03	0.73	0.79	1.01		POLAND	Elblag	Elblag	OX	0	0		D				
p876039a	1		74	15	89	1260	1275	1300	1.26	0.46	0.60	1.12		POLAND	Elblag	Elblag	OX	0	0		D				
p876041a	1		156	18	174	1279	1297	1300	0.98	0.78	0.66	0.96		POLAND	Elblag	Elblag	OX	0	0		D				
p876042a	1		152	18	170	1280	1298	1300	0.74	0.32	0.33	0.70		POLAND	Elblag	Elblag	OX	0	0		D				
p876043a	1		127	16	143	1281	1297	1300	0.86	0.43	0.44	0.81		POLAND	Elblag	Elblag	OX	0	0		D				
p876045a	1		234	15	249	1262	1277	1300	1.14	0.75	0.78	1.11		POLAND	Elblag	Elblag	OX	0	0		D				
p848104a	1		52	17	69	947	964	964	1.78	1.69	1.59	1.75		POLAND	Jezioro	Netno	TW	0	0		D				
p848106a	1		77	19	96	940	959	964	1.80	1.34	1.39	1.71		POLAND	Jezioro	Netno	TW	0	0		D				
p676001O	1		153	18	171	1287	1305	1300	0.98	0.43	0.50	0.92		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676008a	1		147	24	171	1273	1297	1300	0.56	0.33	0.38	0.53		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676104a	1		103	11	114	1279	1290	1300	1.38	0.87	0.87	1.33		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676138b	1		133	11	144	1321	1332	1300	0.69	0.32	0.40	0.66		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676166a	1		155	17	172	1241	1258	1300	0.61	0.50	0.44	0.60		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676171a	1		131	14	145	1259	1273	1300	1.06	0.66	0.71	1.02		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676203a	1	1	110	22	132	1310	1332	1300	1.19	0.94	1.09	1.15		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676204a	1		161	16	177	1363	1379	1300	0.98	0.71	0.69	0.95		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676205a	1		155	20	175	1359	1379	1300	0.83	0.56	0.52	0.80		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676207a	1		108	13	121	1359	1372	1300	1.00	1.33	1.34	1.03		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676210a	1		163	12	175	1364	1376	1300	0.84	0.65	0.94	0.83		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676213a	1		166	18	184	1287	1305	1300	0.81	0.67	0.64	0.80		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676228a	1		121	21	142	1354	1375	1300	1.11	0.80	0.76	1.06		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676232a	1		90	19	109	1390	1409	1300	1.26	0.46	0.39	1.12		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676238a	1		112	24	136	1272	1296	1300	1.13	0.51	1.10	1.02		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676244a	1		64	16	80	1354	1370	1300	1.03	1.03	0.68	1.03		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676245a	1		177	11	188	1360	1371	1300	0.59	0.97	0.93	0.61		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676275a	1		146	15	161	1297	1312	1300	0.75	0.85	0.75	0.76		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676278a	1		192	29	221	1285	1314	1300	0.71	0.34	0.37	0.66		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676279a	1		87	22	109	1273	1295	1300	1.03	0.79	0.84	0.98		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676283a	1		50	12	62	1308	1320	1300	1.76	1.36	1.53	1.68		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676284a	1		116	23	139	1257	1280	1300	0.63	0.38	0.53	0.59		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676290a	1		70	13	83	1248	1261	1300	0.89	0.45	0.76	0.82		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676291a	1		116	14	130	1271	1285	1300	1.15	1.05	0.96	1.14		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0	Sp	D				
p676298a	1		135	24	159	1283	1307	1300	0.81	0.30	0.47	0.73		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676304a	1		129	17	146	1276	1293	1300	0.81	0.36	0.42	0.76		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676329a	1		176	18	194	1288	1306	1300	0.63	0.58	0.73	0.62		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676332a	1		81	27	108	1265	1292	1300	0.90	0.50	0.78	0.80		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676333a	1		163	19	182	1274	1293	1300	0.87	0.35	0.43	0.81		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676337a	1		93	21	114	1282	1303	1300	0.66	0.70	0.84	0.66		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676763a	1		178	23	201	1327	1350	1300	1.81	1.05	0.84	1.72		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676764a	1		86	15	101	1269	1284	1300	1.08	0.66	0.77	1.02		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p676768b	1		90	20	110	1280	1300	1300	1.32	1.11	1.05	1.28		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		A				
p676789a	1		167	22	189	1260	1282	1300	0.92	0.43	0.57	0.87		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757203a	1		189	24	213	1268	1292	1300	0.96	0.59	0.78	0.91		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757207a	1		116	30	146	1263	1293	1300	0.83	0.49	0.56	0.76		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757208a	1		111	9	120	1273	1282	1300	0.97	0.53	0.52	0.93		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757216a	1		157	32	189	1263	1295	1300	0.92	0.35	0.47	0.82		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				

Code	Phase	Pith	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
p757217a	1		50	13	63	1267	1280	1300	2.07	1.57	2.20	1.96		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757218a	1		160	34	194	1268	1302	1300	1.02	0.48	0.59	0.92		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757221a	1		119	37	156	1256	1293	1300	0.80	0.58	0.51	0.75		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757222a	1		172	16	188	1269	1285	1300	0.78	0.39	0.59	0.75		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757224b	1		64	12	76	1269	1281	1300	1.30	0.65	0.98	1.20		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757244a	1		150	20	170	1264	1284	1300	1.11	0.34	0.48	1.02		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757247b	1		35	11	46	1099	1110	1300	1.56	0.82	1.22	1.38		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757804a	1		112	8	120	1254	1262	1300	1.25	2.35	2.47	1.32		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757804b	1		106	12	118	1250	1262	1300	0.92	0.77	1.02	0.90		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
p757813b	1		114	15	129	1247	1262	1300	1.08	1.57	2.54	1.14		POLAND	Kolobrzeg	Kolobrzeg	TW	0	0		D				
P836203a	1		180	13	193	1285	1298	1397	0.79	0.88	0.81	0.80		POLAND	Koszalin	Koszalin	TW	0	0		D				
P836207a	1		99	16	115	1258	1274	1397	1.44	0.95	1.02	1.37		POLAND	Koszalin	Koszalin	TW	0	0		D				
P836208a	1		111	17	128	1308	1325	1397	0.98	0.72	0.63	0.95		POLAND	Koszalin	Koszalin	TW	0	0		D				
P836210a	1		132	18	150	1287	1305	1397	2.31	0.85	1.22	2.14		POLAND	Koszalin	Koszalin	TW	0	0		D				
P8362140	1		112	25	137	1306	1331	1397	0.89	0.53	0.81	0.83		POLAND	Koszalin	Koszalin	TW	0	0		D				
P8362150	1		86	17	103	1290	1307	1397	1.25	1.24	1.16	1.25		POLAND	Koszalin	Koszalin	TW	0	0		D				
P8362180	1		210	18	228	1379	1397	1397	0.99	1.32	1.44	1.02		POLAND	Koszalin	Koszalin	TW	0	0	Sp	D				
P836222b	1		158	28	186	1279	1307	1397	1.17	0.82	0.86	1.11		POLAND	Koszalin	Koszalin	TW	0	0		D				
P836225a	1		94	11	105	1296	1307	1397	2.18	1.08	1.52	2.06		POLAND	Koszalin	Koszalin	TW	0	0	Sp	D				
P836226a	1		127	26	153	1322	1348	1397	0.99	0.53	0.58	0.91		POLAND	Koszalin	Koszalin	TW	0	0		D				
P836228a	1		152	20	172	1329	1349	1397	0.99	0.67	0.78	0.95		POLAND	Koszalin	Koszalin	TW	0	0		D				
P8020010	1		132	14	146	1388	1402	1402	0.96	1.17	1.26	0.98		POLAND	Krupy	Krupy Church	TW	0	0		D				
P802008a	1		81	10	91	1391	1401	1402	1.13	1.48	1.48	1.16		POLAND	Krupy	Krupy Church	TW	0	0		D				
P802010a	1		87	15	102	1386	1401	1402	0.43	0.41	0.46	0.43		POLAND	Krupy	Krupy Church	TW	0	0		D				
P802011a	1		189	21	210	1378	1399	1402	0.62	0.29	0.37	0.58		POLAND	Krupy	Krupy Church	TW	0	0		D				
P802108a	1		228	18	246	1384	1402	1402	0.51	0.27	0.36	0.49		POLAND	Krupy	Krupy Church	TW	0	0		D				
P802115a	2		79	22	101	1736	1758	1758	1.24	0.41	0.68	1.06		POLAND	Krupy	Krupy Church	TW	0	0	Sp	D				
P854004a	1		228	12	240	832	844	848	1.17	1.43	1.27	1.19		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P854007a	1		69	7	76	839	846	848	1.62	1.33	1.30	1.60		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P854009a	1		81	17	98	829	846	848	1.68	1.50	1.21	1.65		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P854011a	1		46	12	58	834	846	848	1.53	1.54	1.36	1.54		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P8540130	1		130	17	147	831	848	848	1.36	1.30	1.86	1.35		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P854014a	1		142	9	151	839	848	848	1.40	1.44	1.68	1.40		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P854022a	2		29	20	49	904	924	924	1.76	1.22	2.35	1.54		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P854025a	2		80	13	93	906	919	924	1.75	1.96	1.34	1.78		POLAND	Rogaszyn	Rogaszyn	TW	0	0	Sp	D				
P854026a	2		27	18	45	906	924	924	1.98	1.54	2.11	1.80		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P854027a	2		31	17	48	907	924	924	1.98	1.65	2.50	1.86		POLAND	Rogaszyn	Rogaszyn	TW	0	0		D				
P854028a	2		90	20	110	904	924	924	1.57	1.06	1.34	1.48		POLAND	Rogaszyn	Rogaszyn	TW	0	0	Sp	D				
P854029a	2		70	19	89	905	924	924	1.47	1.00	1.64	1.37		POLAND	Rogaszyn	Rogaszyn	TW	0	0	Sp	D				
P854031b	2		26	16	42	908	924	924	2.52	2.06	2.86	2.34		POLAND	Rogaszyn	Rogaszyn	TW	0	0	Sp	D				
P722001a	1		144	13	157	1986	1999	1999	2.08	1.99	2.07	2.07		POLAND	Siennow	Siennow	TW	0	0		D				
P722002a	1		184	15	199	1984	1999	1999	1.73	2.28	2.92	1.77		POLAND	Siennow	Siennow	TW	0	0		D				
P722003a	1		162	13	175	1986	1999	1999	1.95	2.03	2.08	1.96		POLAND	Siennow	Siennow	TW	0	0		D				
P722004a	1		181	13	194	1986	1999	1999	1.87	1.10	1.52	1.82		POLAND	Siennow	Siennow	TW	0	0		D				
P722005a	1		138	15	153	1984	1999	1999	2.24	2.39	2.62	2.26		POLAND	Siennow	Siennow	TW	0	0		D				
P722006a	1		185	15	200	1984	1999	1999	1.70	1.48	1.79	1.68		POLAND	Siennow	Siennow	TW	0	0		D				

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
P722007a	1		167	15	182	1984	1999	1999	1.84	1.04	1.35	1.77		POLAND	Siennow	Siennow	TW	0	0		D				
P722008a	1		194	19	213	1980	1999	1999	1.73	1.20	1.71	1.68		POLAND	Siennow	Siennow	TW	0	0		D				
P722009a	1		169	28	197	1971	1999	1999	1.71	1.44	1.64	1.67		POLAND	Siennow	Siennow	TW	0	0		D				
P722010a	1		133	12	145	1987	1999	1999	2.27	1.92	2.28	2.24		POLAND	Siennow	Siennow	TW	0	0		D				
P722011a	1		189	15	204	1984	1999	1999	1.58	0.93	0.88	1.53		POLAND	Siennow	Siennow	TW	0	0		D				
P722012a	1		150	13	163	1986	1999	1999	1.71	2.02	2.03	1.73		POLAND	Siennow	Siennow	TW	0	0		D				
P7480080	1		98	13	111	950	963	963	1.21	1.25	1.44	1.21		POLAND	Swieck Strumiany	Swieck Strumiany	TW	0	0		D				
P748012a	2		122	15	137	899	914	914	1.08	0.85	1.05	1.06		POLAND	Swieck Strumiany	Swieck Strumiany	TW	0	0		D				
P746005a	1		137	11	148	896	907	907	0.92	0.97	1.36	0.92		POLAND	Sypniewo	Sypniewo	TW	0	0		D				
P746112a	2		171	14	185	1014	1028	1028	1.39	0.89	1.02	1.35		POLAND	Sypniewo	Sypniewo	TW	0	0	W	D				
P746114a	2		64	8	72	1020	1028	1028	2.00	2.08	1.83	2.01		POLAND	Sypniewo	Sypniewo	TW	0	0	W	D				
P746115a	2		69	8	77	1020	1028	1028	1.92	1.89	1.62	1.92		POLAND	Sypniewo	Sypniewo	TW	0	0	W	D				
p717011a	1		155	20	175	1238	1258	1200	0.99	0.66	0.55	0.95		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717012a	1		168	12	180	1239	1251	1200	0.91	1.06	0.80	0.92		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717015a	1		84	16	100	1226	1242	1200	1.79	0.96	1.10	1.66		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717021a	1		122	4	126	1245	1249	1200	1.79	0.67	0.86	1.76		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717110a	1		126	22	148	1220	1242	1200	1.16	1.12	1.16	1.15		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717127a	1		127	18	145	1232	1250	1200	1.24	0.88	0.91	1.20		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717154a	1		111	16	127	1233	1249	1200	1.06	0.60	0.57	1.00		POLAND	Szczecin	Szczecin	TW	0	0	Sp	D				
p717222a	1		127	20	147	1222	1242	1200	1.68	1.24	1.42	1.62		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717269a	1		181	22	203	1242	1264	1200	1.32	0.84	0.85	1.27		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717506a	1		171	12	183	1253	1265	1200	1.07	0.99	0.97	1.07		POLAND	Szczecin	Szczecin	TW	0	0		D				
p717508a	1		158	25	183	1243	1268	1200	1.27	0.65	0.93	1.19		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727065a	1		162	16	178	1246	1262	1200	0.78	0.88	0.75	0.79		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727070a	1		82	12	94	1251	1263	1200	0.96	1.11	1.41	0.98		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727071a	1		178	13	191	1257	1270	1200	1.04	0.38	0.43	1.00		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727073a	1		145	14	159	1238	1252	1200	1.29	0.98	0.76	1.26		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727076a	1		140	19	159	1238	1257	1200	1.23	1.21	1.07	1.23		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727079a	1		152	17	169	1235	1252	1200	0.97	0.70	0.98	0.94		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727085a	1		150	19	169	1229	1248	1200	0.97	0.46	0.71	0.91		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727087a	1		261	16	277	1229	1245	1200	0.55	0.47	0.48	0.54		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727088a	1		90	17	107	1235	1252	1200	0.46	0.48	0.46	0.46		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727089a	1		74	20	94	1236	1256	1200	1.10	1.04	1.05	1.09		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727090a	1		167	23	190	1239	1262	1200	0.80	0.37	0.39	0.75		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727094a	1		171	6	177	1266	1272	1200	1.22	2.30	1.34	1.26		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727099a	1		183	20	203	1242	1262	1200	0.94	0.77	0.71	0.93		POLAND	Szczecin	Szczecin	TW	0	0		D				
p7271118	1		68	11	79	1172	1183	1200	1.36	0.89	0.95	1.29		POLAND	Szczecin	Szczecin	TW	0	0		D				
p7271164	1		84	20	104	1171	1191	1200	0.88	0.74	0.65	0.85		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727164a	1		147	25	172	1224	1249	1200	0.81	0.60	0.58	0.78		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727165a	1	1	90	19	109	1165	1184	1200	1.00	0.21	0.47	0.86		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727239a	1		83	14	97	1243	1257	1200	0.82	0.91	0.89	0.84		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727251a	1		203	17	220	1257	1274	1200	0.81	0.56	0.57	0.79		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727327a	1		131	20	151	1230	1250	1200	0.73	0.62	0.76	0.72		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727372a	1		118	21	139	1229	1250	1200	1.13	0.80	1.15	1.08		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727373a	1		152	20	172	1226	1246	1200	0.72	0.68	0.56	0.72		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727422a	1		89	22	111	1222	1244	1200	1.35	1.03	1.52	1.29		POLAND	Szczecin	Szczecin	TW	0	0		D				

Code	Phase	Pith	H Wd	S Wd	Rings	H/S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
p727439a	1	1	115	25	140	1223	1248	1200	0.76	0.47	0.59	0.71		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727466a	1		43	13	56	1149	1162	1200	1.33	1.26	1.48	1.31		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727500a	1		64	13	77	1129	1142	1200	0.68	0.70	0.54	0.68		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727500b	1		58	16	74	1127	1143	1200	0.61	0.54	0.52	0.60		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727551a	1	1	60	15	75	1146	1161	1200	0.83	0.63	0.54	0.79		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727717a	1		55	12	67	1191	1203	1200	1.63	0.87	1.65	1.50		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727782b	1		51	7	58	1188	1195	1200	1.14	0.62	0.96	1.08		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727836a	1		110	14	124	1167	1181	1200	0.49	0.28	0.41	0.47		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727873a	1		75	14	89	1189	1203	1200	0.82	0.59	0.60	0.78		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727912a	1		69	15	84	1189	1204	1200	0.90	0.75	0.76	0.87		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727915a	1	1	40	13	53	1179	1192	1200	1.66	1.79	1.49	1.69		POLAND	Szczecin	Szczecin	TW	0	0		D				
p727916a	1	1	44	13	57	1179	1192	1200	1.42	1.46	1.32	1.43		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757904a	1		76	13	89	1243	1256	1200	1.56	0.92	0.95	1.47		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757934a	1		65	13	78	1068	1081	1200	1.53	0.84	0.64	1.41		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757941a	1		92	12	104	1227	1239	1200	1.05	0.87	0.90	1.03		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757942a	1		68	13	81	1222	1235	1200	0.83	1.26	1.12	0.90		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757947a	1		116	16	132	1249	1265	1200	1.13	1.02	1.04	1.12		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757949a	1		140	24	164	1054	1078	1200	0.66	0.26	0.38	0.60		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757951a	1		159	16	175	1249	1265	1200	0.98	0.87	0.90	0.97		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757955a	1		62	21	83	1244	1265	1200	1.65	0.93	1.03	1.46		POLAND	Szczecin	Szczecin	TW	0	0		D				
p757962a	1		114	25	139	1254	1279	1200	0.98	0.88	1.04	0.96		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857001a	1		107	23	130	1218	1241	1200	0.91	0.74	0.96	0.88		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857019a	1		45	14	59	1136	1150	1200	1.03	0.75	0.95	0.96		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857023a	1		73	14	87	1154	1168	1200	1.35	1.03	1.14	1.30		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857024a	1		59	25	84	1158	1183	1200	1.12	0.56	0.86	0.95		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857027b	1		114	18	132	1228	1246	1200	0.95	0.74	0.82	0.93		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857035a	1		89	23	112	1218	1241	1200	0.86	1.11	0.99	0.91		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857036a	1	1	176	17	193	1224	1241	1200	0.81	0.73	0.61	0.81		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857037a	1	5	85	19	104	1163	1182	1200	0.71	0.54	0.88	0.68		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857040a	1		72	16	88	1094	1110	1200	2.42	0.90	1.35	2.15		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857046a	1		172	20	192	1221	1241	1200	0.76	0.83	0.79	0.77		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857048a	1	1	145	19	164	1222	1241	1200	1.28	0.69	0.89	1.22		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857049a	1		183	23	206	1239	1262	1200	0.88	0.56	0.53	0.85		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857050a	1		155	13	168	1227	1240	1200	0.81	0.63	0.69	0.79		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857053a	1		129	21	150	1242	1263	1200	0.85	0.79	0.62	0.84		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857061a	1		98	16	114	1132	1148	1200	0.69	0.73	0.62	0.70		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857063a	1		64	11	75	1140	1151	1200	1.17	1.41	1.11	1.21		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857101a	1	1	31	19	50	1043	1062	1200	1.08	0.67	1.05	0.92		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857102a	1		62	15	77	1066	1081	1200	1.06	0.74	0.53	1.00		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857102b	1	1	65	14	79	1067	1081	1200	1.36	0.74	0.51	1.25		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857103a	1	1	24	11	35	1025	1036	1200	1.33	1.16	1.77	1.28		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857109a	1		86	16	102	1066	1082	1200	1.11	0.85	0.65	1.07		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857112a	1	5	90	13	103	1068	1081	1200	1.21	0.92	0.90	1.17		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857114b	1		64	15	79	1013	1028	1200	0.69	1.33	0.66	0.81		POLAND	Szczecin	Szczecin	TW	0	0		D				
p8571150	1		37	11	48	1050	1061	1200	1.04	1.05	0.90	1.04		POLAND	Szczecin	Szczecin	TW	0	0		D				
p857117a	1		52	13	65	1068	1081	1200	1.11	0.78	0.68	1.05		POLAND	Szczecin	Szczecin	TW	0	0		D				

APPENDIX 4: TABLE OF SAPWOOD RING DATA

Code	Phase	Pith	H/Wd	S/Wd	Rings	H/S bdy	LMR Date	Phase	H/Wd MRW	S/Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
P857117b	1		55	12	67	1069	1081	1200	1.33	0.96	0.82	1.26		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857119a	1		99	13	112	1068	1081	1200	0.95	1.00	0.75	0.96		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857120a	1	1	35	23	58	1021	1044	1200	1.10	0.55	0.54	0.88		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857121b	1		47	13	60	1031	1044	1200	0.94	0.58	0.63	0.87		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857123a	1	5	54	9	63	1053	1062	1200	0.67	1.39	1.09	0.78		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857125O	1		55	8	63	1053	1061	1200	0.62	1.56	1.29	0.74		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857129b	1	1	27	10	37	1026	1036	1200	1.58	1.55	1.50	1.57		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857130a	1	1	26	14	40	974	988	1200	1.84	1.39	2.08	1.69		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857131b	1	1	44	14	58	1044	1058	1200	1.06	0.66	0.86	0.96		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857133b	1	1	28	8	36	1028	1036	1200	1.39	1.41	1.27	1.39		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857138a	1	1	29	13	42	975	988	1200	1.97	1.24	2.03	1.74		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857140O	1	5	47	12	59	974	986	1200	1.01	1.24	0.99	1.06		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857142O	1		65	20	85	967	987	1200	0.90	0.53	0.65	0.81		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857143b	1		34	10	44	1011	1021	1200	1.32	1.64	1.80	1.40		POLAND	Szczecin	Szczecin	TW	0	0		D				
P857150O	1		42	8	50	981	989	1200	2.21	1.46	1.69	2.09		POLAND	Szczecin	Szczecin	TW	0	0		D				
P739016a	1		122	12	134	881	893	901	0.89	0.87	1.07	0.89		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0		D				
P739017a	1		100	14	114	884	898	901	1.25	0.91	1.20	1.21		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0		D				
P739026a	1		131	14	145	880	894	901	1.24	1.53	1.87	1.27		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0		D				
P739031a	1		173	12	185	869	881	901	0.85	1.61	1.48	0.90		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0	Sp	D				
P739103a	1		108	18	126	882	900	901	1.09	1.02	1.08	1.08		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0	Sp	D				
P739104a	1		45	21	66	880	901	901	1.11	0.86	1.18	1.03		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0		D				
P739108a	1		145	13	158	884	897	901	0.73	0.80	0.83	0.74		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0		D				
P739111a	1		37	12	49	874	886	901	1.10	1.14	1.30	1.11		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0		D				
P739124a	1		139	11	150	881	892	901	0.93	1.65	1.52	0.99		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0	Sp	D				
P739125a	1		169	16	185	881	897	901	0.96	1.56	1.50	1.01		POLAND	Wola Szydlowska	Wola Szydlowska	TW	0	0	Sp	D				
P694108a	1	S	135	17	152	889	906	907	1.54	1.05	1.17	1.48		POLAND	Wolin	Wolin site 4	TW	0	0	Sp	D				
P694109a	1	S	196	13	209	893	906	907	1.35	0.96	1.32	1.32		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694110a	1	S	167	18	185	888	906	907	1.63	1.11	1.13	1.58		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694111a	1	S	117	13	130	893	906	907	1.21	0.48	0.88	1.14		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694113a	1	S	120	15	135	890	905	907	1.19	0.33	0.55	1.09		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694116a	1		125	14	139	892	906	907	1.16	0.33	0.55	1.08		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694118a	1		170	16	186	890	906	907	1.38	1.58	1.46	1.39		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694119a	1		119	11	130	895	906	907	1.10	0.35	0.66	1.04		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694121a	1		112	17	129	889	906	907	1.51	1.08	1.51	1.45		POLAND	Wolin	Wolin site 4	TW	0	0	Sp	D				
P694124a	1		143	25	168	880	905	907	0.94	0.64	0.75	0.89		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694125a	1		109	19	128	887	906	907	1.39	0.86	1.20	1.31		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694126a	1		120	12	132	893	905	907	1.19	0.39	0.63	1.12		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694128a	1		110	27	137	878	905	907	1.12	0.61	0.74	1.02		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694130a	1		178	16	194	889	905	907	1.43	1.21	1.35	1.41		POLAND	Wolin	Wolin site 4	TW	0	0	Sp	D				
P694131a	1		179	14	193	892	906	907	1.44	1.24	1.61	1.42		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694132a	1		115	16	131	889	905	907	1.22	0.49	0.53	1.13		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694134a	1		158	18	176	887	905	907	1.01	1.54	1.60	1.06		POLAND	Wolin	Wolin site 4	TW	0	0	Sp	D				
P694140a	1		108	17	125	887	904	907	1.44	0.96	1.25	1.38		POLAND	Wolin	Wolin site 4	TW	0	0	Sp	D				
P694141a	1		106	18	124	888	906	907	1.36	1.20	1.40	1.33		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694143a	1		109	19	128	887	906	907	1.62	1.31	1.31	1.57		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694144a	1		149	18	167	888	906	907	1.24	1.22	1.29	1.24		POLAND	Wolin	Wolin site 4	TW	0	0		D				

Code	Phase	Path	H Wd	S Wd	Rings	H S bdy	LMR Date	Phase	H Wd MRW	S Wd MRW	MRW-10	MRW	Region	County	Parish	Building	Source	Radius	Variance	Season	DateType	Member	Type	Status	NGR
P694147a	1		132	11	143	894	905	907	1.19	0.31	0.52	1.12		POLAND	Wolin	Wolin site 4	TW	0	0	Sp	D				
P694149a	1		73	28	101	878	906	907	1.97	0.56	1.35	1.58		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694153a	1		131	23	154	883	906	907	0.84	0.52	0.52	0.80		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694163a	1		101	14	115	893	907	907	1.32	1.29	1.22	1.31		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694167a	1		166	17	183	889	906	907	1.30	1.22	1.37	1.30		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694169a	1		102	17	119	889	906	907	1.25	0.99	1.16	1.22		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694170a	1		123	13	136	893	906	907	1.17	0.44	0.77	1.10		POLAND	Wolin	Wolin site 4	TW	0	0	Sp	D				
P694172a	1		108	18	126	888	906	907	1.43	1.12	1.40	1.39		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694173a	1		106	18	124	888	906	907	1.24	0.99	1.14	1.20		POLAND	Wolin	Wolin site 4	TW	0	0		D				
P694174a	1		112	12	124	894	906	907	1.17	0.47	0.77	1.10		POLAND	Wolin	Wolin site 4	TW	0	0		D				

APPENDIX 5: TABLE OF TEST RESULTS WITH PRIMARY DATA

This section contains the results of testing 1645 samples and 464 combined phases as detailed in *Section 9.1.* The first column gives the phase number, with the rows giving the combined phase information is in **bold**. Each sample and phase is tested against four models: **A**, **A+S**, **B+S**, and **C+S**, as detailed in *Sections 8.1.2, 8.2.2,* and *9.1.2.*

Details of the testing of each of the four models are shown. The first two columns in each section give the *from* and *to* (beginning and end of the estimated range) for each sample or combined phase. The next column gives the *Phase Ag* or agreement level for the combined phases. Where these are below acceptable limits, details are shown to the right of this figure.

The individual agreement index for each sample is given under the *Sample* heading, as detailed in *Section 8.3.5.* Where these are below 60, the sample is eliminated and the combined phase calculated a second time, with the revised agreement figures given. The re-calculated combined phase range is also given below the first one. Where there are still samples with poor agreement levels within the phase after the second test, this procedure is repeated and a third test is performed, with the results tabulated in the *3rd test* column.

Next, the calculated width of each of the individual and combined phase ranges is given in years under *Range*. Finally the *beg range* and *end range* gives the number of years within the lower and outer ends of the predicted range. Where one of the figures in either of these two columns is negative, i.e. (-3), then the real date for this sample or phase has fallen outside the predicted range and has therefore failed the test.

The final column in the table gives the *Real date*, which represents the felling date for the sample, or the latest felling date for the combined phase date.

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
1	**Combine ADDINGTON**	**1487**	**1506**	**124**				**19**	**3**	**16**	**1487**	**1507**	**125**				**20**	**3**	**17**	**1487**	**1504**	**124**				**17**	**3**	**14**	**1488**	**1507**	**124**				**19**	**2**	**17**	**1490**
1	add01	1485	1514		117			29	5	24	1486	1515		118			29	4	25	1485	1513		118			28	5	23	1486	1516		118			30	4	26	1490
1	add08	1484	1511		116			27	6	21	1484	1513		116			29	6	23	1484	1509		115			25	6	19	1484	1513		115			29	6	23	1490
2	**Combine ALCASTON**	**1543**	**1563**	**92.2**				**20**	**14**	**6**	**1544**	**1564**	**94.1**				**20**	**13**	**7**	**1543**	**1562**	**88.9**				**19**	**14**	**5**	**1544**	**1564**	**96.1**				**20**	**13**	**7**	**1557**
2	alc5	1533	1564		83			31	24	7	1533	1565		84.9			32	24	8	1532	1562		79.3			30	25	5	1533	1567		87.4			34	24	10	1557
2	alc6	1544	1573		108			29	13	16	1544	1576		108			32	13	19	1544	1572		107			28	13	15	1544	1576		108			32	13	19	1557
3	**Combine ALFORD**	**1606**	**1616**	**172**				**10**	**5**	**5**	**1606**	**1616**	**175**				**10**	**5**	**5**	**1605**	**1615**	**171**				**10**	**6**	**4**	**1606**	**1617**	**173**				**11**	**5**	**6**	**1611**
3	ALF-A09A	1600	1627		133			27	11	16	1600	1628		134			28	11	17	1600	1626		134			26	11	15	1600	1629		134			29	11	18	1611
3	ALF-A31A	1601	1627		133			26	10	16	1602	1629		134			27	9	18	1601	1626		134			25	10	15	1602	1628		134			26	9	17	1611
3	ALF-A33A	1600	1627		133			27	11	16	1600	1629		134			29	11	18	1600	1626		134			26	11	15	1600	1629		134			29	11	18	1611
3	ALF-A34A	1599	1626		129			27	12	15	1600	1627		130			27	11	16	1600	1625		130			25	11	14	1600	1627		130			27	11	16	1611
3	ALF-A36A	1598	1623		117			25	13	12	1598	1625		119			27	13	14	1598	1623		116			25	13	12	1599	1625		117			26	12	14	1611
3	ALF-A40A	1605	1634		105			29	6	23	1605	1635		106			30	6	24	1605	1632		102			27	6	21	1605	1636		104			31	6	25	1611
4	**Combine OLDHALLFM**	**1616**	**1632**	**136**				**16**	**15**	**1**	**1616**	**1633**	**137**				**17**	**15**	**2**	**1616**	**1630**	**137**				**14**	**15**	**-1**	**1617**	**1633**	**134**				**16**	**14**	**2**	**1631**
4	ohf1	1613	1647		125			34	17	17	1613	1648		125			35	17	18	1613	1644		125			31	17	14	1614	1648		124			34	16	18	1630
4	ohf3	1612	1635		109			23	19	4	1612	1637		110			25	19	6	1612	1634		110			22	19	3	1612	1636		107			24	19	5	1631
4	ohf4	1613	1645		126			32	16	16	1613	1647		126			34	16	18	1613	1643		126			30	16	14	1614	1647		125			33	15	18	1629
5	**Combine ALTON**	**1328**	**1341**	**96.3**				**13**	**8**	**5**	**1329**	**1342**	**100**				**13**	**7**	**6**	**1328**	**1341**	**92.1**				**13**	**8**	**5**	**1329**	**1342**	**102**				**13**	**7**	**6**	**1336**
5	alt1	1329	1352		100			23	7	16	1330	1354		101			24	6	18	1329	1352		98.2			23	7	16	1330	1354		102			24	6	18	1336
5	alt2	1321	1347		107			26	12	14	1321	1348		109			27	12	15	1321	1346		105			25	12	13	1321	1349		111			28	12	16	1333
5	alt3	1319	1344		87.6			25	14	11	1319	1346		90.6			27	14	13	1319	1344		84.4			25	14	11	1320	1346		91.4			26	13	13	1333
6	**Combine ARMYNAVY**	**1494**	**1508**	**79.2**				**14**	**7**	**7**	**1495**	**1509**	**82.8**				**14**	**6**	**8**	**1494**	**1507**	**72.1**				**13**	**7**	**6**	**1495**	**1509**	**81.1**				**14**	**6**	**8**	**1501**
6	a&n1	1481	1510		66.7			29	20	9	1481	1511		69.4			30	20	10	1480	1508		58.9			28	21	7	1481	1511		66.7			30	20	10	1501
6	a&n3	1492	1521		124			29	9	20	1492	1523		125			31	9	22	1492	1520		124			28	9	19	1493	1524		124			31	8	23	1501
6	a&n4	1483	1511		81.6			28	18	10	1483	1513		83.9			30	18	12	1483	1510		78.6			27	18	9	1483	1514		85			31	18	13	1501
6	a&n5	1495	1527		92.8			32	6	26	1495	1529		94.3			34	6	28	1495	1525		90.8			30	6	24	1496	1530		93.3			34	5	29	1501
7	**Combine BELLINN**	**1743**	**1757**	**11n=2 A= 11.0%(An=**				**14**	**11**	**3**	**1743**	**1758**	**13.8**	**n=2 A= 13.8%(**			**15**	**11**	**4**	**1743**	**1757**	**10.1**	**n=2 A= 10.1%(A**			**14**	**11**	**3**	**1743**	**1758**	**12.6**	**FAILS n=2 A=**			**15**	**11**	**4**	**1754**
7	bell11	1745	1765		95.9			20	9	11	1745	1767		99.4			22	9	13	1744	1765		99.5			21	10	11	1745	1766		99.4			21	9	12	1754
7	bell12	1723	1744		4.6			21	31	-10	1723	1745		6.1			22	31	-9	1723	1743		4			20	31	-11	1723	1745		5.4			22	31	-9	1754
8	**Combine GLOVERSTON**	**1714**	**1729**	**162**				**15**	**3**	**12**	**1714**	**1730**	**166**				**16**	**3**	**13**	**1714**	**1729**	**160**				**15**	**3**	**12**	**1717**	**1734**	**164**				**17**	**0**	**17**	**1717**
8	q1021	1708	1768		113			60	3	57	1707	1777		117			70	4	66	1707	1770		116			63	4	59	1711	1798		110			87	0	87	1711
8	q1022	1709	1754		125			45	7	38	1710	1755		126			45	6	39	1710	1752		124			42	6	36	1711	1761		128			50	5	45	1716
8	q1023	1702	1741		115			39	14	25	1703	1742		116			39	13	26	1703	1740		115			37	13	24	1704	1746		112			42	12	30	1716
8	q1024	1700	1745		121			45	16	29	1700	1746		121			46	16	30	1700	1744		120			44	16	28	1702	1753		124			51	14	37	1716
8	q1025	1699	1747		124			48	18	30	1699	1749		125			50	18	32	1699	1745		121			46	18	28	1701	1756		127			55	16	39	1717
8	q1029	1710	1756		119			46	7	39	1710	1758		120			48	7	41	1710	1755		118			45	7	38	1712	1765		122			53	5	48	1717
8	q1030	1701	1744		123			43	16	27	1701	1746		124			45	16	29	1701	1743		122			42	16	26	1703	1752		124			49	14	35	1717
9	**Combine SHAWSBRDG1**	**1609**	**1625**	**52.9**				**16**	**10**	**6**	**1610**	**1626**	**56**				**16**	**9**	**7**	**1609**	**1625**	**50.5**				**16**	**10**	**6**	**1610**	**1627**	**64.3**				**17**	**9**	**8**	**1619**
9	**Combine SHAWSBRDG1**	**1609**	**1629**	**122**				**20**	**10**	**10**	**1611**	**1631**	**125**				**20**	**8**	**12**	**1610**	**1629**	**123**				**19**	**9**	**10**	**1611**	**1632**	**124**				**21**	**8**	**13**	**1619**
9	q1987	1606	1637		125	116		31	11	20	1607	1639		125	118		32	10	22	1606	1635		126	116		29	11	18	1607	1639		125	117		32	10	22	1617
9	q2049	1609	1638		111	114		29	9	20	1610	1639		112	115		29	8	21	1609	1637		109	115		28	9	19	1610	1640		112	115		30	8	22	1618
9	q2060b	1585	1619		23.9			34	34	0	1585	1620		26.1			35	34	1	1585	1618		22.4			33	34	-1	1586	1623		33.3			37	33	4	1619
10	**Combine SHAWSBRDG2**	**1608**	**1627**	**91.6**				**19**	**23**	**-4**	**1608**	**1629**	**93.3**				**21**	**23**	**-2**	**1607**	**1626**	**87.9**				**19**	**24**	**-5**	**1608**	**1629**	**92.4**				**21**	**23**	**-2**	**1631**
10	q2050	1599	1627		82.8			28	31	-3	1599	1629		84.6			30	31	-1	1598	1626		79			28	32	-4	1599	1630		83.7			31	31	0	1630
10	q2066	1608	1640		107			32	23	9	1609	1641		107			32	22	10	1608	1638		106			30	23	7	1609	1642		107			33	22	11	1631
11	**Combine ASHDOWNHS**	**1665**	**1686**	**47.6 n=2 A= 47.6%(A**				**21**	**-2**	**23**	**1666**	**1687**	**50.2**				**21**	**-3**	**24**	**1665**	**1684**	**41.8**	**n=2 A= 41.8%(**			**19**	**-2**	**21**	**1666**	**1687**	**50.5**				**21**	**-3**	**24**	**1663**
11	ah3	1647	1679		35.1			32	14	18	1648	1680		37.5			32	13	19	1647	1677		29.5			30	14	16	1648	1681		37.9			33	13	20	1661
11	ah4	1667	1699		99.9			32	-4	36	1667	1701		101			34	-4	38	1667	1697		98.8			30	-4	34	1668	1702		100			34	-5	39	1663

Number	SITE & sample	A from	A to	A Phase A_n	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	S from	S to	S Phase A_n	S Sample	S 2nd test	S 3rd test	S Range	S beg range	S end range	B from	B to	B Phase A_n	B Sample	B 2nd test	B 3rd test	B Range	B beg range	B end range	C from	C to	C Phase A_n	C Sample	C 2nd test	C 3rd test	C Range	C beg range	C end range	Real date
12	**Combine ASHDOWNLDG**	**1761**	**1771**	**116**				**10**	**6**	**4**	**1762**	**1771**	**122**				**9**	**5**	**4**	**1761**	**1770**	**111**				**9**	**6**	**3**	**1762**	**1771**	**125**				**9**	**5**	**4**	**1767**
12	asl1	1762	1788		77			26	4	22	1763	1789		79.6			26	3	23	1762	1787		74.1			25	4	21	1763	1789		80.9			26	3	23	1766
12	asl2	1749	1777		87.7			28	18	10	1749	1779		90.8			30	18	12	1749	1775		81.6			26	18	8	1750	1778		91.4			28	17	11	1767
12	asl3	1750	1781		115			31	16	15	1751	1783		117			32	15	17	1750	1780		115			30	16	14	1751	1784		124			33	15	18	1766
12	asl4	1756	1781		133			25	10	15	1756	1783		133			27	10	17	1756	1780		134			24	10	14	1757	1783		134			26	9	17	1766
12	asl5	1757	1782		134			25	10	15	1757	1784		134			27	10	17	1757	1780		134			23	10	13	1757	1783		134			26	10	16	1767
12	asl6	1753	1777		104			24	14	10	1753	1778		107			25	14	11	1753	1776		103			23	14	9	1753	1778		106			25	14	11	1767
13	**Combine ASHLEYCOTT**	**1559**	**1576**	**112**				**17**	**9**	**8**	**1559**	**1576**	**114**				**17**	**9**	**8**	**1558**	**1575**	**109**				**17**	**10**	**7**	**1559**	**1577**	**115**				**18**	**9**	**9**	**1568**
13	ac2	1551	1580		107			29	17	12	1551	1582		108			31	17	14	1551	1578		102			27	17	10	1551	1582		109			31	17	14	1568
13	ac3	1559	1582		111			23	8	15	1559	1584		111			25	8	17	1559	1582		110			23	8	15	1559	1584		111			25	8	17	1567
14	**Combine ASHLEYOLDM1**	**1524**	**1538**	**142**				**14**	**6**	**8**	**1525**	**1539**	**143**				**14**	**5**	**9**	**1524**	**1537**	**143**				**13**	**6**	**7**	**1525**	**1539**	**143**				**14**	**5**	**9**	**1530**
14	ash2	1522	1550		123			28	8	20	1522	1552		123			30	8	22	1522	1549		123			27	8	19	1523	1552		123			29	7	22	1530
14	ash5	1520	1546		124			26	10	16	1521	1547		125			26	9	17	1520	1545		124			25	10	15	1521	1547		125			26	9	17	1530
14	ash6	1521	1544		121			23	9	14	1521	1546		121			25	9	16	1521	1544		122			23	9	14	1521	1546		121			25	9	16	1530
15	**Combine ASHLEYOLDM2**	**1512**	**1528**	**117**				**16**	**9**	**7**	**1512**	**1530**	**118**				**18**	**9**	**9**	**1512**	**1527**	**117**				**15**	**9**	**6**	**1512**	**1530**	**118**				**18**	**9**	**9**	**1521**
15	ash12	1508	1532		110			24	12	12	1508	1533		110			25	12	13	1508	1531		109			23	12	11	1508	1533		110			25	12	13	1520
15	ash14	1511	1537		114			26	10	16	1512	1538		115			26	9	17	1511	1536		114			25	10	15	1512	1538		115			26	9	17	1521
16	**Combine GROVEFM**	**1487**	**1504**	**77.8**				**17**	**13**	**4**	**1488**	**1505**	**80.5**				**17**	**12**	**5**	**1487**	**1504**	**69.4**				**17**	**13**	**4**	**1488**	**1505**	**75.8**				**17**	**12**	**5**	**1500**
16	grv2	1477	1503		67			26	23	3	1477	1504		69.8			27	23	4	1477	1501		58.1			24	23	1	1477	1504		64.9			27	23	4	1500
16	grv3	1488	1514		105			26	11	15	1489	1515		105			26	10	16	1488	1513		103			25	11	14	1489	1516		104			27	10	17	1499
17	**Combine GRTBINNAL**	**1456**	**1469**	**52.2**				**13**	**4**	**9**	**1456**	**1470**	**56.6**				**14**	**4**	**10**	**1456**	**1468**	**46.9**				**12**	**4**	**8**	**1456**	**1470**	**56**				**14**	**4**	**10**	**1460**
17	wor1	1445	1469		63.7			24	15	9	1445	1471		67.4			26	15	11	1445	1468		58			23	15	8	1445	1470		65.7			25	15	10	1460
17	wor2	1458	1482		83.8			24	1	23	1458	1484		85.6			26	1	25	1458	1481		81.8			23	1	22	1458	1484		85.1			26	1	25	1459
17	wor3	1444	1469		60.8			25	16	9	1444	1471		64.6			27	16	11	1444	1468		57			24	16	8	1444	1471		65.7			27	16	11	1460
18	**Combine ATTINGHAM**	**1384**	**1400**	**118**				**16**	**2**	**14**	**1384**	**1401**	**119**				**17**	**2**	**15**	**1384**	**1400**	**117**				**16**	**2**	**14**	**1384**	**1402**	**120**				**18**	**2**	**16**	**1386**
18	hfa3	1377	1406		113			29	8	21	1378	1407		114			29	7	22	1377	1405		111			28	8	20	1378	1408		115			30	7	23	1385
18	hfa45	1383	1407		112			24	3	21	1384	1408		112			24	2	22	1383	1406		112			23	3	20	1384	1408		112			24	2	22	1386
19	**Combine BADDESLEY5**	**1570**	**1580**	**27.6 n=6 A= 27.6%(A**				**10**	**8**	**2**	**1570**	**1581**	**31.3**				**11**	**8**	**3**	**1570**	**1580**	**23 n=6 A= 23.0%(Ar**				**10**	**8**	**2**	**1571**	**1582**	**32.2**				**11**	**7**	**4**	**1578**
19	**Combine BADDESLEY5**	**1565**	**1581**	**139**				**16**	**13**	**3**	**1568**	**1583**	**133**				**15**	**10**	**5**	**1567**	**1582**	**130**				**15**	**11**	**4**	**1568**	**1584**	**132**				**16**	**10**	**6**	**1578**
19	bad40	1551	1582		45.6			31	25	6	1551	1583		48.6			32	25	7	1551	1579		36.9			28	25	3	1552	1583		47.8			31	24	7	1576
19	bad41	1560	1589		110	116		29	17	12	1560	1590		111	112		30	17	13	1560	1587		106	109		27	17	10	1560	1591		112	112		31	17	14	1577
19	bad423	1572	1604		53.9			32	2	30	1573	1605		56.7			32	1	31	1572	1602		52			30	2	28	1573	1605		57.1			32	1	31	1574
19	bad47	1564	1591		131	121		27	14	13	1564	1593		131	124		29	14	15	1564	1590		131	124		26	14	12	1564	1593		131	123		29	14	15	1578
19	bad49	1543	1571		9.3			28	30	-2	1543	1573		11			30	30	0	1543	1570		7.9			27	30	-3	1543	1574		12			31	30	1	1573
19	bad50	1566	1596		131	126		30	8	22	1566	1598		131	118		32	8	24	1566	1595		131	117		29	8	21	1567	1598		130	118		31	7	24	1574
20	**Combine BADDESLEY7**	**1625**	**1638**	**152**				**13**	**5**	**8**	**1625**	**1639**	**154**				**14**	**5**	**9**	**1624**	**1637**	**153**				**13**	**6**	**7**	**1626**	**1640**	**152**				**14**	**4**	**10**	**1630**
20	bad61	1619	1647		124			28	11	17	1619	1649		125			30	11	19	1619	1646		125			27	11	16	1620	1649		125			29	10	19	1630
20	bad62	1620	1648		128			28	10	18	1620	1650		129			30	10	20	1620	1647		128			27	10	17	1620	1651		128			31	10	21	1630
20	bad63	1619	1647		125			28	11	17	1619	1649		126			30	11	19	1619	1646		125			27	11	16	1620	1649		125			29	10	19	1630
20	bad64	1623	1655		116			32	7	25	1623	1657		117			34	7	27	1623	1653		116			30	7	23	1624	1658		116			34	6	28	1630
21	**Combine BADDESLEY8**	**1529**	**1549**	**95.3**				**20**	**7**	**13**	**1529**	**1550**	**97**				**21**	**7**	**14**	**1529**	**1548**	**91.5**				**19**	**7**	**12**	**1530**	**1551**	**97**				**21**	**6**	**15**	**1536**
21	bad72	1519	1550		86.7			31	17	14	1520	1551		88.4			31	16	15	1519	1548		82.7			29	17	12	1520	1552		88.6			32	16	16	1536
21	bad74	1529	1561		108			32	6	26	1530	1562		108			32	5	27	1529	1559		107			30	6	24	1530	1563		108			33	5	28	1535
22	**Combine BADDESLEY9**	**1777**	**1790**	**146**				**13**	**13**	**0**	**1778**	**1791**	**148**				**13**	**12**	**1**	**1777**	**1790**	**147**				**13**	**13**	**0**	**1778**	**1791**	**147**				**13**	**12**	**1**	**1790**
22	bad81	1775	1798		124			23	15	8	1775	1800		125			25	15	10	1775	1798		125			23	15	8	1775	1799		125			24	15	9	1790
22	bad82	1774	1797		124			23	16	7	1774	1799		124			25	16	9	1774	1797		124			23	16	7	1774	1799		124			25	16	9	1790
22	bad83	1774	1800		126			26	16	10	1775	1802		127			27	15	12	1774	1799		127			25	16	9	1775	1802		127			27	15	12	1790
23	**Combine CLOTHALL**	**1745**	**1763**	**123**				**18**	**8**	**10**	**1746**	**1763**	**124**				**17**	**7**	**10**	**1745**	**1762**	**124**				**17**	**8**	**9**	**1746**	**1763**	**124**				**17**	**7**	**10**	**1753**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
23	| CLB-B03A	1744	1770		116			26	9	17	1745	1771		117			26	8	18	1744	1769		117			25	9	16	1745	1771		117			26	8	18	1753
23	| CLB-B07A	1742	1768		116			26	5	21	1742	1769		116			27	5	22	1742	1767		116			25	5	20	1743	1769		116			26	4	22	1747
24	**Combine EASTBURY**	**1547**	**1569**	**107**				**22**	**18**	**4**	**1548**	**1570**	**108**				**22**	**17**	**5**	**1547**	**1567**	**106**				**20**	**18**	**2**	**1548**	**1571**	**108**				**23**	**17**	**6**	**1565**
24	| east04m	1540	1572		99.1			32	25	7	1541	1573		100			32	24	8	1540	1569		98.1			29	25	4	1541	1573		100			32	24	8	1565
24	| east07m	1548	1582		111			34	17	17	1548	1583		111			35	17	18	1547	1579		110			32	18	14	1548	1584		111			36	17	19	1565
25	**Combine BARTONSTACEY**	**1526**	**1541**	**127**				**15**	**14**	**1**	**1526**	**1543**	**128**				**17**	**14**	**3**	**1526**	**1540**	**124**				**14**	**14**	**0**	**1527**	**1543**	**129**				**16**	**13**	**3**	**1540**
25	| cfbs1	1520	1551		124			31	19	12	1520	1553		124			33	19	14	1519	1549		123			30	20	10	1520	1554		125			34	19	15	1539
25	| cfbs3	1518	1547		109			29	22	7	1519	1549		110			30	21	9	1518	1546		108			28	22	6	1519	1549		110			30	21	9	1540
25	| cfbs5	1526	1555		111			29	14	15	1526	1556		112			30	14	16	1526	1553		110			27	14	13	1526	1557		113			31	14	17	1540
26	**Combine BAYTON**	**1507**	**1527**	**136**				**20**	**2**	**18**	**1508**	**1528**	**137**				**20**	**1**	**19**	**1507**	**1526**	**135**				**19**	**2**	**17**	**1509**	**1530**	**139**				**21**	**0**	**21**	**1509**
26	| bay12	1499	1544		130			45	10	35	1499	1546		130			47	10	37	1499	1542		130			43	10	33	1501	1551		131			50	8	42	1509
26	| bay23	1506	1541		116			35	3	32	1507	1542		116			35	2	33	1507	1539		115			32	2	30	1508	1544		118			36	1	35	1509
26	| bay39a	1499	1534		113			35	10	25	1499	1536		113			37	10	27	1499	1534		113			35	10	25	1500	1539		114			39	9	30	1509
27	**Combine BEARPARK**	**1458**	**1475**	**124**				**17**	**17**	**0**	**1458**	**1476**	**124**				**18**	**17**	**1**	**1458**	**1474**	**125**				**16**	**17**	**-1**	**1458**	**1477**	**125**				**19**	**17**	**2**	**1475**
27	| BRP-A01A	1455	1481		116			26	20	6	1455	1482		117			27	20	7	1455	1480		117			25	20	5	1455	1483		117			28	20	8	1475
27	| BRP-A04A	1457	1483		116			26	18	8	1457	1484		117			27	18	9	1456	1482		117			26	19	7	1457	1484		117			27	18	9	1475
28	**Combine GOOSE**	**1387**	**1405**	**111**				**18**	**4**	**14**	**1387**	**1407**	**112**				**20**	**4**	**16**	**1387**	**1404**	**109**				**17**	**4**	**13**	**1387**	**1407**	**113**				**20**	**4**	**16**	**1391**
28	| goose1	1387	1414		111			27	4	23	1387	1416		112			29	4	25	1387	1413		111			26	4	22	1387	1416		112			29	4	25	1391
28	| goose2	1380	1409		104			29	11	18	1380	1411		106			31	11	20	1380	1408		102			28	11	17	1380	1411		107			31	11	20	1391
29	**Combine BAYHALL**	**1713**	**1725**	**70**				**12**	**4**	**8**	**1713**	**1726**	**74.1**				**13**	**4**	**9**	**1712**	**1724**	**63.1**				**12**	**5**	**7**	**1713**	**1726**	**74.4**				**13**	**4**	**9**	**1717**
29	**Combine BAYHALL**	**1713**	**1728**	**98.7**				**15**	**4**	**11**	**1714**	**1729**	**101**				**15**	**3**	**12**	**1713**	**1727**	**94**				**14**	**4**	**10**	**1714**	**1729**	**100**				**15**	**3**	**12**	**1717**
29	| BEN-A01B	1712	1740		109	119		28	5	23	1712	1742		110	119		30	5	25	1712	1739		107	118		27	5	22	1713	1742		109	119		29	4	25	1717
29	| BEN-A03	1712	1739		113	121		27	5	22	1712	1741		114	121		29	5	24	1712	1737		112	121		25	5	20	1712	1741		114	121		29	5	24	1717
29	| BEN-A04	1696	1725		48.2			29	20	9	1697	1726		51.3			29	19	10	1696	1724		42.7			28	20	8	1697	1727		52.6			30	19	11	1716
29	| BEN-A05A	1702	1728		83.1	68.2		26	15	11	1702	1730		85.7	70.9		28	15	13	1702	1727		77.8	63.1		25	15	10	1702	1730		84.7	70		28	15	13	1717
30	**Combine BENTFIELD**	**1442**	**1457**	**125**				**15**	**10**	**5**	**1443**	**1458**	**126**				**15**	**9**	**6**	**1442**	**1456**	**126**				**14**	**10**	**4**	**1443**	**1457**	**126**				**14**	**9**	**5**	**1452**
30	| btb02	1441	1462		117			21	11	10	1441	1464		117			23	11	12	1441	1461		117			20	11	9	1441	1463		117			22	11	11	1452
30	| btb05	1440	1462		118			22	12	10	1440	1464		119			24	12	12	1440	1462		119			22	12	10	1440	1464		119			24	12	12	1452
31	**Combine PORCHHS**	**1552**	**1563**	**42.6**				**11**	**13**	**-2**	**1552**	**1564**	**47.1**				**12**	**13**	**-1**	**1551**	**1563**	**37.7**				**12**	**14**	**-2**	**1552**	**1564**	**46.9**				**12**	**13**	**-1**	**1565**
31	**Combine PORCHHS**	**1552**	**1566**	**98.7**				**14**	**13**	**1**	**1553**	**1568**	**102**				**15**	**12**	**3**	**1552**	**1566**	**95.1**				**14**	**13**	**1**	**1553**	**1568**	**105**				**15**	**12**	**3**	**1565**
31	| phbc1	1554	1580		76	99.8		26	10	16	1554	1581		78.7	101		27	10	17	1553	1578		74.9	98.3		25	11	14	1554	1581		79.7	102		27	10	17	1564
31	| phbc3	1545	1572		123	106		27	19	8	1545	1574		124	108		29	19	10	1545	1570		121	104		25	19	6	1545	1574		124	109		29	19	10	1564
31	| phbc4	1542	1571		110	92.2		29	22	7	1543	1572		112	94.6		29	21	8	1542	1570		107	89.5		28	22	6	1543	1573		115	97.6		30	21	9	1564
31	| phbc5	1532	1557		17.5			25	33	-8	1532	1559		20.3			27	33	-6	1532	1556		14.6			24	33	-9	1532	1559		19.3			27	33	-6	1565
32	**Combine MOYSENTS**	**1357**	**1377**	**15.1 n=2 A= 15.1%(A**				**20**	**15**	**5**	**1358**	**1378**	**17.1 n=2 A= 17.1%(**				**20**	**14**	**6**	**1357**	**1376**	**11.1 n=2 A= 11.1%(**				**19**	**15**	**4**	**1358**	**1378**	**16.8 FAILS n=2 A=**				**20**	**14**	**6**	**1372**
32	| moy1	1327	1359		7			32	37	-5	1327	1361		8.2			34	37	-3	1327	1357		4.5			30	37	-7	1328	1361		8.1			33	36	-3	1364
32	| moy3	1359	1389		98.9			30	13	17	1359	1391		99.6			32	13	19	1359	1388		98			29	13	16	1360	1391		98.9			31	12	19	1372
33	**Combine LEDWYCHE**	**1461**	**1476**	**135**				**15**	**2**	**13**	**1462**	**1477**	**137**				**15**	**1**	**14**	**1461**	**1475**	**134**				**14**	**2**	**12**	**1462**	**1477**	**135**				**15**	**1**	**14**	**1463**
33	| led1	1457	1491		129			34	6	28	1458	1492		129			34	5	29	1457	1489		129			32	6	26	1458	1494		128			36	5	31	1463
33	| led2	1460	1485		119			25	3	22	1460	1487		120			27	3	24	1460	1485		119			25	3	22	1461	1487		120			26	2	24	1463
33	| led3	1455	1481		110			26	6	20	1455	1483		112			28	6	22	1455	1480		109			25	6	19	1455	1483		110			28	6	22	1461
34	**Combine BOARSTALL**	**1613**	**1625**	**74.8**				**12**	**2**	**10**	**1613**	**1626**	**78.8**				**13**	**2**	**11**	**1613**	**1624**	**65.2**				**11**	**2**	**9**	**1614**	**1626**	**82.8**				**12**	**1**	**11**	**1615**
34	**Combine BOARSTALL**	**1613**	**1626**	**114**				**13**	**2**	**11**	**1614**	**1628**	**120**				**14**	**1**	**13**	**1613**	**1626**	**112**				**13**	**2**	**11**	**1614**	**1629**	**122**				**15**	**1**	**14**	**1615**
34	| brst1	1613	1642		104	108		29	2	27	1613	1643		105	116		30	2	28	1612	1640		101	114		28	3	25	1613	1644		107	117		31	2	29	1615
34	| brst23	1599	1632		88.9	76.4		33	15	18	1599	1634		91.2	80.3		35	15	20	1599	1629		81.1	70.2		30	15	15	1600	1634		92.3	81.6		34	14	20	1614
34	| brst4	1590	1624		36.5			34	23	11	1590	1626		39.1			36	23	13	1590	1622		29.9			32	23	9	1591	1627		42.3			36	22	14	1613
34	| brst5	1607	1636		130	121		29	7	22	1607	1638		130	123		31	7	24	1607	1635		131	124		28	7	21	1608	1639		131	125		31	6	25	1614
34	| brst6	1611	1642		119	130		31	2	29	1611	1644		120	126		33	2	31	1610	1640		120	126		30	3	27	1611	1645		120	126		34	2	32	1613

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
35	**Combine MEESONFM**	**1499**	**1511**	**137**				**12**	**3**	**9**	**1499**	**1512**	**139**				**13**	**3**	**10**	**1498**	**1511**	**134**				**13**	**4**	**9**	**1499**	**1512**	**137**				**13**	**3**	**10**	**1502**
35	mees1	1493	1516		113			23	9	14	1494	1518		115			24	8	16	1493	1515		111			22	9	13	1493	1517		112			24	9	15	1502
35	mees3	1498	1519		117			21	4	17	1498	1522		118			24	4	20	1498	1519		116			21	4	17	1498	1521		118			23	4	19	1502
35	mees4	1494	1522		130			28	8	20	1494	1524		130			30	8	22	1494	1520		130			26	8	18	1495	1523		130			28	7	21	1502
36	**Combine MEESONHALL**	**1626**	**1643**	**124**				**17**	**11**	**6**	**1627**	**1644**	**124**				**17**	**10**	**7**	**1626**	**1642**	**125**				**16**	**11**	**5**	**1627**	**1644**	**123**				**17**	**10**	**7**	**1637**
36	me1	1624	1653		123			29	13	16	1624	1656		123			32	13	19	1624	1651		123			27	13	14	1624	1655		122			31	13	18	1637
36	me2	1625	1646		110			21	10	11	1625	1648		111			23	10	13	1625	1645		111			20	10	10	1625	1647		110			22	10	12	1635
37	**Combine BOLSOVER**	**1739**	**1752**	**41.7**				**13**	**10**	**3**	**1739**	**1753**	**45.5**				**14**	**10**	**4**	**1738**	**1751**	**37.7**				**13**	**11**	**2**	**1740**	**1754**	**46.5**				**14**	**9**	**5**	**1749**
37	**Combine BOLSOVER**	**1740**	**1756**	**164**				**16**	**9**	**7**	**1740**	**1757**	**165**				**17**	**9**	**8**	**1740**	**1754**	**163**				**14**	**9**	**5**	**1741**	**1757**	**164**				**16**	**8**	**8**	**1749**
37	BLS-B03A	1733	1767		132	125		34	16	18	1734	1768		133	126		34	15	19	1733	1764		132	124		31	16	15	1734	1768		132	125		34	15	19	1749
37	BLS-B06	1707	1738		5.4			31	42	-11	1708	1739		6.5			31	41	-10	1707	1737		4.3			30	42	-12	1708	1740		6.8			32	41	-9	1749
37	BLS-B09A	1735	1770		129	130		35	14	21	1735	1772		129	130		37	14	23	1735	1767		129	130		32	14	18	1736	1772		129	130		36	13	23	1749
37	BLS-B13A	1734	1771		131	132		37	15	22	1734	1773		131	132		39	15	24	1734	1769		131	132		35	15	20	1735	1775		129	132		40	14	26	1749
37	BLS-B15A	1737	1768		118	125		31	12	19	1738	1770		119	126		32	11	21	1737	1766		117	125		29	12	17	1738	1770		120	126		32	11	21	1749
38	**Combine HOMESIDE**	**1452**	**1469**	**123**				**17**	**6**	**11**	**1452**	**1470**	**124**				**18**	**6**	**12**	**1452**	**1468**	**124**				**16**	**6**	**10**	**1452**	**1470**	**124**				**18**	**6**	**12**	**1458**
38	home14	1448	1474		115			26	10	16	1449	1476		116			27	9	18	1448	1473		116			25	10	15	1449	1475		116			26	9	17	1458
38	home3	1451	1477		116			26	7	19	1451	1478		117			27	7	20	1450	1476		117			26	8	18	1451	1478		117			27	7	20	1458
39	**Combine BOSHAM**	**1403**	**1421**	**123**				**18**	**3**	**15**	**1403**	**1423**	**124**				**20**	**3**	**17**	**1403**	**1420**	**124**				**17**	**3**	**14**	**1403**	**1423**	**124**				**20**	**3**	**17**	**1406**
39	bos5	1401	1430		117			29	5	24	1402	1431		117			29	4	25	1401	1429		117			28	5	23	1402	1432		117			30	4	26	1406
39	bos7	1399	1427		116			28	7	21	1400	1429		116			29	6	23	1399	1426		116			27	7	20	1400	1429		116			29	6	23	1406
40	**Combine BRAMLEY**	**1535**	**1555**	**115**				**20**	**11**	**9**	**1536**	**1555**	**116**				**19**	**10**	**9**	**1535**	**1553**	**113**				**18**	**11**	**7**	**1536**	**1556**	**116**				**20**	**10**	**10**	**1546**
40	brmly1	1529	1559		108			30	15	15	1529	1561		109			32	15	17	1529	1557		107			28	15	13	1530	1561		110			31	14	17	1544
40	brmly3	1535	1563		112			28	11	17	1535	1565		113			30	11	19	1535	1562		112			27	11	16	1536	1565		113			29	10	19	1546
41	**Combine GILBERTS**	**1603**	**1624**	**116**				**21**	**22**	**-1**	**1603**	**1626**	**117**				**23**	**22**	**1**	**1603**	**1623**	**115**				**20**	**22**	**-2**	**1604**	**1627**	**118**				**23**	**21**	**2**	**1625**
41	glb4	1603	1634		112			31	22	9	1603	1636		113			33	22	11	1603	1633		112			30	22	8	1604	1637		113			33	21	12	1625
41	glb5	1596	1630		110			34	29	5	1596	1631		110			35	29	6	1596	1628		108			32	29	3	1597	1633		112			36	28	8	1625
42	**Combine BRECON**	**1500**	**1517**	**122**				**17**	**11**	**6**	**1501**	**1518**	**123**				**17**	**10**	**7**	**1500**	**1517**	**121**				**17**	**11**	**6**	**1501**	**1518**	**122**				**17**	**10**	**7**	**1511**
42	bre4	1496	1522		115			26	15	11	1497	1524		115			27	14	13	1496	1521		114			25	15	10	1497	1524		115			27	14	13	1511
42	bre5	1499	1525		115			26	12	14	1500	1527		116			27	11	16	1499	1524		115			25	12	13	1500	1527		116			27	11	16	1511
43	**Combine BRETBY1**	**1612**	**1629**	**45.1**	**n=2 A= 45.1%(A**			**17**	**7**	**10**	**1612**	**1631**	**48.1**	**n=2 A= 48.1%(**			**19**	**7**	**12**	**1612**	**1629**	**38.5**	**n=2 A= 38.5%(**			**17**	**7**	**10**	**1612**	**1631**	**45.1**	**n=2 A= 45.1%(**			**19**	**7**	**12**	**1619**
43	BRT-A03	1597	1623		32.9			26	21	5	1597	1624		35.6			27	21	6	1596	1622		26.6			26	22	4	1597	1624		32.9			27	21	6	1618
43	BRT-A08	1613	1642		98.8			29	6	23	1614	1643		99.9			29	5	24	1613	1641		97.5			28	6	22	1614	1644		98.6			30	5	25	1619
44	**Combine BRETBY2**	**1716**	**1735**	**112**				**19**	**2**	**17**	**1716**	**1736**	**113**				**20**	**2**	**18**	**1715**	**1734**	**110**				**19**	**3**	**16**	**1716**	**1736**	**113**				**20**	**2**	**18**	**1718**
44	BRT-A11	1715	1744		112			29	3	26	1716	1746		112			30	2	28	1715	1743		111			28	3	25	1716	1746		112			30	2	28	1718
44	BRT-A16	1709	1738		105			29	9	20	1709	1740		106			31	9	22	1709	1737		103			28	9	19	1709	1741		106			32	9	23	1718
45	**Combine BRETBY3**	**1804**	**1816**	**132**				**12**	**1**	**11**	**1804**	**1817**	**135**				**13**	**1**	**12**	**1803**	**1815**	**129**				**12**	**2**	**10**	**1804**	**1817**	**134**				**13**	**1**	**12**	**1805**
45	BRT-A17	1797	1824		120			27	8	19	1797	1826		121			29	8	21	1797	1823		119			26	8	18	1797	1826		121			29	8	21	1805
45	BRT-A19	1803	1831		114			28	-3	31	1803	1833		115			30	-3	33	1803	1830		113			27	-3	30	1803	1834		114			31	-3	34	1800
45	BRT-A21	1794	1822		101			28	9	19	1794	1824		103			30	9	21	1794	1821		98.1			27	9	18	1795	1824		104			29	8	21	1803
45	BRT-A22	1801	1827		126			26	0	26	1802	1829		126			27	-1	28	1801	1826		126			25	0	25	1802	1828		126			26	-1	27	1801
46	**Combine REDLION**	**1546**	**1559**	**149**				**13**	**10**	**3**	**1547**	**1560**	**151**				**13**	**9**	**4**	**1546**	**1558**	**145**				**12**	**10**	**2**	**1547**	**1560**	**149**				**13**	**9**	**4**	**1556**
46	bcs1	1543	1572		126			29	13	16	1544	1574		127			30	12	18	1543	1571		127			28	13	15	1544	1574		127			30	12	18	1556
46	bcs5	1542	1567		125			25	14	11	1542	1569		125			27	14	13	1542	1566		125			24	14	10	1542	1569		124			27	14	13	1556
46	bcs6	1537	1567		112			30	19	11	1537	1569		114			32	19	13	1537	1565		108			28	19	9	1538	1569		114			31	18	13	1556
46	bcs7	1544	1573		125			29	11	18	1544	1574		126			30	11	19	1544	1572		124			28	11	17	1545	1576		124			31	10	21	1555
47	**Combine SHALFORD**	**1575**	**1592**	**143**				**17**	**7**	**10**	**1576**	**1593**	**144**				**17**	**6**	**11**	**1575**	**1591**	**143**				**16**	**7**	**9**	**1576**	**1594**	**144**				**18**	**6**	**12**	**1582**
47	shl13	1570	1602		124			32	12	20	1571	1603		125			32	11	21	1570	1600		125			30	12	18	1571	1605		125			34	11	23	1582
47	shl14	1573	1605		121			32	9	23	1574	1606		122			32	8	24	1573	1603		121			30	9	21	1574	1606		122			32	8	24	1582

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
47	shl23	1570	1602		124			32	10	22	1570	1603		124			33	10	23	1570	1600		123			30	10	20	1570	1604		124			34	10	24	1580
48	**Combine DUNDAS1**	**1137**	**1155**	**127**				**18**	**10**	**8**	**1138**	**1156**	**128**				**18**	**9**	**9**	**1137**	**1153**	**121**				**16**	**10**	**6**	**1138**	**1157**	**128**				**19**	**9**	**10**	**1147**
48	dw02	1130	1165		121			35	17	18	1130	1167		122			37	17	20	1130	1162		120			32	17	15	1131	1167		122			36	16	20	1147
48	dw03	1137	1170		111			33	10	23	1137	1172		112			35	10	25	1137	1168		109			31	10	21	1138	1172		112			34	9	25	1147
48	dw04	1128	1163		112			35	19	16	1128	1165		113			37	19	18	1128	1160		107			32	19	13	1129	1165		112			36	18	18	1147
49	**Combine DUNDAS2**	**1178**	**1188**	**43.3**				**10**	**4**	**6**	**1179**	**1188**	**48.4**				**9**	**3**	**6**	**1178**	**1188**	**38.8**				**10**	**4**	**6**	**1179**	**1189**	**46.2**				**10**	**3**	**7**	**1182**
49	**Combine DUNDAS2**	**1180**	**1192**	**145**				**12**	**2**	**10**	**1180**	**1194**	**146**				**14**	**2**	**12**	**1180**	**1192**	**146**				**12**	**2**	**10**	**1180**	**1194**	**146**				**14**	**2**	**12**	**1182**
49	dw36b	1162	1188		42.5			26	20	6	1163	1190		45.7			27	19	8	1162	1187		35.2			25	20	5	1163	1189		44.8			26	19	7	1182
49	dw37	1164	1184		23.4			20	18	2	1164	1186		26.7			22	18	4	1164	1184		22.1			20	18	2	1164	1186		24.9			22	18	4	1182
49	dw38	1177	1198		122	121		21	5	16	1177	1200		123	122		23	5	18	1177	1198		122	123		21	5	16	1177	1200		123	122		23	5	18	1182
49	dw42	1178	1201		99.8	122		23	4	19	1179	1203		103	123		24	3	21	1178	1201		99.5	123		23	4	19	1179	1203		102	123		24	3	21	1182
49	dw43	1176	1202		127	128		26	6	20	1176	1203		128	128		27	6	21	1176	1201		128	128		25	6	19	1176	1204		126	129		28	6	22	1182
50	**Combine BRUTON1**	**1451**	**1463**	**112**				**12**	**3**	**9**	**1451**	**1464**	**116**				**13**	**3**	**10**	**1451**	**1462**	**109**				**11**	**3**	**8**	**1451**	**1464**	**114**				**13**	**3**	**10**	**1454**
50	bru21	1448	1477		123			29	6	23	1449	1479		124			30	5	25	1448	1476		123			28	6	22	1449	1479		123			30	5	25	1454
50	bru22	1447	1472		127			25	6	19	1447	1474		128			27	6	21	1447	1471		127			24	6	18	1447	1474		127			27	6	21	1453
50	bru23	1439	1465		66.6			26	14	12	1439	1466		69.4			27	14	13	1439	1464		62.8			25	14	11	1439	1466		69			27	14	13	1453
50	bru24	1449	1478		121			29	4	25	1449	1480		122			31	4	27	1449	1476		120			27	4	23	1449	1480		120			31	4	27	1453
51	**Combine BRUTON2**	**1452**	**1469**	**125**				**17**	**10**	**7**	**1452**	**1470**	**126**				**18**	**10**	**8**	**1452**	**1468**	**126**				**16**	**10**	**6**	**1452**	**1470**	**126**				**18**	**10**	**8**	**1462**
51	bru11	1449	1476		117			27	13	14	1450	1477		118			27	12	15	1449	1475		118			26	13	13	1450	1477		118			27	12	15	1462
51	bru15	1449	1476		117			27	13	14	1450	1477		118			27	12	15	1449	1474		118			25	13	12	1450	1477		118			27	12	15	1462
52	**Combine BRUTON3**	**1421**	**1437**	**123**				**16**	**9**	**7**	**1422**	**1438**	**124**				**16**	**8**	**8**	**1421**	**1436**	**123**				**15**	**9**	**6**	**1422**	**1437**	**123**				**15**	**8**	**7**	**1430**
52	bru1	1420	1444		116			24	10	14	1421	1445		117			24	9	15	1420	1443		117			23	10	13	1421	1445		117			24	9	15	1430
52	bru2	1418	1442		115			24	12	12	1419	1443		116			24	11	13	1418	1441		115			23	12	11	1419	1442		116			23	11	12	1430
53	**Combine BUILDWAS**	**1537**	**1554**	**111**				**17**	**11**	**6**	**1538**	**1555**	**112**				**17**	**10**	**7**	**1537**	**1553**	**109**				**16**	**11**	**5**	**1538**	**1555**	**111**				**17**	**10**	**7**	**1548**
53	bld1	1537	1563		112			26	11	15	1538	1565		112			27	10	17	1537	1562		111			25	11	14	1538	1564		112			26	10	16	1548
53	bld11	1532	1557		103			25	16	9	1532	1559		105			27	16	11	1532	1555		102			23	16	7	1532	1558		104			26	16	10	1548
54	**Combine LAMONBY**	**1611**	**1634**	**124**				**23**	**4**	**19**	**1611**	**1635**	**124**				**24**	**4**	**20**	**1611**	**1632**	**124**				**21**	**4**	**17**	**1612**	**1636**	**125**				**24**	**3**	**21**	**1615**
54	bbs-b01a	1609	1643		116			34	6	28	1610	1645		116			35	5	30	1609	1641		115			32	6	26	1610	1646		116			36	5	31	1615
54	bbs-b02a	1606	1642		117			36	9	27	1607	1644		117			37	8	29	1606	1640		118			34	9	25	1607	1646		118			39	8	31	1615
55	**Combine LITTLEBOURNE**	**1512**	**1532**	**125**				**20**	**13**	**7**	**1513**	**1533**	**126**				**20**	**12**	**8**	**1512**	**1531**	**126**				**19**	**13**	**6**	**1513**	**1534**	**126**				**21**	**12**	**9**	**1525**
55	KLB-A42A	1511	1539		114			28	14	14	1511	1540		115			29	14	15	1511	1537		115			26	14	12	1512	1540		114			28	13	15	1525
55	KLB-A48A	1509	1541		120			32	16	16	1509	1543		121			34	16	18	1509	1539		121			30	16	14	1510	1543		121			33	15	18	1525
56	**Combine SHOOTROUGH**	**1420**	**1432**	**124**				**12**	**2**	**10**	**1420**	**1433**	**126**				**13**	**2**	**11**	**1420**	**1431**	**121**				**11**	**2**	**9**	**1420**	**1432**	**125**				**12**	**2**	**10**	**1422**
56	shu1	1417	1443		129			26	5	21	1417	1444		129			27	5	22	1416	1441		129			25	6	19	1417	1444		129			27	5	22	1422
56	shu2	1412	1436		96.6			24	10	14	1413	1437		99.1			24	9	15	1412	1435		92.9			23	10	13	1413	1436		97.4			23	9	14	1422
56	shu3	1419	1440		116			21	3	18	1419	1441		117			22	3	19	1419	1439		115			20	3	17	1419	1441		117			22	3	19	1422
57	**Combine TYMAWR1**	**1456**	**1468**	**45.9**				**12**	**4**	**8**	**1457**	**1468**	**50.7**				**11**	**3**	**8**	**1456**	**1467**	**39.6 - n=3 A= 39.6%(**				**11**	**4**	**7**	**1457**	**1468**	**45.7**				**11**	**3**	**8**	**1460**
57	**Combine TYMAWR1**	**1456**	**1470**	**94.5**				**14**	**4**	**10**	**1458**	**1473**	**82.4**				**15**	**2**	**13**	**1457**	**1471**	**76.7**				**14**	**3**	**11**	**1458**	**1472**	**81.4**				**14**	**2**	**12**	**1460**
57	tm1	1449	1470		92.3	85.8		21	11	10	1449	1472		95.2	72		23	11	12	1449	1470		89.8	65.9		21	11	10	1449	1472		95.1	71		23	11	12	1460
57	tm2	1444	1464		34			20	16	4	1444	1466		38			22	16	6	1443	1464		27.6			21	17	4	1444	1465		32.5			21	16	5	1460
57	tm4	1458	1480		82.7	108		22	0	22	1458	1482		85.2	106		24	0	24	1458	1480		81	104		22	0	22	1458	1482		83.4	105		24	0	24	1458
58	**Combine TYMAWR2**	**1589**	**1609**	**125**				**20**	**5**	**15**	**1589**	**1610**	**126**				**21**	**5**	**16**	**1588**	**1608**	**126**				**20**	**6**	**14**	**1589**	**1611**	**126**				**22**	**5**	**17**	**1594**
58	tm11	1586	1617		118			31	8	23	1587	1618		118			31	7	24	1586	1614		118			28	8	20	1587	1618		118			31	7	24	1594
58	tm15	1586	1616		117			30	7	23	1586	1618		117			32	7	25	1586	1615		118			29	7	22	1587	1618		118			31	6	25	1593
59	**Combine TYMAWR3**	**1617**	**1635**	**98.2**				**18**	**13**	**5**	**1617**	**1636**	**100**				**19**	**13**	**6**	**1616**	**1634**	**97**				**18**	**14**	**4**	**1617**	**1636**	**102**				**19**	**13**	**6**	**1630**
59	tm22	1617	1645		109			28	13	15	1617	1647		109			30	13	17	1617	1643		108			26	13	13	1618	1646		109			28	12	16	1630
59	tm24	1608	1636		89.8			28	22	6	1609	1638		91.6			29	21	8	1608	1635		88.6			27	22	5	1609	1638		93.9			29	21	8	1630
60	**Combine TYMAWR4**	**1798**	**1811**	**114**				**13**	**10**	**3**	**1799**	**1812**	**118**				**13**	**9**	**4**	**1798**	**1811**	**111**				**13**	**10**	**3**	**1799**	**1813**	**114**				**14**	**9**	**5**	**1808**

Number	SITE & sample	A from	A to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	Real date
60	| tm32	1798	1828		106			30	10	20	1798	1830		108			32	10	22	1798	1827		105			29	10	19	1799	1830		106			31	9	22	1808
60	| tm34	1796	1825		126			29	12	17	1796	1827		127			31	12	19	1796	1824		126			28	12	16	1797	1828		126			31	11	20	1808
60	| tm35	1792	1818		117			26	16	10	1793	1820		118			27	15	12	1792	1817		116			25	16	9	1793	1819		116			26	15	11	1808
60	| tm36	1788	1814		83.3			26	20	6	1789	1816		85.7			27	19	8	1788	1813		80.3			25	20	5	1789	1816		84			27	19	8	1808
61	**Combine CHARLWOOD1**	**1627**	**1643**	**109**				**16**	**14**	**2**	**1628**	**1644**	**111**				**16**	**13**	**3**	**1627**	**1643**	**108**				**16**	**14**	**2**	**1628**	**1644**	**111**				**16**	**13**	**3**	**1641**
61	| che2	1622	1646		102			24	19	5	1622	1647		103			25	19	6	1622	1645		101			23	19	4	1622	1647		103			25	19	6	1641
61	| che7	1628	1651		111			23	13	10	1628	1653		112			25	13	12	1628	1650		111			22	13	9	1628	1652		112			24	13	11	1641
62	**Combine CHARLWOOD2**	**1407**	**1418**	**35.3**	**n=4 A= 35.3%(A**			**11**	**4**	**7**	**1408**	**1418**	**40.2**				**10**	**3**	**7**	**1407**	**1418**	**32.5**	**n=4 A= 32.5%(**			**11**	**4**	**7**	**1408**	**1419**	**37.7**				**11**	**3**	**8**	**1411**
62	**Combine CHARLWOOD2**	**1408**	**1421**	**101**				**13**	**3**	**10**	**1409**	**1421**	**104**				**12**	**2**	**10**	**1408**	**1420**	**95.1**				**12**	**3**	**9**	**1409**	**1422**	**99.4**				**13**	**2**	**11**	**1411**
62	| chd1	1399	1421		91.1	70.7		22	12	10	1399	1423		93	74		24	12	12	1399	1420		82.7	64.3		21	12	9	1399	1423		87.9	68.8		24	12	12	1411
62	| chd2	1390	1410		12.3			20	21	-1	1390	1412		14.8			22	21	1	1390	1411		11.4			21	21	0	1390	1412		14.2			22	21	1	1411
62	| chd5	1407	1431		108	121		24	4	20	1407	1433		110	122		26	4	22	1407	1430		109	121		23	4	19	1407	1433		109	121		26	4	22	1411
62	| chd7	1407	1430		104	119		23	4	19	1408	1432		107	119		24	3	21	1407	1430		103	118		23	4	19	1408	1432		104	119		24	3	21	1411
63	**Combine CHARLWOOD3**	**1432**	**1444**	**145**				**12**	**4**	**8**	**1432**	**1445**	**147**				**13**	**4**	**9**	**1432**	**1443**	**145**				**11**	**4**	**7**	**1433**	**1445**	**145**				**12**	**3**	**9**	**1436**
63	| chc2	1428	1449		121			21	5	16	1428	1452		122			24	5	19	1428	1449		121			21	5	16	1428	1451		119			23	5	18	1433
63	| chc3	1427	1451		122			24	7	17	1427	1452		123			25	7	18	1427	1450		123			23	7	16	1427	1453		123			26	7	19	1434
63	| chc4	1431	1460		109			29	4	25	1432	1461		110			29	3	26	1431	1459		108			28	4	24	1432	1461		109			29	3	26	1435
63	| chc7	1426	1455		130			29	10	19	1426	1456		130			30	10	20	1426	1454		130			28	10	18	1426	1457		132			31	10	21	1436
64	**Combine CHARLWOOD4**	**1397**	**1413**	**108**				**16**	**4**	**12**	**1398**	**1414**	**110**				**16**	**3**	**13**	**1397**	**1413**	**107**				**16**	**4**	**12**	**1398**	**1414**	**110**				**16**	**3**	**13**	**1401**
64	| chb1	1391	1416		101			25	10	15	1391	1418		102			27	10	17	1391	1415		99.1			24	10	14	1391	1418		103			27	10	17	1401
64	| chb2	1397	1421		111			24	4	20	1398	1422		111			24	3	21	1397	1420		110			23	4	19	1398	1422		111			24	3	21	1401
65	**Combine CHARLWOOD5**	**1437**	**1448**	**106**				**11**	**4**	**7**	**1437**	**1449**	**110**				**12**	**4**	**8**	**1437**	**1447**	**102**				**10**	**4**	**6**	**1437**	**1449**	**108**				**12**	**4**	**8**	**1441**
65	**Combine CHARLWOOD5**	**1437**	**1450**	**145**				**13**	**4**	**9**										**1437**	**1450**	**147**				**13**	**4**	**9**	**1438**	**1452**	**147**				**14**	**3**	**11**	**1441**
65	| cha1	1436	1459		119	123		23	4	19	1436	1461		120			25	4	21	1436	1458		119	123		22	4	18	1436	1460		121	123		24	4	20	1440
65	| cha3	1434	1460		129	125		26	5	21	1434	1462		129			28	5	23	1434	1459		129	128		25	5	20	1434	1463		128	128		29	5	24	1439
65	| cha4	1425	1448		57			23	14	9	1425	1450		60.3			25	14	11	1425	1448		52.3			23	14	9	1425	1450		58.4			25	14	11	1439
65	| cha5	1434	1458		129	125		24	7	17	1434	1460		129			26	7	19	1434	1457		129	124		23	7	16	1434	1460		129	124		26	7	19	1441
66	**Combine CHAWTON1**	**1578**	**1589**	**84.8**				**11**	**6**	**5**	**1579**	**1590**	**89.5**				**11**	**5**	**6**	**1578**	**1588**	**78.1**				**10**	**6**	**4**	**1579**	**1590**	**87.7**				**11**	**5**	**6**	**1584**
66	**Combine CHAWTON1**	**1578**	**1590**	**143**				**12**	**6**	**6**	**1579**	**1592**	**141**				**13**	**5**	**8**	**1579**	**1590**	**131**				**11**	**5**	**6**	**1580**	**1592**	**136**				**12**	**4**	**8**	**1584**
66	| chw25	1572	1604		135	131		32	11	21	1572	1605		136	131		33	11	22	1572	1602		135	130		30	11	19	1572	1606		136	132		34	11	23	1583
66	| chw40	1579	1613		80.9	95.5		34	4	30	1579	1614		83.1	98.6		35	4	31	1578	1611		77.8	94		33	5	28	1579	1616		79	94.7		37	4	33	1583
66	| chw41	1571	1599		125	115		28	12	16	1571	1601		126	116		30	12	18	1571	1597		123	112		26	12	14	1571	1600		124	113		29	12	17	1583
66	| chw42	1576	1603		125	130		27	6	21	1576	1605		126	129		29	6	23	1576	1601		124	128		25	6	19	1576	1605		126	129		29	6	23	1582
66	| chw43	1559	1587		31.9			28	22	6	1560	1589		34.7			29	21	8	1559	1586		29.3			27	22	5	1560	1589		36.1			29	21	8	1581
66	| chw49	1570	1599		122	120		29	14	15	1570	1601		123	113		31	14	17	1569	1597		117	105		28	15	13	1570	1600		120	109		30	14	16	1584
67	**Combine CHAWTON2**	**1574**	**1592**	**55.5**				**18**	**16**	**2**	**1574**	**1593**	**58.5**				**19**	**16**	**3**	**1574**	**1591**	**46.3**	**n=2 A= 46.3%(**			**17**	**16**	**1**	**1574**	**1593**	**54.5**				**19**	**16**	**3**	**1590**
67	| chw39	1575	1603		102			28	15	13	1575	1605		103			30	15	15	1575	1602		99.8			27	15	12	1576	1605		101			29	14	15	1590
67	| chw44	1559	1587		42.8			28	31	-3	1559	1589		45.7			30	31	-1	1559	1585		33.7			26	31	-5	1559	1588		41.8			29	31	-2	1590
68	**Combine CHAWTON3**	**1647**	**1660**	**116**				**13**	**5**	**8**	**1647**	**1661**	**118**				**14**	**5**	**9**	**1647**	**1660**	**113**				**13**	**5**	**8**	**1647**	**1662**	**118**				**15**	**5**	**10**	**1652**
68	| chw29	1646	1673		113			27	6	21	1646	1675		114			29	6	23	1646	1672		113			26	6	20	1647	1675		114			28	5	23	1652
68	| chw30	1644	1668		123			24	8	16	1644	1669		123			25	8	17	1644	1667		124			23	8	15	1644	1670		123			26	8	18	1652
68	| chw32	1637	1664		92.6			27	15	12	1637	1666		94.8			29	15	14	1637	1663		88.6			26	15	11	1638	1666		95.5			28	14	14	1652
69	**Combine CHAWTON4**	**1649**	**1659**	**116**				**10**	**6**	**4**	**1649**	**1660**	**120**				**11**	**6**	**5**	**1649**	**1659**	**111**				**10**	**6**	**4**	**1649**	**1660**	**121**				**11**	**6**	**5**	**1655**
69	| chw21	1644	1667		125			23	11	12	1644	1669		126			25	11	14	1644	1666		126			22	11	11	1644	1668		126			24	11	13	1655
69	| chw22	1636	1663		72.7			27	19	8	1637	1664		76			27	18	9	1636	1661		66.8			25	19	6	1637	1664		77.3			27	18	9	1655
69	| chw23	1647	1670		122			23	8	15	1647	1672		123			25	8	17	1647	1669		123			22	8	14	1647	1671		124			24	8	16	1655
69	| chw53	1647	1670		121			23	8	15	1648	1672		122			24	7	17	1647	1670		120			23	8	15	1648	1672		121			24	7	17	1655
70	**Combine CHAWTON5**	**1659**	**1672**	**81.9**				**13**	**7**	**6**	**1659**	**1673**	**85.7**				**14**	**7**	**7**	**1659**	**1671**	**79.1**				**12**	**7**	**5**	**1660**	**1673**	**87.5**				**13**	**6**	**7**	**1666**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
70	chw34	1653	1677		110			24	13	11	1653	1679		111			26	13	13	1653	1676		107			23	13	10	1653	1678		110			25	13	12	1666
70	chw35	1647	1674		68.3			27	19	8	1648	1675		71.6			27	18	9	1648	1673		66.6			25	18	7	1648	1675		75.2			27	18	9	1666
70	chw36	1660	1686		94.6			26	6	20	1661	1687		96.1			26	5	21	1660	1684		93.2			24	6	18	1661	1687		96.2			26	5	21	1666
71	**Combine LUMLEY**	**1365**	**1382**	**125**				**17**	**10**	**7**	**1365**	**1384**	**126**				**19**	**10**	**9**	**1365**	**1381**	**126**				**16**	**10**	**6**	**1366**	**1383**	**126**				**17**	**9**	**8**	**1375**
71	lum4	1363	1389		117			26	12	14	1363	1390		117			27	12	15	1363	1388		117			25	12	13	1364	1390		117			26	11	15	1375
71	lum8	1363	1389		118			26	11	15	1363	1390		118			27	11	16	1363	1388		118			25	11	14	1363	1390		119			27	11	16	1374
72	**Combine CHILD**	**1451**	**1466**	**125**				**15**	**14**	**1**	**1451**	**1467**	**126**				**16**	**14**	**2**	**1451**	**1465**	**126**				**14**	**14**	**0**	**1451**	**1467**	**126**				**16**	**14**	**2**	**1465**
72	child5	1449	1473		119			24	16	8	1449	1475		120			26	16	10	1449	1472		120			23	16	7	1449	1475		120			26	16	10	1465
72	child6	1449	1471		115			22	16	6	1449	1473		116			24	16	8	1449	1471		116			22	16	6	1449	1473		116			24	16	8	1465
73	**Combine CHERRINGTON**	**1616**	**1636**	**39.8**	**n=2 A= 39.8%(A**			**20**	**19**	**1**	**1617**	**1637**	**42.6**	**n=2 A= 42.6%(**			**20**	**18**	**2**	**1616**	**1634**	**31.6**	**n=2 A= 31.6%(**			**18**	**19**	**-1**	**1617**	**1637**	**40.1**	**FAILS n=2 A=**			**20**	**18**	**2**	**1635**
73	cher11	1597	1627		27.2			30	38	-8	1597	1629		29.7			32	38	-6	1597	1624		19.9			27	38	-11	1597	1628		27.5			31	38	-7	1635
73	cher12	1618	1648		100			30	16	14	1618	1650		101			32	16	16	1618	1646		98.6			28	16	12	1619	1650		99.9			31	15	16	1634
74	**Combine CHEWSTOKE**	**1376**	**1391**	**28.7**	**n=3 A= 28.7%(A**			**15**	**10**	**5**	**1377**	**1392**	**31.9**	**n=3 A= 31.9%(**			**15**	**9**	**6**	**1376**	**1391**	**23.3**	**n=3 A= 23.3%(**			**15**	**10**	**5**	**1377**	**1392**	**31.3**	**FAILS n=3 A=**			**15**	**9**	**6**	**1386**
74	**Combine CHEWSTOKE**	**1377**	**1397**	**62**				**20**	**9**	**11**	**1378**	**1398**	**64.7**				**20**	**8**	**12**	**1377**	**1396**	**56**				**19**	**9**	**10**	**1378**	**1399**	**64.8**				**21**	**8**	**13**	**1386**
74	chew3	1363	1392		70.3	49.6		29	23	6	1363	1395		73	52.3		32	23	9	1363	1391		62.7	43.4		28	23	5	1364	1395		73.9	52.6		31	22	9	1386
74	chew5	1356	1384		21.1			28	30	-2	1356	1386		23.7			30	30	0	1356	1382		16.9			26	30	-4	1357	1386		23.1			29	29	0	1386
74	chew6	1379	1408		77.5	103		29	7	22	1379	1410		79.5	103		31	7	24	1379	1407		75.4	101		28	7	21	1380	1411		78.3	103		31	6	25	1386
75	**Combine CHICKSANDS1**	**1536**	**1546**	**139**				**10**	**5**	**5**	**1536**	**1547**	**142**				**11**	**5**	**6**	**1536**	**1546**	**136**				**10**	**5**	**5**	**1536**	**1547**	**142**				**11**	**5**	**6**	**1541**
75	CHK-P02	1532	1555		129			23	8	15	1532	1557		130			25	8	17	1532	1555		130			23	8	15	1533	1556		130			23	7	16	1540
75	CHK-P06A	1533	1554		127			21	8	13	1534	1556		128			22	7	15	1533	1554		128			21	8	13	1534	1555		127			21	7	14	1541
75	CHK-P09B	1527	1552		101			25	14	11	1527	1554		103			27	14	13	1527	1551		95.3			24	14	10	1527	1553		102			26	14	12	1541
75	CHK-P10A	1535	1558		118			23	5	18	1535	1560		119			25	5	20	1535	1558		118			23	5	18	1535	1560		119			25	5	20	1540
76	**Combine CHICKSANDS4**	**1489**	**1507**	**125**				**18**	**15**	**3**	**1489**	**1507**	**126**				**18**	**15**	**3**	**1489**	**1506**	**126**				**17**	**15**	**2**	**1489**	**1508**	**126**				**19**	**15**	**4**	**1504**
76	CHK-P39B	1486	1515		119			29	18	11	1487	1516		119			29	17	12	1486	1513		119			27	18	9	1487	1516		119			29	17	12	1504
76	CHK-P44B	1486	1512		116			26	18	8	1487	1514		116			27	17	10	1487	1512		117			25	17	8	1487	1515		116			28	17	11	1504
77	**Combine CHICKSANDS5**	**1803**	**1816**	**141**				**13**	**10**	**3**	**1803**	**1818**	**143**				**15**	**10**	**5**	**1803**	**1816**	**143**				**13**	**10**	**3**	**1804**	**1818**	**142**				**14**	**9**	**5**	**1813**
77	CHK-P47A	1799	1822		116			23	14	9	1799	1823		117			24	14	10	1799	1821		117			22	14	8	1799	1823		116			24	14	10	1813
77	CHK-P58	1800	1829		126			29	12	17	1801	1830		126			29	11	18	1800	1827		126			27	12	15	1801	1830		126			29	11	18	1812
77	CHK-P59A	1800	1826		125			26	13	13	1801	1828		126			27	12	15	1800	1825		125			25	13	12	1801	1827		125			26	12	14	1813
78	**Combine CHICKSANDS6**	**1807**	**1820**	**115**				**13**	**7**	**6**	**1807**	**1821**	**118**				**14**	**7**	**7**	**1807**	**1819**	**113**				**12**	**7**	**5**	**1808**	**1821**	**118**				**13**	**6**	**7**	**1814**
78	CHK-P72	1806	1831		118			25	8	17	1806	1833		118			27	8	19	1806	1830		117			24	8	16	1807	1833		118			26	7	19	1814
78	CHK-P73A	1798	1823		87.9			25	16	9	1798	1825		90.4			27	16	11	1798	1822		85.2			24	16	8	1799	1825		90.8			26	15	11	1814
78	CHK-P78	1805	1829		124			24	9	15	1805	1831		124			26	9	17	1805	1828		124			23	9	14	1805	1831		124			26	9	17	1814
79	**Combine CHIDDINGLY**	**1575**	**1587**	**126**				**12**	**1**	**11**	**1576**	**1588**	**130**				**12**	**0**	**12**	**1575**	**1587**	**123**				**12**	**1**	**11**	**1576**	**1588**	**132**				**12**	**0**	**12**	**1576**
79	CHD-F11	1571	1597		129			26	5	21	1571	1598		129			27	5	22	1571	1596		129			25	5	20	1571	1598		129			27	5	22	1576
79	CHD-F16A	1570	1598		131			28	5	23	1571	1600		131			29	4	25	1570	1597		131			27	5	22	1571	1600		131			29	4	25	1575
79	CHD-F18A	1575	1600		110			25	1	24	1575	1602		112			27	1	26	1575	1598		109			23	1	22	1575	1601		113			26	1	25	1576
79	CHD-F19A	1563	1592		86.2			29	12	17	1564	1594		88.8			30	11	19	1563	1591		81.8			28	12	16	1564	1594		91.4			30	11	19	1575
80	**Combine OLDPOUND**	**1539**	**1556**	**101**				**17**	**8**	**9**	**1539**	**1558**	**103**				**19**	**8**	**11**	**1539**	**1555**	**97.3**				**16**	**8**	**8**	**1540**	**1558**	**103**				**18**	**7**	**11**	**1547**
80	pcc2	1539	1565		109			26	8	18	1540	1567		110			27	7	20	1539	1565		108			26	8	18	1540	1567		110			27	7	20	1547
80	pcc5	1531	1558		92.7			27	12	15	1531	1560		94.5			29	12	17	1531	1557		88.8			26	12	14	1532	1560		94.6			28	11	17	1543
81	**Combine CLUN**	**1452**	**1464**	**89.7**				**12**	**13**	**-1**	**1453**	**1465**	**94.1**				**12**	**12**	**0**	**1452**	**1464**	**85.5**				**12**	**13**	**-1**	**1453**	**1466**	**92.4**				**13**	**12**	**1**	**1465**
81	**Combine CLUN**	**1452**	**1466**	**121**				**14**	**13**	**1**	**1454**	**1468**	**131**				**14**	**11**	**3**	**1453**	**1466**	**124**				**13**	**12**	**1**	**1454**	**1469**	**130**				**15**	**11**	**4**	**1465**
81	pent1	1453	1485		79.7	97.9		32	11	21	1454	1486		82.1	101		32	10	22	1454	1483		75.7	96.1		29	10	19	1454	1488		80.2	99.8		34	10	24	1464
81	pent2	1446	1478		134	108		32	15	17	1446	1479		134	126		33	15	18	1446	1475		132	122		29	15	14	1446	1480		134	125		34	15	19	1461
81	pent3	1444	1473		121	108		29	20	9	1445	1475		122	108		30	19	11	1445	1472		120	106		27	19	8	1445	1476		122	108		31	19	12	1464
81	pent4	1447	1476		132	128		29	18	11	1448	1477		132	125		29	17	12	1447	1475		132	125		28	18	10	1448	1478		132	125		30	17	13	1465
81	pent5	1438	1463		46.1			25	26	-1	1438	1465		49.3			27	26	1	1438	1463		44.4			25	26	-1	1439	1465		48.5			26	25	1	1464

Number	SITE & sample	A from	A to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	Real date
82	**Combine CLUNBURY**	**1476**	**1496**	**109**				**20**	**18**	**2**	**1477**	**1497**	**110**				**20**	**17**	**3**	**1476**	**1495**	**106**				**19**	**18**	**1**	**1477**	**1498**	**112**				**21**	**17**	**4**	**1494**
82	clun020	1476	1505		111			29	18	11	1477	1506		111			29	17	12	1476	1504		110			28	18	10	1477	1507		111			30	17	13	1494
82	clun023	1468	1500		102			32	26	6	1468	1502		104			34	26	8	1468	1498		99.3			30	26	4	1469	1503		105			34	25	9	1494
83	**Combine ABCOTT**	**1539**	**1553**	**124**				**14**	**7**	**7**	**1539**	**1554**	**127**				**15**	**7**	**8**	**1539**	**1552**	**120**				**13**	**7**	**6**	**1540**	**1554**	**126**				**14**	**6**	**8**	**1546**
83	cgfa12	1539	1564		110			25	7	18	1539	1566		111			27	7	20	1539	1564		107			25	7	18	1540	1566		110			26	6	20	1546
83	cgfa13	1532	1559		112			27	11	16	1532	1561		114			29	11	18	1532	1558		111			26	11	15	1532	1561		115			29	11	18	1543
83	cgfa14	1533	1560		118			27	13	14	1533	1561		119			28	13	15	1533	1558		115			25	13	12	1533	1561		118			28	13	15	1546
84	**Combine CLUNGUNFORD**	**1613**	**1632**	**27.1**	**n=2 A= 27.1%(A**			**19**	**15**	**4**	**1614**	**1633**	**29.4**	**n=2 A= 29.4%(**			**19**	**14**	**5**	**1613**	**1631**	**19.2**	**n=2 A= 19.2%(**			**18**	**15**	**3**	**1614**	**1633**	**30.1**	**FAILS n=2 A= 3**			**19**	**14**	**5**	**1628**
84	cgfb3	1583	1620		15.2			37	45	-8	1584	1622		17			38	44	-6	1583	1617		9.4			34	45	-11	1584	1622		17.6			38	44	-6	1628
84	cgfb4	1615	1641		104			26	12	14	1615	1642		104			27	12	15	1614	1640		103			26	13	13	1615	1642		104			27	12	15	1627
85	**Combine ROWTON1**	**1558**	**1577**	**123**				**19**	**13**	**6**	**1558**	**1578**	**124**				**20**	**13**	**7**	**1557**	**1575**	**123**				**18**	**14**	**4**	**1558**	**1578**	**124**				**20**	**13**	**7**	**1571**
85	cgfe1	1556	1585		116			29	15	14	1557	1586		116			29	14	15	1556	1583		116			27	15	12	1557	1586		116			29	14	15	1571
85	cgfe2	1554	1583		116			29	17	12	1554	1584		117			30	17	13	1554	1581		116			27	17	10	1554	1585		117			31	17	14	1571
86	**Combine ROWTON2**	**1584**	**1603**	**102**				**19**	**14**	**5**	**1585**	**1604**	**103**				**19**	**13**	**6**	**1584**	**1602**	**95.5**				**18**	**14**	**4**	**1585**	**1604**	**103**				**19**	**13**	**6**	**1598**
86	cgfe3	1575	1606		93.9			31	21	10	1575	1607		95.6			32	21	11	1574	1604		86.7			30	22	8	1575	1608		95.7			33	21	12	1596
86	cgfe4	1585	1611		109			26	13	13	1585	1613		110			28	13	15	1585	1610		108			25	13	12	1585	1613		110			28	13	15	1598
87	**Combine COBHAM1**	**1584**	**1593**	**77.8**				**9**	**8**	**1**	**1585**	**1594**	**83.7**				**9**	**7**	**2**	**1584**	**1593**	**69.4**				**9**	**8**	**1**	**1585**	**1595**	**84.5**				**10**	**7**	**3**	**1592**
87	**Combine COBHAM1**	**1582**	**1593**	**162**				**11**	**10**	**1**	**1584**	**1595**	**162**				**11**	**8**	**3**	**1583**	**1593**	**158**				**10**	**9**	**1**	**1584**	**1595**	**165**				**11**	**8**	**3**	**1592**
87	COB-B03A	1574	1600		96	112		26	18	8	1574	1601		98.5	102		27	18	9	1574	1599		95.2	99.7		25	18	7	1574	1602		97.4	101		28	18	10	1592
87	COB-B04A	1586	1619		51.1			33	6	27	1586	1621		53.8			35	6	29	1586	1617		46.4			31	6	25	1587	1622		52			35	5	30	1592
87	COB-B05A	1567	1596		53.1			29	25	4	1567	1598		56.1			31	25	6	1567	1595		48.1			28	25	3	1568	1599		57.5			31	24	7	1592
87	COB-B09A	1567	1596		50.8			29	25	4	1567	1597		53.9			30	25	5	1567	1594		44.8			27	25	2	1567	1598		53.7			31	25	6	1592
87	COB-B21A	1573	1606		123	131		33	19	14	1573	1608		124	125		35	19	16	1573	1604		121	123		31	19	12	1574	1609		128	128		35	18	17	1592
87	COB-B24A	1581	1612		126	104		31	11	20	1581	1614		126	120		33	11	22	1580	1610		127	120		30	12	18	1581	1615		127	120		34	11	23	1592
87	COB-B28B	1575	1607		131	134		32	17	15	1576	1608		132	131		32	16	16	1575	1605		129	130		30	17	13	1576	1609		132	132		33	16	17	1592
87	COB-B45A	1578	1608		138	130		30	14	16	1578	1610		138	135		32	14	18	1578	1606		138	135		28	14	14	1579	1610		138	134		31	13	18	1592
87	COB-B46A	1581	1609		128	122		28	4	24	1581	1611		129	122		30	4	26	1581	1607		128	120		26	4	22	1582	1610		131	124		28	3	25	1585
88	**Combine COBHAM2**	**1572**	**1591**	**100**				**19**	**9**	**10**	**1572**	**1592**	**102**				**20**	**9**	**11**	**1572**	**1590**	**95.2**				**18**	**9**	**9**	**1573**	**1593**	**104**				**20**	**8**	**12**	**1581**
88	COB-C48A	1572	1600		109			28	9	19	1572	1602		109			30	9	21	1572	1599		108			27	9	18	1573	1602		110			29	8	21	1581
88	COB-C66	1561	1595		92.1			34	20	14	1561	1596		93.8			35	20	15	1561	1593		86.3			32	20	12	1562	1598		96.9			36	19	17	1581
89	**Combine COBHAM3**	**1648**	**1662**	**74.9**				**14**	**14**	**0**	**1649**	**1663**	**78.6**				**14**	**13**	**1**	**1648**	**1661**	**69.1**				**13**	**14**	**-1**	**1649**	**1663**	**81.6**				**14**	**13**	**1**	**1662**
89	**Combine COBHAM3**	**1648**	**1664**	**117**				**16**	**14**	**2**	**1649**	**1666**	**118**				**17**	**13**	**4**	**1649**	**1663**	**112**				**14**	**13**	**1**	**1650**	**1666**	**116**				**16**	**12**	**4**	**1662**
89	COB-D68A	1649	1680		90.8	109		31	12	19	1650	1682		92.4	108		32	11	21	1649	1678		87.4	105		29	12	17	1650	1682		91.6	107		32	11	21	1661
89	COB-D74A	1629	1661		41.6			32	28	4	1629	1662		44.4			33	28	5	1629	1659		37.8			30	28	2	1630	1663		49.3			33	27	6	1657
89	COB-D77A	1640	1669		115	97.3		29	21	8	1641	1671		116	101		30	20	10	1640	1668		111	95.6		28	21	7	1641	1671		114	99.3		30	20	10	1661
89	COBF110A	1644	1673		129	124		29	18	11	1644	1674		130	122		30	18	12	1644	1671		130	121		27	18	9	1644	1675		129	122		31	18	13	1662
90	**Combine COBHAM4**	**1760**	**1777**	**84.2**				**17**	**8**	**9**	**1760**	**1778**	**86.6**				**18**	**8**	**10**	**1760**	**1776**	**83**				**16**	**8**	**8**	**1760**	**1778**	**89.5**				**18**	**8**	**10**	**1768**
90	COBF113A	1761	1787		106			26	7	19	1761	1788		107			27	7	20	1760	1785		106			25	8	17	1761	1788		107			27	7	20	1768
90	COBF114A	1750	1776		74			26	18	8	1750	1778		76.6			28	18	10	1750	1776		72.7			26	18	8	1750	1779		79.8			29	18	11	1768
91	**Combine COMBE**	**1612**	**1633**	**125**				**21**	**6**	**15**	**1613**	**1634**	**125**				**21**	**5**	**16**	**1612**	**1631**	**126**				**19**	**6**	**13**	**1613**	**1634**	**125**				**21**	**5**	**16**	**1618**
91	cmb46	1611	1637		112			26	7	19	1611	1639		112			28	7	21	1611	1636		113			25	7	18	1611	1639		111			28	7	21	1618
91	cmb9	1609	1644		123			35	9	26	1609	1646		123			37	9	28	1609	1641		123			32	9	23	1610	1647		123			37	8	29	1618
92	**Combine ABERCONWY**	**1417**	**1423**	**201**				**6**	**3**	**3**	**1417**	**1424**	**211**				**7**	**3**	**4**	**1417**	**1423**	**198**				**6**	**3**	**3**	**1417**	**1424**	**210**				**7**	**3**	**4**	**1420**
92	ach1	1413	1434		137			21	7	14	1413	1435		138			22	7	15	1413	1434		138			21	7	14	1413	1435		138			22	7	15	1420
92	ach10	1409	1433		128			24	9	15	1409	1435		130			26	9	17	1409	1433		126			24	9	15	1409	1435		132			26	9	17	1418
92	ach13	1417	1435		90.9			18	1	17	1417	1437		94.9			20	1	19	1417	1436		87.6			19	1	18	1417	1437		94.6			20	1	19	1418
92	ach2	1410	1432		126			22	7	15	1410	1434		128			24	7	17	1410	1432		127			22	7	15	1410	1434		131			24	7	17	1417
92	ach3	1411	1431		126			20	7	13	1411	1433		128			22	7	15	1411	1430		123			19	7	12	1411	1432		124			21	7	14	1418

Number	SITE & sample	A from	to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
92	ach5	1413	1431		135			18	4	14	1414	1433		137			19	3	16	1414	1432		137			18	3	15	1414	1433		137			19	3	16	1417
92	ach6	1411	1432		133			21	7	14	1412	1434		134			22	6	16	1411	1432		132			21	7	14	1412	1433		133			21	6	15	1418
92	ach8	1413	1434		138			21	5	16	1413	1436		138			23	5	18	1413	1434		139			21	5	16	1413	1436		138			23	5	18	1418
92	ach9	1411	1432		130			21	7	14	1411	1433		132			22	7	15	1411	1431		129			20	7	13	1411	1433		131			22	7	15	1418
93	**Combine PLASMAWR**	**1567**	**1578**	**79.4**				**11**	**11**	**0**	**1567**	**1579**	**84.4**				**12**	**11**	**1**	**1567**	**1577**	**71.6**				**10**	**11**	**-1**	**1568**	**1579**	**82.1**				**11**	**10**	**1**	**1578**
93	**Combine PLASMAWR**	**1570**	**1582**	**133**				**12**	**8**	**4**	**1568**	**1581**	**139**				**13**	**10**	**3**	**1567**	**1579**	**130**				**12**	**11**	**1**	**1569**	**1581**	**138**				**12**	**9**	**3**	**1578**
93	pmh123	1566	1595		108	130		29	12	17	1566	1597		109	121		31	12	19	1566	1594		106	118		28	12	16	1566	1597		109	121		31	12	19	1578
93	pmh1b	1566	1598		95.3	97.4		32	9	23	1567	1599		97.3	112		32	8	24	1566	1596		91.6	107		30	9	21	1567	1601		94.6	110		34	8	26	1575
93	pmh2	1559	1588		125	98.2		29	19	10	1559	1590		126	115		31	19	12	1559	1586		122	111		27	19	8	1559	1590		125	114		31	19	12	1578
93	pmh4	1548	1575		28.1			27	29	-2	1548	1577		30.9			29	29	0	1548	1573		24.3			25	29	-4	1548	1577		29.8			29	29	0	1577
93	pmh5	1558	1588		122	125		30	16	14	1558	1590		123	112		32	16	16	1558	1586		120	108		28	16	12	1559	1590		124	113		31	15	16	1574
93	pmh6	1560	1589		130	121		29	16	13	1560	1590		130	121		30	16	14	1560	1587		128	118		27	16	11	1560	1591		130	120		31	16	15	1576
94	**Combine AYDON**	**1538**	**1545**	**87.8**				**7**	**5**	**2**	**1538**	**1546**	**95.2**				**8**	**5**	**3**	**1538**	**1545**	**78.6**				**7**	**5**	**2**	**1538**	**1547**	**97**				**9**	**5**	**4**	**1543**
94	ac01	1526	1552		94.4			26	17	9	1527	1554		97.4			27	16	11	1526	1551		90.8			25	17	8	1527	1554		96.2			27	16	11	1543
94	ac02	1523	1550		65.1			27	20	7	1523	1552		68.6			29	20	9	1523	1549		60.8			26	20	6	1523	1552		69.6			29	20	9	1543
94	ac07	1536	1564		104			28	7	21	1536	1566		105			30	7	23	1536	1563		101			27	7	20	1537	1566		104			29	6	23	1543
94	ac09	1532	1563		139			31	11	20	1532	1564		139			32	11	21	1532	1561		139			29	11	18	1532	1566		137			34	11	23	1543
94	AYD-A01A	1528	1556		122			28	13	15	1528	1558		124			30	13	17	1528	1555		120			27	13	14	1529	1558		125			29	12	17	1541
94	AYD-A02	1527	1553		99.5			26	14	12	1527	1554		102			27	14	13	1527	1552		97.6			25	14	11	1527	1555		103			28	14	14	1541
94	AYD-A03A	1525	1551		79.9			26	16	10	1526	1553		83.3			27	15	12	1525	1550		76.9			25	16	9	1526	1552		82.8			26	15	11	1541
94	AYD-A04A	1523	1555		96.8			32	18	14	1524	1556		99.4			32	17	15	1523	1553		88.9			30	18	12	1524	1557		102			33	17	16	1541
94	AYD-A07A	1537	1561		98.6			24	4	20	1537	1564		101			27	4	23	1537	1561		93.6			24	4	20	1537	1563		103			26	4	22	1541
94	AYD-A11	1537	1566		80.7			29	8	21	1538	1567		82.9			29	7	22	1537	1564		80.3			27	8	19	1538	1567		85			29	7	22	1545
95	**Combine HALTON**	**1540**	**1562**	**125**				**22**	**19**	**3**	**1540**	**1563**	**126**				**23**	**19**	**4**	**1540**	**1560**	**126**				**20**	**19**	**1**	**1541**	**1564**	**126**				**23**	**18**	**5**	**1559**
95	HTC-A04A	1537	1571		118			34	22	12	1538	1572		118			34	21	13	1537	1568		118			31	22	9	1538	1573		118			35	21	14	1559
95	HTC-A08A	1537	1570		117			33	22	11	1537	1572		117			35	22	13	1537	1568		117			31	22	9	1538	1572		117			34	21	13	1559
96	**Combine TUCKEY**	**1132**	**1153**	**41.7**				**21**	**13**	**8**	**1133**	**1153**	**44.3**				**20**	**12**	**8**	**1132**	**1151**	**35.8**	**n=3 A= 35.8%(**			**19**	**13**	**6**	**1134**	**1155**	**49.4**				**21**	**11**	**10**	**1145**
96	**Combine TUCKEY**																												**1135**	**1162**	**59**				**27**	**10**	**17**	**1145**
96	Q9452	1136	1176		79.6			40	9	31	1136	1178		80.6			42	9	33	1136	1173		77.3			37	9	28	1137	1179		81.9	102		42	8	34	1145
96	Q9453	1112	1152		55.1			40	28	12	1112	1154		57.4			42	28	14	1112	1149		48.7			37	28	9	1113	1156		62.9	46.4		43	27	16	1140
96	Q9454	1112	1151		50.2			39	27	12	1112	1152		52.6			40	27	13	1112	1148		44.8			36	27	9	1113	1154		57.2			41	26	15	1139
97	**Combine COTTINGHAM**	**1258**	**1270**	**19.2**	**n=3 A= 19.2%(A**			**12**	**4**	**8**	**1258**	**1271**	**22.7**	**n=3 A= 22.7%(**			**13**	**4**	**9**	**1258**	**1270**	**18.2**	**n=3 A= 18.2%(**			**12**	**4**	**8**	**1258**	**1271**	**23.6**	**FAILED**	**n=3 A:**		**13**	**4**	**9**	**1262**
97	**Combine COTTINGHAM**	**1259**	**1275**	**122**				**16**	**3**	**13**	**1259**	**1276**	**120**				**17**	**3**	**14**	**1259**	**1274**	**119**				**15**	**3**	**12**	**1259**	**1276**	**121**				**17**	**3**	**14**	**1262**
97	cot1	1254	1280		128	117		26	7	19	1254	1281		128	114		27	7	20	1254	1279		128	113		25	7	18	1254	1282		128	115		28	7	21	1261
97	cot4	1232	1256		4.5			24	29	-5	1232	1258		5.8			26	29	-3	1232	1256		4			24	29	-5	1232	1259		6.2			27	29	-2	1261
97	cot8	1258	1282		100	114		24	4	20	1259	1283		103	113		24	3	21	1258	1281		101	113		23	4	19	1259	1283		104	113		24	3	21	1262
98	**Combine GOLDINGHALL**	**1637**	**1653**	**89.4**				**16**	**22**	**-6**	**1638**	**1654**	**92.3**				**16**	**21**	**-5**	**1637**	**1652**	**81.6**				**15**	**22**	**-7**	**1638**	**1654**	**91.3**				**16**	**21**	**-5**	**1659**
98	g1	1639	1668		98.1			29	20	9	1639	1669		99.3			30	20	10	1639	1666		95			27	20	7	1639	1670		99.2			31	20	11	1659
98	g2	1625	1654		71.8			29	34	-5	1626	1656		74.5			30	33	-3	1625	1652		64.6			27	34	-7	1626	1655		71.8			29	33	-4	1659
98	g3	1629	1662		117			33	30	3	1629	1664		118			35	30	5	1629	1659		115			30	30	0	1630	1664		120			34	29	5	1659
99	**Combine SPONST**	**1443**	**1453**	**91.4**				**10**	**12**	**-2**	**1444**	**1454**	**96.8**				**10**	**11**	**-1**	**1443**	**1452**	**82**				**9**	**12**	**-3**	**1444**	**1455**	**94.1**				**11**	**11**	**0**	**1455**
99	**Combine SPONST**	**1445**	**1455**	**120**				**10**	**10**	**0**	**1444**	**1455**	**122**				**11**	**11**	**0**	**1444**	**1453**	**110**				**9**	**11**	**-2**	**1445**	**1456**	**119**				**11**	**10**	**1**	**1455**
99	spon1	1433	1459		96	87.6		26	21	5	1433	1461		98.2	89.5		28	21	7	1433	1458		96.1	86.9		25	21	4	1433	1462		97.9	88.9		29	21	8	1454
99	spon10	1438	1471		135	133		33	15	18	1438	1473		135	136		35	15	20	1438	1469		135	136		31	15	16	1439	1474		134	136		35	14	21	1453
99	spon2	1432	1461		102	93.8		29	22	7	1433	1462		104	95.5		29	21	8	1432	1459		96.7	87.8		27	22	5	1433	1462		101	92.1		29	21	8	1454
99	spon3	1430	1462		96.2	88.7		32	24	8	1431	1463		98.2	90.5		32	23	9	1430	1460		90.6	82.5		30	24	6	1431	1463		99	91.1		32	23	9	1454
99	spon4	1426	1455		49.5			29	28	1	1426	1457		52.4			31	28	3	1426	1453		43.2			27	28	-1	1426	1457		51.5			31	28	3	1454
99	spon6	1442	1476		103	122		34	13	21	1442	1477		104	113		35	13	22	1442	1474		100	110		32	13	19	1443	1479		100	110		36	12	24	1455

Number	SITE & sample	A from	to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
99	spon7	1442	1473		102	111		31	12	19	1443	1474		103	113		31	11	20	1442	1471		99.1	110		29	12	17	1443	1475		104	114		32	11	21	1454
99	spon8	1441	1471		118	125		30	13	17	1441	1473		120	126		32	13	19	1441	1469		117	124		28	13	15	1442	1473		120	127		31	12	19	1454
100	**Combine COVENTRY**	**1410**	**1421**	**24.5**	**n=6 A= 24.5%(A**			**11**	**5**	**6**	**1411**	**1421**	**28.2**	**n=6 A= 28.2%(**			**10**	**4**	**6**	**1410**	**1420**	**20.5**	**n=6 A= 20.5%(**			**10**	**5**	**5**	**1411**	**1422**	**27.8**	**n=6 A= 27.8%(**			**11**	**4**	**7**	**1415**
100	**Combine COVENTRY**	**1412**	**1426**	**157**				**14**	**3**	**11**	**1413**	**1426**	**160**				**13**	**2**	**11**	**1412**	**1424**	**158**				**12**	**3**	**9**	**1413**	**1426**	**159**				**13**	**2**	**11**	**1415**
100	prc1	1410	1439		99.2	126		29	5	24	1410	1441		102	125		31	5	26	1410	1437		99	124		27	5	22	1410	1441		101	124		31	5	26	1415
100	prc10	1408	1436		121	128		28	6	22	1408	1438		122	129		30	6	24	1408	1435		121	129		27	6	21	1409	1438		122	129		29	5	24	1414
100	prc3	1386	1414		13.2			28	28	0	1386	1416		15.2			30	28	2	1386	1413		10.7			27	28	-1	1387	1416		15.4			29	27	2	1414
100	prc4	1386	1413		12			27	28	-1	1386	1415		14			29	28	1	1386	1412		9.5			26	28	-2	1386	1415		13.7			29	28	1	1414
100	prc6	1406	1433		134	119		27	9	18	1406	1435		134	122		29	9	20	1406	1432		134	121		26	9	17	1406	1435		134	121		29	9	20	1415
100	prc7	1407	1436		126	129		29	8	21	1408	1438		127	130		30	7	23	1407	1435		127	130		28	8	20	1408	1438		126	130		30	7	23	1415
101	**Combine WHITEFRIARS2**	**1486**	**1503**	**141**				**17**	**8**	**9**	**1487**	**1504**	**142**				**17**	**7**	**10**	**1486**	**1501**	**141**				**15**	**8**	**7**	**1487**	**1504**	**143**				**17**	**7**	**10**	**1494**
101	wfr11	1480	1511		119			31	13	18	1480	1512		120			32	13	19	1479	1509		119			30	14	16	1480	1514		120			34	13	21	1493
101	wfr7	1483	1514		125			31	9	22	1483	1515		126			32	9	23	1482	1512		126			30	10	20	1483	1517		126			34	9	25	1492
101	wfr8	1484	1515		122			31	10	21	1484	1516		122			32	10	22	1484	1512		122			28	10	18	1485	1516		122			31	9	22	1494
102	**Combine WHITEFRIARS3**	**1544**	**1559**	**119**				**15**	**4**	**11**	**1545**	**1560**	**121**				**15**	**3**	**12**	**1544**	**1558**	**116**				**14**	**4**	**10**	**1545**	**1561**	**122**				**16**	**3**	**13**	**1548**
102	wfr15	1535	1564		100			29	12	17	1536	1566		102			30	11	19	1535	1563		97.3			28	12	16	1536	1566		102			30	11	19	1547
102	wfr16	1539	1568		123			29	9	20	1540	1569		124			29	8	21	1539	1567		123			28	9	19	1540	1569		124			29	8	21	1548
102	wfr178	1544	1573		110			29	4	25	1545	1574		111			29	3	26	1544	1571		108			27	4	23	1545	1574		111			29	3	26	1548
103	**Combine VINECOTT**	**1468**	**1487**	**116**				**19**	**5**	**14**	**1468**	**1488**	**117**				**20**	**5**	**15**	**1468**	**1486**	**115**				**18**	**5**	**13**	**1469**	**1489**	**117**				**20**	**4**	**16**	**1473**
103	crl12	1462	1491		109			29	11	18	1463	1493		110			30	10	20	1462	1490		108			28	11	17	1463	1493		109			30	10	20	1473
103	crl5	1468	1496		113			28	4	24	1468	1498		114			30	4	26	1468	1495		113			27	4	23	1468	1499		114			31	4	27	1472
104	**Combine DARNAWAY**	**1376**	**1397**	**107**				**21**	**7**	**14**	**1376**	**1398**	**108**				**22**	**7**	**15**	**1376**	**1395**	**102**				**19**	**7**	**12**	**1377**	**1400**	**117**				**23**	**6**	**17**	**1383**
104	Q6753M	1376	1413		112			37	7	30	1376	1414		112			38	7	31	1376	1410		111			34	7	27	1377	1416		114			39	6	33	1383
104	Q6760m	1356	1402		79.4			46	22	24	1356	1404		81.3			48	22	26	1356	1399		74			43	22	21	1358	1409		90.8			51	20	31	1378
104	Q6761m	1370	1411		126			41	8	33	1370	1412		126			42	8	34	1370	1408		126			38	8	30	1372	1416		126			44	6	38	1378
105	**Combine BUCKSHEAD**	**1613**	**1628**	**86**				**15**	**7**	**8**	**1614**	**1629**	**89.2**				**15**	**6**	**9**	**1613**	**1627**	**83**				**14**	**7**	**7**	**1614**	**1629**	**88.7**				**15**	**6**	**9**	**1620**
105	**Combine BUCKSHEAD**	**1615**	**1633**	**124**				**18**	**5**	**13**	**1615**	**1634**	**125**				**19**	**5**	**14**	**1614**	**1632**	**125**				**18**	**6**	**12**	**1615**	**1635**	**125**				**20**	**5**	**15**	**1620**
105	SDS-A01A	1613	1641		112	117		28	7	21	1613	1643		113	117		30	7	23	1613	1639		112	117		26	7	19	1614	1642		113	117		28	6	22	1620
105	SDS-A05A	1611	1639		124	117		28	9	19	1612	1641		124	117		29	8	21	1611	1638		124	117		27	9	18	1612	1641		124	117		29	8	21	1620
105	SDS-A08B	1601	1627		55.5			26	4	22	1602	1628		58.4			26	3	23	1601	1626		52.3			25	4	21	1602	1628		58			26	3	23	1605
106	**Combine ODDA**	**1588**	**1603**	**89.5**				**15**	**5**	**10**	**1589**	**1604**	**92.6**				**15**	**4**	**11**	**1588**	**1602**	**87**				**14**	**5**	**9**	**1589**	**1605**	**88.1**				**16**	**4**	**12**	**1593**
106	oda04	1590	1628		77.9			38	2	36	1590	1630		79.9			40	2	38	1590	1625		76.6			35	2	33	1591	1631		77.3			40	1	39	1592
106	oda06	1577	1603		64.7			26	16	10	1578	1604		67.2			26	15	11	1577	1602		62.6			25	16	9	1578	1604		63.2			26	15	11	1593
106	oda07	1583	1614		129			31	10	21	1583	1615		129			32	10	22	1583	1613		129			30	10	20	1583	1617		129			34	10	24	1593
106	oda09	1582	1612		124			30	8	22	1582	1614		124			32	8	24	1582	1610		122			28	8	20	1583	1614		123			31	7	24	1590
107	**Combine DILSTON**	**1602**	**1612**	**130**				**10**	**9**	**1**	**1602**	**1613**	**135**				**11**	**9**	**2**	**1601**	**1611**	**120**				**10**	**10**	**0**	**1602**	**1614**	**134**				**12**	**9**	**3**	**1611**
107	**Combine DILSTON**	**1602**	**1614**	**168**				**12**	**9**	**3**	**1603**	**1615**	**170**				**12**	**8**	**4**	**1602**	**1613**	**163**				**11**	**9**	**2**	**1603**	**1615**	**171**				**12**	**8**	**4**	**1611**
107	DST-A04A	1595	1624		132	126		29	16	13	1596	1625		132	127		29	15	14	1595	1623		133	128		28	16	12	1596	1626		132	127		30	15	15	1611
107	DST-A05A	1584	1615		55.1			31	27	4	1584	1616		57.9			32	27	5	1583	1613		47.6			30	28	2	1584	1617		57.4			33	27	6	1611
107	DST-A09A	1593	1627		133	128		34	18	16	1594	1628		134	128		34	17	17	1593	1624		132	126		31	18	13	1594	1628		134	129		34	17	17	1611
107	DST-A10A	1601	1627		111	119		26	10	16	1601	1629		113	121		28	10	18	1601	1626		107	117		25	10	15	1601	1629		117	123		28	10	18	1611
107	DST-A13A	1599	1637		108	117		38	12	26	1599	1639		109	117		40	12	28	1599	1634		107	116		35	12	23	1600	1640		104	113		40	11	29	1611
107	DST-A16A	1591	1628		133	128		37	20	17	1592	1629		134	128		37	19	18	1591	1625		131	124		34	20	14	1592	1631		135	131		39	19	20	1611
107	DST-A17A	1593	1625		131	124		32	18	14	1593	1627		131	125		34	18	16	1593	1623		129	122		30	18	12	1594	1627		131	125		33	17	16	1611
108	**Combine DINMORE**	**1583**	**1598**	**142**				**15**	**21**	**-6**	**1583**	**1599**	**144**				**16**	**21**	**-5**	**1583**	**1596**	**140**				**13**	**21**	**-8**	**1584**	**1599**	**139**				**15**	**20**	**-5**	**1604**
108	din21	1581	1620		116			39	23	16	1581	1622		116			41	23	18	1581	1618		112			37	23	14	1582	1625		109			43	22	21	1604
108	din4	1575	1606		116			31	28	3	1575	1608		117			33	28	5	1574	1604		113			30	29	1	1575	1608		115			33	28	5	1603
108	din5b	1577	1606		120			29	26	3	1577	1608		121			31	26	5	1577	1605		122			28	26	2	1577	1609		121			32	26	6	1603

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
108	din8	1580	1610		126			30	24	6	1580	1612		126			32	24	8	1580	1607		126			27	24	3	1580	1611		127			31	24	7	1604
109	**Combine DISCOED**	**1519**	**1535**	**3.9**	**n=2 A= 3.9%(An=**			**16**	**17**	**-1**	**1519**	**1536**	**4.9**	**n=2 A= 4.9%(An**			**17**	**17**	**0**	**1519**	**1534**	**2.9**	**n=2 A= 2.9%(An**			**15**	**17**	**-2**	**1519**	**1536**	**4.9**	**FAILED**	**n=2 A=**		**17**	**17**	**0**	**1536**
109	uhd2	1480	1509		1			29	51	-22	1480	1511		1.4			31	51	-20	1480	1507		0.7			27	51	-24	1480	1511		1.4			31	51	-20	1531
109	uhd3	1520	1545		100			25	16	9	1520	1547		101			27	16	11	1520	1544		99.7			24	16	8	1521	1547		100			26	15	11	1536
110	**Combine CULTRAHS**	**1660**	**1685**	**126**				**25**	**11**	**14**	**1661**	**1686**	**126**				**25**	**10**	**15**	**1660**	**1684**	**126**				**24**	**11**	**13**	**1662**	**1688**	**126**				**26**	**9**	**17**	**1671**
110	q8873	1655	1698		124			43	15	28	1655	1700		123			45	15	30	1655	1695		123			40	15	25	1657	1704		124			47	13	34	1670
110	q8880	1659	1691		112			32	8	24	1659	1693		112			34	8	26	1659	1689		112			30	8	22	1660	1694		112			34	7	27	1667
111	**Combine NENDRUM**	**611**	**619**	**24.2**				**8**	**10**	**-2**	**612**	**620**	**27.9**				**8**	**9**	**-1**	**611**	**619**	**18.1**	**n=15 A= 18.1%**			**8**	**10**	**-2**	**613**	**622**	**30.5**				**9**	**8**	**1**	**621**
111	**Combine NENDRUM**	**610**	**620**	**162**				**10**	**11**	**-1**	**609**	**619**	**166**				**10**	**12**	**-2**	**608**	**617**	**150**				**9**	**13**	**-4**	**610**	**620**	**152**				**10**	**11**	**-1**	**621**
111	**Combine NENDRUM**	**608**	**618**	**211**				**10**	**13**	**-3**										**606**	**616**	**195**				**10**	**15**	**-5**	**608**	**619**	**195**				**11**	**13**	**-2**	**621**
111	Q10013	591	631		88.2	112	123	40	27	13	591	633		90.8	105		42	27	15	591	628		78.5	95.2	107	37	27	10	592	635		94.8	111	121	43	26	17	618
111	Q10019	580	611		8.5			31	40	-9	581	612		10.1			31	39	-8	580	610		6.7			30	40	-10	581	614		9.5			33	39	-6	620
111	Q10214	618	661		6.4			43	3	40	618	663		7.3			45	3	42	618	658		4.8			40	3	37	620	666		7.9			46	1	45	621
111	Q10215	599	639		137	139	138	40	21	19	600	640		138	139		40	20	20	600	637		137	139	135	37	20	17	601	643		140	139	133	42	19	23	620
111	Q10216	596	635		120	127	135	39	24	15	596	637		121	131		41	24	17	596	633		116	129	136	37	24	13	597	640		126	136	139	43	23	20	620
111	Q10217	588	625		53.7			37	31	6	589	626		56.7			37	30	7	589	623		50			34	30	4	590	629		62.7	78.8	90.6	39	29	10	619
111	Q10226	594	636		115	123	132	42	26	16	594	637		117	127		43	26	17	594	633		111	125	133	39	26	13	595	642		124	135	139	47	25	22	620
111	Q10227	595	629		91.5	111	124	34	24	10	596	630		94.2	110		34	23	11	596	628		89.1	108	121	32	23	9	597	633		96.3	115	125	36	22	14	619
111	Q10228	609	652		84.8	56.8		43	10	33	609	654		85.3	62.3		45	10	35	609	649		83.6	56.7		40	10	30	610	657		82.2	56.2		47	9	38	619
111	Q10446	594	628		80	100	114	34	25	9	595	629		82.9	99.3		34	24	10	594	625		71.7	91.3	106	31	25	6	595	630		79.5	98.8	112	35	24	11	619
111	Q9914	602	632		130	136	131	30	17	13	602	634		132	136		32	17	15	602	632		132	136	131	30	17	13	603	635		130	136	134	32	16	16	619
111	Q9917m	601	637		138	139	136	36	19	17	601	639		138	139		38	19	19	601	635		137	138	134	34	19	15	602	641		139	138	133	39	18	21	620
111	Q9918	603	644		138	122	106	41	16	25	603	645		138	125		42	16	26	603	642		138	123	108	39	16	23	605	649		136	119	104	44	14	30	619
111	Q9931	582	622		38.5			40	36	4	582	624		41			42	36	6	582	620		32.1			38	36	2	583	627		47.2			44	35	9	618
111	Q9932	600	642		142	140	134	42	20	22	600	644		142	138		44	20	24	600	640		141	138	131	40	20	20	602	648		142	135	125	46	18	28	620
112	**Combine JDILLON**	**1232**	**1264**	**123**				**32**	**36**	**-4**	**1233**	**1265**	**124**				**32**	**35**	**-3**	**1232**	**1262**	**123**				**30**	**36**	**-6**	**1235**	**1269**	**124**				**34**	**33**	**1**	**1268**
112	q10100	1230	1279		117			49	38	11	1230	1281		118			51	38	13	1230	1276		117			46	38	8	1232	1286		118	138		54	36	18	1268
112	q10101	1227	1273		115			46	41	5	1227	1275		115			48	41	7	1227	1269		114			42	41	1	1229	1279		115			50	39	11	1268
113	**Combine PATRICKST**	**1183**	**1211**	**101**				**28**	**19**	**9**	**1184**	**1212**	**102**				**28**	**18**	**10**	**1183**	**1208**	**98.1**				**25**	**19**	**6**	**1185**	**1214**	**103**				**29**	**17**	**12**	**1202**
113	Q8122	1173	1212		93			39	29	10	1173	1214		94			41	29	12	1173	1210		90.2			37	29	8	1174	1216		94.7			42	28	14	1202
113	Q8124	1184	1227		109			43	18	25	1184	1229		109			45	18	27	1184	1223		108			39	18	21	1185	1232		109			47	17	30	1202
114	**Combine RATHFARNHAM**	**1579**	**1592**	**113**				**13**	**5**	**8**	**1580**	**1592**	**117**				**12**	**4**	**8**	**1579**	**1591**	**105**				**12**	**5**	**7**	**1581**	**1594**	**119**				**13**	**3**	**10**	**1584**
114	**Combine RATHFARNHAM**	**1581**	**1594**	**140**				**13**	**3**	**10**	**1581**	**1594**	**146**				**13**	**3**	**10**	**1581**	**1594**	**182**				**13**	**3**	**10**	**1582**	**1597**	**150**				**15**	**2**	**13**	**1584**
114	**Combine RATHFARNHAM**	**1581**	**1596**	**185**				**15**	**3**	**12**	**1581**	**1597**	**186**				**16**	**3**	**13**																			**1584**
114	q9176	1576	1616		119	124	129	40	7	33	1576	1618		120	127	131	42	7	35	1576	1613		118	130		37	7	30	1577	1621		120	127		44	6	38	1583
114	q9177	1557	1597		63	52.7		40	27	13	1557	1599		65	57.4		42	27	15	1557	1594		55.3			37	27	10	1558	1602		69.4	61.1		44	26	18	1584
114	q9178	1573	1615		132	136	135	42	11	31	1574	1616		132	135	135	42	10	32	1573	1613		132	135		40	11	29	1575	1620		131	135		45	9	36	1584
114	q9180m	1576	1610		128	130	131	34	7	27	1576	1611		129	132	131	35	7	28	1576	1608		127	131		32	7	25	1577	1613		130	132		36	6	30	1583
114	q9181	1567	1612		135	132	126	45	16	29	1568	1613		136	130	124	45	15	30	1567	1609		134	121		42	16	26	1569	1617		138	133		48	14	34	1583
114	q9183	1563	1593		54.5			30	21	9	1563	1595		57			32	21	11	1563	1592		53			29	21	8	1564	1596		54.5			32	20	12	1584
114	q9184m	1577	1617		111	124	129	40	7	33	1577	1619		112	121	127	42	7	35	1577	1614		110	126		37	7	30	1578	1621		113	122		43	6	37	1584
114	q9186	1570	1610		136	129	122	40	14	26	1571	1611		136	131	125	40	13	27	1570	1607		135	122		37	14	23	1572	1613		136	130		41	12	29	1584
115	**Combine TOWNSENDST**	**1644**	**1669**	**115**				**25**	**12**	**13**	**1644**	**1670**	**116**				**26**	**12**	**14**	**1644**	**1666**	**111**				**22**	**12**	**10**	**1645**	**1671**	**116**				**26**	**11**	**15**	**1656**
115	q9599	1635	1675		109			40	21	19	1635	1677		110			42	21	21	1635	1672		105			37	21	16	1636	1678		111			42	20	22	1656
115	q9600	1644	1679		112			35	11	24	1644	1681		112			37	11	26	1644	1677		111			33	11	22	1645	1682		112			37	10	27	1655
116	**Combine CAERLAVEROCK**	**1330**	**1352**	**131**				**22**	**3**	**19**	**1330**	**1354**	**132**				**24**	**3**	**21**	**1329**	**1351**	**128**				**22**	**4**	**18**	**1332**	**1356**	**132**				**24**	**1**	**23**	**1333**
116	Q2852	1328	1370		120			42	5	37	1328	1371		120			43	5	38	1327	1367		119			40	6	34	1329	1374		121			45	4	41	1333
116	Q2853	1318	1360		106			42	15	27	1319	1362		107			43	14	29	1318	1357		102			39	15	24	1320	1364		107			44	13	31	1333

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	B to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	C to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
116	Q2866	1325	1370		125			45	8	37	1326	1371		126			45	7	38	1325	1367		125			42	8	34	1327	1375		125			48	6	42	1333
117	**Combine THREAVE**	**1445**	**1467**	**132**				**22**	**2**	**20**	**1446**	**1467**	**133**				**21**	**1**	**20**	**1445**	**1465**	**131**				**20**	**2**	**18**	**1447**	**1470**	**127**				**23**	**0**	**23**	**1447**
117	Q3047	1440	1475		119			35	7	28	1440	1477		119			37	7	30	1440	1473		118			33	7	26	1441	1479		117			38	6	32	1447
117	Q3051	1440	1475		118			35	7	28	1440	1476		118			36	7	29	1440	1473		118			33	7	26	1441	1478		116			37	6	31	1447
117	Q3052	1443	1492		116			49	3	46	1443	1494		117			51	3	48	1443	1490		114			47	3	44	1445	1501		111			56	1	55	1446
118	**Combine DUMMER**	**1419**	**1429**	**35.6**				**10**	**5**	**5**	**1419**	**1430**	**40.6**				**11**	**5**	**6**	**1419**	**1428**	**30.7**	**n=4 A= 30.7%(**			**9**	**5**	**4**	**1419**	**1430**	**39.5**				**11**	**5**	**6**	**1424**
118	**Combine DUMMER**	**1421**	**1432**	**57.8**				**11**	**3**	**8**	**1420**	**1432**	**52.7**				**12**	**4**	**8**										**1420**	**1432**	**50.1**				**12**	**4**	**8**	**1424**
118	**Combine DUMMER**										**1421**	**1437**	**67.5**				**16**	**3**	**13**										**1421**	**1437**	**67.9**				**16**	**3**	**13**	**1424**
118	dmra1	1407	1433		82.5	67.5		26	16	10	1408	1435		86.4	72.7	54.6	27	15	12	1407	1432		76.2			25	16	9	1408	1435		88	74.2	55.2	27	15	12	1423
118	dmra2	1408	1430		60.9	66.1		22	13	9	1408	1432		65.6	52.6		24	13	11	1408	1429		53.7			21	13	8	1408	1431		60.2	47.9		23	13	10	1421
118	dmra4	1421	1444		62	86.8		23	2	21	1421	1446		64.5	86.3	105	25	2	23	1421	1444		58.9			23	2	21	1422	1446		63.2	84.9	105	24	1	23	1423
118	dmra5	1405	1428		40.6			23	19	4	1405	1430		45.1			25	19	6	1405	1428		39.1			23	19	4	1406	1430		46.5			24	18	6	1424
119	**Combine FINCHALE**	**1363**	**1373**	**19.6**	**n=6 A= 19.6%(A**			**10**	**6**	**4**	**1363**	**1374**	**22.7**	**n=6 A= 22.7%(**			**11**	**6**	**5**	**1363**	**1373**	**16.3**	**n=6 A= 16.3%(**			**10**	**6**	**4**	**1363**	**1375**	**23.6**	**FAILED**	**n=6 A**		**12**	**6**	**6**	**1369**
119	**Combine FINCHALE**	**1360**	**1375**	**86.9**				**15**	**9**	**6**	**1360**	**1376**	**89.8**				**16**	**9**	**7**	**1360**	**1374**	**83.9**				**14**	**9**	**5**	**1361**	**1377**	**89.8**				**16**	**8**	**8**	**1369**
119	FCL-A03A	1361	1393		104	91.4		32	8	24	1362	1394		105	92.9		32	7	25	1361	1391		105	89.4		30	8	22	1362	1395		105	92.3		33	7	26	1369
119	FCL-A04	1340	1368		19.9			28	29	-1	1340	1370		22.5			30	29	1	1340	1367		17.2			27	29	-2	1340	1371		24.1			31	29	2	1369
119	FCL-A05A	1341	1369		22.7			28	28	0	1342	1371		25.5			29	27	2	1341	1369		20.1			28	28	0	1342	1372		27			30	27	3	1369
119	FCL-A06A	1351	1382		107	109		31	18	13	1352	1384		109	110		32	17	15	1351	1380		97.6	104		29	18	11	1352	1383		107	109		31	17	14	1369
119	FCL-A07A	1350	1376		71.9	78.5		26	19	7	1351	1378		75.1	81		27	18	9	1351	1376		70.3	79.7		25	18	7	1351	1378		76.1	82.3		27	18	9	1369
119	FCL-A20A	1365	1396		50.8			31	4	27	1366	1398		53.6			32	3	29	1365	1395		47.2			30	4	26	1366	1399		52			33	3	30	1369
120	**Combine EGRINSTEAD1**	**1343**	**1357**	**146**				**14**	**9**	**5**	**1343**	**1358**	**147**				**15**	**9**	**6**	**1343**	**1356**	**146**				**13**	**9**	**4**	**1343**	**1358**	**147**				**15**	**9**	**6**	**1352**
120	egh1	1340	1366		124			26	11	15	1341	1368		125			27	10	17	1340	1365		125			25	11	14	1341	1368		125			27	10	17	1351
120	egh3	1338	1367		127			29	14	15	1338	1368		128			30	14	16	1337	1365		126			28	15	13	1338	1368		128			30	14	16	1352
120	egh4	1341	1364		122			23	10	13	1341	1365		123			24	10	14	1340	1363		123			23	11	12	1341	1365		122			24	10	14	1351
121	**Combine EGRINSTEAD2**	**1443**	**1459**	**106**				**16**	**7**	**9**	**1444**	**1460**	**107**				**16**	**6**	**10**	**1443**	**1459**	**106**				**16**	**7**	**9**	**1444**	**1460**	**106**				**16**	**6**	**10**	**1450**
121	egd1	1443	1469		111			26	7	19	1444	1471		111			27	6	21	1443	1468		110			25	7	18	1444	1471		110			27	6	21	1450
121	egd2	1439	1460		97.9			21	11	10	1439	1461		99.4			22	11	11	1439	1460		97.9			21	11	10	1439	1461		97.6			22	11	11	1450
122	**Combine EGRINSTEAD3**	**1450**	**1463**	**109**				**13**	**2**	**11**	**1450**	**1464**	**112**				**14**	**2**	**12**	**1450**	**1462**	**107**				**12**	**2**	**10**	**1450**	**1464**	**113**				**14**	**2**	**12**	**1452**
122	ege2	1443	1469		113			26	9	17	1444	1470		114			26	8	18	1443	1468		112			25	9	16	1444	1471		114			27	8	19	1452
122	ege4	1450	1476		102			26	2	24	1451	1478		104			27	1	26	1450	1475		101			25	2	23	1451	1478		104			27	1	26	1452
122	ege7	1442	1467		101			25	8	17	1442	1469		103			27	8	19	1442	1467		100			25	8	17	1443	1469		104			26	7	19	1450
123	**Combine EGRINSTEAD4**	**1364**	**1374**	**130**				**10**	**6**	**4**	**1364**	**1375**	**134**				**11**	**6**	**5**	**1364**	**1374**	**127**				**10**	**6**	**4**	**1364**	**1375**	**135**				**11**	**6**	**5**	**1370**
123	egj10	1358	1384		129			26	12	14	1358	1386		130			28	12	16	1358	1383		127			25	12	13	1358	1386		131			28	12	16	1370
123	egj3	1363	1384		123			21	6	15	1363	1385		124			22	6	16	1363	1383		123			20	6	14	1363	1385		124			22	6	16	1369
123	egj4	1363	1384		120			21	6	15	1363	1386		122			23	6	17	1363	1384		120			21	6	15	1363	1386		122			23	6	17	1369
123	egj5	1355	1378		88.6			23	14	9	1355	1380		91.8			25	14	11	1355	1378		86.8			23	14	9	1356	1380		92.1			24	13	11	1369
124	**Combine EGRINSTEAD5**	**1632**	**1649**	**114**				**17**	**8**	**9**	**1632**	**1651**	**116**				**19**	**8**	**11**	**1632**	**1649**	**114**				**17**	**8**	**9**	**1633**	**1651**	**115**				**18**	**7**	**11**	**1640**
124	ega5	1632	1658		113			26	8	18	1632	1660		114			28	8	20	1632	1657		113			25	8	17	1632	1661		113			29	8	21	1640
124	ega6	1627	1653		107			26	13	13	1627	1654		108			27	13	14	1627	1652		106			25	13	12	1628	1654		107			26	12	14	1640
125	**Combine HENDREDHS2**	**1512**	**1526**	**4.7**	**n=3 A= 4.7%(An=**			**14**	**10**	**4**	**1513**	**1527**	**6**	**n=3 A= 6.0%(An=**			**14**	**9**	**5**	**1512**	**1525**	**4**	**n=3 A= 4.0%(An=**			**13**	**10**	**3**	**1513**	**1527**	**6.2**	**FAILED**	**n=3 A=**		**14**	**9**	**5**	**1522**
125	**Combine HENDREDHS2**	**1513**	**1531**	**107**				**18**	**9**	**9**	**1514**	**1532**	**108**				**18**	**8**	**10**	**1513**	**1530**	**106**				**17**	**9**	**8**	**1514**	**1532**	**109**				**18**	**8**	**10**	**1522**
125	ehh11	1507	1533		121	99.4		26	15	11	1507	1535		122	101		28	15	13	1507	1532		121	98.4		25	15	10	1507	1536		123	102		29	15	14	1522
125	ehh12	1514	1540		92.5	111		26	8	18	1514	1541		93.6	111		27	8	19	1514	1539		91.5	110		25	8	17	1514	1542		93.9	111		28	8	20	1522
125	ehh16	1470	1499		0.4			29	21	8	1471	1500		0.7			29	20	9	1470	1498		0.3			28	21	7	1471	1500		0.7			29	20	9	1491
126	**Combine HENDREDHS3**	**1530**	**1544**	**126**				**14**	**5**	**9**	**1530**	**1545**	**127**				**15**	**5**	**10**	**1530**	**1544**	**127**				**14**	**5**	**9**	**1530**	**1545**	**126**				**15**	**5**	**10**	**1535**
126	ehh3	1529	1548		114			19	4	15	1529	1550		115			21	4	17	1529	1548		115			19	4	15	1529	1549		114			20	4	16	1533
126	ehh4	1528	1551		122			23	7	16	1528	1552		122			24	7	17	1528	1550		122			22	7	15	1528	1552		122			24	7	17	1535
127	**Combine OLDFORGE**	**1545**	**1563**	**50.6**				**18**	**11**	**7**	**1546**	**1564**	**53.6**				**18**	**10**	**8**	**1545**	**1562**	**43.1**	**n=2 A= 43.1%(**			**17**	**11**	**6**	**1546**	**1564**	**52.3**				**18**	**10**	**8**	**1556**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
127	| eaha12	1529	1557		37.3			28	24	4	1530	1559		40.2			29	23	6	1529	1555		30.1			26	24	2	1530	1559		39			29	23	6	1553
127	| eaha34	1547	1573		102			26	9	17	1547	1574		103			27	9	18	1546	1572		101			26	10	16	1547	1574		103			27	9	18	1556
128	**Combine WISTERIAHS**	**1464**	**1478**	**76.9**				**14**	**9**	**5**	**1464**	**1479**	**80.3**				**15**	**9**	**6**	**1464**	**1477**	**69.6**				**13**	**9**	**4**	**1465**	**1480**	**80.3**				**15**	**8**	**7**	**1473**
128	**Combine WISTERIAHS**	**1465**	**1482**	**138**				**17**	**8**	**9**	**1465**	**1483**	**139**				**18**	**8**	**10**	**1465**	**1480**	**138**				**15**	**8**	**7**	**1466**	**1483**	**138**				**17**	**7**	**10**	**1473**
128	| ehs1	1459	1488		127	116		29	14	15	1459	1490		128	116		31	14	17	1459	1487		127	115		28	14	14	1459	1491		127	115		32	14	18	1473
128	| ehs2	1443	1475		33.4			32	30	2	1444	1476		35.9			32	29	3	1443	1473		27.8			30	30	0	1444	1477		36.5			33	29	4	1473
128	| ehs3	1461	1493		125	125		32	12	20	1462	1494		125	125		32	11	21	1461	1491		125	125		30	12	18	1462	1495		125	125		33	11	22	1473
128	| ehs4	1463	1495		111	121		32	10	22	1463	1497		112	122		34	10	24	1463	1493		110	121		30	10	20	1464	1498		111	121		34	9	25	1473
129	**Combine OLDBURFA**	**1638**	**1659**	**93.1**				**21**	**6**	**15**	**1639**	**1660**	**94.7**				**21**	**5**	**16**	**1638**	**1657**	**89.5**				**19**	**6**	**13**	**1639**	**1661**	**94.8**				**22**	**5**	**17**	**1644**
129	| brfa7	1628	1660		84.3			32	16	16	1629	1661		85.9			32	15	17	1628	1658		80.6			30	16	14	1629	1662		86.2			33	15	18	1644
129	| brfa9	1639	1671		107			32	5	27	1639	1673		108			34	5	29	1639	1669		106			30	5	25	1640	1674		108			34	4	30	1644
130	**Combine COTTESMORE**	**1601**	**1616**	**140**				**15**	**1**	**14**	**1602**	**1617**	**142**				**15**	**0**	**15**	**1601**	**1615**	**138**				**14**	**1**	**13**	**1602**	**1618**	**140**				**16**	**0**	**16**	**1602**
130	| ott1	1596	1624		120			28	6	22	1596	1626		121			30	6	24	1596	1622		122			26	6	20	1597	1625		120			28	5	23	1602
130	| ott3	1600	1637		110			37	2	35	1601	1638		111			37	1	36	1600	1634		108			34	2	32	1601	1639		109			38	1	37	1602
130	| ott6	1591	1626		115			35	11	24	1592	1627		116			35	10	25	1591	1623		112			32	11	21	1592	1628		117			36	10	26	1602
130	| ott8	1597	1628		129			31	5	26	1597	1630		129			33	5	28	1596	1626		129			30	6	24	1597	1631		129			34	5	29	1602
131	**Combine EXETERCATH1**	**1291**	**1303**	**149**				**12**	**7**	**5**	**1291**	**1304**	**152**				**13**	**7**	**6**	**1291**	**1302**	**144**				**11**	**7**	**4**	**1292**	**1305**	**152**				**13**	**6**	**7**	**1298**
131	| EXT-C21A	1291	1320		103			29	7	22	1291	1322		104			31	7	24	1291	1319		100			28	7	21	1291	1322		106			31	7	24	1298
131	| EXT-C24A	1285	1316		132			31	9	22	1285	1318		133			33	9	24	1285	1315		133			30	9	21	1286	1319		133			33	8	25	1294
131	| EXT-C31A	1284	1314		128			30	7	23	1284	1316		129			32	7	25	1284	1313		129			29	7	22	1285	1317		130			32	6	26	1291
131	| EXT-C34A	1284	1316		132			32	7	25	1285	1317		132			32	6	26	1284	1314		131			30	7	23	1285	1318		132			33	6	27	1291
131	| EXT-C36B	1281	1311		106			30	12	18	1281	1313		108			32	12	20	1281	1309		101			28	12	16	1281	1313		105			32	12	20	1293
132	**Combine EXETERCATH2**	**1284**	**1300**	**110**				**16**	**22**	**-6**	**1284**	**1301**	**113**				**17**	**22**	**-5**	**1284**	**1298**	**108**				**14**	**22**	**-8**	**1285**	**1301**	**116**				**16**	**21**	**-5**	**1306**
132	| EXT-C49A	1276	1308		116			32	30	2	1277	1309		117			32	29	3	1276	1306		115			30	30	0	1277	1310		119			33	29	4	1306
132	| EXT-C50A	1274	1305		98			31	32	-1	1274	1306		99.8			32	32	0	1274	1303		96.2			29	32	-3	1275	1307		102			32	31	1	1306
132	| EXT-C57A	1285	1314		104			29	9	20	1285	1315		105			30	9	21	1284	1312		103			28	10	18	1285	1315		107			30	9	21	1294
133	**Combine EXETERCATH3**	**1304**	**1314**	**97.2**				**10**	**11**	**-1**	**1305**	**1315**	**103**				**10**	**10**	**0**	**1304**	**1313**	**90.1**				**9**	**11**	**-2**	**1305**	**1315**	**106**				**10**	**10**	**0**	**1315**
133	**Combine EXETERCATH3**	**1305**	**1315**	**160**				**10**	**10**	**0**	**1305**	**1316**	**163**				**11**	**10**	**1**	**1304**	**1314**	**155**				**10**	**11**	**-1**	**1305**	**1316**	**166**				**11**	**10**	**1**	**1315**
133	| EXTC110A	1301	1328		129	132		27	11	16	1301	1330		130	133		29	11	18	1301	1327		129	132		26	11	15	1301	1330		130	133		29	11	18	1312
133	| EXTC111A	1303	1330		111	121		27	11	16	1303	1332		113	122		29	11	18	1303	1328		109	119		25	11	14	1303	1332		114	122		29	11	18	1314
133	| EXTC124A	1299	1331		134	136		32	16	16	1300	1332		134	136		32	15	17	1299	1329		135	136		30	16	14	1300	1333		133	135		33	15	18	1315
133	| EXT-C84A	1299	1327		135	133		28	16	12	1299	1329		136	134		30	16	14	1299	1325		136	134		26	16	10	1300	1329		136	134		29	15	14	1315
133	| EXT-C85	1290	1322		91.2	82.5		32	20	12	1291	1323		93.5	85		32	19	13	1290	1320		85.6	77.2		30	20	10	1291	1324		97.3	88.9		33	19	14	1310
133	| EXT-C86A	1283	1312		29			29	9	20	1284	1314		31.8			30	8	22	1283	1311		25.6			28	9	19	1284	1314		33.6			30	8	22	1292
133	| EXT-C91A	1300	1326		135	133		26	14	12	1300	1328		135	133		28	14	14	1300	1325		135	133		25	14	11	1300	1328		135	132		28	14	14	1314
134	**Combine EXETERCATH4**	**1311**	**1320**	**69.3**				**9**	**17**	**-8**	**1312**	**1321**	**75.1**				**9**	**16**	**-7**	**1311**	**1320**	**63.7**				**9**	**17**	**-8**	**1312**	**1321**	**76.1**				**9**	**16**	**-7**	**1328**
134	**Combine EXETERCATH4**	**1312**	**1322**	**104**				**10**	**16**	**-6**	**1312**	**1323**	**109**				**11**	**16**	**-5**	**1312**	**1321**	**100**				**9**	**16**	**-7**	**1312**	**1323**	**110**				**11**	**16**	**-5**	**1328**
134	| EXTC164A	1301	1327		101	91		26	19	7	1302	1329		104	93.9		27	18	9	1301	1326		97	86.5		25	19	6	1302	1328		104	93.9		26	18	8	1320
134	| EXTC165A	1294	1320		35.9			26	30	-4	1295	1321		39.4			26	29	-3	1294	1319		31.6			25	30	-5	1295	1321		39.5			26	29	-3	1324
134	| EXTC175A	1301	1327		102	91.4		26	23	3	1301	1329		104	94.2		28	23	5	1301	1326		97.3	87.2		25	23	2	1301	1330		106	96.1		29	23	6	1324
134	| EXTC183A	1312	1337		80.9	96.3		25	1	24	1312	1339		83.7	98.4		27	1	26	1312	1335		79.9	95.5		23	1	22	1312	1338		85.5	99.9		26	1	25	1313
134	| EXTC184A	1306	1327		124	113		21	15	6	1306	1329		125	115		23	15	8	1306	1327		126	117		21	15	6	1306	1329		125	116		23	15	8	1321
134	| EXTC193A	1310	1337		110	120		27	11	16	1310	1339		111	121		29	11	18	1310	1335		110	120		25	11	14	1310	1339		110	120		29	11	18	1321
135	**Combine EXETERCATH5**	**1324**	**1333**	**122**				**9**	**13**	**-4**	**1325**	**1334**	**128**				**9**	**12**	**-3**	**1324**	**1333**	**113**				**9**	**13**	**-4**	**1325**	**1334**	**125**				**9**	**12**	**-3**	**1337**
135	**Combine EXETERCATH5**	**1329**	**1338**	**142**				**9**	**8**	**1**	**1325**	**1336**	**191**				**11**	**12**	**-1**	**1325**	**1334**	**186**				**9**	**12**	**-3**	**1325**	**1336**	**190**				**11**	**12**	**-1**	**1337**
135	| EXTC214A	1320	1346		135	107		26	17	9	1320	1347		136	134		27	17	10	1319	1344		136	133		25	18	7	1320	1347		136	133		27	17	10	1337
135	| EXTC215A	1323	1350		104	134		27	13	14	1324	1351		106	116		27	12	15	1323	1348		100	112		25	13	12	1324	1351		105	116		27	12	15	1336
135	| EXTC219A	1307	1333		36			26	13	13	1307	1334		39.1			27	13	14	1306	1332		29.9			26	14	12	1307	1334		37			27	13	14	1320

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	A Range	A beg range	A end range	S from	S to	Phase A_n	Sample	2nd test	3rd test	S Range	S beg range	S end range	B from	B to	Phase A_n	Sample	2nd test	3rd test	B Range	B beg range	B end range	C from	C to	Phase A_n	Sample	2nd test	3rd test	C Range	C beg range	C end range	Real date
135	EXTC221A	1318	1345		135	97.8		27	19	8	1318	1347		135	130		29	19	10	1318	1344		135	129		26	19	7	1318	1347		135	131		29	19	10	1337
135	EXTC247A	1320	1344		134	127		24	14	10	1320	1346		135	132		26	14	12	1320	1344		135	133		24	14	10	1320	1346		135	132		26	14	12	1334
135	EXTC250A	1318	1347		137	127		29	12	17	1319	1349		137	135		30	11	19	1318	1346		137	134		28	12	16	1319	1349		137	135		30	11	19	1330
135	EXTC269A	1319	1346		136	104		27	9	18	1319	1348		137	134		29	9	20	1319	1345		137	134		26	9	17	1319	1348		137	134		29	9	20	1328
136	**Combine EXETERCATH6**	**1612**	**1621**	**148**				**9**	**4**	**5**	**1612**	**1622**	**154**				**10**	**4**	**6**	**1612**	**1620**	**139**				**8**	**4**	**4**	**1613**	**1622**	**155**				**9**	**3**	**6**	**1616**
136	EXTC134A	1601	1629		104			28	15	13	1601	1631		106			30	15	15	1601	1627		98.8			26	15	11	1602	1630		107			28	14	14	1616
136	EXTC135A	1608	1636		133			28	8	20	1608	1637		133			29	8	21	1608	1635		132			27	8	19	1609	1638		131			29	7	22	1616
136	EXTC136A	1608	1631		134			23	8	15	1608	1633		135			25	8	17	1608	1630		135			22	8	14	1608	1632		134			24	8	16	1616
136	EXTC137A	1607	1633		135			26	9	17	1607	1634		136			27	9	18	1607	1631		136			24	9	15	1608	1634		136			26	8	18	1616
136	EXTC168A	1610	1634		124			24	6	18	1610	1636		125			26	6	20	1610	1633		123			23	6	17	1610	1635		126			25	6	19	1616
136	EXTC179A	1597	1626		73.2			29	13	16	1597	1628		76.1			31	13	18	1597	1624		65.5			27	13	14	1597	1628		78.4			31	13	18	1610
136	EXTC180	1609	1635		125			26	7	19	1610	1637		126			27	6	21	1609	1634		125			25	7	18	1610	1636		126			26	6	20	1616
137	**Combine EXETERCATH7**	**1754**	**1771**	**122**				**17**	**12**	**5**	**1754**	**1773**	**123**				**19**	**12**	**7**	**1754**	**1771**	**123**				**17**	**12**	**5**	**1754**	**1773**	**124**				**19**	**12**	**7**	**1766**
137	EXTC141A	1753	1779		116			26	13	13	1753	1781		116			28	13	15	1753	1778		116			25	13	12	1753	1781		116			28	13	15	1766
137	EXTC143A	1750	1777		115			27	16	11	1750	1779		116			29	16	13	1750	1776		116			26	16	10	1751	1779		116			28	15	13	1766
138	**Combine EXETERCATH8**	**1675**	**1695**	**125**				**20**	**9**	**11**	**1675**	**1696**	**125**				**21**	**9**	**12**	**1675**	**1694**	**125**				**19**	**9**	**10**	**1676**	**1697**	**125**				**21**	**8**	**13**	**1684**
138	EXT-C81A	1673	1705		119			32	11	21	1673	1706		119			33	11	22	1673	1703		119			30	11	19	1673	1707		119			34	11	23	1684
138	EXT-C82A	1672	1701		115			29	11	18	1673	1702		115			29	10	19	1672	1700		115			28	11	17	1673	1703		115			30	10	20	1683
139	**Combine FELBRIGG**	**1681**	**1687**	**124**				**6**	**3**	**3**	**1681**	**1688**	**134**				**7**	**3**	**4**	**1680**	**1686**	**113**				**6**	**4**	**2**	**1681**	**1688**	**133**				**7**	**3**	**4**	**1684**
139	**Combine FELBRIGG**	**1681**	**1688**	**230**				**7**	**3**	**4**	**1682**	**1689**	**239**				**7**	**2**	**5**	**1681**	**1687**	**224**				**6**	**3**	**3**	**1682**	**1689**	**231**				**7**	**2**	**5**	**1684**
139	flbrg01	1673	1703		142	140		30	11	19	1673	1705		142	140		32	11	21	1673	1701		141	138		28	11	17	1674	1705		142	140		31	10	21	1684
139	flbrg02	1678	1707		113	122		29	6	23	1678	1708		114	123		30	6	24	1678	1705		112	121		27	6	21	1678	1709		110	120		31	6	25	1684
139	flbrg04	1677	1701		130	135		24	7	17	1678	1702		131	136		24	6	18	1677	1700		129	135		23	7	16	1678	1702		133	137		24	6	18	1684
139	flbrg06	1672	1701		139	134		29	12	17	1673	1703		139	135		30	11	19	1672	1700		137	132		28	12	16	1673	1703		140	136		30	11	19	1684
139	flbrg07	1677	1697		137	135		20	7	13	1677	1699		138	136		22	7	15	1677	1696		138	137		19	7	12	1677	1698		138	135		21	7	14	1684
139	flbrg08	1675	1704		140	141		29	9	20	1675	1705		140	141		30	9	21	1674	1702		141	141		28	10	18	1675	1705		140	141		30	9	21	1684
139	flbrg09	1676	1705		134	138		29	8	21	1676	1707		134	138		31	8	23	1676	1703		134	138		27	8	19	1676	1707		131	136		31	8	23	1684
139	flbrg10	1680	1708		83	96.3		28	4	24	1680	1710		85.7	98.5		30	4	26	1679	1707		81.5	94.9		28	5	23	1680	1710		83.3	96.1		30	4	26	1684
139	flbrg11	1668	1699		113	106		31	16	15	1668	1700		115	108		32	16	16	1668	1697		108	100		29	16	13	1669	1700		119	112		31	15	16	1684
139	flbrg12	1676	1705		133	138		29	8	21	1676	1707		134	138		31	8	23	1676	1703		134	138		27	8	19	1676	1707		131	136		31	8	23	1684
139	flbrg13	1672	1699		132	126		27	12	15	1673	1700		133	127		27	11	16	1672	1697		131	124		25	12	13	1673	1700		133	127		27	11	16	1684
139	flbrg14	1658	1687		27.9			29	26	3	1658	1689		30.7			31	26	5	1658	1685		21.9			27	26	1	1658	1689		31.1			31	26	5	1684
139	flbrg15	1677	1696		137	134		19	7	12	1677	1698		138	135		21	7	14	1677	1696		138	136		19	7	12	1677	1697		137	132		20	7	13	1684
139	flbrg17	1665	1689		43.1			24	19	5	1665	1690		46.5			25	19	6	1665	1688		42.3			23	19	4	1665	1691		48.4			26	19	7	1684
139	flbrg18	1672	1695		116	106		23	12	11	1673	1697		118	108		24	11	13	1672	1694		113	104		22	12	10	1672	1696		113	104		24	12	12	1684
140	**Combine DEGREY1**	**1695**	**1708**	**106**				**13**	**8**	**5**	**1696**	**1708**	**109**				**12**	**7**	**5**	**1695**	**1707**	**108**				**12**	**8**	**4**	**1696**	**1709**	**104**				**13**	**7**	**6**	**1703**
140	FLT-A02A	1696	1733		77.4			37	7	30	1697	1734		79.4			37	6	31	1696	1729		78			33	7	26	1697	1735		74.5			38	6	32	1703
140	FLT-A07A	1689	1712		106			23	14	9	1689	1714		107			25	14	11	1689	1711		105			22	14	8	1689	1713		104			24	14	10	1703
140	FLT-A08A	1689	1713		110			24	14	10	1689	1715		111			26	14	12	1689	1712		112			23	14	9	1689	1715		111			26	14	12	1703
140	FLT-A09A	1691	1716		126			25	12	13	1691	1718		127			27	12	15	1691	1715		126			24	12	12	1691	1718		126			27	12	15	1703
141	**Combine DEGREY2**	**1706**	**1717**	**17.8**	**n=4 A= 17.8%(A**			**11**	**12**	**-1**	**1706**	**1718**	**20.8**	**n=4 A= 20.8%(**			**12**	**12**	**0**	**1706**	**1717**	**13.1**	**n=4 A= 13.1%(**			**11**	**12**	**-1**	**1706**	**1719**	**20.4**	**FAILED n=4 A:**			**13**	**12**	**1**	**1718**
141	FLT-A14A	1689	1720		57.5			31	14	17	1689	1721		61			32	14	18	1689	1718		48.6			29	14	15	1690	1722		63			32	13	19	1703
141	FLT-A16A	1687	1715		30.9			28	16	12	1687	1716		34.3			29	16	13	1687	1713		24.9			26	16	10	1688	1716		33.6			28	15	13	1703
141	FLT-A18A	1689	1715		32.2			26	14	12	1689	1716		35.8			27	14	13	1689	1714		27.5			25	14	11	1689	1717		35.3			28	14	14	1703
141	FLT-A20A	1709	1736		55.4			27	9	18	1709	1738		57.8			29	9	20	1709	1736		51.8			27	9	18	1710	1739		55.7			29	8	21	1718
142	**Combine DEGREY3**	**1711**	**1718**	**1**	**n=7 A= 1.0%(An=**			**7**	**15**	**-8**	**1711**	**1719**	**1.6**	**n=7 A= 1.6%(An**			**8**	**15**	**-7**	**1711**	**1718**	**0.7**	**n=7 A= 0.7%(An**			**7**	**15**	**-8**	**1711**	**1719**	**1.5**	**FAILED n=7 A=**			**8**	**15**	**-7**	**1726**
142	**Combine DEGREY3**	**1718**	**1733**	**124**				**15**	**8**	**7**	**1709**	**1725**	**68.4**				**16**	**17**	**-1**										**1709**	**1725**	**68**				**16**	**17**	**-1**	**1726**
142	FLT-A25A	1691	1712		10.4			21	17	4	1691	1714		13			23	17	6	1691	1712		9			21	17	4	1691	1714		12.4			23	17	6	1708

Number	SITE & sample	A from	A to	Phase A_n	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	S from	S to	Phase A_n	S Sample	S 2nd test	S 3rd test	S Range	S beg range	S end range	B from	B to	Phase A_n	B Sample	B 2nd test	B 3rd test	B Range	B beg range	B end range	C from	C to	Phase A_n	C Sample	C 2nd test	C 3rd test	C Range	C beg range	C end range	Real date
142	FLT-A26A	1714	1735		30.9			21	12	9	1714	1738		35.7			24	12	12	1714	1735		32.9			21	12	9	1714	1737		35.2			23	12	11	1726
142	FLT-A28A	1688	1712		11			24	20	4	1688	1714		13.5			26	20	6	1688	1712		9.3			24	20	4	1688	1715		14.1			27	20	7	1708
142	FLT-A29A	1685	1710		7			25	18	7	1685	1712		8.9			27	18	9	1685	1709		5.4			24	18	6	1686	1712		8.8			26	17	9	1703
142	FLT-A32A	1684	1707		3.3			23	24	-1	1685	1709		4.7			24	23	1	1684	1707		2.8			23	24	-1	1685	1709		4.3			24	23	1	1708
142	FLT-A36A	1710	1732		105	116		22	11	11	1710	1734		107	104		24	11	13	1710	1732		108			22	11	11	1710	1734		106	104		24	11	13	1721
142	FLT-A37B	1698	1721		60.1	117		23	10	13	1698	1723		64.2	56.1		25	10	15	1698	1721		53.1			23	10	13	1699	1723		63.7	55.8		24	9	15	1708
143	**Combine FORD**	**1501**	**1524**	**120**				**23**	**10**	**13**	**1501**	**1525**	**121**				**24**	**10**	**14**	**1500**	**1522**	**119**				**22**	**11**	**11**	**1502**	**1526**	**122**				**24**	**9**	**15**	**1511**
143	frd10	1494	1531		114			37	13	24	1494	1533		115			39	13	26	1494	1528		113			34	13	21	1495	1534		116			39	12	27	1507
143	frd12	1500	1533		113			33	11	22	1500	1535		113			35	11	24	1500	1531		113			31	11	20	1501	1535		114			34	10	24	1511
144	**Combine FORDWICH**	**1547**	**1565**	**97.3**				**18**	**9**	**9**	**1548**	**1566**	**99**				**18**	**8**	**10**	**1547**	**1565**	**98.7**				**18**	**9**	**9**	**1548**	**1567**	**99.6**				**19**	**8**	**11**	**1556**
144	KMF-A06A	1541	1565		89.5			24	15	9	1541	1567		91.1			26	15	11	1541	1566		91			25	15	10	1542	1568		91.9			26	14	12	1556
144	KMF-A08A	1548	1577		108			29	8	21	1548	1579		108			31	8	23	1548	1576		108			28	8	20	1549	1580		108			31	7	24	1556
145	**Combine CLONFERT**	**1640**	**1656**	**99.2**				**16**	**-2**	**18**	**1640**	**1657**	**102**				**17**	**-2**	**19**	**1640**	**1656**	**94.9**				**16**	**-2**	**18**	**1641**	**1660**	**104**				**19**	**-3**	**22**	**1638**
145	q9374m	1625	1659		71.3			34	13	21	1625	1660		73.4			35	13	22	1625	1657		67.8			32	13	19	1626	1662		74.9			36	12	24	1638
145	q9375	1640	1679		98.7			39	-2	41	1640	1680		99.9			40	-2	42	1640	1677		96.9			37	-2	39	1642	1683		101			41	-4	45	1638
145	q9379	1628	1665		110			37	10	27	1629	1667		111			38	9	29	1629	1664		108			35	9	26	1630	1670		113			40	8	32	1638
145	q9380	1636	1673		128			37	2	35	1636	1675		128			39	2	37	1636	1672		127			36	2	34	1637	1678		127			41	1	40	1638
146	**Combine GLASGOW**	**1170**	**1193**	**124**				**23**	**21**	**2**	**1171**	**1193**	**124**				**22**	**20**	**2**	**1170**	**1191**	**124**				**21**	**21**	**0**	**1171**	**1194**	**124**				**23**	**20**	**3**	**1191**
146	glasgow1	1169	1202		116			33	22	11	1169	1204		116			35	22	13	1169	1199		116			30	22	8	1170	1204		116			34	21	13	1191
146	glasgow2	1166	1200		116			34	25	9	1167	1201		117			34	24	10	1166	1197		116			31	25	6	1167	1201		117			34	24	10	1191
147	**Combine WESTGATEST1**	**1579**	**1590**	**77.9**				**11**	**8**	**3**	**1580**	**1591**	**82.6**				**11**	**7**	**4**	**1579**	**1589**	**68.7**				**10**	**8**	**2**	**1580**	**1592**	**82.5**				**12**	**7**	**5**	**1587**
147	**Combine WESTGATEST1**	**1581**	**1593**	**161**				**12**	**6**	**6**	**1580**	**1593**	**173**				**13**	**7**	**6**	**1580**	**1591**	**167**				**11**	**7**	**4**	**1581**	**1594**	**170**				**13**	**6**	**7**	**1587**
147	GLO-B27B	1576	1613		115	116		37	9	28	1577	1614		116	125		37	8	29	1576	1611		114	123		35	9	26	1578	1616		113	122		38	7	31	1585
147	GLO-B28	1570	1605		132	126		35	16	19	1571	1606		133	126		35	15	20	1570	1603		131	124		33	16	17	1571	1607		133	127		36	15	21	1586
147	GLO-B30A	1577	1607		120	127		30	9	21	1577	1609		121	128		32	9	23	1577	1605		119	126		28	9	19	1578	1609		123	129		31	8	23	1586
147	GLO-B32A	1570	1599		116	97.1		29	17	12	1570	1601		117	107		31	17	14	1570	1598		113	102		28	17	11	1571	1602		115	104		31	16	15	1587
147	GLO-B39	1574	1611		131	136		37	13	24	1575	1612		132	135		37	12	25	1574	1608		132	135		34	13	21	1575	1614		131	134		39	12	27	1587
147	GLO-B41A	1550	1583		13.9			33	33	0	1550	1585		15.7			35	33	2	1550	1581		10.5			31	33	-2	1551	1586		16.2			35	32	3	1583
147	GLO-B42A	1575	1604		133	132		29	11	18	1575	1606		134	132		31	11	20	1575	1603		133	133		28	11	17	1576	1607		134	132		31	10	21	1586
148	**Combine WESTGATEST2**	**1613**	**1624**	**153**				**11**	**9**	**2**	**1613**	**1625**	**156**				**12**	**9**	**3**	**1612**	**1623**	**151**				**11**	**10**	**1**	**1613**	**1625**	**153**				**12**	**9**	**3**	**1622**
148	GLO-B02B	1608	1634		130			26	11	15	1609	1636		131			27	10	17	1608	1633		131			25	11	14	1609	1635		130			26	10	16	1619
148	GLO-B04A	1611	1640		119			29	10	19	1611	1642		120			31	10	21	1611	1638		118			27	10	17	1611	1642		120			31	10	21	1621
148	GLO-B05A	1606	1632		119			26	16	10	1606	1633		120			27	16	11	1606	1631		118			25	16	9	1606	1634		119			28	16	12	1622
148	GLO-B07B	1609	1641		126			32	5	27	1610	1642		126			32	4	28	1609	1639		126			30	5	25	1610	1643		124			33	4	29	1614
148	GLO-B08A	1604	1631		111			27	17	10	1604	1633		113			29	17	12	1604	1630		110			26	17	9	1605	1633		113			28	16	12	1621
149	**Combine WESTGATEST3**	**1613**	**1626**	**51.4**				**13**	**4**	**9**	**1613**	**1627**	**55**				**14**	**4**	**10**	**1613**	**1625**	**47**				**12**	**4**	**8**	**1614**	**1628**	**51.3**				**14**	**3**	**11**	**1617**
149	**Combine WESTGATEST3**	**1615**	**1631**	**118**				**16**	**2**	**14**	**1614**	**1631**	**114**				**17**	**3**	**14**	**1614**	**1629**	**112**				**15**	**3**	**12**	**1615**	**1631**	**107**				**16**	**2**	**14**	**1617**
149	GLO-B11B	1607	1634		121	105		27	9	18	1608	1635		121	103		27	8	19	1607	1632		120	101		25	9	16	1608	1635		119	100		27	8	19	1616
149	GLO-B13A	1610	1637		125	120		27	6	21	1611	1638		126	119		27	5	22	1610	1635		125	119		25	6	19	1611	1638		126	117		27	5	22	1616
149	GLO-B48B	1614	1654		78.8	107		40	3	37	1614	1655		81	102		41	3	38	1614	1651		78.4	101		37	3	34	1615	1657		73.1	95.9		42	2	40	1617
149	GLO-B49A	1593	1620		22.2			27	23	4	1593	1622		24.5			29	23	6	1593	1619		18.8			26	23	3	1594	1622		24			28	22	6	1616
150	**Combine GOLDCLIFF1**	**1554**	**1568**	**94**				**14**	**7**	**7**	**1555**	**1569**	**96.7**				**14**	**6**	**8**	**1554**	**1568**	**92.2**				**14**	**7**	**7**	**1555**	**1569**	**94.6**				**14**	**6**	**8**	**1561**
150	g66ws27	1548	1568		85.3			20	13	7	1548	1570		88.1			22	13	9	1548	1568		83.5			20	13	7	1548	1570		86			22	13	9	1561
150	g66ws28	1555	1576		107			21	6	15	1555	1578		108			23	6	17	1555	1576		107			21	6	15	1555	1578		108			23	6	17	1561
151	**Combine GOLDCLIFF2**	**-276**	**-268**	**123**				**8**	**5**	**3**	**-275**	**-267**	**130**				**8**	**4**	**4**	**-276**	**-268**	**117**				**8**	**5**	**3**	**-275**	**-266**	**138**				**9**	**4**	**5**	**-271**
151	**Combine GOLDCLIFF2**																			**-275**	**-267**	**144**				**8**	**4**	**4**										**-271**
151	gc7001	-280	-254		134			26	7	19	-279	-252		134			27	6	21	-279	-254		134	136		25	6	19	-279	-251		134			28	6	22	-273
151	gc7009	-277	-253		113			24	4	20	-277	-251		115			26	4	22	-277	-254		113	120		23	4	19	-277	-251		117			26	4	22	-273

Number	SITE & sample	A from	A to	Phase An	Sample	2nd test	3rd test	A Range	A beg range	A end range	S from	S to	Phase An	Sample	2nd test	3rd test	S Range	S beg range	S end range	B from	B to	Phase An	Sample	2nd test	3rd test	B Range	B beg range	B end range	C from	C to	Phase An	Sample	2nd test	3rd test	C Range	C beg range	C end range	Real date
151	gc7015	-280	-256		137			24	7	17	-280	-254		137			26	7	19	-280	-257		137	136		23	7	16	-280	-254		137			26	7	19	-273
151	gc7026	-281	-254		138			27	8	19	-281	-252		139			29	8	21	-281	-255		139	137		26	8	18	-281	-252		139			29	8	21	-273
151	gc7050	-288	-260		95.7			28	17	11	-288	-258		98.3			30	17	13	-288	-260		94.5	88.7		28	17	11	-287	-257		104			30	16	14	-271
151	gc7083	-279	-253		130			26	6	20	-279	-252		131			27	6	21	-279	-254		130	133		25	6	19	-278	-252		131			26	5	21	-273
151	gc7097	-291	-262		70.2			29	20	9	-290	-261		73.4			29	19	10	-291	-263		65.8	60.9		28	20	8	-290	-260		77.5			30	19	11	-271
151	gc7105	-278	-253		123			25	5	20	-278	-251		124			27	5	22	-278	-254		123	128		24	5	19	-278	-252		126			26	5	21	-273
151	gc7128	-291	-264		60			27	20	7	-291	-262		63.3			29	20	9	-291	-265		56.1			26	20	6	-290	-262		66.4			28	19	9	-271
152	**Combine GREENHAM**	**1566**	**1582**	**86.3**				**16**	**4**	**12**	**1566**	**1583**	**89**				**17**	**4**	**13**	**1565**	**1581**	**80.9**				**16**	**5**	**11**	**1566**	**1583**	**89.1**				**17**	**4**	**13**	**1570**
152	**Combine GREENHAM**	**1567**	**1587**	**125**				**20**	**3**	**17**	**1567**	**1589**	**126**				**22**	**3**	**19**	**1567**	**1586**	**126**				**19**	**3**	**16**	**1568**	**1589**	**126**				**21**	**2**	**19**	**1570**
152	negmf12	1564	1596		118	118		32	6	26	1565	1597		119	118		32	5	27	1564	1594		117	118		30	6	24	1565	1598		118	118		33	5	28	1570
152	negmf19	1564	1595		119	117		31	6	25	1565	1597		120	117		32	5	27	1564	1593		119	117		29	6	23	1565	1596		120	117		31	5	26	1570
152	negmf9	1551	1581		54.9			30	19	11	1551	1583		57.5			32	19	13	1551	1579		49.5			28	19	9	1552	1583		57.7			31	18	13	1570
153	**Combine ABBAS**	**1283**	**1296**	**123**				**13**	**6**	**7**	**1283**	**1297**	**125**				**14**	**6**	**8**	**1283**	**1296**	**123**				**13**	**6**	**7**	**1283**	**1298**	**125**				**15**	**6**	**9**	**1289**
153	ahc04	1282	1311		114			29	6	23	1282	1313		114			31	6	25	1282	1310		113			28	6	22	1282	1313		113			31	6	25	1288
153	ahc06	1275	1301		105			26	14	12	1275	1303		107			28	14	14	1275	1301		105			26	14	12	1275	1304		109			29	14	15	1289
153	ahc07	1280	1302		120			22	9	13	1280	1304		120			24	9	15	1280	1302		120			22	9	13	1280	1304		119			24	9	15	1289
154	**Combine ROSE&CROWN**	**1568**	**1586**	**29.6**	**n=2 A= 29.6%(A**			**18**	**4**	**14**	**1568**	**1587**	**32.3**	**n=2 A= 32.3%(**			**19**	**4**	**15**	**1567**	**1585**	**24.2**	**n=2 A= 24.2%(**			**18**	**5**	**13**	**1568**	**1587**	**33.1**	**FAILED**	**n=2 A**		**19**	**4**	**15**	**1572**
154	rcw3	1544	1576		17.7			32	26	6	1545	1577		19.9			32	25	7	1544	1574		13.4			30	26	4	1545	1577		20.6			32	25	7	1570
154	rcw5	1569	1597		101			28	3	25	1569	1599		102			30	3	27	1569	1595		100			26	3	23	1570	1598		102			28	2	26	1572
155	**Combine HABBERLEY**	**1570**	**1588**	**124**				**18**	**6**	**12**	**1570**	**1589**	**124**				**19**	**6**	**13**	**1570**	**1586**	**124**				**16**	**6**	**10**	**1571**	**1588**	**124**				**17**	**5**	**12**	**1576**
155	habm1	1567	1593		115			26	9	17	1567	1594		115			27	9	18	1567	1591		115			24	9	15	1568	1594		115			26	8	18	1576
155	habm2	1569	1595		117			26	7	19	1569	1597		118			28	7	21	1569	1594		118			25	7	18	1569	1597		118			28	7	21	1576
156	**Combine MAYTREE**	**1557**	**1568**	**159**				**11**	**2**	**9**	**1557**	**1569**	**162**				**12**	**2**	**10**	**1556**	**1567**	**158**				**11**	**3**	**8**	**1558**	**1569**	**156**				**11**	**1**	**10**	**1559**
156	mtc1	1548	1574		104			26	11	15	1548	1576		106			28	11	17	1548	1573		105			25	11	14	1548	1576		106			28	11	17	1559
156	mtc2	1553	1591		119			38	6	32	1553	1593		120			40	6	34	1553	1589		117			36	6	30	1554	1595		111			41	5	36	1559
156	mtc3	1549	1581		132			32	10	22	1550	1582		133			32	9	23	1549	1579		132			30	10	20	1550	1583		133			33	9	24	1559
156	mtc4	1551	1577		126			26	8	18	1551	1578		127			27	8	19	1551	1575		126			24	8	16	1551	1578		124			27	8	19	1559
156	mtc5	1555	1585		115			30	3	27	1555	1587		116			32	3	29	1555	1583		113			28	3	25	1556	1587		116			31	2	29	1558
156	mtc6	1551	1580		133			29	8	21	1551	1581		133			30	8	22	1550	1578		132			28	9	19	1551	1581		132			30	8	22	1559
157	**Combine VANN**	**1538**	**1551**	**156**				**13**	**4**	**9**	**1539**	**1552**	**158**				**13**	**3**	**10**	**1538**	**1550**	**153**				**12**	**4**	**8**	**1539**	**1553**	**158**				**14**	**3**	**11**	**1542**
157	vann1	1535	1566		129			31	7	24	1535	1568		130			33	7	26	1535	1564		129			29	7	22	1535	1569		130			34	7	27	1542
157	vann24	1530	1559		116			29	11	18	1530	1561		117			31	11	20	1530	1558		115			28	11	17	1531	1562		116			31	10	21	1541
157	vann3	1532	1562		128			30	8	22	1532	1564		129			32	8	24	1532	1560		129			28	8	20	1533	1564		128			31	7	24	1540
157	vann5	1537	1569		113			32	5	27	1537	1571		114			34	5	29	1537	1567		111			30	5	25	1538	1572		114			34	4	30	1542
157	vann6	1529	1563		124			34	13	21	1529	1565		125			36	13	23	1529	1561		122			32	13	19	1530	1566		127			36	12	24	1542
158	**Combine HAMPSTEAD1**	**1788**	**1804**	**115**				**16**	**8**	**8**	**1788**	**1805**	**116**				**17**	**8**	**9**	**1788**	**1803**	**114**				**15**	**8**	**7**	**1788**	**1806**	**117**				**18**	**8**	**10**	**1796**
158	hn14	1788	1812		112			24	7	17	1788	1813		113			25	7	18	1788	1811		112			23	7	16	1788	1814		113			26	7	19	1795
158	hn4	1782	1808		108			26	14	12	1783	1810		110			27	13	14	1782	1807		107			25	14	11	1783	1810		110			27	13	14	1796
159	**Combine HAMPSTEAD2**	**1801**	**1814**	**86.2**				**13**	**11**	**2**	**1802**	**1815**	**90**				**13**	**10**	**3**	**1801**	**1814**	**84.9**				**13**	**11**	**2**	**1802**	**1815**	**88.3**				**13**	**10**	**3**	**1812**
159	hn2	1793	1817		87.3			24	19	5	1794	1818		90			24	18	6	1793	1816		88			23	19	4	1794	1818		91.5			24	18	6	1812
159	hn5	1803	1829		88.9			26	9	17	1803	1831		90.7			28	9	19	1803	1828		87.7			25	9	16	1803	1831		89.2			28	9	19	1812
159	hn9	1795	1817		99.7			22	17	5	1795	1819		102			24	17	7	1795	1817		97.5			22	17	5	1795	1819		98.7			24	17	7	1812
160	**Combine TAN-Y-BRYN**	**1342**	**1357**	**60.4**				**15**	**18**	**-3**	**1342**	**1359**	**63.7**				**17**	**18**	**-1**	**1342**	**1356**	**53.8**				**14**	**18**	**-4**	**1343**	**1359**	**68.1**				**16**	**17**	**-1**	**1360**
160	**Combine TAN-Y-BRYN**	**1343**	**1362**	**94.2**				**19**	**17**	**2**	**1343**	**1363**	**96**				**20**	**17**	**3**	**1343**	**1361**	**92.2**				**18**	**17**	**1**	**1344**	**1363**	**97.7**				**19**	**16**	**3**	**1360**
160	tyb1	1322	1356		42.5			34	38	-4	1322	1357		45.4			35	38	-3	1321	1354		36			33	39	-6	1323	1359		49.7			36	37	-1	1360
160	tyb2	1334	1363		105	85.3		29	26	3	1334	1364		107	87.2		30	26	4	1334	1361		104	83.2		27	26	1	1334	1365		108	89.3		31	26	5	1360
160	tyb3	1344	1372		93.6	108		28	16	12	1344	1374		94.7	108		30	16	14	1343	1371		91.7	107		28	17	11	1344	1374		95.8	108		30	16	14	1360
161	**Combine HARDWICKHALL**	**1595**	**1615**	**125**				**20**	**30**	**-10**	**1595**	**1617**	**125**				**22**	**30**	**-8**	**1595**	**1614**	**124**				**19**	**30**	**-11**	**1596**	**1617**	**126**				**21**	**29**	**-8**	**1625**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
161	| HDW-B09A	1590	1625		121			35	35	0	1590	1626		121			36	35	1	1590	1622		120			32	35	-3	1591	1627		122			36	34	2	1625
161	| HDW-B10A	1594	1622		113			28	31	-3	1594	1623		113			29	31	-2	1594	1620		113			26	31	-5	1595	1623		113			28	30	-2	1625
162	**Combine HAROME**	**1555**	**1575**	**125**				**20**	**15**	**5**	**1555**	**1576**	**125**				**21**	**15**	**6**	**1555**	**1573**	**125**				**18**	**15**	**3**	**1556**	**1576**	**124**				**20**	**14**	**6**	**1570**
162	| rdl1	1552	1581		114			29	18	11	1553	1582		115			29	17	12	1552	1578		114			26	18	8	1553	1581		114			28	17	11	1570
162	| rdl2	1553	1585		119			32	17	15	1553	1586		119			33	17	16	1553	1582		119			29	17	12	1553	1587		119			34	17	17	1570
163	**Combine HEADSTONE**	**1497**	**1511**	**93.9**				**14**	**8**	**6**	**1497**	**1512**	**96.8**				**15**	**8**	**7**	**1497**	**1510**	**90.1**				**13**	**8**	**5**	**1498**	**1512**	**96.2**							**1505**
163	**Combine HEADSTONE**																			**1498**	**1515**	**125**				**17**	**7**	**10**										
163	| HED-B08A	1494	1523		125			29	11	18	1495	1524		126			29	10	19	1494	1522		125	118		28	11	17	1495	1525		125			30	10	20	1505
163	| HED-B15B	1497	1523		113			26	8	18	1497	1525		114			28	8	20	1497	1522		112	116		25	8	17	1497	1525		114			28	8	20	1505
163	| HED-B16A	1485	1511		63.5			26	20	6	1486	1513		66.4			27	19	8	1485	1510		59.3			25	20	5	1486	1513		65.5			27	19	8	1505
164	**Combine TUNSTALL**	**1477**	**1489**	**114**				**12**	**7**	**5**	**1477**	**1490**	**118**				**13**	**7**	**6**	**1477**	**1488**	**109**				**11**	**7**	**4**	**1478**	**1490**	**116**				**12**	**6**	**6**	**1484**
164	| TUN-A04A	1476	1502		111			26	8	18	1477	1504		113			27	7	20	1476	1502		109			26	8	18	1477	1504		112			27	7	20	1484
164	| TUN-A07A	1466	1492		79.3			26	18	8	1467	1493		82.2			26	17	9	1466	1491		74.1			25	18	7	1467	1493		80.5			26	17	9	1484
164	| TUN-A10A	1475	1501		125			26	9	17	1475	1503		125			28	9	19	1475	1500		125			25	9	16	1475	1504		125			29	9	20	1484
164	| TUN-A12A	1471	1495		118			24	13	11	1471	1497		120			26	13	13	1471	1495		118			24	13	11	1471	1497		119			26	13	13	1484
165	**Combine PEMBROKE**	**1406**	**1416**	**19.1 n=4 A= 19.1%(A**				**10**	**7**	**3**	**1406**	**1417**	**22.6 n=4 A= 22.6%(**				**11**	**7**	**4**	**1406**	**1416**	**14.6 n=4 A= 14.6%(**				**10**	**7**	**3**	**1406**	**1417**	**22.1 FAILED n=4 A=**				**11**	**7**	**4**	**1413**
165	**Combine PEMBROKE**	**1407**	**1419**	**84.2**				**12**	**6**	**6**	**1407**	**1419**	**80.7**				**12**	**6**	**6**	**1407**	**1421**	**109**				**14**	**6**	**8**	**1407**	**1419**	**80.9**				**12**	**6**	**6**	**1413**
165	**Combine PEMBROKE**	**1408**	**1422**	**116**				**14**	**5**	**9**	**1408**	**1422**	**113**				**14**	**5**	**9**										**1408**	**1422**	**112**				**14**	**5**	**9**	**1413**
165	| pem1	1402	1424		129	124	110	22	10	12	1402	1426		130	121	106	24	10	14	1402	1424		129	102		22	10	12	1402	1426		130	121	105	24	10	14	1412
165	| pem3	1392	1419		61.5	56.8		27	20	7	1393	1420		65.5	54.8		27	19	8	1392	1417		53.3			25	20	5	1393	1420		65.9	55.3		27	19	8	1412
165	| pem4	1407	1428		84.7	106	113	21	6	15	1408	1430		87.2	104	112	22	5	17	1407	1428		82.7	111		21	6	15	1408	1429		87.1	104	112	21	5	16	1413
165	| pem6	1377	1404		5.4			27	36	-9	1377	1406		6.9			29	36	-7	1377	1403		3.7			26	36	-10	1377	1406		6.6			29	36	-7	1413
166	**Combine MARKWICK**	**1409**	**1418**	**136**				**9**	**-1**	**10**	**1409**	**1419**	**141**				**10**	**-1**	**11**	**1409**	**1418**	**130**				**9**	**-1**	**10**	**1410**	**1419**	**142**				**9**	**-2**	**11**	**1408**
166	| mrk1	1400	1423		91.3			23	8	15	1400	1425		94.3			25	8	17	1400	1423		88.3			23	8	15	1400	1425		92			25	8	17	1408
166	| mrk3	1408	1432		113			24	0	24	1408	1434		114			26	0	26	1408	1432		110			24	0	24	1408	1435		114			27	0	27	1408
166	| mrk5	1408	1432		115			24	0	24	1408	1434		116			26	0	26	1408	1431		114			23	0	23	1408	1434		117			26	0	26	1408
166	| mrk6	1397	1428		107			31	10	21	1397	1429		109			32	10	22	1397	1427		103			30	10	20	1398	1430		115			32	9	23	1407
166	| mrk7	1404	1430		135			26	3	23	1404	1432		136			28	3	25	1404	1429		136			25	3	22	1404	1433		I36			29	3	26	1407
166	| mrk8	1403	1426		124			23	5	18	1403	1428		126			25	5	20	1403	1426		124			23	5	18	1403	1428		124			25	5	20	1408
167	**Combine MOORHOUSE**	**1479**	**1500**	**125**				**21**	**6**	**15**	**1480**	**1501**	**126**				**21**	**5**	**16**	**1479**	**1499**	**125**				**20**	**6**	**14**	**1480**	**1502**	**125**				**22**	**5**	**17**	**1485**
167	| mhfn3	1477	1509		119			32	8	24	1477	1511		119			34	8	26	1477	1507		119			30	8	22	1478	1512		119			34	7	27	1485
167	| mhfn4	1477	1507		116			30	8	22	1477	1509		116			32	8	24	1477	1505		116			28	8	20	1478	1509		115			31	7	24	1485
168	**Combine HENLEY1**	**1339**	**1355**	**125**				**16**	**6**	**10**	**1339**	**1356**	**126**				**17**	**6**	**11**	**1339**	**1354**	**126**				**15**	**6**	**9**	**1339**	**1356**	**126**				**17**	**6**	**11**	**1345**
168	| hhc1	1337	1360		117			23	8	15	1337	1362		118			25	8	17	1337	1360		118			23	8	15	1337	1362		117			25	8	17	1345
168	| hhc3	1337	1361		117			24	8	16	1337	1362		118			25	8	17	1337	1360		118			23	8	15	1337	1363		118			26	8	18	1345
169	**Combine HENLEY2**	**1431**	**1447**	**119**				**16**	**9**	**7**	**1431**	**1448**	**120**				**17**	**9**	**8**	**1430**	**1446**	**116**				**16**	**10**	**6**	**1431**	**1449**	**120**				**18**	**9**	**9**	**1440**
169	| hhc4	1423	1451		103			28	14	14	1423	1453		104			30	14	16	1423	1450		102			27	14	13	1423	1454		104			31	14	17	1437
169	| hhc5	1424	1456		122			32	16	16	1425	1457		122			32	15	17	1424	1454		121			30	16	14	1425	1458		122			33	15	18	1440
169	| hhc6	1431	1463		107			32	9	23	1431	1464		108			33	9	24	1431	1461		106			30	9	21	1432	1465		108			33	8	25	1440
170	**Combine HENLEY3**	**1448**	**1462**	**126**				**14**	**3**	**11**	**1448**	**1464**	**126**				**16**	**3**	**13**	**1448**	**1462**	**126**				**14**	**3**	**11**	**1448**	**1463**	**126**				**15**	**3**	**12**	**1451**
170	| hhc14	1447	1467		116			20	4	16	1447	1469		117			22	4	18	1446	1467		117			21	5	16	1447	1468		117			21	4	17	1451
170	| hhc15	1446	1468		119			22	5	17	1446	1470		119			24	5	19	1446	1468		119			22	5	17	1446	1470		119			24	5	19	1451
171	**Combine HENLEY4**	**1419**	**1432**	**123**				**13**	**14**	**-1**	**1419**	**1433**	**125**				**14**	**14**	**0**	**1419**	**1432**	**121**				**13**	**14**	**-1**	**1419**	**1434**	**124**				**15**	**14**	**1**	**1433**
171	| hhc21	1418	1444		111			26	15	11	1419	1446		113			27	14	13	1418	1444		110			26	15	11	1419	1446		112			27	14	13	1433
171	| hhc22	1414	1441		126			27	19	8	1414	1443		127			29	19	10	1414	1440		126			26	19	7	1415	1443		127			28	18	10	1433
171	| hhc25	1412	1436		102			24	21	3	1412	1438		103			26	21	5	1412	1435		99.5			23	21	2	1412	1438		101			26	21	5	1433
172	**Combine HENLEY5**	**1458**	**1472**	**123**				**14**	**13**	**1**	**1458**	**1473**	**125**				**15**	**13**	**2**	**1458**	**1472**	**123**				**14**	**13**	**1**	**1459**	**1474**	**123**				**15**	**12**	**3**	**1471**
172	| hhc27	1453	1479		118			26	12	14	1453	1480		118			27	12	15	1453	1478		118			25	12	13	1453	1481		119			28	12	16	1465

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	B to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	C to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
172	hhc28	1458	1487		108			29	13	16	1458	1489		109			31	13	18	1458	1486		108			28	13	15	1459	1490		108			31	12	19	1471
172	hhc29	1453	1477		113			24	12	12	1453	1479		114			26	12	14	1453	1476		113			23	12	11	1453	1479		112			26	12	14	1465
173	**Combine KINGSARMS**	**1596**	**1606**	**143**				**10**	**6**	**4**	**1597**	**1607**	**147**				**10**	**5**	**5**	**1596**	**1605**	**137**				**9**	**6**	**3**	**1597**	**1607**	**153**				**10**	**5**	**5**	**1602**
173	htc1	1583	1612		86			29	18	11	1583	1614		88.7			31	18	13	1583	1611		82.4			28	18	10	1584	1615		94.2			31	17	14	1601
173	htc2	1585	1614		104			29	16	13	1585	1616		106			31	16	15	1585	1612		98.8			27	16	11	1585	1616		109			31	16	15	1601
173	htc3	1592	1616		133			24	10	14	1592	1617		133			25	10	15	1592	1615		134			23	10	13	1592	1618		133			26	10	16	1602
173	htc6	1592	1618		134			26	10	16	1592	1620		135			28	10	18	1592	1617		135			25	10	15	1592	1620		135			28	10	18	1602
173	htc8	1595	1618		121			23	7	16	1595	1620		122			25	7	18	1594	1617		120			23	8	15	1595	1619		124			24	7	17	1602
173	htc9	1594	1620		124			26	8	18	1594	1622		125			28	8	20	1594	1619		123			25	8	17	1594	1622		124			28	8	20	1602
174	**Combine HERSTMONCEUX**	**1806**	**1819**	**127**				**13**	**7**	**6**	**1807**	**1819**	**129**				**12**	**6**	**6**	**1806**	**1818**	**123**				**12**	**7**	**5**	**1807**	**1819**	**127**				**12**	**6**	**6**	**1813**
174	hxw01	1802	1825		121			23	11	12	1802	1827		122			25	11	14	1801	1824		120			23	12	11	1802	1826		122			24	11	13	1813
174	hxw06	1800	1824		112			24	13	11	1801	1825		114			24	12	12	1800	1823		109			23	13	10	1801	1825		112			24	12	12	1813
174	hxw07	1806	1829		111			23	6	17	1806	1831		113			25	6	19	1806	1828		109			22	6	16	1806	1830		111			24	6	18	1812
175	**Combine ERCALL**	**1595**	**1607**	**20.6**	**n=5 A= 20.6%(A**			**12**	**13**	**-1**	**1596**	**1608**	**23.7**	**n=5 A= 23.7%(**			**12**	**12**	**0**	**1595**	**1606**	**15.9**	**n=5 A= 15.9%(**			**11**	**13**	**-2**	**1596**	**1608**	**24**	**FAILED**	**n=5 A=**		**12**	**12**	**0**	**1608**
175	**Combine ERCALL**	**1589**	**1604**	**118**				**15**	**19**	**-4**	**1589**	**1605**	**120**				**16**	**19**	**-3**	**1589**	**1606**	**117**				**17**	**19**	**-2**	**1589**	**1605**	**126**				**16**	**19**	**-3**	**1608**
175	erc10	1576	1611		60.1	96.4		35	32	3	1577	1612		63.1	98.5		35	31	4	1576	1608		52.6			32	32	0	1577	1613		68.8	104		36	31	5	1608
175	erc11	1582	1614		95.5	125		32	26	6	1582	1616		98	126		34	26	8	1582	1612		87.7	112		30	26	4	1583	1617		101	127		34	25	9	1608
175	erc14	1589	1614		119	110		25	19	6	1589	1616		120	111		27	19	8	1589	1612		117	111		23	19	4	1589	1615		117	113		26	19	7	1608
175	erc4	1569	1597		9.9			28	39	-11	1569	1599		11.8			30	39	-9	1568	1596		7.4			28	40	-12	1569	1599		11.4			30	39	-9	1608
175	erc56	1599	1631		43.3			32	9	23	1599	1633		45.6			34	9	25	1599	1629		40.9			30	9	21	1600	1633		44.6			33	8	25	1608
176	**Combine HIGHHAM**	**1472**	**1490**	**49.9**	**n=2 A= 49.9%(A**			**18**	**9**	**9**	**1472**	**1491**	**52.9**				**19**	**9**	**10**	**1472**	**1489**	**43.6**	**n=2 A= 43.6%(**			**17**	**9**	**8**	**1473**	**1491**	**54.9**				**18**	**8**	**10**	**1481**
176	lhm2	1473	1499		103			26	8	18	1474	1501		104			27	7	20	1473	1498		103			25	8	17	1474	1500		104			26	7	19	1481
176	lhm4	1454	1485		36.2			31	27	4	1454	1486		39.1			32	27	5	1454	1483		30.1			29	27	2	1455	1486		41.1			31	26	5	1481
177	**Combine BRADENHAM**	**1646**	**1657**	**186**				**11**	**7**	**4**	**1647**	**1657**	**188**				**10**	**6**	**4**	**1646**	**1656**	**185**				**10**	**7**	**3**	**1647**	**1658**	**188**				**11**	**6**	**5**	**1653**
177	bdm10	1638	1664		113			26	15	11	1638	1666		115			28	15	13	1638	1663		112			25	15	10	1638	1667		115			29	15	14	1653
177	bdm12	1641	1668		133			27	12	15	1641	1670		134			29	12	17	1641	1666		134			25	12	13	1641	1670		134			29	12	17	1653
177	bdm14	1641	1671		136			30	12	18	1641	1673		136			32	12	20	1641	1670		136			29	12	17	1642	1673		136			31	11	20	1653
177	bdm3	1641	1668		134			27	12	15	1641	1670		135			29	12	17	1641	1667		135			26	12	14	1642	1670		135			28	11	17	1653
177	bdm4	1644	1670		126			26	9	17	1644	1672		127			28	9	19	1644	1669		126			25	9	16	1644	1673		127			29	9	20	1653
177	bdm9	1643	1668		131			25	10	15	1643	1670		132			27	10	17	1643	1667		132			24	10	14	1643	1670		132			27	10	17	1653
178	**Combine HINTON**	**1617**	**1636**	**47.5**	**n=2 A= 47.5%(A**			**19**	**3**	**16**	**1617**	**1637**	**50.3**				**20**	**3**	**17**	**1617**	**1635**	**41.8**	**n=2 A= 41.8%(**			**18**	**3**	**15**	**1618**	**1637**	**52.9**				**19**	**2**	**17**	**1620**
178	bhf12	1618	1647		103			29	2	27	1619	1648		103			29	1	28	1618	1646		102			28	2	26	1619	1648		103			29	1	28	1620
178	bhf3	1598	1630		34			32	22	10	1598	1631		36.6			33	22	11	1598	1628		28.6			30	22	8	1599	1632		39.3			33	21	12	1620
179	**Combine SEAHENGE**	**-2057**	**-2048**	**16.3**	**n=7 A= 16.3%(A**			**9**	**9**	**0**	**-2057**	**-2047**	**19.3**	**n=7 A= 19.3%(**			**10**	**9**	**1**	**-2057**	**-2048**	**13.6**	**n=7 A= 13.6%(**			**9**	**9**	**0**	**-2057**	**-2047**	**20.5**	**FAILED**	**n=7 A:**		**10**	**9**	**1**	**-2048**
179	**Combine SEAHENGE**	**-2059**	**-2046**	**98**				**13**	**11**	**2**	**-2056**	**-2044**	**87.4**				**12**	**8**	**4**	**-2059**	**-2047**	**92.8**				**12**	**11**	**1**	**-2056**	**-2045**	**69.4**				**11**	**8**	**3**	**-2048**
179	**Combine SEAHENGE**										**-2055**	**-2042**	**110**				**13**	**7**	**6**										**-2055**	**-2043**	**87.2**				**12**	**7**	**5**	**-2048**
179	hns10a	-2058	-2027		97.8	94.5		31	10	21	-2058	-2025		99.2	120	126	33	10	23	-2058	-2028		96	91.9		30	10	20	-2058	-2024		94.8	108	117	34	10	24	-2048
179	hns12a	-2061	-2038		131	124		23	13	10	-2061	-2037		132	120	109	24	13	11	-2061	-2040		132	124		21	13	8	-2061	-2037		130	123	114	24	13	11	-2048
179	hns27	-2093	-2064		2.5			29	45	-16	-2092	-2062		3.3			30	44	-14	-2092	-2065		2			27	44	-17	-2092	-2061		3.6			31	44	-13	-2048
179	hns31	-2076	-2045		52.6			31	28	3	-2076	-2043		55.6			33	28	5	-2076	-2046		46.7			30	28	2	-2076	-2042		60.7	53.5		34	28	6	-2048
179	hns35a	-2067	-2039		115	113		28	19	9	-2067	-2037		116	97	85.7	30	19	11	-2067	-2039		116	115		28	19	9	-2066	-2036		121	111	102	30	18	12	-2048
179	hns46a	-2056	-2024		58.6			32	8	24	-2055	-2023		61.3	90.1	104	32	7	25	-2056	-2026		57.3			30	8	22	-2055	-2022		60.7	76.4	89.2	33	7	26	-2048
179	hns64a	-2073	-2042		71.8	72.7		31	25	6	-2073	-2041		74.7	58.9		32	25	7	-2073	-2044		63.9	65.7		29	25	4	-2072	-2041		76.6	67.8	60.7	31	24	7	-2048
180	**Combine CATHERTON**	**1480**	**1492**	**92.6**				**12**	**6**	**6**	**1480**	**1493**	**96.5**				**13**	**6**	**7**	**1480**	**1492**	**94**				**12**	**6**	**6**	**1480**	**1493**	**99.9**				**13**	**6**	**7**	**1486**
180	cath1	1481	1504		97.3			23	5	18	1481	1506		98.9			25	5	20	1481	1503		97.3			22	5	17	1481	1505		100			24	5	19	1486
180	cath2	1472	1500		118			28	12	16	1472	1502		119			30	12	18	1472	1499		114			27	12	15	1473	1502		120			29	11	18	1484
180	cath3	1472	1493		76.4			21	13	8	1472	1494		79.8			22	13	9	1472	1493		80.8			21	13	8	1472	1495		82.7			23	13	10	1485
181	**Combine HUMPHRESTON**	**1469**	**1485**	**116**				**16**	**7**	**9**	**1470**	**1486**	**117**				**16**	**6**	**10**	**1469**	**1484**	**117**				**15**	**7**	**8**	**1470**	**1486**	**115**				**16**	**6**	**10**	**1476**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
181	hh12	1466	1487		106			21	10	11	1467	1489		107			22	9	13	1466	1487		107			21	10	11	1467	1488		105			21	9	12	1476
181	hh18	1468	1497		117			29	8	21	1469	1498		117			29	7	22	1468	1495		117			27	8	19	1469	1498		116			29	7	22	1476
182	**Combine ISAACLORD**	**1629**	**1646**	**125**				**17**	**6**	**11**	**1629**	**1648**	**126**				**19**	**6**	**13**	**1629**	**1646**	**126**				**17**	**6**	**11**	**1630**	**1648**	**126**				**18**	**5**	**13**	**1635**
182	ili12	1627	1653		119			26	8	18	1627	1655		119			28	8	20	1627	1653		119			26	8	18	1627	1656		119			29	8	21	1635
182	ili16	1627	1652		116			25	8	17	1627	1654		116			27	8	19	1627	1651		116			24	8	16	1628	1654		116			26	7	19	1635
183	**Combine ACTONCT1**	**1527**	**1545**	**124**				**18**	**8**	**10**	**1527**	**1547**	**125**				**20**	**8**	**12**	**1527**	**1544**	**123**				**17**	**8**	**9**	**1527**	**1547**	**123**				**20**	**8**	**12**	**1535**
183	a05	1523	1552		117			29	12	17	1524	1553		117			29	11	18	1523	1550		115			27	12	15	1524	1553		115			29	11	18	1535
183	a07	1525	1554		117			29	10	19	1526	1555		117			29	9	20	1525	1553		117			28	10	18	1526	1556		117			30	9	21	1535
184	**Combine ACTONCT2**	**1561**	**1578**	**144**				**17**	**0**	**17**	**1562**	**1578**	**144**				**16**	**-1**	**17**	**1561**	**1576**	**144**				**15**	**0**	**15**	**1562**	**1578**	**145**				**16**	**-1**	**17**	**1561**
184	a23	1558	1590		124			32	3	29	1559	1591		125			32	2	30	1558	1587		125			29	3	26	1559	1591		125			32	2	30	1561
184	a24	1558	1588		125			30	3	27	1558	1590		125			32	3	29	1558	1585		125			27	3	24	1558	1589		125			31	3	28	1561
184	a25	1556	1585		121			29	4	25	1556	1587		122			31	4	27	1556	1584		122			28	4	24	1556	1588		122			32	4	28	1560
185	**Combine IGHTHAM**	**1599**	**1622**	**122**				**23**	**14**	**9**	**1600**	**1622**	**123**				**22**	**13**	**9**	**1599**	**1620**	**122**				**21**	**14**	**7**	**1601**	**1624**	**124**				**23**	**12**	**11**	**1613**
185	KIM-R03	1599	1630		114			31	14	17	1599	1632		114			33	14	19	1599	1628		114			29	14	15	1599	1633		115			34	14	20	1613
185	KIM-R04	1594	1629		116			35	18	17	1594	1631		117			37	18	19	1594	1627		116			33	18	15	1595	1632		118			37	17	20	1612
186	**Combine KIMPTON1**	**1439**	**1452**	**140**				**13**	**6**	**7**	**1439**	**1453**	**142**				**14**	**6**	**8**	**1439**	**1452**	**138**				**13**	**6**	**7**	**1440**	**1453**	**141**				**13**	**5**	**8**	**1445**
186	kim10	1435	1458		120			23	10	13	1435	1460		121			25	10	15	1435	1458		120			23	10	13	1436	1459		120			23	9	14	1445
186	kim8	1433	1462		127			29	12	17	1434	1463		127			29	11	18	1433	1460		125			27	12	15	1434	1463		128			29	11	18	1445
186	kim9	1438	1461		118			23	7	16	1438	1463		119			25	7	18	1438	1461		117			23	7	16	1439	1463		118			24	6	18	1445
187	**Combine KIMPTON2**	**1534**	**1548**	**126**				**14**	**1**	**13**	**1534**	**1549**	**127**				**15**	**1**	**14**	**1534**	**1547**	**126**				**13**	**1**	**12**	**1534**	**1549**	**127**				**15**	**1**	**14**	**1535**
187	kim11	1531	1554		121			23	4	19	1531	1556		121			25	4	21	1531	1554		121			23	4	19	1532	1555		121			23	3	20	1535
187	kim12	1533	1552		114			19	2	17	1533	1554		115			21	2	19	1533	1552		115			19	2	17	1533	1554		115			21	2	19	1535
188	**Combine MARRIOTS**	**1575**	**1593**	**57.8**				**18**	**8**	**10**	**1575**	**1594**	**60.7**				**19**	**8**	**11**	**1575**	**1592**	**54.2**				**17**	**8**	**9**	**1575**	**1594**	**59.4**				**19**	**8**	**11**	**1583**
188	mar14	1563	1588		46.5			25	19	6	1563	1590		49.2			27	19	8	1563	1587		42.6			24	19	5	1563	1589		48.1			26	19	7	1582
188	mar16	1577	1606		99.2			29	6	23	1577	1607		100			30	6	24	1576	1604		98.6			28	7	21	1577	1607		99.7			30	6	24	1583
189	**Combine KINGSOMBORNE**	**1501**	**1515**	**106**				**14**	**3**	**11**	**1501**	**1516**	**109**				**15**	**3**	**12**	**1500**	**1514**	**95.9**				**14**	**4**	**10**	**1502**	**1517**	**109**				**15**	**2**	**13**	**1504**
189	ksm1	1502	1534		90.2			32	2	30	1502	1536		91.6			34	2	32	1502	1533		85.1			31	2	29	1503	1537		91.1			34	1	33	1504
189	ksm2	1493	1525		120			32	11	21	1494	1526		121			32	10	22	1493	1522		118			29	11	18	1494	1526		119			32	10	22	1504
189	ksm5	1491	1525		116			34	13	21	1492	1526		117			34	12	22	1491	1523		116			32	13	19	1492	1528		120			36	12	24	1504
189	ksm7	1486	1522		89.1			36	18	18	1486	1524		91.2			38	18	20	1486	1519		79.4			33	18	15	1487	1524		91.7			37	17	20	1504
190	**Combine SWANNINN**	**1446**	**1458**	**33.4 n=3 A= 33.4%(A**				**12**	**3**	**9**	**1446**	**1460**	**37.5 n=3 A= 37.5%(**				**14**	**3**	**11**	**1446**	**1458**	**30 n=3 A= 30.0%(Ar**				**12**	**3**	**9**	**1446**	**1460**	**32.8 FAILED AE75n**				**14**	**3**	**11**	**1449**
190	**Combine SWANNINN**	**1447**	**1464**	**109**				**17**	**2**	**15**	**1448**	**1465**	**110**				**17**	**1**	**16**	**1447**	**1464**	**108**				**17**	**2**	**15**	**1448**	**1465**	**109**				**17**	**1**	**16**	**1449**
190	shk1	1431	1450		13.8			19	17	2	1431	1452		16.3			21	17	4	1431	1450		11.5			19	17	2	1431	1451		13.2			20	17	3	1448
190	shk3	1447	1474		85.4	111		27	1	26	1448	1475		89.9	112		27	0	27	1447	1473		87.3	111		26	1	25	1448	1475		87.9	112		27	0	27	1448
190	shk7	1442	1466		126	101		24	7	17	1442	1468		125	103		26	7	19	1442	1465		124	99.9		23	7	16	1442	1468		125	102		26	7	19	1449
191	**Combine HERGEST1**	**1259**	**1278**	**95.9**				**19**	**8**	**11**	**1260**	**1279**	**97.8**				**19**	**7**	**12**	**1259**	**1277**	**90.8**				**18**	**8**	**10**	**1260**	**1279**	**97.6**				**19**	**7**	**12**	**1267**
191	hc13	1260	1288		108			28	7	21	1260	1290		109			30	7	23	1260	1286		107			26	7	19	1261	1289		109			28	6	22	1267
191	hc24	1250	1279		87.2			29	17	12	1250	1281		89.1			31	17	14	1250	1278		81.4			28	17	11	1250	1281		89.1			31	17	14	1267
192	**Combine HERGEST3**	**1663**	**1675**	**32**				**12**	**3**	**9**	**1664**	**1675**	**35.6**				**11**	**2**	**9**	**1663**	**1674**	**24 n=5 A= 24.0%(Ar**				**11**	**3**	**8**	**1664**	**1676**	**37**				**12**	**2**	**10**	**1666**
192	**Combine HERGEST3**	**1665**	**1681**	**95.5**				**16**	**1**	**15**	**1665**	**1682**	**98.5**				**17**	**1**	**16**	**1656**	**1676**	**126**				**20**	**10**	**10**	**1666**	**1682**	**99.1**				**16**	**0**	**16**	**1666**
192	hc27	1653	1686		120	93.5		33	13	20	1653	1688		122	95.7		35	13	22	1653	1684		116	119		31	13	18	1654	1688		125	98.6		34	12	22	1666
192	hc28	1655	1686		125	98.5		31	11	20	1655	1687		126	101		32	11	21	1654	1684		119	116		30	12	18	1655	1688		126	98.9		33	11	22	1666
192	hc4	1651	1674		50.2			23	15	8	1651	1676		54.3			25	15	10	1651	1673		45.3			22	15	7	1651	1675		49.3			24	15	9	1666
192	hc5a	1630	1669		17.1			39	36	3	1631	1670		19			39	35	4	1630	1666		12.1			36	36	0	1631	1673		22.9			42	35	7	1666
192	hc8	1666	1694		60.2	100		28	-1	29	1666	1696		62.3	101		30	-1	31	1666	1693		54.1			27	-1	28	1667	1696		61.4	101		29	-2	31	1665
193	**Combine HERGEST4**	**1658**	**1677**	**31.4 n=2 A= 31.4%(A**				**19**	**8**	**11**	**1658**	**1679**	**34.1 n=2 A= 34.1%(A**				**21**	**8**	**13**	**1658**	**1676**	**26.6 n=2 A= 26.6%(**				**18**	**8**	**10**	**1659**	**1679**	**35.6 FAILED n=2 A**				**20**	**7**	**13**	**1666**
193	hc11	1660	1689		100			29	6	23	1660	1691		101			31	6	25	1660	1687		99.6			27	6	21	1660	1691		101			31	6	25	1666
193	hc18	1635	1667		19.4			32	31	1	1636	1668		21.6			32	30	2	1635	1665		15.5			30	31	-1	1636	1669		23			33	30	3	1666

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	AS from	AS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	BS from	BS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	CS from	CS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
194	**Combine LATTON**	**1454**	**1470**	**100**				**16**	**11**	**5**	**1454**	**1471**	**102**				**17**	**11**	**6**	**1454**	**1469**	**98**				**15**	**11**	**4**	**1454**	**1471**	**101**				**17**	**11**	**6**	**1465**
194	lat1	1447	1471		91.9			24	18	6	1447	1473		93.9			26	18	8	1447	1470		89.7			23	18	5	1447	1473		93.3			26	18	8	1465
194	lat8	1454	1479		109			25	10	15	1454	1481		110			27	10	17	1454	1478		108			24	10	14	1454	1481		109			27	10	17	1464
195	**Combine LEOMINSTER**	**1491**	**1502**	**149**				**11**	**9**	**2**	**1491**	**1503**	**152**				**12**	**9**	**3**	**1490**	**1501**	**146**				**11**	**10**	**1**	**1491**	**1504**	**149**				**13**	**9**	**4**	**1500**
195	gbl1	1483	1512		123			29	16	13	1484	1513		124			29	15	14	1483	1510		122			27	16	11	1484	1513		124			29	15	14	1499
195	gbl2	1489	1516		120			27	10	17	1489	1518		121			29	10	19	1489	1514		120			25	10	15	1489	1518		123			29	10	19	1499
195	gbl3	1485	1513		130			28	14	14	1485	1515		131			30	14	16	1485	1511		131			26	14	12	1486	1515		131			29	13	16	1499
195	gbl5	1482	1508		105			26	17	9	1482	1510		107			28	17	11	1482	1507		102			25	17	8	1482	1510		105			28	17	11	1499
195	gbl6	1488	1521		121			33	12	21	1488	1523		121			35	12	23	1488	1519		119			31	12	19	1489	1523		117			34	11	23	1500
196	**Combine LYSS**	**1543**	**1552**	**117**				**9**	**-1**	**10**	**1543**	**1552**	**122**				**9**	**-1**	**10**	**1542**	**1551**	**104**				**9**	**0**	**9**	**1543**	**1552**	**127**				**9**	**-1**	**10**	**1542**
196	lyss1	1541	1562		124			21	1	20	1541	1564		125			23	1	22	1541	1562		123			21	1	20	1541	1563		126			22	1	21	1542
196	lyss2	1541	1567		108			26	1	25	1542	1569		110			27	0	27	1541	1566		107			25	1	24	1542	1568		108			26	0	26	1542
196	lyss34	1539	1562		132			23	3	20	1539	1563		133			24	3	21	1539	1560		133			21	3	18	1539	1563		133			24	3	21	1542
196	lyss5	1537	1560		128			23	5	18	1537	1562		129			25	5	20	1537	1560		129			23	5	18	1537	1562		129			25	5	20	1542
196	lyss678	1525	1558		71.8			33	16	17	1525	1560		74.9			35	16	19	1525	1555		60.7			30	16	14	1526	1560		78.8			34	15	19	1541
196	lyss9	1528	1560		89.2			32	14	18	1528	1561		91.9			33	14	19	1528	1558		81.1			30	14	16	1528	1562		97.7			34	14	20	1542
197	**Combine LAWNSFM**	**1545**	**1567**	**63.9**				**22**	**3**	**19**	**1545**	**1568**	**66.2**				**23**	**3**	**20**	**1545**	**1565**	**58.1**				**20**	**3**	**17**	**1546**	**1569**	**68.8**				**23**	**2**	**21**	**1548**
197	lwn03	1528	1563		51.4			35	20	15	1528	1565		53.7			37	20	17	1528	1560		45.4			32	20	12	1529	1566		56.7			37	19	18	1548
197	lwn06	1546	1580		103			34	2	32	1547	1582		104			35	1	34	1546	1578		102			32	2	30	1547	1583		104			36	1	35	1548
198	**Combine LITTLEWYM**	**1536**	**1544**	**42.1**				**8**	**4**	**4**	**1537**	**1544**	**49.7**				**7**	**3**	**4**	**1536**	**1543**	**40**				**7**	**4**	**3**	**1537**	**1545**	**49**				**8**	**3**	**5**	**1540**
198	**Combine LITTLEWYM**	**1537**	**1545**	**147**				**8**	**3**	**5**	**1537**	**1545**	**154**				**8**	**3**	**5**	**1537**	**1544**	**147**				**7**	**3**	**4**	**1537**	**1546**	**160**				**9**	**3**	**6**	**1540**
198	lwy01	1532	1556		136	136		24	8	16	1532	1558		137	137		26	8	18	1532	1555		137	137		23	8	15	1532	1558		137	137		26	8	18	1540
198	lwy04	1532	1555		137	136		23	8	15	1532	1557		138	136		25	8	17	1532	1555		137	136		23	8	15	1532	1557		137	136		25	8	17	1540
198	lwy06	1535	1561		94.8	107		26	5	21	1536	1562		98.2	109		26	4	22	1535	1560		95.7	107		25	5	20	1536	1562		98.9	110		26	4	22	1540
198	lwy07	1535	1558		109	119		23	5	18	1535	1560		112	121		25	5	20	1535	1558		110	120		23	5	18	1535	1560		114	123		25	5	20	1540
198	lwy12	1531	1556		138	136		25	9	16	1531	1558		138	137		27	9	18	1531	1555		138	136		24	9	15	1531	1558		138	136		27	9	18	1540
198	lwy17	1508	1531		2.5			23	32	-9	1508	1533		3.6			25	32	-7	1507	1530		2.1			23	33	-10	1508	1532		3.1			24	32	-8	1540
198	lwy25	1531	1558		138	138		27	9	18	1531	1560		138	138		29	9	20	1531	1558		137	138		27	9	18	1532	1561		136	138		29	8	21	1540
198	lwy26	1525	1549		81.9	73.3		24	15	9	1525	1550		84.6	76.6		25	15	10	1525	1549		82.9	75.2		24	15	9	1525	1551		89.1	80.9		26	15	11	1540
198	lwy30	1524	1552		100	92.1		28	16	12	1524	1554		102	94.8		30	16	14	1524	1551		96.1	88.9		27	16	11	1525	1554		107	99.2		29	15	14	1540
199	**Combine TYDRAW1**	**1470**	**1485**	**118**				**15**	**10**	**5**	**1470**	**1487**	**119**				**17**	**10**	**7**	**1470**	**1485**	**119**				**15**	**10**	**5**	**1470**	**1487**	**118**				**17**	**10**	**7**	**1480**
199	tdm3	1467	1488		109			21	13	8	1467	1490		110			23	13	10	1467	1488		110			21	13	8	1467	1490		109			23	13	10	1480
199	tdm7	1469	1495		116			26	8	18	1469	1496		117			27	8	19	1469	1494		116			25	8	17	1470	1496		116			26	7	19	1477
200	**Combine TYDRAW2**	**1631**	**1651**	**117**				**20**	**11**	**9**	**1631**	**1652**	**118**				**21**	**11**	**10**	**1630**	**1650**	**117**				**20**	**12**	**8**	**1631**	**1653**	**119**				**22**	**11**	**11**	**1642**
200	tdm1	1625	1656		111			31	16	15	1625	1657		111			32	16	16	1624	1654		110			30	17	13	1625	1659		112			34	16	18	1641
200	tdm2	1630	1661		113			31	12	19	1630	1662		114			32	12	20	1630	1659		113			29	12	17	1631	1662		114			31	11	20	1642
201	**Combine ABERGLASNEY**	**1769**	**1778**	**177**				**9**	**2**	**7**	**1769**	**1779**	**181**				**10**	**2**	**8**	**1769**	**1777**	**177**				**8**	**2**	**6**	**1769**	**1779**	**183**				**10**	**2**	**8**	**1771**
201	abg1	1766	1789		132			23	5	18	1766	1791		133			25	5	20	1765	1788		132			23	6	17	1766	1790		133			24	5	19	1771
201	abg2	1768	1791		113			23	3	20	1768	1793		115			25	3	22	1768	1790		113			22	3	19	1768	1792		116			24	3	21	1771
201	abg3	1761	1787		124			26	10	16	1762	1789		125			27	9	18	1761	1786		123			25	10	15	1762	1788		126			26	9	17	1771
201	abg4	1763	1786		126			23	8	15	1763	1788		127			25	8	17	1763	1785		125			22	8	14	1763	1787		126			24	8	16	1771
201	abg5	1764	1789		135			25	7	18	1764	1791		135			27	7	20	1764	1788		135			24	7	17	1765	1791		135			26	6	20	1771
201	abg6	1762	1788		130			26	9	17	1762	1790		131			28	9	19	1762	1787		129			25	9	16	1762	1790		132			28	9	19	1771
202	**Combine ABERDEUNANT**	**1788**	**1799**	**51.4**				**11**	**8**	**3**	**1789**	**1799**	**56.4**				**10**	**7**	**3**	**1788**	**1798**	**47.8**				**10**	**8**	**2**	**1789**	**1799**	**56.3**				**10**	**7**	**3**	**1796**
202	**Combine ABERDEUNANT**	**1789**	**1801**	**80.6**				**12**	**7**	**5**	**1789**	**1802**	**84.8**				**13**	**7**	**6**	**1789**	**1800**	**79.3**				**11**	**7**	**4**	**1789**	**1802**	**84**				**13**	**7**	**6**	**1796**
202	**Combine ABERDEUNANT**	**1790**	**1805**	**112**				**15**	**6**	**9**										**1790**	**1804**	**112**				**14**	**6**	**8**										**1796**
202	abr11	1773	1797		36.5			24	21	3	1773	1799		40.2			26	21	5	1773	1796		32.4			23	21	2	1773	1799		40.8			26	21	5	1794
202	abr13	1790	1813		80.3	99	113	23	4	19	1790	1815		83	101		25	4	21	1790	1813		79.1	98.3	113	23	4	19	1790	1815		81.5	99.5		25	4	21	1794

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
202	abr14	1779	1800		70.1	56.5		21	15	6	1779	1802		74	60.3		23	15	8	1779	1800		69.1	55.4		21	15	6	1779	1802		74.1	60.4		23	15	8	1794
202	abr17	1786	1807		128	123	105	21	10	11	1786	1809		129	124		23	10	13	1786	1806		129	123	104	20	10	10	1786	1808		129	123		22	10	12	1796
203	**Combine LLWYN**	**1546**	**1557**	**121**				**11**	**6**	**5**	**1546**	**1558**	**125**				**12**	**6**	**6**	**1546**	**1556**	**114**				**10**	**6**	**4**	**1547**	**1558**	**128**				**11**	**5**	**6**	**1552**
203	**Combine LLWYN**																			**1546**	**1558**	**151**				**12**	**6**	**6**										**1552**
203	llyn1	1545	1571		114			26	7	19	1545	1572		115			27	7	20	1545	1569		112	120		24	7	17	1546	1572		117			26	6	20	1552
203	llyn2	1539	1568		127			29	13	16	1539	1569		128			30	13	17	1539	1566		126	117		27	13	14	1539	1570		128			31	13	18	1552
203	llyn3	1543	1571		127			28	9	19	1544	1573		127			29	8	21	1543	1570		127	129		27	9	18	1544	1573		127			29	8	21	1552
203	llyn4	1530	1561		64			31	19	12	1530	1562		66.9			32	19	13	1530	1558		56.7			28	19	9	1531	1562		68.7			31	18	13	1549
203	llyn5	1540	1569		132			29	12	17	1541	1570		132			29	11	18	1540	1567		132	126		27	12	15	1541	1570		133			29	11	18	1552
204	**Combine LLANDLOES**	**1573**	**1595**	**125**				**22**	**21**	**1**	**1573**	**1597**	**125**				**24**	**21**	**3**	**1573**	**1593**	**125**				**20**	**21**	**-1**	**1574**	**1597**	**126**				**23**	**20**	**3**	**1594**
204	lnyc21	1568	1604		119			36	25	11	1569	1606		119			37	24	13	1568	1602		120			34	25	9	1569	1608		120			39	24	15	1593
204	lnyc24	1572	1603		115			31	22	9	1572	1605		115			33	22	11	1571	1601		115			30	23	7	1572	1605		115			33	22	11	1594
205	**Combine TUHWNT1**	**1598**	**1619**	**16 n=2 A= 16.0%(An**				**21**	**14**	**7**	**1599**	**1620**	**18.3**	**n=2 A= 18.3%(**			**21**	**13**	**8**	**1598**	**1618**	**14.3**	**n=2 A= 14.3%(**			**20**	**14**	**6**	**1599**	**1621**	**17.2**	**FAILED**	**n=2 A**		**22**	**13**	**9**	**1612**
205	thg4	1601	1637		86.4			36	10	26	1602	1639		89.5			37	9	28	1601	1634		88.9			33	10	23	1602	1640		87.9			38	9	29	1611
205	thg8	1577	1603		8.7			26	35	-9	1577	1604		10.1			27	35	-8	1577	1602		7.2			25	35	-10	1578	1604		9.4			26	34	-8	1612
206	**Combine TUHWNT2**	**1623**	**1643**	**60.1**				**20**	**25**	**-5**	**1623**	**1644**	**62.7**				**21**	**25**	**-4**	**1623**	**1642**	**50.6**				**19**	**25**	**-6**	**1624**	**1645**	**59.7**				**21**	**24**	**-3**	**1648**
206	thg1	1607	1639		47.6			32	41	-9	1608	1640		50.2			32	40	-8	1607	1636		38.1			29	41	-12	1608	1640		47.3			32	40	-8	1648
206	thg3	1624	1655		102			31	24	7	1625	1657		103			32	23	9	1624	1654		100			30	24	6	1625	1658		102			33	23	10	1648
207	**Combine HAFOD**	**1423**	**1433**	**123**				**10**	**9**	**1**	**1424**	**1434**	**128**				**10**	**8**	**2**	**1423**	**1433**	**121**				**10**	**9**	**1**	**1424**	**1434**	**126**				**10**	**8**	**2**	**1432**
207	hfd1	1419	1446		135			27	12	15	1419	1448		135			29	12	17	1419	1445		135			26	12	14	1419	1448		135			29	12	17	1431
207	hfd2	1424	1453		73.4			29	6	23	1425	1455		76			30	5	25	1424	1452		70.7			28	6	22	1425	1455		74.2			30	5	25	1430
207	hfd3	1416	1441		120			25	16	9	1416	1443		122			27	16	11	1416	1441		120			25	16	9	1417	1443		122			26	15	11	1432
207	hfd4	1419	1445		135			26	12	14	1419	1446		135			27	12	15	1419	1444		135			25	12	13	1419	1447		135			28	12	16	1431
207	hfd5	1415	1439		101			24	17	7	1415	1440		103			25	17	8	1415	1438		102			23	17	6	1415	1441		104			26	17	9	1432
207	hfd6	1415	1439		102			24	17	7	1416	1440		105			24	16	8	1415	1438		101			23	17	6	1416	1440		102			24	16	8	1432
208	**Combine TYDDYNCYNNAR1**	**1457**	**1473**	**129**				**16**	**15**	**1**	**1457**	**1474**	**130**				**17**	**15**	**2**	**1457**	**1472**	**126**				**15**	**15**	**0**	**1458**	**1474**	**128**				**16**	**14**	**2**	**1472**
208	tydc1	1450	1479		114			29	21	8	1451	1481		115			30	20	10	1450	1478		112			28	21	7	1451	1481		114			30	20	10	1471
208	tydc23	1456	1488		113			32	16	16	1457	1489		113			32	15	17	1456	1486		111			30	16	14	1457	1490		112			33	15	18	1472
208	tydc4	1452	1481		121			29	18	11	1452	1482		122			30	18	12	1452	1479		121			27	18	9	1452	1483		121			31	18	13	1470
209	**Combine TYDDYNCYNNAR2**	**1594**	**1614**	**108**				**20**	**16**	**4**	**1595**	**1614**	**109**				**19**	**15**	**4**	**1594**	**1612**	**106**				**18**	**16**	**2**	**1595**	**1614**	**110**				**19**	**15**	**4**	**1610**
209	tydc12	1587	1616		100			29	22	7	1587	1618		102			31	22	9	1587	1614		98.2			27	22	5	1587	1618		103			31	22	9	1609
209	tydc13	1594	1623		111			29	16	13	1595	1625		111			30	15	15	1594	1621		110			27	16	11	1595	1624		111			29	15	14	1610
210	**Combine STPETERS**	**289**	**296**	**90.9**				**7**	**5**	**2**	**290**	**296**	**99.9**				**6**	**4**	**2**	**289**	**296**	**83.4**				**7**	**5**	**2**	**290**	**297**	**95.2**				**7**	**4**	**3**	**294**
210	**Combine STPETERS**	**288**	**295**	**145**				**7**	**6**	**1**	**289**	**296**	**154**				**7**	**5**	**2**	**288**	**295**	**142**				**7**	**6**	**1**	**289**	**297**	**148**				**8**	**5**	**3**	**294**
210	**Combine STPETERS**	**287**	**294**	**192**				**7**	**7**	**0**	**288**	**295**	**200**				**7**	**6**	**1**	**287**	**294**	**188**				**7**	**7**	**0**	**288**	**295**	**193**				**7**	**6**	**1**	**294**
210	pet1297	272	299		48.1			27	22	5	272	301		51.6			29	22	7	272	298		44			26	22	4	273	301		53.8			28	21	7	294
210	pet1304	278	302		87.8	96.9	110	24	15	9	279	303		91.1	99.7	113	24	14	10	279	301		86.1	96	110	22	14	8	279	303		89.1	98.1	111	24	14	10	293
210	pet1307	289	320		65.6	53.7		31	4	27	289	321		68.1	56.6		32	4	28	289	318		65.8	52.9		29	4	25	290	322		66.9	55.1		32	3	29	293
210	pet1350	277	301		74.2	83	96.9	24	16	8	278	302		77.8	86.3	99.6	24	15	9	277	300		70.1	79.6	93.8	23	16	7	278	302		73.7	82.6	96.2	24	15	9	293
210	pet1367	282	309		138	139	137	27	11	16	283	310		139	140	137	27	10	17	283	308		139	140	137	25	10	15	283	311		139	140	137	28	10	18	293
210	pet1369	279	303		99.8	108	120	24	14	10	279	305		103	111	122	26	14	12	279	302		96.6	106	119	23	14	9	279	305		100	109	121	26	14	12	293
210	pet1467	283	308		138	139	135	25	10	15	283	310		139	139	136	27	10	17	283	307		139	139	135	24	10	14	284	310		139	139	136	26	9	17	293
210	pet1477	282	308		136	138	138	26	11	15	283	309		137	139	138	26	10	16	282	307		136	139	138	25	11	14	283	309		137	139	138	26	10	16	293
210	pet1484	285	311		135	127	112	26	8	18	285	312		136	129	114	27	8	19	285	310		135	127	111	25	8	17	286	312		136	129	115	26	7	19	293
210	pet1551	284	313		136	130	118	29	9	20	285	314		137	131	119	29	8	21	284	312		136	129	115	28	9	19	285	315		135	127	114	30	8	22	293
210	pet1558	281	304		116	123	132	23	12	11	281	306		118	125	133	25	12	13	281	304		116	124	133	23	12	11	281	306		117	124	133	25	12	13	293
210	pet1562	281	307		133	136	139	26	12	14	282	309		134	137	139	27	11	16	282	307		132	136	139	25	11	14	282	309		134	137	139	27	11	16	293
210	pet1569	290	319		47.1			29	3	26	291	320		50.3			29	2	27	291	318		42			27	2	25	291	322		46.9			31	2	29	293

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	B to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	C to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
211	**Combine SUNLIGHT**	**290**	**298**	**191**				**8**	**3**	**5**	**291**	**299**	**197**				**8**	**2**	**6**	**290**	**298**	**191**				**8**	**3**	**5**	**291**	**299**	**197**				**8**	**2**	**6**	**293**
211	sun543	288	311		124			23	5	18	288	312		125			24	5	19	288	311		122			23	5	18	289	312		127			23	4	19	293
211	**sun551**	287	313		128			26	6	20	287	314		129			27	6	21	287	312		127			25	6	19	288	314		129			26	5	21	293
211	**sun551b**	283	309		133			26	10	16	284	311		134			27	9	18	283	308		133			25	10	15	284	311		134			27	9	18	293
211	**sun552**	285	313		136			28	8	20	286	315		137			29	7	22	285	313		137			28	8	20	286	315		136			29	7	22	293
211	**sun554**	283	310		134			27	10	17	283	312		135			29	10	19	283	309		134			26	10	16	284	312		136			28	9	19	293
211	**sun555**	284	308		130			24	9	15	284	310		131			26	9	17	284	307		130			23	9	14	284	310		130			26	9	17	293
211	**sun557**	286	313		134			27	7	20	286	315		135			29	7	22	286	312		135			26	7	19	287	315		134			28	6	22	293
211	**sun642**	280	304		93.5			24	13	11	281	305		96.3			24	12	12	281	304		93.7			23	12	11	281	306		96.3			25	12	13	293
212	**Combine WHTOWER1**	**1484**	**1500**	**146**				**16**	**6**	**10**	**1484**	**1501**	**147**				**17**	**6**	**11**	**1484**	**1498**	**145**				**14**	**6**	**8**	**1485**	**1501**	**146**				**16**	**5**	**11**	**1490**
212	tol21	1479	1510		126			31	10	21	1479	1512		126			33	10	23	1478	1508		125			30	11	19	1479	1512		126			33	10	23	1489
212	tol24	1481	1510		124			29	9	20	1481	1511		125			30	9	21	1480	1508		124			28	10	18	1481	1511		124			30	9	21	1490
212	tol31	1481	1510		123			29	7	22	1482	1511		124			29	6	23	1481	1509		123			28	7	21	1482	1512		124			30	6	24	1488
213	**Combine WHTOWER3**	**1601**	**1609**	**126**				**8**	**2**	**6**	**1602**	**1610**	**133**				**8**	**1**	**7**	**1601**	**1609**	**117**				**8**	**2**	**6**	**1602**	**1610**	**134**				**8**	**1**	**7**	**1603**
213	tol1	1599	1618		130			19	4	15	1599	1620		131			21	4	17	1599	1618		129			19	4	15	1599	1620		132			21	4	17	1603
213	tol10	1598	1626		126			28	4	24	1598	1628		126			30	4	26	1598	1624		128			26	4	22	1598	1627		127			29	4	25	1602
213	tol11	1588	1614		69.7			26	15	11	1588	1615		73.2			27	15	12	1588	1613		65.4			25	15	10	1588	1616		74.9			28	15	13	1603
213	tol2	1601	1627		82.6			26	2	24	1602	1629		85.2			27	1	26	1601	1626		78.2			25	2	23	1602	1628		83.5			26	1	25	1603
213	**tol4**	1595	1622		137			27	8	19	1595	1624		137			29	8	21	1595	1620		137			25	8	17	1595	1624		138			29	8	21	1603
213	tol5	1591	1620		120			29	12	17	1591	1622		122			31	12	19	1591	1618		115			27	12	15	1591	1622		124			31	12	19	1603
213	tol51	1592	1615		96.8			23	10	13	1592	1617		99.9			25	10	15	1592	1614		93.4			22	10	12	1592	1616		97.3			24	10	14	1602
213	tol7	1592	1621		128			29	11	18	1593	1622		129			29	10	19	1592	1620		125			28	11	17	1593	1622		131			29	10	19	1603
214	**Combine WHTOWER4**	**1526**	**1542**	**144**				**16**	**7**	**9**	**1527**	**1543**	**144**				**16**	**6**	**10**	**1526**	**1541**	**143**				**15**	**7**	**8**	**1527**	**1544**	**144**				**17**	**6**	**11**	**1533**
214	tol82	1525	1551		121			26	7	19	1525	1553		122			28	7	21	1525	1550		121			25	7	18	1525	1554		122			29	7	22	1532
214	tol84	1521	1550		121			29	12	17	1521	1552		122			31	12	19	1521	1548		120			27	12	15	1521	1552		121			31	12	19	1533
214	tol87	1522	1554		127			32	10	22	1523	1555		128			32	9	23	1522	1552		128			30	10	20	1523	1557		128			34	9	25	1532
215	**Combine WHTOWER5**	**1780**	**1790**	**141**				**10**	**3**	**7**	**1780**	**1792**	**144**				**12**	**3**	**9**	**1780**	**1790**	**141**				**10**	**3**	**7**	**1780**	**1791**	**143**				**11**	**3**	**8**	**1783**
215	tol80	1778	1804		119			26	5	21	1779	1806		120			27	4	23	1778	1803		120			25	5	20	1779	1805		119			26	4	22	1783
215	tol85	1778	1799		126			21	5	16	1778	1801		127			23	5	18	1778	1799		127			21	5	16	1778	1801		127			23	5	18	1783
215	tol86	1773	1795		104			22	10	12	1773	1797		106			24	10	14	1773	1795		103			22	10	12	1773	1797		105			24	10	14	1783
215	tol88	1776	1798		127			22	7	15	1776	1800		128			24	7	17	1776	1798		128			22	7	15	1776	1800		128			24	7	17	1783
216	**Combine WHTOWER6**	**1778**	**1790**	**69.7**				**12**	**3**	**9**	**1779**	**1791**	**74.6**				**12**	**2**	**10**	**1778**	**1790**	**60**				**12**	**3**	**9**	**1779**	**1790**	**70**				**11**	**2**	**9**	**1781**
216	tol33	1770	1791		78.9			21	11	10	1770	1793		83			23	11	12	1770	1791		71.4			21	11	10	1770	1792		76.9			22	11	11	1781
216	tol34	1767	1792		73.8			25	14	11	1767	1794		77.7			27	14	13	1767	1791		66.2			24	14	10	1768	1794		77			26	13	13	1781
216	tol35	1780	1801		91.9			21	1	20	1780	1802		93.5			22	1	21	1780	1801		87.4			21	1	20	1780	1803		91			23	1	22	1781
217	**Combine WHTOWER8**	**1773**	**1792**	**125**				**19**	**7**	**12**	**1773**	**1794**	**125**				**21**	**7**	**14**	**1773**	**1791**	**125**				**18**	**7**	**11**	**1774**	**1794**	**125**				**20**	**6**	**14**	**1780**
217	tol19	1770	1799		117			29	9	20	1770	1800		117			30	9	21	1770	1797		117			27	9	18	1770	1801		117			31	9	22	1779
217	tol50	1771	1800		117			29	9	20	1772	1801		117			29	8	21	1771	1799		117			28	9	19	1772	1802		117			30	8	22	1780
218	**Combine WHTOWER9**	**1777**	**1787**	**15.1 n=5 A= 15.1%(A**				**10**	**4**	**6**	**1777**	**1788**	**18 n=5 A= 18.0%(Ar**				**11**	**4**	**7**	**1777**	**1786**	**12.5 n=5 A= 12.5%(**				**9**	**4**	**5**	**1778**	**1788**	**18 FAILED n=5 A=**				**10**	**3**	**7**	**1781**
218	**Combine WHTOWER9**	**1778**	**1789**	**147**				**11**	**3**	**8**	**1778**	**1790**	**149**				**12**	**3**	**9**	**1778**	**1788**	**146**				**10**	**3**	**7**	**1778**	**1790**	**150**				**12**	**3**	**9**	**1781**
218	tol43	1776	1800		110	120		24	5	19	1777	1801		111	121		24	4	20	1776	1799		108	119		23	5	18	1777	1801		111	121		24	4	20	1781
218	tol44	1735	1764		0.7			29	42	-13	1735	1765		1			30	42	-12	1735	1762		0.4			27	42	-15	1735	1766		1			31	42	-11	1777
218	tol46	1773	1799		132	130		26	7	19	1774	1800		133	130		26	6	20	1773	1798		133	130		25	7	18	1774	1800		133	130		26	6	20	1780
218	tol48	1774	1800		127	130		26	6	20	1775	1802		127	130		27	5	22	1774	1799		127	130		25	6	19	1775	1801		127	130		26	5	21	1780
218	tol49	1770	1795		119	107		25	11	14	1770	1797		121	109		27	11	16	1770	1794		118	105		24	11	13	1770	1797		121	109		27	11	16	1781
219	**Combine SPRINGHILL**	**1686**	**1719**	**117**				**33**	**12**	**21**	**1687**	**1719**	**118**				**32**	**11**	**21**	**1687**	**1717**	**116**				**30**	**11**	**19**	**1689**	**1725**	**121**				**36**	**9**	**27**	**1698**
219	q1043	1686	1732		112			46	11	35	1686	1734		113			48	11	37	1686	1731		112			45	11	34	1688	1740		114			52	9	43	1697

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
219	q1054	1676	1726		111			50	22	28	1676	1729		112			53	22	31	1676	1726		110			50	22	28	1678	1738		115			60	20	40	1698
220	**Combine SUMMERSFM**	**1421**	**1440**	**111**				**19**	**20**	**-1**	**1421**	**1442**	**112**				**21**	**20**	**1**	**1420**	**1439**	**109**				**19**	**21**	**-2**	**1421**	**1442**	**113**				**21**	**20**	**1**	**1441**
220	sfls16	1421	1450		111			29	20	9	1421	1452		112			31	20	11	1420	1448		111			28	21	7	1421	1452		112			31	20	11	1441
220	sfls78	1413	1445		104			32	28	4	1414	1446		105			32	27	5	1413	1442		102			29	28	1	1414	1446		106			32	27	5	1441
221	**Combine BREWERYFM**	**1482**	**1494**	**109**				**12**	**7**	**5**	**1482**	**1495**	**113**				**13**	**7**	**6**	**1481**	**1493**	**105**				**12**	**8**	**4**	**1483**	**1496**	**116**				**13**	**6**	**7**	**1489**
221	lng-c01a	1479	1510		126			31	8	23	1479	1512		126			33	8	25	1479	1508		126			29	8	21	1479	1513		126			34	8	26	1487
221	lng-c02a	1482	1513		97.5			31	7	24	1482	1515		99.1			33	7	26	1482	1512		94.8			30	7	23	1482	1516		99			34	7	27	1489
221	lng-c03a	1476	1504		127			28	10	18	1476	1506		128			30	10	20	1476	1502		127			26	10	16	1477	1505		126			28	9	19	1486
221	lng-c04a	1469	1504		108			35	19	16	1469	1506		110			37	19	18	1469	1502		103			33	19	14	1470	1507		114			37	18	19	1488
221	lng-c06a	1468	1497		72.4			29	20	9	1469	1499		75			30	19	11	1469	1496		71.9			27	19	8	1469	1500		78.1			31	19	12	1488
222	**Combine CORLEA**	**-152**	**-140**	**195**				**12**	**4**	**8**	**-151**	**-139**	**197**				**12**	**3**	**9**	**-152**	**-140**	**194**				**12**	**4**	**8**	**-150**	**-137**	**200**				**13**	**2**	**11**	**-148**
222	Q5631	-166	-122		128			44	18	26	-166	-120		128			46	18	28	-166	-124		124			42	18	24	-164	-116		133			48	16	32	-148
222	Q5634	-155	-117		119			38	7	31	-155	-115		120			40	7	33	-155	-120		121			35	7	28	-154	-113		122			41	6	35	-148
222	Q5635	-162	-128		121			34	14	20	-162	-127		122			35	14	21	-162	-129		121			33	14	19	-161	-124		123			37	13	24	-148
222	Q5639	-157	-120		133			37	9	28	-157	-119		133			38	9	29	-157	-122		132			35	9	26	-156	-115		132			41	8	33	-148
222	Q5640	-160	-122		136			38	12	26	-160	-120		137			40	12	28	-160	-123		137			37	12	25	-158	-117		137			41	10	31	-148
222	Q5642	-157	-129		129			28	9	19	-157	-127		130			30	9	21	-157	-129		131			28	9	19	-156	-127		127			29	8	21	-148
222	Q5645	-159	-122		136			37	11	26	-158	-121		136			37	10	27	-158	-124		136			34	10	24	-157	-118		136			39	9	30	-148
223	**Combine LWRCATESBY**	**1570**	**1589**	**87.4**				**19**	**9**	**10**	**1571**	**1590**	**89.6**				**19**	**8**	**11**	**1570**	**1588**	**81.8**				**18**	**9**	**9**	**1571**	**1590**	**91.1**				**19**	**8**	**11**	**1579**
223	pmc09	1571	1598		107			27	8	19	1571	1600		108			29	8	21	1571	1597		106			26	8	18	1572	1600		108			28	7	21	1579
223	pmc13	1558	1590		77.2			32	18	14	1559	1591		79.5			32	17	15	1558	1588		71			30	18	12	1559	1592		81.5			33	17	16	1576
224	**Combine ROMANS**	**1438**	**1453**	**125**				**15**	**4**	**11**	**1438**	**1454**	**126**				**16**	**4**	**12**	**1437**	**1453**	**126**				**16**	**5**	**11**	**1438**	**1454**	**126**				**16**	**4**	**12**	**1442**
224	rom01	1436	1460		118			24	5	19	1436	1462		119			26	5	21	1436	1459		119			23	5	18	1436	1462		119			26	5	21	1441
224	rom03	1435	1459		116			24	7	17	1436	1460		117			24	6	18	1435	1458		117			23	7	16	1436	1460		116			24	6	18	1442
225	**Combine KYA**	**1568**	**1576**	**136**				**8**	**1**	**7**	**1568**	**1577**	**142**				**9**	**1**	**8**	**1568**	**1576**	**132**				**8**	**1**	**7**	**1568**	**1577**	**116**				**9**	**1**	**8**	**1569**
225	**Combine KYA**	**1567**	**1575**	**104**				**8**	**2**	**6**	**1568**	**1576**	**111**				**8**	**1**	**7**	**1567**	**1575**	**99.9**				**8**	**2**	**6**	**1569**	**1577**	**147**				**8**	**0**	**8**	**1569**
225	kya1	1565	1589		126	130		24	4	20	1565	1591		127	131		26	4	22	1565	1588		125	130		23	4	19	1565	1591		128	132		26	4	22	1569
225	kya11	1566	1593		104	113		27	3	24	1566	1595		105	114		29	3	26	1566	1592		103	112		26	3	23	1567	1595		106	114		28	2	26	1569
225	kya2	1558	1585		116	109		27	11	16	1558	1587		118	111		29	11	18	1558	1584		116	109		26	11	15	1559	1587		121	114		28	10	18	1569
225	kya3	1566	1592		109	117		26	3	23	1566	1594		110	118		28	3	25	1566	1591		108	116		25	3	22	1566	1595		111	119		29	3	26	1569
225	kya4	1552	1577		46.1			25	17	8	1552	1579		49.6			27	17	10	1552	1577		44.9			25	17	8	1553	1579		51.4			26	16	10	1569
225	kya5	1560	1586		128	123		26	9	17	1560	1587		130	124		27	9	18	1560	1585		129	123		25	9	16	1560	1589		131	126		29	9	20	1569
225	kya6	1565	1591		126	131		26	4	22	1565	1592		127	131		27	4	23	1565	1590		126	131		25	4	21	1565	1592		127	132		27	4	23	1569
225	kya7	1558	1585		120	113		27	11	16	1558	1587		121	115		29	11	18	1558	1584		117	110		26	11	15	1559	1587		122	116		28	10	18	1569
225	kya8	1554	1581		76.9	70.4		27	15	12	1554	1583		80	73.5		29	15	14	1554	1580		72.9	66.6		26	15	11	1555	1583		82.1	75.6		28	14	14	1569
226	**Combine THEHOVEL**	**1799**	**1814**	**39.1**	**n=3 A= 39.1%(A**			**15**	**13**	**2**	**1800**	**1815**	**42.5**				**15**	**12**	**3**	**1799**	**1814**	**33.2**	**n=3 A= 33.2%(**			**15**	**13**	**2**	**1800**	**1816**	**45**				**16**	**12**	**4**	**1812**
226	**Combine THEHOVEL**										**1800**	**1820**	**58.8**				**20**	**12**	**8**										**1801**	**1822**	**61.2**				**21**	**11**	**10**	**1812**
226	hvl1	1801	1830		83.5			29	11	18	1802	1832		85	104		30	10	20	1802	1830		80.4			28	10	18	1802	1834		84.5	103		32	10	22	1812
226	hvl2	1781	1812		40.8			31	31	0	1781	1813		43.9			32	31	1	1781	1811		35.2			30	31	-1	1782	1814		46			32	30	2	1812
226	hvl3	1783	1815		57.7			32	29	3	1784	1816		60.8	45.5		32	28	4	1784	1813		52.2			29	28	1	1784	1818		64.6	48.3		34	28	6	1812
227	**Combine KINGST**	**1468**	**1482**	**142**				**14**	**7**	**7**	**1469**	**1482**	**144**				**13**	**6**	**7**	**1468**	**1481**	**141**				**13**	**7**	**6**	**1469**	**1482**	**143**				**13**	**6**	**7**	**1475**
227	ludg1	1463	1489		121			26	12	14	1463	1490		122			27	12	15	1463	1488		119			25	12	13	1463	1490		121			27	12	15	1475
227	ludg2	1467	1490		122			23	7	16	1467	1492		123			25	7	18	1466	1489		123			23	8	15	1467	1491		123			24	7	17	1474
227	ludg3	1466	1491		125			25	9	16	1466	1493		125			27	9	18	1466	1490		125			24	9	15	1466	1493		125			27	9	18	1475
228	**Combine BROADST**	**1445**	**1460**	**102**				**15**	**15**	**0**	**1446**	**1461**	**105**				**15**	**14**	**1**	**1445**	**1459**	**99**				**14**	**15**	**-1**	**1446**	**1461**	**106**				**15**	**14**	**1**	**1460**
228	ludi1	1433	1462		72.1			29	27	2	1434	1463		74.7			29	26	3	1433	1460		68.3			27	27	0	1434	1463		76.2			29	26	3	1460
228	ludi3	1443	1472		121			29	17	12	1444	1473		122			29	16	13	1443	1471		121			28	17	11	1444	1474		121			30	16	14	1460
228	ludi4	1444	1471		119			27	16	11	1444	1473		120			29	16	13	1444	1469		119			25	16	9	1444	1473		120			29	16	13	1460

Number	SITE & sample	A from	A to	Phase An	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase An	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase An	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase An	Sample	2nd test	3rd test	Range	beg range	end range	Real date
229	**Combine DEERPARK**	**624**	**649**	**124**				**25**	**25**	**0**	**625**	**650**	**124**				**25**	**24**	**1**	**624**	**648**	**124**				**24**	**25**	**-1**	**626**	**652**	**124**				**26**	**23**	**3**	**649**
229	| Q6833M	620	657		115			37	29	8	621	658		115			37	28	9	620	655		115			35	29	6	622	660		115			38	27	11	649
229	| Q6848	622	660		118			38	27	11	622	662		118			40	27	13	622	659		118			37	27	10	624	665		118			41	25	16	649
230	**Combine OVERTON**	**1606**	**1622**	**125**				**16**	**10**	**6**	**1606**	**1624**	**126**				**18**	**10**	**8**	**1606**	**1621**	**126**				**15**	**10**	**5**	**1606**	**1623**	**126**				**17**	**10**	**7**	**1616**
230	| ooh3	1603	1629		117			26	13	13	1603	1630		118			27	13	14	1603	1627		117			24	13	11	1603	1630		118			27	13	14	1616
230	| ooh4	1604	1629		117			25	12	13	1604	1631		118			27	12	15	1604	1628		118			24	12	12	1604	1631		118			27	12	15	1616
231	**Combine ASTLEY**	**1642**	**1655**	**89.2**				**13**	**8**	**5**	**1643**	**1655**	**93.2**				**12**	**7**	**5**	**1642**	**1654**	**83.8**				**12**	**8**	**4**	**1643**	**1656**	**91.4**				**13**	**7**	**6**	**1650**
231	| AST-B05A	1637	1660		115			23	12	11	1637	1662		116			25	12	13	1637	1659		115			22	12	10	1637	1661		113			24	12	12	1649
231	| AST-B13A	1634	1661		108			27	15	12	1635	1662		110			27	14	13	1634	1660		107			26	15	11	1635	1662		110			27	14	13	1649
231	| AST-B15A	1644	1674		75.7			30	5	25	1644	1676		77.8			32	5	27	1644	1673		72.8			29	5	24	1645	1676		75.1			31	4	27	1649
231	| AST-B16A	1630	1659		84.9			29	20	9	1630	1661		87.6			31	20	11	1630	1658		78.6			28	20	8	1631	1662		89.6			31	19	12	1650
232	**Combine AISLE**	**1735**	**1749**	**n=2 A= 46.2%(An= 9**				**14**	**5**	**9**	**1735**	**1751**	**49.9**	**n=2 A= 49.9%(A**			**16**	**5**	**11**	**1735**	**1749**	**42.6**	**n=2 A= 42.6%(A**			**14**	**5**	**9**	**1735**	**1751**	**49.6**	**n=2 A= 49.6%(A**			**16**	**5**	**11**	**1740**
232	| aisle3	1721	1744		33.1			23	19	4	1722	1746		36.5			24	18	6	1721	1744		29.7			23	19	4	1722	1746		36.3			24	18	6	1740
232	| aisle4	1736	1758		101			22	4	18	1736	1760		102			24	4	20	1736	1758		101			22	4	18	1736	1760		102			24	4	20	1740
233	**Combine BLAGRAVEFM**	**1804**	**1817**	**145**				**13**	**2**	**11**	**1804**	**1818**	**147**				**14**	**2**	**12**	**1804**	**1816**	**145**				**12**	**2**	**10**	**1805**	**1818**	**146**				**13**	**1**	**12**	**1806**
233	| blag1	1799	1825		125			26	6	20	1800	1826		125			26	5	21	1799	1824		124			25	6	19	1800	1826		125			26	5	21	1805
233	| blag4	1802	1825		123			23	4	19	1802	1826		124			24	4	20	1802	1824		123			22	4	18	1802	1826		123			24	4	20	1806
233	| blag5	1802	1825		125			23	4	19	1802	1827		125			25	4	21	1802	1825		125			23	4	19	1802	1827		125			25	4	21	1806
234	**Combine BOTTOMFM**	**1769**	**1783**	**156**				**14**	**6**	**8**	**1770**	**1784**	**157**				**14**	**5**	**9**	**1769**	**1782**	**157**				**13**	**6**	**7**	**1770**	**1785**	**157**				**15**	**5**	**10**	**1775**
234	| bfg2	1762	1791		119			29	13	16	1762	1793		120			31	13	18	1762	1790		119			28	13	15	1763	1794		121			31	12	19	1775
234	| bfg3	1766	1792		126			26	9	17	1766	1794		127			28	9	19	1766	1791		127			25	9	16	1766	1794		126			28	9	19	1775
234	| bfg45	1765	1796		130			31	10	21	1765	1797		130			32	10	22	1765	1794		130			29	10	19	1766	1798		130			32	9	23	1775
234	| bfg67	1766	1800		126			34	9	25	1767	1801		126			34	8	26	1766	1798		126			32	9	23	1767	1803		125			36	8	28	1775
235	**Combine CHAZEY1**	**1604**	**1612**	**116**				**8**	**6**	**2**	**1605**	**1613**	**123**				**8**	**5**	**3**	**1604**	**1612**	**109**				**8**	**6**	**2**	**1605**	**1613**	**124**				**8**	**5**	**3**	**1610**
235	**Combine CHAZEY1**																			**1604**	**1613**	**134**				**9**	**6**	**3**										**1610**
235	| chz1	1595	1621		114			26	14	12	1596	1622		116			26	13	13	1595	1620		110	102		25	14	11	1596	1622		114			26	13	13	1609
235	| chz10	1591	1615		60.2			24	19	5	1591	1617		64			26	19	7	1591	1614		57.7			23	19	4	1591	1617		64.6			26	19	7	1610
235	| chz2	1600	1623		136			23	10	13	1600	1625		137			25	10	15	1600	1623		137	135		23	10	13	1600	1625		137			25	10	15	1610
235	| chz3	1598	1621		127			23	12	11	1598	1623		129			25	12	13	1598	1621		128	122		23	12	11	1598	1623		129			25	12	13	1610
235	| chz5	1603	1628		105			25	7	18	1603	1630		106			27	7	20	1603	1628		101	111		25	7	18	1604	1630		105			26	6	20	1610
235	| chz7	1596	1624		132			28	14	14	1596	1626		133			30	14	16	1596	1623		131	125		27	14	13	1597	1626		134			29	13	16	1610
235	| chz8	1594	1621		110			27	15	12	1594	1623		113			29	15	14	1594	1619		105	97.7		25	15	10	1594	1623		113			29	15	14	1609
235	| chz9	1604	1630		84			26	5	21	1605	1631		86.6			26	4	22	1604	1629		83.2	94.8		25	5	20	1605	1631		88.7			26	4	22	1609
236	**Combine CHAZEY2**	**1609**	**1618**	**103**				**9**	**5**	**4**	**1609**	**1619**	**109**				**10**	**5**	**5**	**1609**	**1618**	**98**				**9**	**5**	**4**	**1609**	**1619**	**108**				**10**	**5**	**5**	**1614**
236	| chz14	1606	1630		130			24	7	17	1606	1632		130			26	7	19	1606	1629		130			23	7	16	1606	1631		130			25	7	18	1613
236	| chz15	1600	1623		93.2			23	13	10	1600	1625		96.2			25	13	12	1599	1622		90.1			23	14	9	1600	1624		95.4			24	13	11	1613
236	| chz16	1608	1632		104			24	5	19	1609	1633		106			24	4	20	1608	1631		102			23	5	18	1609	1633		106			24	4	20	1613
236	| chz18	1606	1629		131			23	8	15	1606	1631		132			25	8	17	1605	1628		132			23	9	14	1606	1630		132			24	8	16	1614
236	| chz19	1597	1620		65.4			23	16	7	1597	1622		69			25	16	9	1597	1620		60.9			23	16	7	1597	1622		68.4			25	16	9	1613
237	**Combine CHAZEY3**	**1606**	**1622**	**122**				**16**	**5**	**11**	**1606**	**1623**	**123**				**17**	**5**	**12**	**1606**	**1621**	**122**				**15**	**5**	**10**	**1606**	**1623**	**122**				**17**	**5**	**12**	**1611**
237	| chz21	1603	1626		113			23	8	15	1603	1628		114			25	8	17	1603	1625		113			22	8	14	1603	1627		113			24	8	16	1611
237	| chz23	1604	1630		117			26	7	19	1605	1632		118			27	6	21	1604	1630		117			26	7	19	1605	1632		117			27	6	21	1611
238	**Combine CHAZEY4**	**1599**	**1614**	**125**				**15**	**12**	**3**	**1600**	**1615**	**126**				**15**	**11**	**4**	**1599**	**1614**	**126**				**15**	**12**	**3**	**1600**	**1615**	**126**				**15**	**11**	**4**	**1611**
238	| chz27	1597	1621		119			24	14	10	1598	1622		120			24	13	11	1597	1620		120			23	14	9	1598	1622		120			24	13	11	1611
238	| chz28	1598	1618		115			20	11	9	1598	1620		116			22	11	11	1597	1618		115			21	12	9	1598	1619		115			21	11	10	1609
239	**Combine MDMHOUSE**	**1601**	**1607**	**139**				**6**	**9**	**-3**	**1601**	**1608**	**148**				**7**	**9**	**-2**	**1601**	**1607**	**129**				**6**	**9**	**-3**	**1602**	**1609**	**149**				**7**	**8**	**-1**	**1610**
239	**Combine MDMHOUSE**																			**1601**	**1607**	**152**				**6**	**9**	**-3**										**1610**
239	| mdmh12	1594	1618		133			24	14	10	1595	1619		134			24	13	11	1594	1617		133	131		23	14	9	1595	1619		131			24	13	11	1608

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
239	mdmh13	1597	1624		126			27	11	16	1598	1625		127			27	10	17	1597	1622		126	129		25	11	14	1598	1625		129			27	10	17	1608
239	mdmh14	1600	1634		64.4			34	8	26	1601	1636		66.7			35	7	28	1600	1632		62.7	67.6		32	8	24	1601	1637		62.6			36	7	29	1608
239	mdmh15	1597	1623		132			26	11	15	1597	1625		132			28	11	17	1597	1622		130	132		25	11	14	1597	1626		132			29	11	18	1608
239	mdmh17	1597	1621		133			24	11	13	1597	1624		134			27	11	16	1597	1621		132	134		24	11	13	1597	1623		135			26	11	15	1608
239	mdmh18	1595	1626		136			31	13	18	1596	1627		136			31	12	19	1595	1625		136	137		30	13	17	1596	1628		134			32	12	20	1608
239	mdmh19	1588	1614		80.7			26	19	7	1588	1615		83.7			27	19	8	1588	1613		78.3	75.1		25	19	6	1588	1616		84.5			28	19	9	1607
239	mdmh2	1589	1617		107			28	18	10	1589	1619		109			30	18	12	1589	1615		100	96.9		26	18	8	1590	1618		107			28	17	11	1607
239	mdmh20	1580	1615		63.9			35	27	8	1581	1616		66.7			35	26	9	1580	1613		56.8			33	27	6	1581	1618		73.8			37	26	11	1607
239	mdmh21	1593	1619		132			26	17	9	1593	1620		133			27	17	10	1593	1618		134	131		25	17	8	1594	1620		133			26	16	10	1610
239	mdmh22	1592	1618		128			26	15	11	1593	1620		129			27	14	13	1592	1617		128	125		25	15	10	1593	1620		128			27	14	13	1607
239	mdmh23	1590	1617		112			27	17	10	1590	1619		114			29	17	12	1590	1616		109	105		26	17	9	1590	1619		114			29	17	12	1607
239	mdmh24	1590	1619		117			29	18	11	1590	1620		119			30	18	12	1590	1617		117	114		27	18	9	1590	1621		123			31	18	13	1608
239	mdmh3	1598	1628		110			30	10	20	1598	1630		111			32	10	22	1598	1626		110	114		28	10	18	1599	1630		111			31	9	22	1608
240	**Combine MDMMILL1**	**1761**	**1772**	**117**				**11**	**3**	**8**	**1761**	**1773**	**121**				**12**	**3**	**9**	**1761**	**1772**	**111**				**11**	**3**	**8**	**1762**	**1774**	**118**				**12**	**2**	**10**	**1764**
240	**Combine MDMMILL1**	**1762**	**1775**	**159**				**13**	**2**	**11**	**1762**	**1775**	**160**				**13**	**2**	**11**	**1762**	**1774**	**159**				**12**	**2**	**10**	**1762**	**1776**	**159**				**14**	**2**	**12**	**1764**
240	mm13	1756	1785		132	128		29	8	21	1757	1786		133	128		29	7	22	1756	1784		133	129		28	8	20	1757	1787		133	129		30	7	23	1764
240	mm14	1757	1783		131	124		26	7	19	1757	1784		131	125		27	7	20	1757	1782		131	124		25	7	18	1757	1785		131	124		28	7	21	1764
240	mm15	1759	1790		114	123		31	5	26	1760	1792		115	123		32	4	28	1759	1789		113	122		30	5	25	1760	1793		113	122		33	4	29	1764
240	mm16	1757	1786		131	129		29	7	22	1758	1787		131	130		29	6	23	1757	1785		131	129		28	7	21	1758	1787		131	129		29	6	23	1764
240	mm17	1746	1773		55.4			27	18	9	1746	1775		58.3			29	18	11	1746	1772		49.3			26	18	8	1747	1775		56.9			28	17	11	1764
241	**Combine MDMMILL2**	**1742**	**1752**	**56.9**				**10**	**4**	**6**	**1742**	**1754**	**61.7**				**12**	**4**	**8**	**1742**	**1752**	**53.2**				**10**	**4**	**6**	**1742**	**1754**	**56.7**				**12**	**4**	**8**	**1746**
241	**Combine MDMMILL2**	**1743**	**1756**	**113**				**13**	**3**	**10**	**1743**	**1757**	**115**				**14**	**3**	**11**	**1743**	**1755**	**112**				**12**	**3**	**9**	**1743**	**1757**	**114**				**14**	**3**	**11**	**1746**
241	mm21	1728	1749		26.5			21	17	4	1728	1750		29.8			22	17	5	1728	1748		23.5			20	17	3	1728	1750		25.9			22	17	5	1745
241	mm22	1743	1770		80.9	106		27	2	25	1743	1772		84.2	107		29	2	27	1743	1768		81.2	105		25	2	23	1743	1772		82.4	106		29	2	27	1745
241	mm23	1736	1759		117	95.1		23	9	14	1736	1760		117	97.3		24	9	15	1736	1758		115	93.9		22	9	13	1736	1760		117	96		24	9	15	1745
241	mm24	1739	1763		129	122		24	7	17	1739	1764		129	123		25	7	18	1739	1762		129	123		23	7	16	1739	1765		129	123		26	7	19	1746
242	**Combine MDMMILL3**	**1768**	**1787**	**121**				**19**	**8**	**11**	**1769**	**1788**	**122**				**19**	**7**	**12**	**1769**	**1786**	**121**				**17**	**7**	**10**	**1769**	**1788**	**122**				**19**	**7**	**12**	**1776**
242	mm31	1764	1792		115			28	11	17	1764	1794		115			30	11	19	1764	1791		115			27	11	16	1765	1794		116			29	10	19	1775
242	mm32	1768	1794		115			26	8	18	1768	1796		115			28	8	20	1768	1793		115			25	8	17	1768	1797		115			29	8	21	1776
243	**Combine MILLFM1**	**1729**	**1741**	**83.9**				**12**	**13**	**-1**	**1730**	**1742**	**88.5**				**12**	**12**	**0**	**1729**	**1740**	**79.4**				**11**	**13**	**-2**	**1730**	**1742**	**86**				**12**	**12**	**0**	**1742**
243	mfb1	1719	1743		72.1			24	23	1	1719	1744		75.5			25	23	2	1719	1742		67.4			23	23	0	1719	1744		72.7			25	23	2	1742
243	mfb2	1731	1759		75.4			28	11	17	1731	1761		77.7			30	11	19	1731	1758		73			27	11	16	1732	1761		76.3			29	10	19	1742
243	mfb4	1723	1749		121			26	19	7	1723	1750		123			27	19	8	1723	1748		122			25	19	6	1724	1750		124			26	18	8	1742
243	mfb5	1722	1746		107			24	20	4	1722	1748		109			26	20	6	1722	1745		105			23	20	3	1722	1748		108			26	20	6	1742
244	**Combine MILLFM2**	**1329**	**1343**	**124**				**14**	**5**	**9**	**1329**	**1345**	**125**				**16**	**5**	**11**	**1329**	**1343**	**124**				**14**	**5**	**9**	**1329**	**1344**	**124**				**15**	**5**	**10**	**1334**
244	mfc4	1327	1347		114			20	7	13	1327	1349		114			22	7	15	1327	1347		114			20	7	13	1327	1348		113			21	7	14	1334
244	mfc5	1327	1351		120			24	7	17	1328	1352		120			24	6	18	1328	1351		120			23	6	17	1328	1352		120			24	6	18	1334
245	**Combine NEWFARM1**	**1738**	**1753**	**133**				**15**	**2**	**13**	**1739**	**1754**	**135**				**15**	**1**	**14**	**1738**	**1753**	**131**				**15**	**2**	**13**	**1739**	**1755**	**133**				**16**	**1**	**15**	**1740**
245	nfh21	1736	1765		124			29	4	25	1736	1766		125			30	4	26	1736	1764		125			28	4	24	1736	1767		125			31	4	27	1740
245	nfh22	1736	1765		122			29	3	26	1737	1766		122			29	2	27	1737	1764		121			27	2	25	1737	1768		122			31	2	29	1739
245	nfh24	1731	1759		109			28	9	19	1731	1761		110			30	9	21	1731	1758		106			27	9	18	1732	1761		108			29	8	21	1740
246	**Combine NEWFARM2**	**1754**	**1763**	**62.5**				**9**	**4**	**5**	**1754**	**1764**	**68**				**10**	**4**	**6**	**1754**	**1763**	**57.1**				**9**	**4**	**5**	**1755**	**1764**	**65.3**				**9**	**3**	**6**	**1758**
246	**Combine NEWFARM2**	**1755**	**1765**	**87.5**				**10**	**3**	**7**	**1755**	**1766**	**92.4**				**11**	**3**	**8**	**1755**	**1765**	**84.1**				**10**	**3**	**7**	**1755**	**1766**	**87.1**				**11**	**3**	**8**	**1758**
246	nfh1	1745	1766		77.7	66.3		21	13	8	1746	1768		81.5	70.1		22	12	10	1745	1766		74.7	63.1		21	13	8	1746	1767		77	65.9		21	12	9	1758
246	nfh2	1748	1770		119	109		22	10	12	1748	1772		121	111		24	10	14	1748	1769		118	106		21	10	11	1748	1772		119	109		24	10	14	1758
246	nfh3	1756	1782		66.9	82.9		26	2	24	1756	1783		69.8	85.4		27	2	25	1756	1781		65.5	82		25	2	23	1756	1784		66.9	82.4		28	2	26	1758
246	nfh4	1752	1773		128	128		21	6	15	1752	1775		129	129		23	6	17	1752	1773		128	129		21	6	15	1752	1775		129	129		23	6	17	1758
246	nfh5	1738	1764		43.9			26	20	6	1739	1765		47.5			26	19	7	1738	1763		38.9			25	20	5	1739	1765		48.8			26	19	7	1758

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	B to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	C to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
247	**Combine PARKFARM**	**1715**	**1728**	**68.3**				**13**	**7**	**6**	**1716**	**1729**	**72.3**				**13**	**6**	**7**	**1715**	**1728**	**62.2**				**13**	**7**	**6**	**1716**	**1729**	**68.6**				**13**	**6**	**7**	**1722**
247	**Combine PARKFARM**	**1716**	**1733**	**105**				**17**	**6**	**11**	**1716**	**1734**	**107**				**18**	**6**	**12**	**1716**	**1732**	**103**				**16**	**6**	**10**	**1717**	**1734**	**104**				**17**	**5**	**12**	**1722**
247	pfb1	1703	1726		46.7			23	18	5	1703	1728		50.2			25	18	7	1703	1725		41.3			22	18	4	1703	1727		47.5			24	18	6	1721
247	pfb2	1716	1742		93	110		26	5	21	1717	1744		94.9	111		27	4	23	1717	1742		90.3	109		25	4	21	1717	1745		92.3	110		28	4	24	1721
247	pfb3	1711	1734		119	97.1		23	11	12	1711	1736		120	98.6		25	11	14	1711	1734		118	94.8		23	11	12	1711	1735		119	96.4		24	11	13	1722
248	**Combine PITHOUSE**	**1455**	**1463**	**116**				**8**	**-1**	**9**	**1455**	**1464**	**123**				**9**	**-1**	**10**	**1455**	**1462**	**108**				**7**	**-1**	**8**	**1455**	**1464**	**124**				**9**	**-1**	**10**	**1454**
248	**Combine PITHOUSE**	**1455**	**1464**	**159**				**9**	**-1**	**10**	**1456**	**1465**	**163**				**9**	**-2**	**11**	**1455**	**1464**	**153**				**9**	**-1**	**10**	**1456**	**1465**	**165**				**9**	**-2**	**11**	**1454**
248	p01	1455	1474		101	112		19	-1	20	1455	1476		103	114		21	-1	22	1455	1474		96.9	109		19	-1	20	1455	1475		104	114		20	-1	21	1454
248	p02	1450	1476		137	135		26	4	22	1450	1477		138	136		27	4	23	1450	1475		138	135		25	4	21	1450	1478		137	136		28	4	24	1454
248	p03	1452	1470		131	127		18	2	16	1452	1472		132	128		20	2	18	1452	1471		132	129		19	2	17	1452	1472		132	128		20	2	18	1454
248	**p04**	**1449**	1473		135	130		24	5	19	1449	1476		136	131		27	5	22	**1449**	1472		134	**128**		23	5	18	1449	1475		135	131		26	5	21	1454
248	p05	1441	1464		48.9			23	13	10	1441	1466		53			25	13	12	1441	1464		44.7			23	13	10	1441	1466		53.5			25	13	12	1454
248	p06	1445	1473		121	113		28	9	19	1446	1475		123	116		29	8	21	1445	1472		114	106		27	9	18	1446	1475		124	117		29	8	21	1454
249	**Combine ROSEFMCOT**	**1738**	**1750**	**128**				**12**	**8**	**4**	**1739**	**1750**	**132**				**11**	**7**	**4**	**1738**	**1749**	**127**				**11**	**8**	**3**	**1739**	**1751**	**129**				**12**	**7**	**5**	**1746**
249	rfc1	1731	1754		100			23	14	9	1731	1755		102			24	14	10	1730	1753		94.4			23	15	8	1731	1755		96.8			24	14	10	1745
249	rfc2	1737	1764		111			27	8	19	1738	1765		113			27	7	20	1738	1763		112			25	7	18	1738	1766		113			28	7	21	1745
249	rfc3	1732	1756		116			24	14	10	1733	1757		118			24	13	11	1733	1756		120			23	13	10	1733	1759		120			26	13	13	1746
249	rfc4	1736	1762		127			26	10	16	1736	1763		128			27	10	17	1736	1761		127			25	10	15	1736	1765		127			29	10	19	1746
250	**Combine ROSEFMHS**	**1608**	**1622**	**121**				**14**	**5**	**9**	**1608**	**1624**	**122**				**16**	**5**	**11**	**1608**	**1622**	**121**				**14**	**5**	**9**	**1608**	**1623**	**122**				**15**	**5**	**10**	**1613**
250	rose1	1607	1630		116			23	6	17	1607	1632		117			25	6	19	1607	1629		116			22	6	16	1607	1631		116			24	6	18	1613
250	rose3	1605	1626		113			21	4	17	1605	1628		114			23	4	19	1605	1626		113			21	4	17	1605	1627		113			22	4	18	1609
251	**Combine STEPCOTT**	**1801**	**1814**	**134**				**13**	**9**	**4**	**1801**	**1815**	**136**				**14**	**9**	**5**	**1801**	**1814**	**128**				**13**	**9**	**4**	**1802**	**1816**	**139**				**14**	**8**	**6**	**1810**
251	step4	1795	1829		133			34	15	19	1796	1830		133			34	14	20	1795	1827		133			32	15	17	1796	1832		133			36	14	22	1810
251	step5	1795	1829		133			34	15	19	1796	1830		133			34	14	20	1795	1827		133			32	15	17	1796	1832		133			36	14	22	1810
251	step6	1788	1820		88.2			32	22	10	1788	1822		90.5			34	22	12	1788	1818		81.5			30	22	8	1789	1823		92.9			34	21	13	1810
251	step7	1801	1824		115			23	9	14	1801	1826		116			25	9	16	1801	1824		114			23	9	14	1801	1826		118			25	9	16	1810
252	**Combine STIRRUPS**	**1548**	**1564**	**115**				**16**	**8**	**8**	**1549**	**1565**	**117**				**16**	**7**	**9**	**1548**	**1563**	**114**				**15**	**8**	**7**	**1549**	**1565**	**119**				**16**	**7**	**9**	**1556**
252	str1	1548	1580		108			32	8	24	1549	1581		109			32	7	25	1548	1577		108			29	8	21	1549	1581		110			32	7	25	1556
252	str2	1539	1568		96.8			29	17	12	1539	1570		98.5			31	17	14	1539	1567		95.2			28	17	11	1540	1571		100			31	16	15	1556
252	str4	1543	1572		122			29	13	16	1544	1574		122			30	12	18	1543	1571		123			28	13	15	1544	1574		123			30	12	18	1556
253	**Combine BOTHY**	**1621**	**1635**	**128**				**14**	**-2**	**16**	**1622**	**1636**	**130**				**14**	**-3**	**17**	**1621**	**1634**	**128**				**13**	**-2**	**15**	**1622**	**1636**	**130**				**14**	**-3**	**17**	**1619**
253	both1	1620	1644		121			24	-1	25	1620	1645		122			25	-1	26	1620	1643		122			23	-1	24	1620	1645		122			25	-1	26	1619
253	both2	1614	1640		103			26	5	21	1614	1641		105			27	5	22	1614	1639		102			25	5	20	1615	1641		105			26	4	22	1619
253	both6	1619	1648		123			29	0	29	1620	1649		124			29	-1	30	1619	1646		123			27	0	27	1620	1649		122			29	-1	30	1619
254	**Combine 3CHIMNEYS**	**1449**	**1465**	**104**				**16**	**10**	**6**	**1450**	**1466**	**106**				**16**	**9**	**7**	**1449**	**1464**	**97.1**				**15**	**10**	**5**	**1450**	**1466**	**99.7**				**16**	**9**	**7**	**1459**
254	chimn2	1439	1466		76.3			27	19	8	1440	1467		78.6			27	18	9	1439	1464		69.5			25	19	6	1440	1467		72.3			27	18	9	1458
254	chimn20	1449	1480		113			31	10	21	1449	1481		114			32	10	22	1449	1479		110			30	10	20	1450	1483		111			33	9	24	1459
254	chimn34	1447	1476		124			29	11	18	1447	1477		124			30	11	19	1447	1474		124			27	11	16	1447	1478		124			31	11	20	1458
255	**Combine WHITTLES1**	**1465**	**1478**	**103**				**13**	**6**	**7**	**1466**	**1478**	**106**				**12**	**5**	**7**	**1465**	**1477**	**96.6**				**12**	**6**	**6**	**1466**	**1478**	**109**				**12**	**5**	**7**	**1471**
255	wtl1	1451	1481		74.5			30	19	11	1451	1483		77.5			32	19	13	1451	1480		66.9			29	19	10	1452	1483		82.6			31	18	13	1470
255	wtl3	1464	1488		116			24	6	18	1465	1489		117			24	5	19	1464	1487		116			23	6	17	1465	1489		117			24	5	19	1470
255	wtl4	1463	1484		121			21	8	13	1464	1485		122			21	7	14	1463	1484		122			21	8	13	1464	1485		121			21	7	14	1471
256	**Combine WHITTLES2**	**1400**	**1415**	**112**				**15**	**12**	**3**	**1401**	**1415**	**113**				**14**	**11**	**3**	**1400**	**1414**	**112**				**14**	**12**	**2**	**1401**	**1415**	**112**				**14**	**11**	**3**	**1412**
256	wtl14	1400	1422		113			22	12	10	1400	1424		113			24	12	12	1400	1422		113			22	12	10	1400	1424		113			24	12	12	1412
256	wtl15	1396	1417		104			21	16	5	1396	1418		105			22	16	6	1396	1416		104			20	16	4	1396	1418		104			22	16	6	1412
257	**Combine RYECOTT**	**1478**	**1489**	**13.4 n=6 A= 13.4%(A**				**11**	**9**	**2**	**1479**	**1490**	**15.6**				**11**	**8**	**3**	**1478**	**1488**	**10 n=6 A= 10.0%(A**				**10**	**9**	**1**	**1479**	**1490**	**17.9 FAILED n=6 A=**				**11**	**8**	**3**	**1487**
257	**Combine RYECOTT**	**1480**	**1493**	**109**				**13**	**7**	**6**	**1480**	**1493**	**113**				**13**	**7**	**6**	**1479**	**1492**	**106**				**13**	**8**	**5**	**1480**	**1494**	**114**				**14**	**7**	**7**	**1487**
257	rye1	1475	1507		124	132		32	12	20	1475	1509		124	132		34	12	22	1475	1505		126	132		30	12	18	1476	1509		123	132		33	11	22	1487

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
257	rye2	1468	1500		120	98.5		32	19	13	1469	1501		121	101		32	18	14	1468	1498		118	96		30	19	11	1469	1502		124	105		33	18	15	1487
257	rye3	1480	1508		65.6	99.1		28	7	21	1480	1510		67.7	101		30	7	23	1480	1506		61.9	96.4		26	7	19	1481	1509		69.7	102		28	6	22	1487
257	rye4	1471	1497		117	93		26	15	11	1471	1498		119	95.4		27	15	12	1470	1496		116	91		26	16	10	1471	1498		117	93.4		27	15	12	1486
257	rye5	1445	1480		10.1			35	42	-7	1446	1481		11.7			35	41	-6	1446	1478		7.6			32	41	-9	1447	1483		13.8			36	40	-4	1487
257	rye6	1442	1477		6.3			35	45	-10	1443	1478		7.5			35	44	-9	1442	1474		4.4			32	45	-13	1443	1479		8.6			36	44	-8	1487
258	**Combine MEATH**	**1193**	**1206**	**126**				**13**	**11**	**2**	**1193**	**1207**	**129**				**14**	**11**	**3**	**1193**	**1205**	**116**				**12**	**11**	**1**	**1195**	**1209**	**136**				**14**	**9**	**5**	**1204**
258	Q8768	1174	1214		80.5			40	28	12	1174	1216		82.5			42	28	14	1174	1211		69.9			37	28	9	1175	1218		84.6			43	27	16	1202
258	Q8769	1191	1233		108			42	4	38	1191	1234		109			43	4	39	1190	1230		110			40	5	35	1192	1237		109			45	3	42	1195
258	Q8771	1174	1221		106			47	30	17	1174	1223		108			49	30	19	1174	1219		102			45	30	15	1176	1229		120			53	28	25	1204
258	Q8859m	1189	1218		129			29	15	14	1189	1220		130			31	15	16	1189	1217		130			28	15	13	1190	1221		129			31	14	17	1204
258	Q8860	1191	1225		119			34	13	21	1191	1226		120			35	13	22	1191	1224		115			33	13	20	1192	1229		120			37	12	25	1204
258	Q8938	1183	1219		124			36	21	15	1183	1220		124			37	21	16	1183	1217		124			34	21	13	1184	1223		126			39	20	19	1204
259	**Combine MEDBOURNE**	**1236**	**1247**	**126**				**11**	**2**	**9**	**1236**	**1248**	**130**				**12**	**2**	**10**	**1236**	**1247**	**124**				**11**	**2**	**9**	**1236**	**1248**	**131**				**12**	**2**	**10**	**1238**
259	MDB-A11	1227	1253		103			26	11	15	1227	1254		105			27	11	16	1227	1252		103			25	11	14	1228	1254		107			26	10	16	1238
259	MDB-A13	1233	1258		127			25	4	21	1233	1260		128			27	4	23	1233	1257		128			24	4	20	1233	1260		128			27	4	23	1237
259	MDB-A16	1228	1254		111			26	9	17	1228	1255		113			27	9	18	1228	1253		108			25	9	16	1228	1256		113			28	9	19	1237
259	MDB-A17	1235	1261		110			26	2	24	1235	1262		111			27	2	25	1235	1260		109			25	2	23	1236	1262		111			26	1	25	1237
260	**Combine MEDMENHAM**	**1547**	**1568**	**125**				**21**	**14**	**7**	**1548**	**1569**	**126**				**21**	**13**	**8**	**1547**	**1566**	**125**				**19**	**14**	**5**	**1548**	**1569**	**126**				**21**	**13**	**8**	**1561**
260	lfm6	1546	1575		115			29	15	14	1546	1576		116			30	15	15	1546	1573		116			27	15	12	1546	1577		116			31	15	16	1561
260	lfm7	1544	1575		119			31	17	14	1544	1577		119			33	17	16	1544	1574		119			30	17	13	1544	1578		119			34	17	17	1561
261	**Combine MERIONETH**	**1434**	**1446**	**102**				**12**	**7**	**5**	**1434**	**1447**	**105**				**13**	**7**	**6**	**1434**	**1446**	**94.1**				**12**	**7**	**5**	**1435**	**1447**	**110**				**12**	**6**	**6**	**1441**
261	afh2	1433	1454		117			21	8	13	1434	1456		118			22	7	15	1433	1454		117			21	8	13	1434	1455		118			21	7	14	1441
261	afh3	1432	1452		122			20	9	11	1432	1454		123			22	9	13	1432	1453		123			21	9	12	1432	1454		123			22	9	13	1441
261	afh5	1419	1450		72.6			31	21	10	1419	1452		75.7			33	21	12	1419	1448		62.8			29	21	8	1419	1453		81.2			34	21	13	1440
262	**Combine GWERNFYDA**	**1539**	**1556**	**109**				**17**	**13**	**4**	**1539**	**1557**	**111**				**18**	**13**	**5**	**1539**	**1555**	**105**				**16**	**13**	**3**	**1540**	**1557**	**111**				**17**	**12**	**5**	**1552**
262	gwe1	1533	1565		121			32	19	13	1534	1566		122			32	18	14	1533	1563		121			30	19	11	1534	1567		122			33	18	15	1552
262	gwe2	1539	1573		105			34	13	21	1540	1574		106			34	12	22	1539	1571		103			32	13	19	1540	1576		105			36	12	24	1552
262	gwe3	1528	1560		91.1			32	24	8	1529	1561		92.8			32	23	9	1528	1558		87.7			30	24	6	1529	1562		93.1			33	23	10	1552
263	**Combine NEUADD**	**1501**	**1517**	**126**				**16**	**6**	**10**	**1502**	**1517**	**126**				**15**	**5**	**10**	**1501**	**1516**	**126**				**15**	**6**	**9**	**1502**	**1517**	**126**				**15**	**5**	**10**	**1507**
263	neu1	1499	1523		119			24	8	16	1500	1524		119			24	7	17	1499	1522		119			23	8	15	1500	1524		119			24	7	17	1507
263	neu3	1500	1521		116			21	7	14	1500	1523		117			23	7	16	1500	1521		117			21	7	14	1500	1523		117			23	7	16	1507
264	**Combine PENIARTH**	**1539**	**1555**	**142**				**16**	**12**	**4**	**1540**	**1556**	**143**				**16**	**11**	**5**	**1539**	**1554**	**141**				**15**	**12**	**3**	**1540**	**1556**	**142**				**16**	**11**	**5**	**1551**
264	pen1	1535	1564		124			29	15	14	1536	1565		124			29	14	15	1535	1562		124			27	15	12	1536	1565		124			29	14	15	1550
264	pen2	1534	1563		123			29	16	13	1534	1565		123			31	16	15	1534	1561		122			27	16	11	1534	1565		123			31	16	15	1550
264	pen3	1538	1567		121			29	13	16	1538	1568		122			30	13	17	1538	1565		120			27	13	14	1538	1569		121			31	13	18	1551
265	**Combine DAIRYCOT**	**1488**	**1509**	**125**				**21**	**12**	**9**	**1489**	**1510**	**125**				**21**	**11**	**10**	**1488**	**1507**	**125**				**19**	**12**	**7**	**1489**	**1511**	**125**				**22**	**11**	**11**	**1500**
265	dcm11	1486	1518		117			32	14	18	1487	1519		118			32	13	19	1486	1516		118			30	14	16	1487	1520		118			33	13	20	1500
265	dcm12	1485	1516		117			31	15	16	1486	1517		117			31	14	17	1485	1514		117			29	15	14	1486	1518		117			32	14	18	1500
266	**Combine DETTON1**	**1565**	**1583**	**41.4**	**n=2 A= 41.4%(A**			**18**	**11**	**7**	**1565**	**1584**	**44.2**	**n=2 A= 44.2%(**			**19**	**11**	**8**	**1565**	**1582**	**33.6**	**n=2 A= 33.6%(**			**17**	**11**	**6**	**1565**	**1585**	**45**	**n=2 A= 45.0%(Ar**			**20**	**11**	**9**	**1576**
266	dh1	1566	1593		103			27	7	20	1566	1595		104			29	7	22	1566	1592		102			26	7	19	1566	1595		103			29	7	22	1573
266	dh3	1543	1576		27.9			33	33	0	1543	1578		30.5			35	33	2	1543	1573		21			30	33	-3	1544	1578		31.3			34	32	2	1576
267	**Combine DETTON2**	**1776**	**1792**	**108**				**16**	**4**	**12**	**1777**	**1793**	**110**				**16**	**3**	**13**	**1776**	**1791**	**108**				**15**	**4**	**11**	**1777**	**1792**	**110**				**15**	**3**	**12**	**1780**
267	dh1012	1776	1800		111			24	4	20	1777	1801		112			24	3	21	1776	1799		111			23	4	19	1777	1801		112			24	3	21	1780
267	dh11	1771	1794		101			23	9	14	1771	1796		103			25	9	16	1771	1793		101			22	9	13	1771	1795		102			24	9	15	1780
268	**Combine BERRYCOURT**	**1574**	**1584**	**105**				**10**	**6**	**4**	**1574**	**1585**	**110**				**11**	**6**	**5**	**1573**	**1583**	**98.7**				**10**	**7**	**3**	**1574**	**1585**	**110**				**11**	**6**	**5**	**1580**
268	**Combine BERRYCOURT**	**1574**	**1586**	**136**				**12**	**6**	**6**										**1574**	**1585**	**133**				**11**	**6**	**5**	**1574**	**1585**	**133**				**11**	**6**	**5**	**1580**
268	bcf19	1563	1592		104	91.7		29	17	12	1564	1593		106			29	16	13	1563	1590		100	87.8		27	17	10	1564	1593		108			29	16	13	1580
268	bcf2	1560	1586		57.4			26	20	6	1560	1587		60.9			27	20	7	1560	1584		53			24	20	4	1561	1587		59.9			26	19	7	1580

Number	SITE & sample	A from	A to	A ϕ_n	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	AS from	AS to	AS ϕ_n	AS Sample	AS 2nd test	AS 3rd test	B Range	B beg range	B end range	BS from	BS to	BS ϕ_n	B Sample	B 2nd test	B 3rd test	C Range	C beg range	C end range	CS from	CS to	CS ϕ_n	C Sample	C 2nd test	C 3rd test	Range	beg range	end range	Real date
268	bcf3	1570	1599		132	132		29	10	19	1570	1600		132			30	10	20	1569	1597		133	132		28	11	17	1570	1600		132			30	10	20	1580
268	bcf4	1570	1598		132	132		28	10	18	1570	1600		132			30	10	20	1569	1597		133	132		28	11	17	1570	1600		132			30	10	20	1580
268	bcf56	1573	1597		107	117		24	7	17	1574	1598		109			24	6	18	1573	1596		104	116		23	7	16	1574	1597		111			23	6	17	1580
269	**Combine OLDSWAN**	**1655**	**1670**	**185**				**15**	**1**	**14**	**1656**	**1671**	**185**				**15**	**0**	**15**	**1655**	**1669**	**185**				**14**	**1**	**13**	**1657**	**1672**	**185**				**15**	**-1**	**16**	**1656**
269	NWK-P01A	1650	1687		131			37	6	31	1651	1689		131			38	5	33	1650	1685		131			35	6	29	1652	1690		131			38	4	34	1656
269	NWK-P04A	1648	1686		133			38	8	30	1648	1688		133			40	8	32	1648	1683		133			35	8	27	1649	1690		133			41	7	34	1656
269	NWK-P06A	1649	1684		130			35	7	28	1649	1686		131			37	7	30	1649	1682		131			33	7	26	1650	1687		131			37	6	31	1656
269	NWK-P07A	1650	1685		131			35	6	29	1650	1687		132			37	6	31	1650	1683		132			33	6	27	1651	1688		132			37	5	32	1656
269	NWK-P08A	1650	1687		132			37	6	31	1650	1688		133			38	6	32	1649	1684		132			35	7	28	1651	1689		132			38	5	33	1656
270	**Combine POTTERDIKE**	**1732**	**1749**	**91.8**				**17**	**8**	**9**	**1732**	**1751**	**93.9**				**19**	**8**	**11**	**1732**	**1748**	**87.6**				**16**	**8**	**8**	**1732**	**1751**	**95.4**				**19**	**8**	**11**	**1740**
270	NWK-E01	1732	1759		108			27	8	19	1733	1760		108			27	7	20	1732	1757		107			25	8	17	1733	1760		108			27	7	20	1740
270	NWK-E05	1722	1751		82.3			29	9	20	1722	1752		84.6			30	9	21	1722	1749		77.6			27	9	18	1722	1753		86.4			31	9	22	1731
271	**Combine WOOLPACK**	**1445**	**1454**	**162**				**9**	**6**	**3**	**1446**	**1454**	**168**				**8**	**5**	**3**	**1445**	**1454**	**158**				**9**	**6**	**3**	**1446**	**1455**	**169**				**9**	**5**	**4**	**1451**
271	NEW-D02	1438	1464		129			26	11	15	1438	1465		130			27	11	16	1438	1463		127			25	11	14	1439	1465		129			26	10	16	1449
271	NEW-D12	1441	1465		135			24	10	14	1441	1468		136			27	10	17	1441	1465		136			24	10	14	1441	1468		136			27	10	17	1451
271	NEW-D14	1445	1470		88.9			25	6	19	1445	1472		91.6			27	6	21	1445	1470		84.4			25	6	19	1446	1472		90.4			26	5	21	1451
271	NEW-D15	1440	1463		132			23	11	12	1440	1465		133			25	11	14	1440	1463		133			23	11	12	1440	1465		132			25	11	14	1451
271	NEW-D17	1438	1463		126			25	13	12	1438	1465		128			27	13	14	1438	1463		128			25	13	12	1439	1465		129			26	12	14	1451
271	NEW-D23	1439	1465		135			26	12	14	1440	1467		136			27	11	16	1439	1465		135			26	12	14	1440	1467		136			27	11	16	1451
271	NEW-D25	1434	1462		103			28	12	16	1434	1464		106			30	12	18	1434	1461		101			27	12	15	1435	1464		109			29	11	18	1446
272	**Combine TRINITYHS**	**1520**	**1529**	**195**				**9**	**4**	**5**	**1521**	**1530**	**200**				**9**	**3**	**6**	**1520**	**1529**	**190**				**9**	**4**	**5**	**1521**	**1530**	**199**				**9**	**3**	**6**	**1524**
272	NWC-A01A	1515	1539		134			24	9	15	1515	1541		135			26	9	17	1515	1538		134			23	9	14	1515	1541		134			26	9	17	1524
272	NWC-A08A	1507	1536		83.7			29	17	12	1508	1537		86.3			29	16	13	1507	1534		77.2			27	17	10	1508	1537		86.8			29	16	13	1524
272	NWC-A10A	1517	1545		129			28	7	21	1517	1547		129			30	7	23	1517	1544		127			27	7	20	1518	1547		128			29	6	23	1524
272	NWC-A11	1517	1541		134			24	7	17	1517	1543		134			26	7	19	1517	1541		133			24	7	17	1517	1543		134			26	7	19	1524
272	NWC-A13A	1516	1542		135			26	8	18	1517	1543		136			26	7	19	1516	1541		135			25	8	17	1517	1543		136			26	7	19	1524
272	NWC-A15A	1515	1542		137			27	9	18	1515	1544		138			29	9	20	1515	1541		138			26	9	17	1516	1544		138			28	8	20	1524
272	NWC-A16A	1515	1544		137			29	9	20	1516	1545		137			29	8	21	1515	1542		138			27	9	18	1516	1545		137			29	8	21	1524
272	NWC-A17A	1515	1541		136			26	9	17	1516	1543		137			27	8	19	1515	1540		137			25	9	16	1516	1542		137			26	8	18	1524
273	**Combine GATEROUNDS**	**1572**	**1585**	**143**				**13**	**8**	**5**	**1573**	**1586**	**144**				**13**	**7**	**6**	**1572**	**1584**	**144**				**12**	**8**	**4**	**1573**	**1585**	**144**				**12**	**7**	**5**	**1580**
273	grtn2	1570	1593		125			23	10	13	1570	1595		126			25	10	15	1570	1592		126			22	10	12	1570	1594		126			24	10	14	1580
273	grtn3	1568	1591		120			23	12	11	1568	1593		121			25	12	13	1568	1590		120			22	12	10	1568	1592		120			24	12	12	1580
273	grtn4	1571	1594		123			23	9	14	1571	1596		124			25	9	16	1571	1593		123			22	9	13	1571	1595		124			24	9	15	1580
274	**Combine NEWDIGATE**	**1607**	**1615**	**136**				**8**	**1**	**7**	**1607**	**1616**	**142**				**9**	**1**	**8**	**1607**	**1615**	**132**				**8**	**1**	**7**	**1607**	**1616**	**139**				**9**	**1**	**8**	**1608**
274	nds07	1599	1625		125			26	9	17	1600	1627		127			27	8	19	1599	1624		124			25	9	16	1600	1626		128			26	8	18	1608
274	nds14	1597	1618		69.8			21	11	10	1597	1619		73.8			22	11	11	1597	1617		67.4			20	11	9	1597	1619		68.5			22	11	11	1608
274	nds15	1607	1627		103			20	1	19	1607	1629		106			22	1	21	1607	1627		99.3			20	1	19	1607	1628		107			21	1	20	1608
274	nds16	1599	1627		132			28	9	19	1600	1629		133			29	8	21	1599	1626		132			27	9	18	1600	1629		135			29	8	21	1608
274	nds17	1602	1627		135			25	6	19	1602	1629		136			27	6	21	1602	1626		136			24	6	18	1602	1629		136			27	6	21	1608
274	nds22	1603	1629		131			26	5	21	1604	1631		131			27	4	23	1603	1628		132			25	5	20	1604	1630		131			26	4	22	1608
275	**Combine NCADBURY**	**1330**	**1344**	**86.8**				**14**	**14**	**0**	**1330**	**1345**	**90.2**				**15**	**14**	**1**	**1330**	**1343**	**82.9**				**13**	**14**	**-1**	**1331**	**1346**	**91.3**				**15**	**13**	**2**	**1344**
275	ncvh5	1322	1348		97.8			26	22	4	1322	1349		100			27	22	5	1322	1347		96			25	22	3	1322	1350		100			28	22	6	1344
275	ncvh6	1331	1359		93.4			28	13	15	1332	1361		94.8			29	12	17	1331	1358		91.5			27	13	14	1332	1361		94.9			29	12	17	1344
275	ncvh7	1319	1348		85.6			29	25	4	1320	1349		88.2			29	24	5	1319	1347		82.3			28	25	3	1320	1349		90			29	24	5	1344
276	**Combine BATCHELORS**	**1495**	**1508**	**147**				**13**	**4**	**9**	**1495**	**1509**	**148**				**14**	**4**	**10**	**1495**	**1507**	**147**				**12**	**4**	**8**	**1495**	**1509**	**147**				**14**	**4**	**10**	**1499**
276	nwb1	1493	1515		121			22	6	16	1493	1517		122			24	6	18	1493	1515		122			22	6	16	1493	1517		122			24	6	18	1499
276	nwb2	1490	1519		131			29	9	20	1490	1521		131			31	9	22	1490	1518		131			28	9	19	1491	1522		131			31	8	23	1499
276	nwb7	1491	1515		123			24	8	16	1492	1516		123			24	7	17	1491	1514		122			23	8	15	1492	1516		122			24	7	17	1499

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
277	**Combine CASTLEBRDG1**	**1467**	**1480**	**147**				**13**	**11**	**2**	**1467**	**1481**	**148**				**14**	**11**	**3**	**1467**	**1479**	**148**				**12**	**11**	**1**	**1467**	**1482**	**148**				**15**	**11**	**4**	**1478**
277	| cbc3	1464	1488		123			24	12	12	1464	1490		124			26	12	14	1464	1487		124			23	12	11	1464	1489		123			25	12	13	1476
277	| cbc5	1464	1489		124			25	12	13	1464	1491		125			27	12	15	1464	1488		125			24	12	12	1464	1491		125			27	12	15	1476
277	| cbc6	1463	1490		127			27	15	12	1463	1492		128			29	15	14	1463	1489		128			26	15	11	1464	1492		128			28	14	14	1478
278	**Combine CASTLEBRDG2**	**1523**	**1537**	**102**				**14**	**12**	**2**	**1524**	**1538**	**105**				**14**	**11**	**3**	**1523**	**1536**	**94.5**				**13**	**12**	**1**	**1524**	**1539**	**104**				**15**	**11**	**4**	**1535**
278	**Combine CASTLEBRDG2**	**1524**	**1541**	**141**				**17**	**11**	**6**	**1525**	**1542**	**142**				**17**	**10**	**7**	**1524**	**1540**	**142**				**16**	**11**	**5**	**1525**	**1543**	**143**				**18**	**10**	**8**	**1535**
278	| cbc10	1520	1554		125	127		34	13	21	1521	1555		125	127		34	12	22	1520	1552		126	127		32	13	19	1521	1556		125	127		35	12	23	1533
278	| cbc7	1508	1537		55			29	22	7	1508	1539		57.7			31	22	9	1508	1536		47.8			28	22	6	1508	1539		55.9			31	22	9	1530
278	| cbc8	1518	1549		130	119		31	15	16	1518	1550		130	119		32	15	17	1518	1548		130	119		30	15	15	1518	1552		131	121		34	15	19	1533
278	| cbc9	1522	1551		116	121		29	13	16	1523	1552		117	121		29	12	17	1522	1550		114	121		28	13	15	1523	1553		117	121		30	12	18	1535
279	**Combine CRUCKCOTT**	**1377**	**1391**	**104**				**14**	**7**	**7**	**1377**	**1393**	**107**				**16**	**7**	**9**	**1377**	**1390**	**103**				**13**	**7**	**6**	**1378**	**1393**	**103**				**15**	**6**	**9**	**1384**
279	| ccnw1	1371	1395		106			24	11	13	1371	1397		107			26	11	15	1371	1394		105			23	11	12	1371	1397		105			26	11	15	1382
279	| ccnw3	1371	1395		107			24	11	13	1371	1398		108			27	11	16	1371	1394		107			23	11	12	1371	1397		107			26	11	15	1382
279	| ccnw4	1378	1410		95			32	6	26	1378	1412		96.5			34	6	28	1378	1408		93.5			30	6	24	1378	1412		93.2			34	6	28	1384
280	**Combine OAKHOLME**	**1396**	**1405**	**169**				**9**	**6**	**3**	**1397**	**1406**	**174**				**9**	**5**	**4**	**1396**	**1405**	**163**				**9**	**6**	**3**	**1397**	**1406**	**173**				**9**	**5**	**4**	**1402**
280	| osc1	1388	1412		111			24	13	11	1388	1414		114			26	13	13	1388	1412		110			24	13	11	1388	1414		115			26	13	13	1401
280	| osc2	1393	1416		132			23	8	15	1393	1418		133			25	8	17	1393	1416		132			23	8	15	1394	1417		133			23	7	16	1401
280	| osc3	1395	1416		116			21	7	14	1396	1418		118			22	6	16	1395	1416		112			21	7	14	1396	1417		118			21	6	15	1402
280	| osc4	1393	1416		134			23	8	15	1393	1418		134			25	8	17	1393	1416		134			23	8	15	1393	1419		134			26	8	18	1401
280	| osc6	1389	1415		128			26	13	13	1389	1417		130			28	13	15	1389	1414		125			25	13	12	1389	1417		130			28	13	15	1402
280	| osc7	1390	1413		124			23	10	13	1390	1415		125			25	10	15	1389	1412		120			23	11	12	1390	1414		123			24	10	14	1400
281	**Combine STRETEFM**	**1439**	**1456**	**119**				**17**	**9**	**8**	**1439**	**1457**	**120**				**18**	**9**	**9**	**1438**	**1455**	**119**				**17**	**10**	**7**	**1439**	**1457**	**118**				**18**	**9**	**9**	**1448**
281	| sfnw1	1436	1459		109			23	11	12	1436	1461		110			25	11	14	1435	1458		110			23	12	11	1436	1460		109			24	11	13	1447
281	| sfnw34	1437	1466		117			29	11	18	1438	1468		118			30	10	20	1437	1465		117			28	11	17	1438	1468		117			30	10	20	1448
282	**Combine THATCHEDCOT**	**1437**	**1458**	**125**				**21**	**9**	**12**	**1437**	**1460**	**125**				**23**	**9**	**14**	**1437**	**1457**	**125**				**20**	**9**	**11**	**1438**	**1460**	**126**				**22**	**8**	**14**	**1446**
282	| tcnw12	1436	1464		111			28	9	19	1436	1466		112			30	9	21	1436	1463		112			27	9	18	1437	1466		111			29	8	21	1445
282	| tcnw5	1430	1470		123			40	16	24	1431	1471		123			40	15	25	1430	1467		122			37	16	21	1432	1473		125			41	14	27	1446
283	**Combine OLDIMPTON**	**1528**	**1542**	**28.1**	**n=3**	**A= 28.1%(A**		**14**	**15**	**-1**	**1528**	**1543**	**31.1**	**n=3**	**A= 31.1%(**		**15**	**15**	**0**	**1528**	**1541**	**24.1**	**n=3**	**A= 24.1%(**		**13**	**15**	**-2**	**1528**	**1544**	**33.6**	**n=3**	**A= 33.6%(**		**16**	**15**	**1**	**1543**
283	**Combine OLDIMPTON**	**1529**	**1547**	**118**				**18**	**14**	**4**	**1529**	**1548**	**119**				**19**	**14**	**5**	**1529**	**1546**	**117**				**17**	**14**	**3**	**1530**	**1548**	**119**				**18**	**13**	**5**	**1543**
283	| oin12	1529	1555		103	113		26	13	13	1529	1556		104	114		27	13	14	1529	1554		101	113		25	13	12	1529	1557		104	114		28	13	15	1542
283	| oin6	1498	1530		8.6			32	45	-13	1499	1531		10.1			32	44	-12	1499	1528		6.7			29	44	-15	1499	1533		11.5			34	44	-10	1543
283	| oin911	1523	1552		127	112		29	20	9	1524	1553		127	113		29	19	10	1523	1551		126	110		28	20	8	1524	1554		127	113		30	19	11	1543
284	**Combine GEORGEINN1**	**1425**	**1437**	**45.2**				**12**	**7**	**5**	**1426**	**1437**	**49.4**				**11**	**6**	**5**	**1425**	**1436**	**37.1**				**11**	**7**	**4**	**1426**	**1438**	**51**				**12**	**6**	**6**	**1432**
284	**Combine GEORGEINN1**	**1427**	**1442**	**75.1**				**15**	**5**	**10**	**1427**	**1443**	**78.3**				**16**	**5**	**11**	**1428**	**1445**	**126**				**17**	**4**	**13**	**1427**	**1440**	**62.1**				**13**	**5**	**8**	**1432**
284	**Combine GEORGEINN1**	**1428**	**1446**	**126**				**18**	**4**	**14**	**1428**	**1447**	**126**				**19**	**4**	**15**										**1428**	**1448**	**126**				**20**	**4**	**16**	**1432**
284	| gi11	1426	1452		90.9	115	114	26	6	20	1426	1453		92.8	116	114	27	6	21	1426	1451		85.8	114		25	6	19	1427	1453		93.3	107	114	26	5	21	1432
284	| gi15	1408	1440		61.3	42.8		32	22	10	1409	1441		64.5	45.6		32	21	11	1408	1438		54			30	22	8	1409	1442		67.8	59.1		33	21	12	1430
284	| gi16	1408	1438		51.4			30	23	7	1408	1440		54.7			32	23	9	1408	1436		42.3			28	23	5	1409	1440		54			31	22	9	1431
284	| gi7b	1424	1456		105	124	122	32	6	26	1425	1457		106	124	122	32	5	27	1424	1453		106	121		29	6	23	1425	1457		105	116	122	32	5	27	1430
284	| gi9	1410	1438		56.3			28	20	8	1410	1440		59.7			30	20	10	1410	1437		52.1			27	20	7	1411	1440		61.9	52.9		29	19	10	1430
285	**Combine GEORGEINN3**	**1444**	**1462**	**125**				**18**	**9**	**9**	**1445**	**1462**	**126**				**17**	**8**	**9**	**1444**	**1461**	**126**				**17**	**9**	**8**	**1445**	**1463**	**126**				**18**	**8**	**10**	**1453**
285	| gi21a	1442	1468		118			26	11	15	1443	1470		118			27	10	17	1442	1467		118			25	11	14	1443	1470		118			27	10	17	1453
285	| gi26	1442	1468		117			26	11	15	1442	1469		117			27	11	16	1442	1467		117			25	11	14	1443	1469		117			26	10	16	1453
286	**Combine GEORGEINN5**	**1473**	**1483**	**157**				**10**	**5**	**5**	**1473**	**1483**	**161**				**10**	**5**	**5**	**1472**	**1482**	**151**				**10**	**6**	**4**	**1473**	**1483**	**160**				**10**	**5**	**5**	**1478**
286	| gi39	1467	1494		134			27	10	17	1467	1496		134			29	10	19	1467	1492		133			25	10	15	1467	1496		135			29	10	19	1477
286	| gi40	1463	1491		113			28	14	14	1463	1493		115			30	14	16	1463	1489		108			26	14	12	1464	1492		116			28	13	15	1477
286	| gi41	1472	1495		109			23	6	17	1472	1497		111			25	6	19	1472	1494		104			22	6	16	1472	1496		110			24	6	18	1478
286	| gi43	1467	1493		131			26	11	15	1467	1494		132			27	11	16	1467	1491		131			24	11	13	1467	1494		132			27	11	16	1478

Number	SITE & sample	A from	A to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A	Sample	2nd test	3rd test	Range	beg range	end range	Real date
286	gi44	1468	1490		127			22	9	13	1468	1492		128			24	9	15	1468	1489		128			21	9	12	1468	1492		127			24	9	15	1477
287	**Combine KINGST**	**1441**	**1459**	**117**				**18**	**6**	**12**	**1442**	**1460**	**118**				**18**	**5**	**13**	**1441**	**1458**	**117**				**17**	**6**	**11**	**1442**	**1460**	**116**				**18**	**5**	**13**	**1447**
287	kso1	1441	1469		116			28	6	22	1441	1471		116			30	6	24	1441	1468		116			27	6	21	1441	1472		115			31	6	25	1447
287	kso3	1438	1462		108			24	8	16	1438	1463		109			25	8	17	1438	1461		108			23	8	15	1438	1464		107			26	8	18	1446
288	**Combine IVIED**	**1442**	**1456**	**103**				**14**	**12**	**2**	**1442**	**1457**	**105**				**15**	**12**	**3**	**1442**	**1456**	**99.6**				**14**	**12**	**2**	**1442**	**1457**	**103**				**15**	**12**	**3**	**1454**
288	ivied2	1435	1458		94.6			23	19	4	1436	1460		96.8			24	18	6	1435	1458		91.4			23	19	4	1436	1460		95.4			24	18	6	1454
288	ivied3	1442	1464		109			22	11	11	1442	1466		110			24	11	13	1442	1464		109			22	11	11	1442	1466		110			24	11	13	1453
289	**Combine LODGEFM1**	**1354**	**1375**	**124**				**21**	**14**	**7**	**1354**	**1376**	**124**				**22**	**14**	**8**	**1354**	**1373**	**123**				**19**	**14**	**5**	**1355**	**1377**	**124**				**22**	**13**	**9**	**1368**
289	lf2	1349	1383		118			34	19	15	1350	1384		118			34	18	16	1349	1381		117			32	19	13	1350	1385		119			35	18	17	1368
289	lf3	1353	1383		115			30	15	15	1353	1385		115			32	15	17	1353	1381		115			28	15	13	1354	1385		115			31	14	17	1368
290	**Combine LODGEFM2**	**1362**	**1383**	**125**				**21**	**12**	**9**	**1363**	**1384**	**126**				**21**	**11**	**10**	**1362**	**1381**	**126**				**19**	**12**	**7**	**1363**	**1384**	**126**				**21**	**11**	**10**	**1374**
290	lf5	1360	1389		116			29	14	15	1360	1391		116			31	14	17	1360	1388		117			28	14	14	1360	1392		116			32	14	18	1374
290	lf6	1360	1391		119			31	13	18	1360	1392		119			32	13	19	1359	1389		119			30	14	16	1360	1394		119			34	13	21	1373
291	**Combine MANISTY**	**1398**	**1408**	**108**				**10**	**2**	**8**	**1398**	**1409**	**112**				**11**	**2**	**9**	**1398**	**1408**	**106**				**10**	**2**	**8**	**1398**	**1410**	**109**				**12**	**2**	**10**	**1400**
291	man1	1391	1414		112			23	9	14	1392	1416		114			24	8	16	1391	1414		113			23	9	14	1392	1416		115			24	8	16	1400
291	man2	1399	1425		83.5			26	1	25	1399	1427		85.9			28	1	27	1399	1424		81.8			25	1	24	1399	1428		83			29	1	28	1400
291	man3	1393	1415		124			22	7	15	1393	1417		125			24	7	17	1393	1415		123			22	7	15	1393	1417		123			24	7	17	1400
291	man5	1391	1412		99.8			21	9	12	1391	1414		102			23	9	14	1391	1412		99.4			21	9	12	1391	1414		101			23	9	14	1400
292	**Combine MONKS**	**1292**	**1306**	**14.7**	**n=2 A= 14.7%(A**			**14**	**8**	**6**	**1292**	**1308**	**17.3**	**n=2 A= 17.3%(**			**16**	**8**	**8**	**1292**	**1306**	**11.7**	**n=2 A= 11.7%(**			**14**	**8**	**6**	**1292**	**1307**	**16.7**	**FAILED**	**n=2 A**		**15**	**8**	**7**	**1300**
292	mc1	1267	1293		6.6			26	33	-7	1267	1294		8.2			27	33	-6	1266	1291		4.7			25	34	-9	1267	1294		7.8			27	33	-6	1300
292	mc2	1293	1314		101			21	7	14	1293	1317		102			24	7	17	1293	1314		102			21	7	14	1293	1316		102			23	7	16	1300
293	**Combine OLDCHURCH**	**1350**	**1374**	**121**				**24**	**16**	**8**	**1351**	**1375**	**121**				**24**	**15**	**9**	**1350**	**1372**	**119**				**22**	**16**	**6**	**1351**	**1376**	**120**				**25**	**15**	**10**	**1366**
293	och1	1349	1385		115			36	17	19	1349	1386		116			37	17	20	1349	1383		115			34	17	17	1350	1388		115			38	16	22	1366
293	och2	1345	1380		113			35	21	14	1345	1382		114			37	21	16	1345	1377		112			32	21	11	1346	1382		112			36	20	16	1366
294	**Combine OLDVICARAGE**	**1390**	**1399**	**104**				**9**	**5**	**4**	**1390**	**1400**	**109**				**10**	**5**	**5**	**1390**	**1398**	**97.8**				**8**	**5**	**3**	**1390**	**1400**	**105**				**10**	**5**	**5**	**1395**
294	ovo1	1387	1416		124			29	6	23	1387	1417		124			30	6	24	1387	1414		124			27	6	21	1387	1418		124			31	6	25	1393
294	ovo2	1386	1410		133			24	9	15	1386	1412		134			26	9	17	1386	1410		133			24	9	15	1386	1413		134			27	9	18	1395
294	ovo3	1380	1409		121			29	15	14	1381	1410		122			29	14	15	1381	1408		120			27	14	13	1381	1412		124			31	14	17	1395
294	ovo4	1383	1409		127			26	12	14	1383	1410		128			27	12	15	1383	1408		126			25	12	13	1383	1410		127			27	12	15	1395
294	ovo5	1378	1404		87.1			26	17	9	1379	1406		89.9			27	16	11	1378	1403		80			25	17	8	1379	1405		85.2			26	16	10	1395
294	ovo7	1390	1422		67.9			32	5	27	1391	1423		70.4			32	4	28	1391	1420		64.7			29	4	25	1391	1425		67.1			34	4	30	1395
294	ovo8	1378	1402		73.5			24	17	7	1378	1404		76.7			26	17	9	1378	1402		73.2			24	17	7	1379	1405		77.1			26	16	10	1395
295	**Combine THEPRIORY**	**1440**	**1459**	**143**				**19**	**8**	**11**	**1441**	**1460**	**144**				**19**	**7**	**12**	**1440**	**1457**	**144**				**17**	**8**	**9**	**1441**	**1461**	**144**				**20**	**7**	**13**	**1448**
295	odmpry1	1436	1468		121			32	12	20	1437	1469		122			32	11	21	1436	1466		122			30	12	18	1437	1470		121			33	11	22	1448
295	odmpry2	1437	1475		124			38	11	27	1437	1477		124			40	11	29	1437	1471		124			34	11	23	1438	1477		124			39	10	29	1448
295	odmpry3	1433	1470		124			37	15	22	1434	1471		124			37	14	23	1433	1467		124			34	15	19	1434	1473		125			39	14	25	1448
296	**Combine TUDORCOTT**	**1529**	**1549**	**120**				**20**	**11**	**9**	**1530**	**1550**	**120**				**20**	**10**	**10**	**1529**	**1548**	**118**				**19**	**11**	**8**	**1530**	**1550**	**120**				**20**	**10**	**10**	**1540**
296	tho2	1529	1558		114			29	11	18	1529	1559		115			30	11	19	1529	1556		114			27	11	16	1529	1560		114			31	11	20	1540
296	tho4	1524	1554		113			30	16	14	1524	1556		113			32	16	16	1524	1552		112			28	16	12	1525	1556		113			31	15	16	1540
297	**Combine BURGHCLERE1**	**1446**	**1458**	**82.7**				**12**	**5**	**7**	**1446**	**1459**	**87**				**13**	**5**	**8**	**1446**	**1457**	**75.8**				**11**	**5**	**6**	**1447**	**1459**	**86.3**				**12**	**4**	**8**	**1451**
297	**Combine BURGHCLERE1**	**1447**	**1461**	**113**				**14**	**4**	**10**	**1447**	**1462**	**115**				**15**	**4**	**11**	**1447**	**1460**	**110**				**13**	**4**	**9**	**1447**	**1462**	**117**				**15**	**4**	**11**	**1451**
297	obb1	1432	1458		53.1			26	19	7	1433	1460		56.5			27	18	9	1432	1457		46.8			25	19	6	1433	1459		54.2			26	18	8	1451
297	obb3	1444	1472		121	125		28	7	21	1444	1474		121	126		30	7	23	1444	1470		121	126		26	7	19	1445	1473		121	125		28	6	22	1451
297	obb5	1436	1464		100	84.2		28	15	13	1436	1466		102	86.7		30	15	15	1436	1463		97.2	81		27	15	12	1437	1466		105	89		29	14	15	1451
297	obb6	1446	1470		107	117		24	5	19	1446	1473		108	118		27	5	22	1446	1470		104	116		24	5	19	1446	1472		108	118		26	5	21	1451
298	**Combine OTLEYHALL**	**1507**	**1520**	**128**				**13**	**4**	**9**	**1508**	**1521**	**131**				**13**	**3**	**10**	**1507**	**1520**	**126**				**13**	**4**	**9**	**1508**	**1521**	**131**				**13**	**3**	**10**	**1511**
298	oty04	1507	1531		116			24	4	20	1507	1532		117			25	4	21	1507	1530		115			23	4	19	1507	1533		116			26	4	22	1511
298	otyC01	1504	1528		123			24	7	17	1505	1529		124			24	6	18	1504	1527		124			23	7	16	1505	1529		123			24	6	18	1511

Number	SITE & sample	A from	A to	Phase A_n	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	S from	S to	Phase A_n	S Sample	S 2nd test	S 3rd test	S Range	S beg range	S end range	B from	B to	Phase A_n	B Sample	B 2nd test	B 3rd test	B Range	B beg range	B end range	C from	C to	Phase A_n	C Sample	C 2nd test	C 3rd test	Range	beg range	end range	Real date
298	otyE01	1500	1526		108			26	10	16	1500	1528		110			28	10	18	1500	1525		106			25	10	15	1500	1528		111			28	10	18	1510
299	**Combine OVERTON1**	**1534**	**1547**	**147**				**13**	**8**	**5**	**1534**	**1548**	**148**				**14**	**8**	**6**	**1534**	**1546**	**146**				**12**	**8**	**4**	**1534**	**1548**	**148**				**14**	**8**	**6**	**1542**
299	gso1	1532	1554		121			22	10	12	1532	1556		122			24	10	14	1532	1554		121			22	10	12	1532	1556		121			24	10	14	1542
299	gso2	1527	1561		133			34	14	20	1527	1562		133			35	14	21	1526	1558		130			32	15	17	1527	1563		134			36	14	22	1541
299	gso3	1531	1553		121			22	11	11	1531	1555		122			24	11	13	1531	1553		123			22	11	11	1531	1555		122			24	11	13	1542
300	**Combine OVERTON2**	**1605**	**1619**	**146**				**14**	**10**	**4**	**1606**	**1620**	**147**				**14**	**9**	**5**	**1605**	**1618**	**146**				**13**	**10**	**3**	**1606**	**1620**	**146**				**14**	**9**	**5**	**1615**
300	gso12	1602	1628		125			26	13	13	1602	1629		125			27	13	14	1602	1627		125			25	13	12	1603	1629		125			26	12	14	1615
300	gso13	1601	1627		123			26	14	12	1601	1628		124			27	14	13	1601	1626		123			25	14	11	1602	1628		123			26	13	13	1615
300	gso14	1603	1629		125			26	12	14	1603	1630		125			27	12	15	1603	1628		125			25	12	13	1603	1631		125			28	12	16	1615
301	**Combine OVERTON3**	**1520**	**1535**	**72.4**				**15**	**13**	**2**	**1521**	**1536**	**75.8**				**15**	**12**	**3**	**1520**	**1534**	**68.3**				**14**	**13**	**1**	**1521**	**1536**	**71.5**				**15**	**12**	**3**	**1533**
301	**Combine OVERTON3**	**1522**	**1541**	**125**				**19**	**11**	**8**	**1522**	**1542**	**126**				**20**	**11**	**9**	**1522**	**1540**	**126**				**18**	**11**	**7**	**1523**	**1543**	**126**				**20**	**10**	**10**	**1533**
301	wso2	1508	1531		42.3			23	23	0	1509	1533		45.2			24	22	2	1508	1531		38.6			23	23	0	1509	1533		41.5			24	22	2	1531
301	wso4	1519	1548		118	117		29	14	15	1520	1549		119	117		29	13	16	1519	1546		118	117		27	14	13	1520	1549		118	117		29	13	16	1533
301	wso5	1520	1549		115	118		29	13	16	1520	1550		115	118		30	13	17	1520	1547		114	118		27	13	14	1520	1551		114	118		31	13	18	1533
302	**Combine OVERTON4**	**1544**	**1553**	**55**				**9**	**0**	**9**	**1545**	**1554**	**60.7**				**9**	**-1**	**10**	**1544**	**1553**	**45.1**				**9**	**0**	**9**	**1545**	**1554**	**61.2**				**9**	**-1**	**10**	**1544**
302	**Combine OVERTON4**	**1541**	**1552**	**156**				**11**	**3**	**8**	**1541**	**1553**	**159**				**12**	**3**	**9**	**1541**	**1551**	**152**				**10**	**3**	**7**	**1542**	**1553**	**159**				**11**	**2**	**9**	**1544**
302	ovrtn1	1536	1563		123	133		27	6	21	1536	1565		125	133		29	6	23	1536	1561		119	133		25	6	19	1536	1565		123	133		29	6	23	1542
302	ovrtn2	1536	1559		104	125		23	8	15	1537	1561		107	126		24	7	17	1536	1559		105	127		23	8	15	1537	1561		105	125		24	7	17	1544
302	ovrtn3	1539	1562		129	124		23	5	18	1539	1564		130	125		25	5	20	1539	1562		131	123		23	5	18	1540	1563		129	126		23	4	19	1544
302	ovrtn5	1547	1574		47.3			27	-3	30	1547	1576		49.9			29	-3	32	1547	1573		42.2			26	-3	29	1547	1576		48.8			29	-3	32	1544
302	ovrtn6	1529	1561		82.4	105		32	15	17	1529	1562		85.6	107		33	15	18	1529	1559		73	97.8		30	15	15	1530	1563		89.1	110		33	14	19	1544
302	ovrtn8	1519	1551		23.1			32	25	7	1520	1552		25.8			32	24	8	1519	1549		17.6			30	25	5	1520	1553		27.1			33	24	9	1544
302	ovrtn9	1538	1570		139	125		32	5	27	1538	1571		139	125		33	5	28	1538	1567		139	126		29	5	24	1538	1572		138	123		34	5	29	1543
303	**Combine OVERTON5**	**1497**	**1507**	**20.5**	**n=8 A= 20.5%(A**			**10**	**7**	**3**	**1498**	**1508**	**23.9**	**n=8 A= 23.9%(**			**10**	**6**	**4**	**1497**	**1506**	**16.1**	**n=8 A= 16.1%(**			**9**	**7**	**2**	**1498**	**1508**	**23**	**n=8 A= 23.0%(Ar**			**10**	**6**	**4**	**1504**
303	**Combine OVERTON5**	**1498**	**1509**	**94.2**				**11**	**6**	**5**	**1499**	**1509**	**99.1**				**10**	**5**	**5**	**1498**	**1509**	**108**				**11**	**6**	**5**	**1499**	**1510**	**97.1**				**11**	**5**	**6**	**1504**
303	**Combine OVERTON5**	**1499**	**1510**	**117**				**11**	**5**	**6**	**1499**	**1511**	**121**				**12**	**5**	**7**	**1499**	**1511**	**152**				**12**	**5**	**7**	**1500**	**1512**	**120**				**12**	**4**	**8**	**1504**
303	**Combine OVERTON5**	**1499**	**1512**	**155**				**13**	**5**	**8**	**1500**	**1513**	**157**				**13**	**4**	**9**										**1500**	**1514**	**157**				**14**	**4**	**10**	**1504**
303	cf1	1497	1529		84.4	99.2	111	32	7	25	1498	1530		86.6	101	112	32	6	26	1497	1527		79.1	107	118	30	7	23	1498	1531		85.1	99.8	111	33	6	27	1504
303	cf2	1489	1518		127	119	110	29	15	14	1489	1520		128	120	111	31	15	16	1489	1517		126	108	96.5	28	15	13	1489	1521		128	120	111	32	15	17	1504
303	cf3	1495	1526		117	126	130	31	9	22	1495	1528		118	126	131	33	9	24	1495	1524		118	131	132	29	9	20	1495	1529		118	127	131	34	9	25	1504
303	cf4	1458	1487		1.3			29	46	-17	1458	1489		1.8			31	46	-15	1458	1485		0.9			27	46	-19	1458	1489		1.7			31	46	-15	1504
303	cf5	1491	1525		136	137	135	34	5	29	1492	1527		136	137	135	35	4	31	1491	1523		137	135	130	32	5	27	1492	1528		135	137	136	36	4	32	1496
303	cf6	1482	1511		64.4	56		29	22	7	1482	1512		67.3	58.9		30	22	8	1482	1509		57.1			27	22	5	1482	1513		65.7	57.1		31	22	9	1504
303	cf7	1495	1526		112	122	128	31	9	22	1496	1528		113	123	129	32	8	24	1495	1525		111	128	131	30	9	21	1496	1528		113	123	129	32	8	24	1504
303	cf8	1481	1512		69.9	61.4	54.1	31	23	8	1482	1514		72.6	64.1	56.9	32	22	10	1481	1510		61.6	46.9		29	23	6	1482	1514		72.2	63.5	56	32	22	10	1504
304	**Combine NEWCOLL**	**1387**	**1399**	**89.1**				**12**	**10**	**2**	**1387**	**1401**	**92.6**				**14**	**10**	**4**	**1387**	**1399**	**85.8**				**12**	**10**	**2**	**1387**	**1400**	**93.2**				**13**	**10**	**3**	**1397**
304	**Combine NEWCOLL**	**1388**	**1404**	**122**				**16**	**9**	**7**										**1387**	**1403**	**122**				**16**	**10**	**6**										**1397**
304	btnc1	1387	1411		109	115		24	7	17	1387	1413		111			26	7	19	1387	1410		109	116		23	7	16	1387	1412		111			25	7	18	1394
304	btnc3	1375	1399		59.6			24	22	2	1375	1402		62.9			27	22	5	1375	1398		55.8			23	22	1	1375	1401		63.3			26	22	4	1397
304	btnc6	1384	1408		126	115		24	10	14	1384	1410		126			26	10	16	1384	1407		126	115		23	10	13	1384	1410		126			26	10	16	1394
305	**Combine CHRISTCHURCH**	**1259**	**1267**	**39.3**				**8**	**2**	**6**	**1259**	**1268**	**44.2**				**9**	**2**	**7**	**1259**	**1267**	**33.4**				**8**	**2**	**6**	**1259**	**1269**	**43.2**				**10**	**2**	**8**	**1261**
305	**Combine CHRISTCHURCH**	**1257**	**1268**	**111**				**11**	**4**	**7**	**1257**	**1268**	**116**				**11**	**4**	**7**	**1256**	**1267**	**107**				**11**	**5**	**6**	**1257**	**1269**	**115**				**12**	**4**	**8**	**1261**
305	ccch1	1248	1277		114	120		29	12	17	1248	1279		116	122		31	12	19	1248	1276		109	117		28	12	16	1248	1279		117	123		31	12	19	1260
305	ccch2	1246	1272		79.5	89.6		26	14	12	1247	1274		82.7	92.3		27	13	14	1246	1272		76	88		26	14	12	1247	1274		82.4	92.6		27	13	14	1260
305	ccch3	1261	1293		36.4			32	-1	33	1262	1294		39.1			32	-2	34	1261	1291		32.6			30	-1	31	1262	1296		36.4			34	-2	36	1260
305	ccch4	1247	1273		89.6	99.3		26	12	14	1248	1275		92.5	102		27	11	16	1247	1272		85.1	97.1		25	12	13	1248	1275		90.8	101		27	11	16	1259

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	AS from	AS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	BS from	BS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	CS from	CS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
305	ccch5	1256	1281		126	110		25	4	21	1256	1283		127	112		27	4	23	1256	1280		126	108		24	4	20	1256	1283		128	113		27	4	23	1260
305	ccch6	1239	1269		44.1			30	20	10	1239	1271		47.3			32	20	12	1239	1268		39			29	20	9	1240	1271		51.1			31	19	12	1259
305	ccch8	1255	1287		121	107		32	4	28	1256	1288		122	108		32	3	29	1255	1285		122	107		30	4	26	1256	1289		120	106		33	3	30	1259
305	ccch9	1243	1267		35.8			24	16	8	1243	1268		39.3			25	16	9	1243	1266		32.6			23	16	7	1243	1268		37.4			25	16	9	1259
306	**Combine CORPUSCHRISTI**	**1418**	**1427**	**93.6**				**9**	**6**	**3**	**1419**	**1428**	**99.8**				**9**	**5**	**4**	**1418**	**1427**	**89.4**				**9**	**6**	**3**	**1419**	**1428**	**98.9**				**9**	**5**	**4**	**1424**
306	ccfh1	1412	1437		129			25	11	14	1412	1439		130			27	11	16	1412	1436		129			24	11	13	1412	1439		129			27	11	16	1423
306	ccfh11	1405	1431		69.7			26	17	9	1406	1433		73			27	16	11	1405	1430		65.1			25	17	8	1406	1433		73.1			27	16	11	1422
306	ccfh13	1415	1441		133			26	8	18	1415	1443		134			28	8	20	1415	1440		134			25	8	17	1415	1443		133			28	8	20	1423
306	ccfh14	1418	1446		91.7			28	5	23	1418	1448		93.8			30	5	25	1418	1444		89.8			26	5	21	1419	1448		92.5			29	4	25	1423
306	ccfh2ii	1408	1434		94.9			26	16	10	1408	1435		97.6			27	16	11	1408	1433		96.5			25	16	9	1409	1436		102			27	15	12	1424
306	ccfh3	1418	1444		98.6			26	5	21	1418	1446		101			28	5	23	1418	1443		97.7			25	5	20	1418	1447		101			29	5	24	1423
306	ccfh5	1408	1432		81.9			24	15	9	1409	1433		85.1			24	14	10	1408	1431		78.5			23	15	8	1409	1433		81.2			24	14	10	1423
307	**Combine LINCOLN**	**1433**	**1448**	**115**				**15**	**4**	**11**	**1433**	**1449**	**117**				**16**	**4**	**12**	**1433**	**1447**	**113**				**14**	**4**	**10**	**1433**	**1449**	**118**				**16**	**4**	**12**	**1437**
307	lcb2	1429	1458		127			29	8	21	1429	1460		127			31	8	23	1429	1457		127			28	8	20	1430	1461		127			31	7	24	1437
307	lcb4	1432	1461		112			29	5	24	1433	1462		113			29	4	25	1432	1459		112			27	5	22	1433	1462		114			29	4	25	1437
307	lcb5	1423	1451		89			28	14	14	1423	1452		91.1			29	14	15	1423	1450		87			27	14	13	1424	1453		91.9			29	13	16	1437
308	**Combine MAGDALEN1**	**1464**	**1475**	**135**				**11**	**12**	**-1**	**1464**	**1476**	**139**				**12**	**12**	**0**	**1464**	**1474**	**129**				**10**	**12**	**-2**	**1465**	**1476**	**139**				**11**	**11**	**0**	**1476**
308	mco1	1460	1492		128			32	16	16	1461	1493		128			32	15	17	1460	1490		129			30	16	14	1461	1494		127			33	15	18	1476
308	mco10	1454	1483		106			29	21	8	1455	1484		107			29	20	9	1454	1481		102			27	21	6	1455	1484		107			29	20	9	1475
308	mco713	1463	1489		112			26	12	14	1464	1491		113			27	11	16	1463	1488		109			25	12	13	1464	1490		114			26	11	15	1475
308	mco816	1453	1482		98.2			29	23	6	1454	1483		100			29	22	7	1453	1480		94			27	23	4	1454	1483		101			29	22	7	1476
308	mco9	1459	1487		132			28	16	12	1459	1489		133			30	16	14	1459	1486		133			27	16	11	1460	1489		133			29	15	14	1475
309	**Combine MAGDALEN2**	**1815**	**1829**	**145**				**14**	**9**	**5**	**1815**	**1830**	**146**				**15**	**9**	**6**	**1815**	**1828**	**146**				**13**	**9**	**4**	**1815**	**1830**	**146**				**15**	**9**	**6**	**1824**
309	mco11	1811	1838		126			27	13	14	1811	1840		126			29	13	16	1811	1837		126			26	13	13	1811	1840		127			29	13	16	1824
309	mco12	1813	1839		124			26	9	17	1813	1840		124			27	9	18	1813	1838		124			25	9	16	1813	1841		124			28	9	19	1822
309	mco17	1811	1836		123			25	11	14	1811	1838		123			27	11	16	1811	1835		123			24	11	13	1812	1838		123			26	10	16	1822
310	**Combine MAGDALEN3**	**1729**	**1738**	**86.6**				**9**	**5**	**4**	**1729**	**1739**	**92.3**				**10**	**5**	**5**	**1729**	**1737**	**77.8**				**8**	**5**	**3**	**1730**	**1739**	**92.5**				**9**	**4**	**5**	**1734**
310	**Combine MAGDALEN3**	**1727**	**1737**	**164**				**10**	**7**	**3**	**1730**	**1740**	**130**				**10**	**4**	**6**	**1727**	**1737**	**163**				**10**	**7**	**3**	**1730**	**1741**	**129**				**11**	**4**	**7**	**1734**
310	mco51	1707	1738		35.8			31	27	4	1707	1740		38.6			33	27	6	1707	1736		29.2			29	27	2	1707	1741		39.8			34	27	7	1734
310	mco52	1720	1743		94.9	109		23	14	9	1720	1745		97.6	88.8		25	14	11	1720	1743		94.3	110		23	14	9	1720	1745		92.6	83.8		25	14	11	1734
310	mco54	1723	1755		137	129		32	11	21	1723	1757		138	138		34	11	23	1723	1753		138	130		30	11	19	1724	1757		137	137		33	10	23	1734
310	mco55	1725	1757		125	109		32	8	24	1726	1758		125	130		32	7	25	1725	1755		124	106		30	8	22	1726	1759		124	129		33	7	26	1733
310	mco56	1722	1749		132	133		27	12	15	1722	1751		133	127		29	12	17	1722	1748		132	133		26	12	14	1723	1751		132	127		28	11	17	1734
310	mco57	1718	1749		118	127		31	15	16	1719	1751		120	113		32	14	18	1718	1748		116	125		30	15	15	1719	1751		122	115		32	14	18	1733
310	mco58	1730	1762		59.2			32	4	28	1731	1763		61.9	73.6		32	3	29	1730	1760		55.8			30	4	26	1731	1763		62.8	74.5		32	3	29	1734
310	mco59	1719	1750		124	131		31	15	16	1719	1751		125	119		32	15	17	1719	1748		123	131		29	15	14	1720	1752		127	121		32	14	18	1734
311	**Combine MERTON**	**1606**	**1615**	**142**				**9**	**2**	**7**	**1606**	**1616**	**148**				**10**	**2**	**8**	**1606**	**1614**	**133**				**8**	**2**	**6**	**1606**	**1616**	**154**				**10**	**2**	**8**	**1608**
311	mer12	1600	1634		136			34	6	28	1601	1635		136			34	5	29	1600	1631		137			31	6	25	1601	1636		133			35	5	30	1606
311	mer17	1593	1629		121			36	13	23	1593	1630		123			37	13	24	1593	1626		116			33	13	20	1594	1632		128			38	12	26	1606
311	mer2	1605	1628		109			23	2	21	1605	1630		111			25	2	23	1605	1627		105			22	2	20	1605	1629		113			24	2	22	1607
311	mer3	1604	1627		123			23	3	20	1604	1628		124			24	3	21	1604	1625		122			21	3	18	1604	1628		126			24	3	21	1607
311	mer4	1593	1619		75.9			26	15	11	1594	1621		79.3			27	14	13	1593	1618		72			25	15	10	1594	1621		79.1			27	14	13	1608
311	mer5	1598	1626		129			28	10	18	1598	1628		130			30	10	20	1598	1624		128			26	10	16	1599	1627		131			28	9	19	1608
311	mer7	1595	1626		118			31	11	20	1595	1627		120			32	11	21	1595	1624		115			29	11	18	1596	1628		123			32	10	22	1606
312	**Combine RADCAM**	**1736**	**1745**	**136**				**9**	**4**	**5**	**1737**	**1746**	**142**				**9**	**3**	**6**	**1736**	**1745**	**133**				**9**	**4**	**5**	**1737**	**1746**	**141**				**9**	**3**	**6**	**1740**
312	rco11	1728	1749		91.6			21	12	9	1728	1751		94.8			23	12	11	1728	1749		91.5			21	12	9	1728	1751		93.4			23	12	11	1740
312	rco13	1731	1754		130			23	9	14	1731	1756		131			25	9	16	1730	1753		129			23	10	13	1731	1755		130			24	9	15	1740
312	rco1a	1727	1753		110			26	10	16	1727	1755		112			28	10	18	1727	1752		108			25	10	15	1727	1756		116			29	10	19	1737

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
312	| rco4	1736	1761		95.6			25	4	21	1736	1763		97.9			27	4	23	1736	1760		93.2			24	4	20	1736	1763		96.3			27	4	23	1740
312	| rco6	1731	1755		134			24	9	15	1731	1757		134			26	9	17	1731	1754		134			23	9	14	1731	1757		135			26	9	17	1740
312	| rco7	1734	1756		127			22	6	16	1734	1758		128			24	6	18	1734	1756		127			22	6	16	1734	1758		128			24	6	18	1740
313	**Combine BODLEIAN1**	**1453**	**1471**	**112**				**18**	**5**	**13**	**1454**	**1472**	**113**				**18**	**4**	**14**	**1453**	**1470**	**111**				**17**	**5**	**12**	**1454**	**1472**	**114**				**18**	**4**	**14**	**1458**
313	| bod4	1447	1474		105			27	11	16	1447	1476		106			29	11	18	1447	1473		104			26	11	15	1448	1476		108			28	10	18	1458
313	| bod5	1453	1479		112			26	4	22	1454	1480		112			26	3	23	1453	1478		111			25	4	21	1454	1480		112			26	3	23	1457
314	**Combine BODLEIAN2**	**1479**	**1490**	**35.5**				**11**	**7**	**4**	**1480**	**1491**	**39.9**				**11**	**6**	**5**	**1479**	**1490**	**28.3**	**n=5 A= 28.3%(**			**11**	**7**	**4**	**1480**	**1491**	**40.2**				**11**	**6**	**5**	**1486**
314	**Combine BODLEIAN2**	**1473**	**1488**	**131**				**15**	**13**	**2**	**1473**	**1489**	**133**				**16**	**13**	**3**	**1473**	**1487**	**129**				**14**	**13**	**1**	**1481**	**1493**	**77.3**				**12**	**5**	**7**	**1486**
314	| bod11	1473	1499		124	114		26	13	13	1473	1500		125	115		27	13	14	1472	1498		122	113		26	14	12	1473	1500		125	112		27	13	14	1486
314	| bod13	1482	1509		57.3			27	4	23	1482	1511		59.7			29	4	25	1482	1508		53.4			26	4	22	1482	1511		59.6	79.9		29	4	25	1486
314	| bod18	1456	1485		18			29	30	-1	1457	1486		20.7			29	29	0	1456	1483		13.8			27	30	-3	1457	1486		20.1			29	29	0	1486
314	| bod8	1465	1494		72.9	110		29	21	8	1466	1496		76.4	111		30	20	10	1465	1493		66.3	109		28	21	7	1466	1496		77.7	66		30	20	10	1486
314	| bod9	1467	1499		106	128		32	19	13	1467	1501		108	128		34	19	15	1467	1497		99.5	127		30	19	11	1468	1502		113	101		34	18	16	1486
315	**Combine BODLEIAN3**	**1593**	**1607**	**69.2**				**14**	**5**	**9**	**1594**	**1608**	**73.1**				**14**	**4**	**10**	**1593**	**1605**	**60.4**				**12**	**5**	**7**	**1594**	**1608**	**73.1**				**14**	**4**	**10**	**1598**
315	**Combine BODLEIAN3**	**1594**	**1610**	**99.9**				**16**	**4**	**12**	**1594**	**1611**	**102**				**17**	**4**	**13**	**1594**	**1609**	**94.4**				**15**	**4**	**11**	**1595**	**1611**	**105**				**16**	**3**	**13**	**1598**
315	| bod1	1587	1620		132	123		33	11	22	1587	1622		132	123		35	11	24	1587	1617		132	122		30	11	19	1588	1622		132	124		34	10	24	1598
315	| bod19	1581	1613		94.4	77.8		32	16	16	1581	1615		96.5	80.2		34	16	18	1581	1611		89.2	72.7		30	16	14	1582	1615		99.5	82.8		33	15	18	1597
315	| bod2	1595	1624		85.3	104		29	3	26	1595	1626		87.1	105		31	3	28	1595	1622		81.8	103		27	3	24	1595	1626		88.2	107		31	3	28	1598
315	| bod3	1577	1606		45.1			29	21	8	1577	1607		48.2			30	21	9	1576	1604		37.9			28	22	6	1577	1607		46			30	21	9	1598
316	**Combine BODLEIAN4**	**1602**	**1623**	**109**				**21**	**9**	**12**	**1602**	**1624**	**110**				**22**	**9**	**13**	**1601**	**1621**	**105**				**20**	**10**	**10**	**1602**	**1625**	**110**				**23**	**9**	**14**	**1611**
316	| bod72	1602	1634		111			32	8	24	1602	1636		111			34	8	26	1602	1631		110			29	8	21	1602	1636		111			34	8	26	1610
316	| bod73	1593	1627		101			34	18	16	1594	1628		102			34	17	17	1593	1624		98			31	18	13	1594	1629		103			35	17	18	1611
317	**Combine ZACHARIAS**	**1376**	**1392**	**120**				**16**	**6**	**10**	**1377**	**1393**	**121**				**16**	**5**	**11**	**1376**	**1392**	**118**				**16**	**6**	**10**	**1377**	**1393**	**119**				**16**	**5**	**11**	**1382**
317	| zck1	1372	1396		112			24	9	15	1373	1397		113			24	8	16	1372	1395		110			23	9	14	1373	1397		111			24	8	16	1381
317	| zck18	1376	1399		115			23	6	17	1376	1401		115			25	6	19	1376	1399		115			23	6	17	1376	1402		115			26	6	20	1382
318	**Combine PEMBRIDGEBT**	**1657**	**1671**	**147**				**14**	**11**	**3**	**1658**	**1672**	**148**				**14**	**10**	**4**	**1657**	**1670**	**148**				**13**	**11**	**2**	**1658**	**1672**	**148**				**14**	**10**	**4**	**1668**
318	| pem32	1654	1680		126			26	14	12	1654	1681		126			27	14	13	1653	1679		126			26	15	11	1654	1681		126			27	14	13	1668
318	| pem35	1654	1680		125			26	14	12	1655	1682		126			27	13	14	1654	1679		126			25	14	11	1655	1682		126			27	13	14	1668
318	| pem3738	1655	1679		124			24	13	11	1655	1681		124			26	13	13	1655	1678		124			23	13	10	1655	1680		124			25	13	12	1668
319	**Combine CEFNCAER1**	**1517**	**1528**	**158**				**11**	**9**	**2**	**1517**	**1529**	**160**				**12**	**9**	**3**	**1516**	**1527**	**153**				**11**	**10**	**1**	**1517**	**1530**	**158**				**13**	**9**	**4**	**1526**
319	| ccp1	1514	1541		127			27	12	15	1514	1543		128			29	12	17	1514	1540		127			26	12	14	1514	1543		128			29	12	17	1526
319	| ccp2	1515	1544		120			29	11	18	1515	1545		121			30	11	19	1515	1543		117			28	11	17	1515	1546		119			31	11	20	1526
319	| ccp4	1510	1541		133			31	16	15	1511	1543		134			32	15	17	1510	1540		133			30	16	14	1511	1544		134			33	15	18	1526
319	| ccp5	1511	1538		128			27	14	13	1511	1540		129			29	14	15	1511	1536		127			25	14	11	1511	1540		127			29	14	15	1525
319	| ccp6	1507	1536		107			29	19	10	1508	1537		108			29	18	11	1507	1534		102			27	19	8	1508	1537		107			29	18	11	1526
320	**Combine CEFNCAER2**	**1618**	**1638**	**116**				**20**	**42**	**-22**	**1618**	**1640**	**117**				**22**	**42**	**-20**	**1618**	**1637**	**116**				**19**	**42**	**-23**	**1619**	**1640**	**118**				**21**	**41**	**-20**	**1660**
320	| ccp11	1617	1649		113			32	41	-9	1618	1650		114			32	40	-8	1617	1647		113			30	41	-11	1618	1651		114			33	40	-7	1658
320	| ccp12b	1612	1643		110			31	48	-17	1612	1645		110			33	48	-15	1612	1642		109			30	48	-18	1612	1646		111			34	48	-14	1660
321	**Combine PERTH**	**1146**	**1169**	**120**				**23**	**5**	**18**	**1147**	**1170**	**121**				**23**	**4**	**19**	**1146**	**1168**	**114**				**22**	**5**	**17**	**1149**	**1174**	**115**				**25**	**2**	**23**	**1151**
321	| Q3187	1138	1178		114			40	13	27	1138	1180		115			42	13	29	1138	1176		113			38	13	25	1139	1183		114			44	12	32	1151
321	| Q3903	1138	1178		113			40	13	27	1139	1179		114			40	12	28	1138	1175		110			37	13	24	1140	1181		110			41	11	30	1151
321	| Q3905	1146	1196		105			50	5	45	1147	1198		107			51	4	47	1147	1195		101			48	4	44	1149	1207		102			58	2	56	1151
322	**Combine THESPAIN**	**1572**	**1583**	**147**				**11**	**7**	**4**	**1573**	**1584**	**149**				**11**	**6**	**5**	**1572**	**1583**	**147**				**11**	**7**	**4**	**1573**	**1584**	**148**				**11**	**6**	**5**	**1579**
322	| spn2	1569	1592		128			23	10	13	1569	1594		129			25	10	15	1569	1591		129			22	10	12	1569	1593		129			24	10	14	1579
322	| spn3	1567	1593		129			26	12	14	1567	1594		130			27	12	15	1567	1592		129			25	12	13	1568	1594		130			26	11	15	1579
322	| spn4	1571	1597		115			26	8	18	1571	1598		116			27	8	19	1571	1596		115			25	8	17	1572	1598		115			26	7	19	1579
322	| spn6	1567	1588		113			21	12	9	1567	1590		115			23	12	11	1567	1588		114			21	12	9	1567	1590		114			23	12	11	1579
323	**Combine GOODYERS1**	**1625**	**1637**	**168**				**12**	**7**	**5**	**1625**	**1638**	**170**				**13**	**7**	**6**	**1625**	**1636**	**169**				**11**	**7**	**4**	**1626**	**1638**	**169**				**12**	**6**	**6**	**1632**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	B to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	C to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
323	gdyr1	1621	1650		131			29	11	18	1621	1652		132			31	11	20	1621	1648		132			27	11	16	1621	1652		132			31	11	20	1632
323	gdyr23	1620	1657		133			37	12	25	1620	1658		133			38	12	26	1619	1654		134			35	13	22	1621	1659		131			38	11	27	1632
323	gdyr4	1619	1646		125			27	13	14	1620	1647		126			27	12	15	1620	1645		127			25	12	13	1620	1647		125			27	12	15	1632
323	gdyr5	1617	1646		117			29	14	15	1617	1647		119			30	14	16	1617	1644		116			27	14	13	1617	1648		118			31	14	17	1631
323	gdyr6	1622	1651		125			29	10	19	1623	1652		126			29	9	20	1622	1650		124			28	10	18	1623	1653		126			30	9	21	1632
324	**Combine GOODYERS2**	**1633**	**1645**	**147**				**12**	**4**	**8**	**1633**	**1646**	**149**				**13**	**4**	**9**	**1633**	**1644**	**146**				**11**	**4**	**7**	**1633**	**1646**	**149**				**13**	**4**	**9**	**1637**
324	gdyr10	1631	1658		119			27	6	21	1632	1659		120			27	5	22	1631	1656		118			25	6	19	1632	1659		120			27	5	22	1637
324	gdyr7	1627	1655		129			28	9	19	1627	1657		129			30	9	21	1627	1654		129			27	9	18	1628	1657		130			29	8	21	1636
324	gdyr8	1625	1651		110			26	11	15	1626	1653		112			27	10	17	1625	1650		108			25	11	14	1626	1652		111			26	10	16	1636
324	gdyr9	1630	1656		129			26	6	20	1630	1657		129			27	6	21	1629	1655		129			26	7	19	1630	1657		129			27	6	21	1636
325	**Combine DONKEYCART**	**1532**	**1550**	**71**				**18**	**2**	**16**	**1533**	**1551**	**73.6**				**18**	**1**	**17**	**1532**	**1549**	**68.6**				**17**	**2**	**15**	**1533**	**1551**	**71**				**18**	**1**	**17**	**1534**
325	pet1	1523	1547		61.7			24	11	13	1524	1548		64.2			24	10	14	1523	1546		59.2			23	11	12	1524	1548		61.8			24	10	14	1534
325	pet2	1534	1563		100			29	0	29	1534	1564		101			30	0	30	1534	1561		99.2			27	0	27	1534	1565		99.8			31	0	31	1534
326	**Combine TULLYS**	**1435**	**1448**	**102**				**13**	**7**	**6**	**1435**	**1449**	**105**				**14**	**7**	**7**	**1435**	**1448**	**99**				**13**	**7**	**6**	**1436**	**1449**	**108**				**13**	**6**	**7**	**1442**
326	tlys2	1435	1459		112			24	6	18	1435	1461		113			26	6	20	1435	1458		112			23	6	17	1435	1461		114			26	6	20	1441
326	tlys3	1423	1451		74			28	19	9	1423	1452		76.9			29	19	10	1423	1450		70			27	19	8	1424	1453		80.1			29	18	11	1442
326	tlys4	1432	1457		125			25	9	16	1432	1459		126			27	9	18	1432	1456		126			24	9	15	1433	1459		126			26	8	18	1441
327	**Combine CAUSEWAY**	**1553**	**1563**	**105**				**10**	**4**	**6**	**1553**	**1564**	**111**				**11**	**4**	**7**	**1553**	**1562**	**92.1**				**9**	**4**	**5**	**1554**	**1564**	**110**				**10**	**3**	**7**	**1557**
327	pirb1	1540	1571		95.8			31	17	14	1540	1572		98.2			32	17	15	1539	1569		90.3			30	18	12	1540	1574		99.2			34	17	17	1557
327	pirb11	1537	1570		80			33	20	13	1537	1572		82.7			35	20	15	1537	1567		73			30	20	10	1538	1572		84.9			34	19	15	1557
327	pirb12	1540	1572		101			32	17	15	1540	1574		103			34	17	17	1540	1570		97.1			30	17	13	1541	1574		106			33	16	17	1557
327	pirb2	1542	1574		118			32	14	18	1543	1575		120			32	13	19	1542	1572		113			30	14	16	1543	1575		118			32	13	19	1556
327	pirb3	1554	1585		69.3			31	3	28	1554	1586		71.8			32	3	29	1554	1582		65			28	3	25	1555	1586		74.9			31	2	29	1557
327	pirb4	1550	1587		108			37	7	30	1551	1588		108			37	6	31	1551	1585		102			34	6	28	1552	1591		99.1			39	5	34	1557
327	pirb5	1547	1576		136			29	9	20	1548	1578		136			30	8	22	1547	1575		136			28	9	19	1548	1578		136			30	8	22	1556
327	pirb9	1544	1573		124			29	13	16	1545	1575		126			30	12	18	1544	1572		122			28	13	15	1545	1575		123			30	12	18	1557
328	**Combine VYNESCOTT**	**1488**	**1506**	**113**				**18**	**23**	**-5**	**1488**	**1508**	**114**				**20**	**23**	**-3**	**1488**	**1506**	**110**				**18**	**23**	**-5**	**1489**	**1509**	**114**				**20**	**22**	**-2**	**1511**
328	pira1	1488	1515		111			27	23	4	1488	1517		112			29	23	6	1488	1514		111			26	23	3	1489	1517		112			28	22	6	1511
328	pira3	1480	1512		107			32	22	10	1481	1513		108			32	21	11	1480	1510		103			30	22	8	1481	1514		108			33	21	12	1502
329	**Combine EASTWELL**	**1757**	**1773**	**4.8**	**n=2 A= 4.8%(An**			**16**	**2**	**14**	**1757**	**1775**	**6.4**	**n=2 A= 6.4%(An**			**18**	**2**	**16**	**1757**	**1774**	**4.9**	**n=2 A= 4.9%(An**			**17**	**2**	**15**	**1758**	**1775**	**6.8**	**FAILED**	**n=2 A=**		**17**	**1**	**16**	**1759**
329	ewp11	1728	1752		1.5			24	24	0	1728	1754		2.1			26	24	2	1728	1752		1.5			24	24	0	1728	1755		2.3			27	24	3	1752
329	ewp17	1759	1786		93.5			27	0	27	1759	1788		96.7			29	0	29	1759	1785		97			26	0	26	1759	1788		96.2			29	0	29	1759
330	**Combine PREES**	**1464**	**1483**	**105**				**19**	**4**	**15**	**1464**	**1484**	**106**				**20**	**4**	**16**	**1464**	**1482**	**104**				**18**	**4**	**14**	**1465**	**1485**	**106**				**20**	**3**	**17**	**1468**
330	pgp1	1464	1494		110			30	4	26	1464	1496		111			32	4	28	1464	1493		110			29	4	25	1465	1496		110			31	3	28	1468
330	pgp2	1457	1485		96.7			28	11	17	1457	1487		98			30	11	19	1457	1484		95.8			27	11	16	1458	1487		97.9			29	10	19	1468
331	**Combine TANHOUSE**	**1430**	**1447**	**78**				**17**	**6**	**11**	**1430**	**1449**	**80.6**				**19**	**6**	**13**	**1430**	**1446**	**73.5**				**16**	**6**	**10**	**1430**	**1449**	**80.6**				**19**	**6**	**13**	**1436**
331	tan2	1431	1457		105			26	5	21	1431	1459		106			28	5	23	1431	1456		104			25	5	20	1431	1460		105			29	5	24	1436
331	tan3	1419	1446		67.1			27	17	10	1419	1448		69.8			29	17	12	1419	1445		62.2			26	17	9	1419	1448		70			29	17	12	1436
332	**Combine WHITEHALL**	**1452**	**1462**	**148**				**10**	**11**	**-1**	**1452**	**1463**	**152**				**11**	**11**	**0**	**1452**	**1462**	**148**				**10**	**11**	**-1**	**1453**	**1463**	**153**				**10**	**10**	**0**	**1463**
332	whl1	1444	1474		131			30	18	12	1444	1476		132			32	18	14	1444	1472		128			28	18	10	1445	1476		133			31	17	14	1462
332	whl4	1452	1476		100			24	11	13	1452	1478		102			26	11	15	1452	1476		98.4			24	11	13	1452	1478		103			26	11	15	1463
332	whl6	1447	1474		134			27	16	11	1447	1476		135			29	16	13	1447	1473		134			26	16	10	1448	1476		135			28	15	13	1463
332	whl8	1446	1467		114			21	17	4	1447	1469		115			22	16	6	1447	1468		119			21	16	5	1447	1469		116			22	16	6	1463
332	whl9	1445	1470		120			25	18	7	1445	1472		122			27	18	9	1445	1469		119			24	18	6	1445	1472		121			27	18	9	1463
333	**Combine GOLEIGH**	**1457**	**1467**	**63.4**				**10**	**9**	**1**	**1457**	**1468**	**68.3**				**11**	**9**	**2**	**1457**	**1467**	**58.4**				**10**	**9**	**1**	**1457**	**1469**	**68.4**				**12**	**9**	**3**	**1466**
333	gm10	1443	1469		62.4			26	20	6	1444	1471		65.9			27	19	8	1444	1469		59.7			25	19	6	1444	1471		67.4			27	19	8	1463
333	gm4	1448	1471		92.5			23	17	6	1448	1473		95.4			25	17	8	1448	1471		90.8			23	17	6	1448	1473		93.4			25	17	8	1465
333	gm6	1443	1472		75.3			29	22	7	1444	1473		78.5			29	21	8	1443	1471		70			28	22	6	1444	1474		80.5			30	21	9	1465

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
333	gm8	1454	1480		129			26	12	14	1454	1481		129			27	12	15	1454	1479		129			25	12	13	1454	1482		130			28	12	16	1466
333	gm9	1459	1488		64.2			29	6	23	1459	1489		66.7			30	6	24	1459	1486		61.3			27	6	21	1459	1490		65.1			31	6	25	1465
334	**Combine SKER**	**1610**	**1627**	**117**				**17**	**13**	**4**	**1610**	**1628**	**118**				**18**	**13**	**5**	**1610**	**1626**	**116**				**16**	**13**	**3**	**1611**	**1628**	**119**				**17**	**12**	**5**	**1623**
334	sker7	1605	1631		111			26	18	8	1605	1633		112			28	18	10	1605	1630		110			25	18	7	1605	1634		113			29	18	11	1623
334	sker9	1610	1634		113			24	13	11	1610	1636		113			26	13	13	1610	1633		113			23	13	10	1610	1636		113			26	13	13	1623
335	**Combine LLANSHAY**	**1431**	**1447**	**58**				**16**	**2**	**14**	**1432**	**1448**	**61.2**				**16**	**1**	**15**	**1431**	**1446**	**50.6**				**15**	**2**	**13**	**1432**	**1449**	**56.8**				**17**	**1**	**16**	**1433**
335	**Combine LLANSHAY**	**1432**	**1454**	**78.7**				**22**	**1**	**21**	**1433**	**1455**	**80.7**				**22**	**0**	**22**	**1432**	**1453**	**73.2**				**21**	**1**	**20**	**1433**	**1456**	**78.5**				**23**	**0**	**23**	**1433**
335	lsy2	1418	1445		52.4			27	13	14	1418	1447		55.2			29	13	16	1418	1443		46			25	13	12	1418	1447		51			29	13	16	1431
335	lsy3	1421	1452		95.2	69		31	12	19	1421	1453		96.8	71		32	12	20	1421	1450		90	63.3		29	12	17	1422	1453		96.2	69		31	11	20	1433
335	lsy4	1434	1468		78.2	103		34	-1	35	1434	1470		80.1	104		36	-1	37	1434	1466		74.3	102		32	-1	33	1435	1472		76.6	103		37	-2	39	1433
336	**Combine NANNERTH**	**1545**	**1562**	**40.6**	**n=2 A= 40.6%(A**			**17**	**11**	**6**	**1545**	**1564**	**43.7**	**n=2 A= 43.7%(**			**19**	**11**	**8**	**1545**	**1562**	**35.5**	**n=2 A= 35.5%(**			**17**	**11**	**6**	**1545**	**1564**	**40.2**	**FAILED**	**n=2 A:**		**19**	**11**	**8**	**1556**
336	nan1	1547	1576		95.4			29	9	20	1547	1577		97			30	9	21	1547	1574		94.9			27	9	18	1547	1578		95.4			31	9	22	1556
336	nan2	1531	1554		29.3			23	24	-1	1531	1556		32			25	24	1	1531	1554		24.4			23	24	-1	1531	1556		28.9			25	24	1	1555
337	**Combine GREATHS**	**1444**	**1457**	**134**				**13**	**6**	**7**	**1444**	**1458**	**136**				**14**	**6**	**8**	**1444**	**1456**	**134**				**12**	**6**	**6**	**1444**	**1458**	**135**				**14**	**6**	**8**	**1450**
337	tgh1	1438	1462		110			24	11	13	1438	1464		112			26	11	15	1438	1461		109			23	11	12	1438	1464		111			26	11	15	1449
337	tgh2	1442	1465		121			23	8	15	1443	1467		122			24	7	17	1442	1464		121			22	8	14	1443	1466		122			23	7	16	1450
337	tgh3	1441	1470		125			29	9	20	1442	1471		125			29	8	21	1441	1469		125			28	9	19	1442	1471		124			29	8	21	1450
338	**Combine READING**	**1330**	**1345**	**101**				**15**	**13**	**2**	**1330**	**1347**	**103**				**17**	**13**	**4**	**1330**	**1344**	**95.2**				**14**	**13**	**1**	**1331**	**1347**	**103**				**16**	**12**	**4**	**1343**
338	w118	1326	1357		126			31	17	14	1326	1358		126			32	17	15	1326	1355		127			29	17	12	1327	1358		126			31	16	15	1343
338	w211	1318	1347		72.6			29	25	4	1318	1348		75.1			30	25	5	1317	1345		66.5			28	26	2	1318	1349		74			31	25	6	1343
338	w215	1330	1359		111			29	13	16	1330	1361		112			31	13	18	1330	1357		109			27	13	14	1330	1361		112			31	13	18	1343
339	**Combine THORPE**	**1569**	**1587**	**91.6**				**18**	**14**	**4**	**1570**	**1588**	**93.7**				**18**	**13**	**5**	**1569**	**1585**	**87.5**				**16**	**14**	**2**	**1570**	**1588**	**92.5**				**18**	**13**	**5**	**1583**
339	tph25	1561	1587		82.5			26	22	4	1561	1588		84.7			27	22	5	1560	1586		78.2			26	23	3	1561	1588		83.5			27	22	5	1583
339	tph29	1570	1597		107			27	13	14	1570	1599		108			29	13	16	1570	1595		106			25	13	12	1570	1598		107			28	13	15	1583
340	**Combine RODE**	**1414**	**1428**	**132**				**14**	**15**	**-1**	**1415**	**1429**	**133**				**14**	**14**	**0**	**1414**	**1428**	**131**				**14**	**15**	**-1**	**1415**	**1429**	**135**				**14**	**14**	**0**	**1429**
340	rode1	1406	1434		108			28	22	6	1407	1436		110			29	21	8	1406	1433		107			27	22	5	1407	1436		112			29	21	8	1428
340	rode2	1412	1438		125			26	17	9	1412	1439		125			27	17	10	1412	1437		125			25	17	8	1412	1439		125			27	17	10	1429
340	rode3	1413	1438		119			25	15	10	1413	1440		120			27	15	12	1413	1437		119			24	15	9	1413	1440		120			27	15	12	1428
341	**Combine WENHAM1**	**1568**	**1590**	**122**				**22**	**19**	**3**	**1568**	**1591**	**122**				**23**	**19**	**4**	**1567**	**1588**	**121**				**21**	**20**	**1**	**1569**	**1592**	**122**				**23**	**18**	**5**	**1587**
341	wnm1243	1563	1596		114			33	23	10	1563	1598		114			35	23	12	1563	1593		113			30	23	7	1564	1598		114			34	22	12	1586
341	wnm1609	1567	1601		116			34	20	14	1567	1602		116			35	20	15	1566	1598		116			32	21	11	1567	1603		116			36	20	16	1587
342	**Combine WENHAM2**	**1596**	**1609**	**95.4**				**13**	**9**	**4**	**1597**	**1610**	**98.7**				**13**	**8**	**5**	**1596**	**1609**	**87**				**13**	**9**	**4**	**1597**	**1610**	**98.9**				**13**	**8**	**5**	**1605**
342	wnm0307b	1596	1620		109			24	9	15	1597	1621		110			24	8	16	1596	1619		106			23	9	14	1597	1621		109			24	8	16	1605
342	wnm0410	1593	1616		124			23	12	11	1593	1618		125			25	12	13	1593	1615		124			22	12	10	1593	1617		124			24	12	12	1605
342	wnm1510	1583	1611		68			28	22	6	1583	1613		71.2			30	22	8	1582	1610		59.7			28	23	5	1583	1613		72.6			30	22	8	1605
343	**Combine ROMSEY**	**1249**	**1266**	**125**				**17**	**7**	**10**	**1249**	**1267**	**126**				**18**	**7**	**11**	**1249**	**1265**	**125**				**16**	**7**	**9**	**1249**	**1267**	**126**				**18**	**7**	**11**	**1256**
343	kjh1	1248	1271		114			23	8	15	1248	1273		114			25	8	17	1248	1271		114			23	8	15	1248	1273		114			25	8	17	1256
343	kjh3	1245	1274		121			29	10	19	1245	1275		121			30	10	20	1245	1272		121			27	10	17	1245	1276		122			31	10	21	1255
344	**Combine GREYSCT1**	**1568**	**1583**	**43.1**				**15**	**10**	**5**	**1568**	**1585**	**46.3**				**17**	**10**	**7**	**1567**	**1583**	**36.7**	**n=3 A= 36.7%(**			**16**	**11**	**5**	**1568**	**1585**	**42.9**				**17**	**10**	**7**	**1578**
344	**Combine GREYSCT1**	**1569**	**1590**	**64.4**				**21**	**9**	**12**	**1569**	**1591**	**66.7**				**22**	**9**	**13**	**1569**	**1588**	**58.6**				**19**	**9**	**10**	**1570**	**1591**	**62.9**				**21**	**8**	**13**	**1578**
344	gct11	1552	1580		41.6			28	26	2	1552	1582		44.5			30	26	4	1552	1578		35.9			26	26	0	1553	1582		42.6			29	25	4	1578
344	gct12	1557	1585		78.5	54.4		28	21	7	1557	1587		80.7	56.6		30	21	9	1557	1583		71.9	48.4		26	21	5	1558	1586		77.3	53		28	20	8	1578
344	gct13	1571	1606		71.2	98.7		35	7	28	1571	1607		73.3	99.7		36	7	29	1571	1603		68.3	97		32	7	25	1572	1608		70	97.9		36	6	30	1578
345	**Combine GREYSCT2**	**1582**	**1596**	**91.9**				**14**	**5**	**9**	**1583**	**1597**	**95**				**14**	**4**	**10**	**1582**	**1596**	**82.8**				**14**	**5**	**9**	**1583**	**1597**	**96.7**				**14**	**4**	**10**	**1587**
345	**Combine GREYSCT2**	**1583**	**1600**	**126**				**17**	**4**	**13**										**1583**	**1599**	**126**				**16**	**4**	**12**										**1587**
345	gct5	1582	1604		115	113		22	4	18	1582	1606		116			24	4	20	1582	1603		115	113		21	4	17	1582	1606		117			24	4	20	1586
345	gct6	1580	1609		126	123		29	7	22	1580	1610		126			30	7	23	1580	1607		126	123		27	7	20	1580	1611		125			31	7	24	1587
345	gct7	1566	1598		59.5			32	19	13	1566	1599		62.5			33	19	14	1566	1596		49.7			30	19	11	1566	1600		64.7			34	19	15	1585

Number	SITE & sample	A from	A to	A Phase A_n	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	AS from	AS to	AS Phase A_n	AS Sample	AS 2nd test	AS 3rd test	AS Range	AS beg range	AS end range	BS from	BS to	BS Phase A_n	BS Sample	BS 2nd test	BS 3rd test	BS Range	BS beg range	BS end range	CS from	CS to	CS Phase A_n	CS Sample	CS 2nd test	CS 3rd test	CS Range	CS beg range	CS end range	Real date
346	**Combine GREYSCT3**	**1443**	**1454**	**108**				**11**	**8**	**3**	**1443**	**1455**	**112**				**12**	**8**	**4**	**1443**	**1454**	**104**				**11**	**8**	**3**	**1444**	**1455**	**113**				**11**	**7**	**4**	**1451**
346	**Combine GREYSCT3**																			**1444**	**1456**	**140**				**12**	**7**	**5**										**1451**
346	gct31	1438	1467		133			29	12	17	1439	1468		133			29	11	18	1438	1465		133	126		27	12	15	1439	1468		133			29	11	18	1450
346	gct34	1441	1462		125			21	10	11	1441	1463		126			22	10	12	1441	1461		126	119		20	10	10	1441	1463		125			22	10	12	1451
346	gct37	1430	1456		62.7			26	15	11	1430	1458		65.9			28	15	13	1430	1455		58.7			25	15	10	1430	1459		68.5			29	15	14	1445
346	gct39	1442	1468		113			26	9	17	1443	1470		114			27	8	19	1442	1467		110	120		25	9	16	1443	1470		112			27	8	19	1451
347	**Combine GREYSCT4**	**1558**	**1573**	**142**				**15**	**16**	**-1**	**1558**	**1574**	**143**				**16**	**16**	**0**	**1558**	**1572**	**141**				**14**	**16**	**-2**	**1559**	**1574**	**141**				**15**	**15**	**0**	**1574**
347	gct41	1554	1580		120			26	20	6	1554	1581		121			27	20	7	1553	1579		120			26	21	5	1554	1581		120			27	20	7	1574
347	gct45	1556	1585		122			29	18	11	1556	1588		123			32	18	14	1556	1584		122			28	18	10	1557	1588		122			31	17	14	1574
347	gct47	1554	1582		124			28	20	8	1554	1584		125			30	20	10	1554	1580		124			26	20	6	1555	1583		124			28	19	9	1574
348	**Combine GREYSCT5**	**1547**	**1567**	**124**				**20**	**12**	**8**	**1547**	**1568**	**124**				**21**	**12**	**9**	**1547**	**1566**	**124**				**19**	**12**	**7**	**1548**	**1569**	**125**				**21**	**11**	**10**	**1559**
348	gct21	1542	1575		118			33	17	16	1542	1577		118			35	17	18	1542	1574		118			32	17	15	1543	1578		119			35	16	19	1559
348	gct22	1546	1575		115			29	13	16	1546	1576		115			30	13	17	1546	1573		115			27	13	14	1546	1577		115			31	13	18	1559
349	**Combine GREYSCT6**	**1578**	**1599**	**99.6**				**21**	**10**	**11**	**1579**	**1600**	**101**				**21**	**9**	**12**	**1578**	**1598**	**94.3**				**20**	**10**	**10**	**1579**	**1601**	**97.2**				**22**	**9**	**13**	**1588**
349	gct25	1579	1612		109			33	9	24	1579	1614		109			35	9	26	1579	1611		107			32	9	23	1580	1615		108			35	8	27	1588
349	gct27	1571	1600		91.6			29	16	13	1571	1601		92.9			30	16	14	1571	1598		86.3			27	16	11	1571	1602		89.2			31	16	15	1587
350	**Combine HOGLANDS**	**1362**	**1379**	**125**				**17**	**8**	**9**	**1363**	**1380**	**126**				**17**	**7**	**10**	**1362**	**1378**	**126**				**16**	**8**	**8**	**1363**	**1380**	**126**				**17**	**7**	**10**	**1370**
350	rdga3	1359	1386		119			27	11	16	1360	1387		119			27	10	17	1359	1385		119			26	11	15	1360	1387		120			27	10	17	1370
350	rdga4	1361	1384		116			23	9	14	1361	1386		116			25	9	16	1361	1384		116			23	9	14	1361	1386		116			25	9	16	1370
351	**Combine SNOXALL**	**1336**	**1343**	**72.3**				**7**	**2**	**5**	**1337**	**1344**	**80.9**				**7**	**1**	**6**	**1336**	**1343**	**71.6**				**7**	**2**	**5**	**1337**	**1344**	**77.8**				**7**	**1**	**6**	**1338**
351	**Combine SNOXALL**	**1335**	**1341**	**121**				**6**	**3**	**3**	**1335**	**1342**	**130**				**7**	**3**	**4**	**1335**	**1341**	**122**				**6**	**3**	**3**	**1335**	**1342**	**128**				**7**	**3**	**4**	**1338**
351	**Combine SNOXALL**	**1333**	**1340**	**179**				**7**	**5**	**2**	**1333**	**1341**	**185**				**8**	**5**	**3**	**1333**	**1340**	**182**				**7**	**5**	**2**	**1333**	**1341**	**184**				**8**	**5**	**3**	**1338**
351	rdgb12	1331	1352		134	136	121	21	7	14	1331	1354		136	137	123	23	7	16	1331	1352		135	136	121	21	7	14	1331	1355		136	136	122	24	7	17	1338
351	rdgb13	1327	1350		102	122	134	23	10	13	1327	1352		105	124	135	25	10	15	1327	1350		100	121	134	23	10	13	1328	1352		106	125	135	24	9	15	1337
351	rdgb14	1328	1346		80.6	107	126	18	9	9	1329	1348		85.2	110	127	19	8	11	1329	1347		87.8	113	130	18	8	10	1329	1348		85.9	111	128	19	8	11	1337
351	rdgb2	1336	1360		86.8	53		24	2	22	1336	1362		89.1	56.7		26	2	24	1336	1359		87.3	52.8		23	2	21	1336	1362		88.5	55.6		26	2	24	1338
351	rdgb3	1327	1348		86.1	108	126	21	10	11	1327	1349		90.1	111	128	22	10	12	1327	1348		81.7	105	124	21	10	11	1327	1349		86.2	108	126	22	10	12	1337
351	rdgb4	1326	1350		99	119	132	24	11	13	1327	1351		102	121	133	24	10	14	1327	1350		96.3	117	132	23	10	13	1327	1351		103	122	134	24	10	14	1337
351	rdgb5	1328	1347		84.3	109	127	19	9	10	1328	1349		88.7	112	129	21	9	12	1328	1347		85.1	110	128	19	9	10	1328	1349		85.7	110	127	21	9	12	1337
351	rdgb6	1338	1364		39.6			26	-1	27	1339	1365		42.9			26	-2	28	1338	1363		38			25	-1	26	1339	1365		40.6			26	-2	28	1337
351	rdgb7	1331	1355		139	131	109	24	7	17	1332	1356		139	131	111	24	6	18	1331	1354		139	132	110	23	7	16	1332	1356		139	131	110	24	6	18	1338
352	**Combine COATSFM**	**1476**	**1494**	**116**				**18**	**10**	**8**	**1477**	**1495**	**117**				**18**	**9**	**9**	**1476**	**1493**	**116**				**17**	**10**	**7**	**1477**	**1495**	**117**				**18**	**9**	**9**	**1486**
352	coat1	1476	1503		114			27	10	17	1476	1505		114			29	10	19	1476	1501		114			25	10	15	1476	1504		114			28	10	18	1486
352	coat2	1471	1498		109			27	7	20	1472	1499		110			27	6	21	1471	1496		109			25	7	18	1472	1499		110			27	6	21	1478
353	**Combine BPALACE2**	**1502**	**1525**	**125**				**23**	**18**	**5**	**1503**	**1526**	**125**				**23**	**17**	**6**	**1502**	**1523**	**125**				**21**	**18**	**3**	**1503**	**1527**	**125**				**24**	**17**	**7**	**1520**
353	bps5	1499	1532		117			33	21	12	1499	1534		117			35	21	14	1499	1530		117			31	21	10	1500	1535		117			35	20	15	1520
353	bps6	1500	1534		117			34	19	15	1501	1535		118			34	18	16	1500	1531		117			31	19	12	1501	1536		117			35	18	17	1519
354	**Combine BPALACE5**	**1647**	**1665**	**114**				**18**	**15**	**3**	**1648**	**1666**	**115**				**18**	**14**	**4**	**1647**	**1664**	**113**				**17**	**15**	**2**	**1648**	**1666**	**114**				**18**	**14**	**4**	**1662**
354	bps33	1647	1675		113			28	15	13	1647	1677		114			30	15	15	1647	1673		113			26	15	11	1648	1676		113			28	14	14	1662
354	bps39	1642	1668		106			26	19	7	1643	1670		107			27	18	9	1642	1667		105			25	19	6	1643	1669		106			26	18	8	1661
355	**Combine BPALACE6**	**1730**	**1744**	**40.8**				**14**	**6**	**8**	**1730**	**1745**	**44.4**				**15**	**6**	**9**	**1729**	**1743**	**35.4**	**n=3 A= 35.4%(**			**14**	**7**	**7**	**1730**	**1745**	**43.9**				**15**	**6**	**9**	**1736**
355	**Combine BPALACE6**	**1731**	**1749**	**85.1**				**18**	**5**	**13**	**1731**	**1750**	**87.2**				**19**	**5**	**14**	**1731**	**1748**	**81**				**17**	**5**	**12**	**1731**	**1751**	**85.4**				**20**	**5**	**15**	**1736**
355	bps30	1732	1761		82.8	105		29	3	26	1732	1762		84.7	106		30	3	27	1732	1759		80.9	104		27	3	24	1732	1763		83.5	105		31	3	28	1735
355	bps35	1722	1748		101	75.7		26	13	13	1722	1750		102	77.9		28	13	15	1722	1747		96.2	71.5		25	13	12	1722	1750		101	76.2		28	13	15	1735
355	bps37	1710	1739		25.5			29	26	3	1711	1740		28.2			29	25	4	1710	1737		21.2			27	26	1	1711	1740		28.6			29	25	4	1736
356	**Combine SARUM2**	**1245**	**1263**	**86.2**				**18**	**9**	**9**	**1245**	**1264**	**88.3**				**19**	**9**	**10**	**1245**	**1262**	**83.8**				**17**	**9**	**8**	**1245**	**1264**	**86.2**				**19**	**9**	**10**	**1254**
356	scnt05	1246	1275		105			29	8	21	1246	1277		105			31	8	23	1246	1274		104			28	8	20	1246	1277		104			31	8	23	1254
356	scnt436	1237	1262		77.6			25	14	11	1237	1264		79.7			27	14	13	1237	1261		75.2			24	14	10	1237	1263		77.7			26	14	12	1251

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
357	**Combine SARUM4**	**1652**	**1661**	**146**				**9**	**11**	**-2**	**1652**	**1662**	**150**				**10**	**11**	**-1**	**1652**	**1661**	**136**				**9**	**11**	**-2**	**1653**	**1662**	**145**				**9**	**10**	**-1**	**1663**
357	| sarum5a	1644	1671		124			27	18	9	1645	1672		125			27	17	10	1644	1669		119			25	18	7	1645	1672		122			27	17	10	1662
357	| sarum5b	1648	1676		132			28	14	14	1648	1678		132			30	14	16	1648	1675		133			27	14	13	1649	1678		132			29	13	16	1662
357	| sarum5c	1646	1672		131			26	17	9	1646	1673		132			27	17	10	1645	1671		129			26	18	8	1646	1673		131			27	17	10	1663
357	| sarum5d	1641	1665		78.4			24	19	5	1641	1667		81.6			26	19	7	1641	1664		73.4			23	19	4	1641	1667		79.1			26	19	7	1660
357	| scl76	1651	1673		116			22	10	12	1651	1675		118			24	10	14	1651	1674		109			23	10	13	1652	1676		115			24	9	15	1661
357	| scnt35	1649	1675		129			26	13	13	1649	1677		130			28	13	15	1649	1674		130			25	13	12	1649	1678		130			29	13	16	1662
358	**Combine SARUM6**	**1732**	**1743**	**103**				**11**	**4**	**7**	**1733**	**1744**	**108**				**11**	**3**	**8**	**1732**	**1743**	**104**				**11**	**4**	**7**	**1733**	**1745**	**110**				**12**	**3**	**9**	**1736**
358	| scl68	1722	1745		72.5			23	14	9	1722	1747		75.7			25	14	11	1723	1745		73.8			22	13	9	1723	1747		75.7			24	13	11	1736
358	| scl8992	1731	1757		120			26	5	21	1731	1758		121			27	5	22	1731	1756		122			25	5	20	1731	1759		123			28	5	23	1736
358	| scl90	1722	1748		93.9			26	14	12	1723	1750		96.4			27	13	14	1723	1748		93.5			25	13	12	1723	1751		98.6			28	13	15	1736
358	| scl91	1726	1755		133			29	10	19	1727	1756		134			29	9	20	1727	1754		133			27	9	18	1727	1758		134			31	9	22	1736
358	| scl93	1732	1760		98.8			28	4	24	1732	1762		101			30	4	26	1732	1760		96.8			28	4	24	1733	1762		99.5			29	3	26	1736
359	**Combine SANDWICH**	**1325**	**1336**	**23.9**	**n=4 A= 23.9%(A**			**11**	**9**	**2**	**1325**	**1337**	**27.5**	**n=4 A= 27.5%(A**			**12**	**9**	**3**	**1325**	**1336**	**19.6**	**n=4 A= 19.6%(A**			**11**	**9**	**2**	**1325**	**1338**	**27.7**	**FAILED**	**n=4 A=**		**13**	**9**	**4**	**1334**
359	| SND-B04A	1312	1338		61.4			26	22	4	1312	1339		65.2			27	22	5	1312	1337		54.9			25	22	3	1312	1339		64.5			27	22	5	1334
359	| SND-B06A	1307	1333		31.7			26	27	-1	1307	1335		35.2			28	27	1	1307	1332		27.3			25	27	-2	1307	1336		36			29	27	2	1334
359	| SND-B07A	1311	1337		54			26	23	3	1311	1338		57.9			27	23	4	1311	1336		49.1			25	23	2	1311	1339		59			28	23	5	1334
359	| SND-B09A	1328	1355		54.4			27	6	21	1328	1357		56.9			29	6	23	1328	1354		52.2			26	6	20	1329	1357		56			28	5	23	1334
360	**Combine STONEPITTS**	**1485**	**1500**	**101**				**15**	**12**	**3**	**1485**	**1502**	**103**				**17**	**12**	**5**	**1485**	**1500**	**95.5**				**15**	**12**	**3**	**1486**	**1502**	**103**				**16**	**11**	**5**	**1497**
360	| KSM-A03B	1483	1512		119			29	14	15	1484	1513		119			29	13	16	1483	1511		118			28	14	14	1484	1514		120			30	13	17	1497
360	| KSM-A04A	1483	1514		121			31	14	17	1483	1516		122			33	14	19	1483	1513		121			30	14	16	1484	1517		121			33	13	20	1497
360	| KSM-A13A	1472	1501		70.1			29	25	4	1472	1503		72.6			31	25	6	1472	1500		64.6			28	25	3	1473	1504		72.6			31	24	7	1497
361	**Combine SELWORTHY**	**1299**	**1314**	**146**				**15**	**16**	**-1**	**1299**	**1315**	**147**				**16**	**16**	**0**	**1298**	**1313**	**146**				**15**	**17**	**-2**	**1299**	**1316**	**146**				**17**	**16**	**1**	**1315**
361	| elc1	1294	1326		127			32	21	11	1295	1327		127			32	20	12	1294	1323		127			29	21	8	1295	1327		127			32	20	12	1315
361	| elc2x	1296	1325		125			29	19	10	1296	1327		125			31	19	12	1296	1324		125			28	19	9	1296	1327		125			31	19	12	1315
361	| elc34	1295	1322		122			27	20	7	1295	1324		122			29	20	9	1295	1320		122			25	20	5	1295	1324		122			29	20	9	1315
362	**Combine SHAPWICK**	**1424**	**1435**	**144**				**11**	**4**	**7**	**1425**	**1435**	**146**				**10**	**3**	**7**	**1424**	**1434**	**144**				**10**	**4**	**6**	**1425**	**1435**	**144**				**10**	**3**	**7**	**1428**
362	| shh21	1423	1442		122			19	5	14	1423	1444		123			21	5	16	1423	1443		122			20	5	15	1423	1444		123			21	5	16	1428
362	| shh24	1421	1441		126			20	7	13	1421	1443		127			22	7	15	1421	1441		126			20	7	13	1421	1443		127			22	7	15	1428
362	| shh25	1422	1440		122			18	6	12	1422	1441		123			19	6	13	1421	1440		122			19	7	12	1422	1441		122			19	6	13	1428
363	**Combine MUCKLETON**	**1357**	**1376**	**122**				**19**	**15**	**4**	**1358**	**1377**	**123**				**19**	**14**	**5**	**1357**	**1374**	**122**				**17**	**15**	**2**	**1358**	**1377**	**122**				**19**	**14**	**5**	**1372**
363	| lem1	1354	1380		114			26	18	8	1354	1382		115			28	18	10	1354	1379		113			25	18	7	1354	1382		114			28	18	10	1372
363	| lem4	1356	1384		116			28	11	17	1356	1386		117			30	11	19	1356	1383		116			27	11	16	1357	1386		117			29	10	19	1367
364	**Combine SHEPTONM**	**1664**	**1676**	**70.1**				**12**	**11**	**1**	**1665**	**1676**	**75**				**11**	**10**	**1**	**1664**	**1675**	**62.6**				**11**	**11**	**0**	**1665**	**1677**	**75.7**				**12**	**10**	**2**	**1675**
364	**Combine SHEPTONM**	**1665**	**1678**	**116**				**13**	**10**	**3**	**1665**	**1679**	**119**				**14**	**10**	**4**	**1665**	**1677**	**110**				**12**	**10**	**2**	**1666**	**1679**	**121**				**13**	**9**	**4**	**1675**
364	| mpsm1	1658	1684		124	111		26	17	9	1659	1685		125	112		26	16	10	1658	1683		122	109		25	17	8	1659	1685		122	109		26	16	10	1675
364	| mpsm2	1646	1673		31.9			27	29	-2	1646	1675		35.1			29	29	0	1646	1672		27.4			26	29	-3	1646	1675		34.6			29	29	0	1675
364	| mpsm4	1666	1694		72.9	92.8		28	8	20	1666	1696		75.3	94.4		30	8	22	1666	1692		69.2	89.5		26	8	18	1667	1695		76.2	95.4		28	7	21	1674
364	| mpsm5	1655	1687		126	116		32	20	12	1655	1689		127	117		34	20	14	1655	1686		125	114		31	20	11	1656	1690		131	122		34	19	15	1675
364	| mpsm6	1655	1687		124	113		32	20	12	1656	1688		125	114		32	19	13	1655	1685		121	109		30	20	10	1656	1689		127	116		33	19	14	1675
365	**Combine WESTEND**	**1436**	**1452**	**58.1**				**16**	**8**	**8**	**1436**	**1453**	**61.1**				**17**	**8**	**9**	**1436**	**1452**	**53.8**				**16**	**8**	**8**	**1436**	**1454**	**56.3**				**18**	**8**	**10**	**1444**
365	| wes1	1426	1447		48			21	15	6	1426	1449		50.8			23	15	8	1426	1447		43.5			21	15	6	1426	1449		46.3			23	15	8	1441
365	| wes2	1437	1466		96.6			29	7	22	1438	1467		98			29	6	23	1437	1464		95.6			27	7	20	1438	1467		96			29	6	23	1444
366	**Combine THEVYNE1**	**1515**	**1533**	**125**				**18**	**9**	**9**	**1515**	**1534**	**125**				**19**	**9**	**10**	**1515**	**1532**	**125**				**17**	**9**	**8**	**1516**	**1534**	**125**				**18**	**8**	**10**	**1524**
366	| vyne13	1513	1538		113			25	11	14	1513	1540		114			27	11	16	1513	1536		114			23	11	12	1513	1539		113			26	11	15	1524
366	| vyne16	1513	1542		120			29	11	18	1513	1544		121			31	11	20	1513	1540		121			27	11	16	1513	1544		120			31	11	20	1524
367	**Combine THEVYNE2**	**1641**	**1655**	**143**				**14**	**13**	**1**	**1641**	**1656**	**144**				**15**	**13**	**2**	**1640**	**1655**	**143**				**15**	**14**	**1**	**1641**	**1657**	**144**				**16**	**13**	**3**	**1654**
367	| vyne21	1636	1665		126			29	18	11	1637	1666		126			29	17	12	1636	1664		126			28	18	10	1637	1667		126			30	17	13	1654

Number	SITE & sample	A from	A to	A Phase A_n	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	AS from	AS to	AS Phase A_n	AS Sample	AS 2nd test	AS 3rd test	AS Range	AS beg range	AS end range	B from	B to	B Phase A_n	B Sample	B 2nd test	B 3rd test	B Range	B beg range	B end range	C from	C to	C Phase A_n	C Sample	C 2nd test	C 3rd test	C Range	C beg range	C end range	Real date
367	vyne22	1639	1666		121			27	15	12	1639	1668		122			29	15	14	1639	1665		121			26	15	11	1639	1668		122			29	15	14	1654
367	vyne23	1636	1663		122			27	18	9	1636	1665		123			29	18	11	1636	1662		122			26	18	8	1636	1665		123			29	18	11	1654
368	**Combine THEVYNE3**	**1522**	**1540**	**108**				**18**	**3**	**15**	**1522**	**1541**	**109**				**19**	**3**	**16**	**1522**	**1539**	**105**				**17**	**3**	**14**	**1523**	**1542**	**109**				**19**	**2**	**17**	**1525**
368	vyne26	1522	1550		111			28	3	25	1522	1551		111			29	3	26	1522	1548		110			26	3	23	1523	1551		111			28	2	26	1525
368	vyne29	1515	1543		101			28	10	18	1515	1545		102			30	10	20	1515	1541		97.8			26	10	16	1516	1544		101			28	9	19	1525
369	**Combine THEVYNE4**	**1619**	**1640**	**122**				**21**	**13**	**8**	**1620**	**1641**	**122**				**21**	**12**	**9**	**1619**	**1638**	**120**				**19**	**13**	**6**	**1620**	**1641**	**120**				**21**	**12**	**9**	**1632**
369	vyne1	1616	1644		113			28	15	13	1616	1646		113			30	15	15	1615	1643		111			28	16	12	1616	1645		111			29	15	14	1631
369	vyne3	1618	1650		117			32	14	18	1618	1652		117			34	14	20	1618	1648		117			30	14	16	1619	1653		117			34	13	21	1632
370	**Combine ABBOTSHS**	**1448**	**1460**	**106**				**12**	**9**	**3**	**1449**	**1461**	**109**				**12**	**8**	**4**	**1448**	**1460**	**108**				**12**	**9**	**3**	**1449**	**1461**	**112**				**12**	**8**	**4**	**1457**
370	ah02	1448	1469		116			21	9	12	1448	1471		117			23	9	14	1448	1469		116			21	9	12	1448	1471		117			23	9	14	1457
370	ah03	1440	1461		75.9			21	17	4	1440	1463		79.2			23	17	6	1440	1462		78.3			22	17	5	1440	1464		82.1			24	17	7	1457
370	ah04	1446	1471		125			25	11	14	1446	1473		126			27	11	16	1446	1470		126			24	11	13	1447	1473		126			26	10	16	1457
371	**Combine CLIVEHS**	**1582**	**1601**	**98.2**				**19**	**9**	**10**	**1583**	**1601**	**100**				**18**	**8**	**10**	**1582**	**1599**	**94.3**				**17**	**9**	**8**	**1583**	**1601**	**100**				**18**	**8**	**10**	**1591**
371	clv5	1573	1602		89.8			29	18	11	1574	1604		91.7			30	17	13	1573	1601		85.5			28	18	10	1574	1603		92.2			29	17	12	1591
371	clv6	1583	1609		109			26	8	18	1583	1611		109			28	8	20	1583	1608		108			25	8	17	1583	1611		109			28	8	20	1591
372	**Combine HUDSONS**	**1606**	**1618**	**81.4**				**12**	**4**	**8**	**1607**	**1619**	**85.5**				**12**	**3**	**9**	**1606**	**1617**	**76.7**				**11**	**4**	**7**	**1607**	**1619**	**86.7**				**12**	**3**	**9**	**1610**
372	**Combine HUDSONS**	**1607**	**1621**	**145**				**14**	**3**	**11**	**1607**	**1622**	**146**				**15**	**3**	**12**	**1607**	**1620**	**146**				**13**	**3**	**10**	**1608**	**1622**	**146**				**14**	**2**	**12**	**1610**
372	hud1	1589	1615		34.4			26	20	6	1589	1617		37.4			28	20	8	1589	1614		30.3			25	20	5	1589	1618		38.6			29	20	9	1609
372	hud2	1604	1631		124	127		27	6	21	1604	1633		125	127		29	6	23	1604	1629		125	127		25	6	19	1604	1633		125	127		29	6	23	1610
372	hud4	1603	1627		127	120		24	7	17	1604	1628		128	121		24	6	18	1603	1626		127	121		23	7	16	1604	1628		127	121		24	6	18	1610
372	hud6	1604	1630		122	125		26	6	20	1605	1632		123	126		27	5	22	1604	1629		122	125		25	6	19	1605	1631		123	125		26	5	21	1610
373	**Combine BEARSTEPS**	**1601**	**1615**	**116**				**14**	**0**	**14**	**1602**	**1616**	**119**				**14**	**-1**	**15**	**1601**	**1614**	**112**				**13**	**0**	**13**	**1602**	**1616**	**125**				**14**	**-1**	**15**	**1601**
373	bs3	1584	1618		66.7			34	17	17	1584	1620		69.2			36	17	19	1584	1616		61.5			32	17	15	1585	1621		76.8			36	16	20	1601
373	bs4	1598	1627		126			29	3	26	1599	1629		127			30	2	28	1598	1626		126			28	3	25	1599	1629		127			30	2	28	1601
373	bs5	1599	1628		126			29	2	27	1599	1629		126			30	2	28	1598	1626		126			28	3	25	1599	1630		126			31	2	29	1601
373	bs7	1598	1626		127			28	3	25	1599	1628		128			29	2	27	1598	1625		128			27	3	24	1599	1628		128			29	2	27	1601
374	**Combine COUNCILHS**	**1494**	**1513**	**123**				**19**	**7**	**12**	**1495**	**1514**	**123**				**19**	**6**	**13**	**1494**	**1512**	**122**				**18**	**7**	**11**	**1495**	**1514**	**122**				**19**	**6**	**13**	**1501**
374	ch11	1491	1518		114			27	10	17	1491	1520		115			29	10	19	1491	1516		114			25	10	15	1491	1520		114			29	10	19	1501
374	ch12	1493	1522		116			29	8	21	1494	1523		117			29	7	22	1493	1520		116			27	8	19	1494	1523		117			29	7	22	1501
375	**Combine PEACHTREE**	**1419**	**1431**	**99.2**				**12**	**12**	**0**	**1419**	**1432**	**104**				**13**	**12**	**1**	**1419**	**1430**	**89.5**				**11**	**12**	**-1**	**1419**	**1431**	**104**				**12**	**12**	**0**	**1431**
375	pch11	1420	1439		104			19	10	9	1420	1441		105			21	10	11	1420	1439		102			19	10	9	1420	1440		106			20	10	10	1430
375	pch13	1410	1437		105			27	21	6	1410	1439		107			29	21	8	1410	1435		99.4			25	21	4	1410	1439		110			29	21	8	1431
375	pch14	1409	1435		90.3			26	22	4	1410	1437		93.8			27	21	6	1409	1434		81.8			25	22	3	1410	1436		92.1			26	21	5	1431
376	**Combine PEGGS**	**1661**	**1676**	**23.2 n=3 A= 23.2%(A**				**15**	**8**	**7**	**1661**	**1677**	**25.9 n=3 A= 25.9%(**				**16**	**8**	**8**	**1661**	**1675**	**19.7 n=3 A= 19.7%(**				**14**	**8**	**6**	**1662**	**1678**	**27.3 FAILED n=3 A=**				**16**	**7**	**9**	**1669**
376	**Combine PEGGS**	**1662**	**1682**	**73.3**				**20**	**7**	**13**	**1662**	**1683**	**75.7**				**21**	**7**	**14**	**1662**	**1681**	**69**				**19**	**7**	**12**	**1663**	**1683**	**74.3**				**20**	**6**	**14**	**1669**
376	pegg2	1663	1695		78	102		32	6	26	1664	1696		79.8	103		32	5	27	1663	1693		76.4	101		30	6	24	1664	1697		78.9	102		33	5	28	1669
376	pegg3	1651	1679		86.9	63		28	18	10	1651	1681		89.2	65.3		30	18	12	1651	1677		81.9	58.5		26	18	8	1652	1680		87.9	64.2		28	17	11	1669
376	pegg4a	1634	1665		11.7			31	35	-4	1635	1667		13.6			32	34	-2	1634	1664		9.6			30	35	-5	1635	1668		15.2			33	34	-1	1669
377	**Combine SINNINGTON**	**1503**	**1522**	**91.4**				**19**	**13**	**6**	**1504**	**1523**	**93.4**				**19**	**12**	**7**	**1503**	**1521**	**87.8**				**18**	**13**	**5**	**1504**	**1523**	**94.4**				**19**	**12**	**7**	**1516**
377	snngtn16	1504	1532		107			28	12	16	1504	1534		108			30	12	18	1504	1531		106			27	12	15	1505	1534		108			29	11	18	1516
377	snngtn18	1494	1522		82.1			28	22	6	1494	1524		84.2			30	22	8	1494	1521		78.1			27	22	5	1494	1525		85.4			31	22	9	1516
378	**Combine GASKYNS1**	**1476**	**1500**	**52.3**				**24**	**13**	**11**	**1477**	**1501**	**54.6**				**24**	**12**	**12**	**1476**	**1498**	**47.2 n=2 A= 47.2%(**				**22**	**13**	**9**	**1478**	**1502**	**57.5**				**24**	**11**	**13**	**1489**
378	gsk4	1478	1515		101			37	11	26	1479	1516		102			37	10	27	1478	1512		99.8			34	11	23	1479	1518		102			39	10	29	1489
378	gsk6	1457	1493		39.7			36	32	4	1457	1494		41.9			37	32	5	1457	1491		34.6			34	32	2	1458	1496		45			38	31	7	1489
379	**Combine GASKYNS2**	**1552**	**1564**	**109**				**12**	**4**	**8**	**1552**	**1565**	**112**				**13**	**4**	**9**	**1552**	**1563**	**103**				**11**	**4**	**7**	**1552**	**1565**	**110**				**13**	**4**	**9**	**1556**
379	gsk11	1549	1574		127			25	7	18	1549	1576		127			27	7	20	1549	1573		127			24	7	17	1549	1576		128			27	7	20	1556
379	gsk12	1552	1581		105			29	4	25	1552	1582		106			30	4	26	1551	1579		103			28	5	23	1552	1582		104			30	4	26	1556
379	gsk13	1546	1572		124			26	10	16	1546	1574		125			28	10	18	1546	1571		123			25	10	15	1546	1574		124			28	10	18	1556

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	S from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
379	| gsk14	1540	1566		71.6			26	16	10	1540	1568		74.5			28	16	12	1540	1565		66			25	16	9	1540	1568		73.5			28	16	12	1556
380	**Combine CRANEFM**	**1332**	**1345**	**144**				**13**	**6**	**7**	**1332**	**1346**	**145**				**14**	**6**	**8**	**1332**	**1344**	**145**				**12**	**6**	**6**	**1332**	**1346**	**146**				**14**	**6**	**8**	**1338**
380	| crane12	1326	1358		132			32	12	20	1326	1360		133			34	12	22	1326	1356		132			30	12	18	1327	1360		133			33	11	22	1338
380	| crane3	1328	1351		119			23	8	15	1328	1353		120			25	8	17	1328	1350		121			22	8	14	1328	1352		121			24	8	16	1336
380	| crane5	1331	1352		119			21	4	17	1331	1355		120			24	4	20	1331	1352		119			21	4	17	1331	1353		120			22	4	18	1335
381	**Combine STONELEIGH1**	**1800**	**1813**	**117**				**13**	**13**	**0**	**1801**	**1814**	**120**				**13**	**12**	**1**	**1800**	**1812**	**114**				**12**	**13**	**-1**	**1801**	**1814**	**121**				**13**	**12**	**1**	**1813**
381	| STO-I08	1796	1825		129			29	17	12	1797	1827		130			30	16	14	1797	1824		130			27	16	11	1797	1828		130			31	16	15	1813
381	| STO-I11	1798	1829		120			31	15	16	1799	1831		121			32	14	18	1798	1827		121			29	15	14	1799	1831		120			32	14	18	1813
381	| STO-I12	1787	1816		70.1			29	25	4	1788	1817		72.8			29	24	5	1787	1815		65.8			28	25	3	1788	1817		73.6			29	24	5	1812
381	| STO-I13	1798	1824		126			26	15	11	1798	1825		127			27	15	12	1798	1823		126			25	15	10	1798	1825		127			27	15	12	1813
382	**Combine STONELEIGH3**	**1560**	**1581**	**121**				**21**	**10**	**11**	**1560**	**1582**	**122**				**22**	**10**	**12**	**1560**	**1580**	**121**				**20**	**10**	**10**	**1561**	**1583**	**123**				**22**	**9**	**13**	**1570**
382	| STO-I53	1554	1588		116			34	16	18	1555	1589		116			34	15	19	1554	1586		115			32	16	16	1555	1591		117			36	15	21	1570
382	| STO-I62	1559	1589		114			30	9	21	1559	1591		114			32	9	23	1559	1588		114			29	9	20	1560	1592		114			32	8	24	1568
383	**Combine STONELEIGH4**	**1593**	**1607**	**104**				**14**	**1**	**13**	**1594**	**1608**	**107**				**14**	**0**	**14**	**1593**	**1606**	**102**				**13**	**1**	**12**	**1594**	**1609**	**114**				**15**	**0**	**15**	**1594**
383	| STO-I80	1586	1618		126			32	8	24	1586	1620		126			34	8	26	1586	1616		125			30	8	22	1587	1621		128			34	7	27	1594
383	| STO-I82	1578	1611		71.9			33	16	17	1578	1613		74.5			35	16	19	1578	1610		69.7			32	16	16	1579	1614		81.2			35	15	20	1594
383	| STO-I84	1594	1625		95.4			31	0	31	1594	1626		96.9			32	0	32	1594	1622		94.8			28	0	28	1595	1626		100			31	-1	32	1594
383	| STO-I85	1587	1617		125			30	7	23	1587	1619		125			32	7	25	1587	1616		125			29	7	22	1588	1619		126			31	6	25	1594
384	**Combine STONELEIGH5**	**1650**	**1663**	**144**				**13**	**8**	**5**	**1650**	**1664**	**147**				**14**	**8**	**6**	**1650**	**1662**	**141**				**12**	**8**	**4**	**1651**	**1665**	**148**				**14**	**7**	**7**	**1658**
384	| STO-I73	1649	1683		105			34	9	25	1650	1684		106			34	8	26	1649	1681		103			32	9	23	1650	1686		107			36	8	28	1658
384	| STO-I74	1646	1677		131			31	12	19	1646	1679		131			33	12	21	1646	1676		131			30	12	18	1647	1680		131			33	11	22	1658
384	| STO-I78	1639	1671		107			32	19	13	1639	1673		109			34	19	15	1639	1669		101			30	19	11	1640	1674		107			34	18	16	1658
384	| STO-I86	1641	1673		119			32	16	16	1641	1674		120			33	16	17	1641	1671		119			30	16	14	1642	1676		122			34	15	19	1657
384	| STO-I87	1644	1675		130			31	13	18	1644	1676		131			32	13	19	1644	1674		132			30	13	17	1645	1679		132			34	12	22	1657
385	**Combine WIGBOROUGH**	**1579**	**1593**	**105**				**14**	**6**	**8**	**1579**	**1594**	**108**				**15**	**6**	**9**	**1579**	**1592**	**99.9**				**13**	**6**	**7**	**1579**	**1594**	**109**				**15**	**6**	**9**	**1585**
385	| wig1	1573	1602		124			29	12	17	1573	1604		124			31	12	19	1573	1600		122			27	12	15	1573	1604		125			31	12	19	1585
385	| wig2	1579	1605		106			26	5	21	1580	1607		107			27	4	23	1579	1604		103			25	5	20	1580	1606		107			26	4	22	1584
385	| wig5	1568	1596		83.1			28	16	12	1568	1598		85.8			30	16	14	1568	1595		79.2			27	16	11	1569	1598		86.9			29	15	14	1584
386	**Combine SHAMBLEHURST**	**1543**	**1558**	**129**				**15**	**5**	**10**	**1543**	**1559**	**130**				**16**	**5**	**11**	**1543**	**1557**	**126**				**14**	**5**	**9**	**1544**	**1559**	**131**				**15**	**4**	**11**	**1548**
386	| shmbl1	1542	1571		114			29	6	23	1543	1572		115			29	5	24	1542	1570		113			28	6	22	1543	1573		115			30	5	25	1548
386	| shmbl2	1534	1566		113			32	13	19	1535	1567		114			32	12	20	1534	1564		109			30	13	17	1535	1568		115			33	12	21	1547
386	| shmbl3	1539	1565		121			26	9	17	1539	1567		122			28	9	19	1539	1564		122			25	9	16	1539	1568		121			29	9	20	1548
387	**Combine SPALDING**	**1464**	**1484**	**88.7**				**20**	**13**	**7**	**1465**	**1485**	**90.6**				**20**	**12**	**8**	**1464**	**1483**	**87.2**				**19**	**13**	**6**	**1465**	**1486**	**93.3**				**21**	**12**	**9**	**1477**
387	| swh01	1465	1495		107			30	12	18	1465	1497		107			32	12	20	1465	1494		106			29	12	17	1466	1497		107			31	11	20	1477
387	| swh02	1454	1484		79.3			30	23	7	1454	1486		81.3			32	23	9	1454	1483		77.7			29	23	6	1455	1487		84.4			32	22	10	1477
388	**Combine SAINTSFM**	**1615**	**1639**	**125**				**24**	**8**	**16**	**1616**	**1640**	**125**				**24**	**7**	**17**	**1615**	**1637**	**125**				**22**	**8**	**14**	**1617**	**1641**	**125**				**24**	**6**	**18**	**1623**
388	| sf42	1612	1647		117			35	11	24	1612	1649		117			37	11	26	1612	1645		117			33	11	22	1613	1650		117			37	10	27	1623
388	| sf43	1613	1648		117			35	10	25	1613	1650		117			37	10	27	1613	1646		117			33	10	23	1614	1651		117			37	9	28	1623
389	**Combine STAFFORD**	**1001**	**1013**	**192**				**12**	**5**	**7**	**1002**	**1014**	**194**				**12**	**4**	**8**	**1001**	**1013**	**192**				**12**	**5**	**7**	**1003**	**1015**	**195**				**12**	**3**	**9**	**1006**
389	| sm09	993	1025		126			32	13	19	993	1027		127			34	13	21	993	1023		125			30	13	17	994	1028		127			34	12	22	1006
389	| sm10	996	1025		131			29	10	19	996	1026		132			30	10	20	996	1024		133			28	10	18	997	1028		132			31	9	22	1006
389	| sm11	996	1029		134			33	10	23	996	1031		135			35	10	25	996	1027		135			31	10	21	997	1031		134			34	9	25	1006
389	| sm12	999	1030		124			31	7	24	999	1032		125			33	7	26	999	1028		124			29	7	22	999	1033		126			34	7	27	1006
389	| sm18	996	1028		134			32	10	22	996	1029		135			33	10	23	996	1026		135			30	10	20	997	1031		135			34	9	25	1006
389	| sm19	994	1027		133			33	12	21	994	1029		134			35	12	23	994	1025		133			31	12	19	995	1030		134			35	11	24	1006
390	**Combine STANHOPE1**	**1518**	**1536**	**109**				**18**	**15**	**3**	**1518**	**1537**	**111**				**19**	**15**	**4**	**1518**	**1535**	**106**				**17**	**15**	**2**	**1518**	**1538**	**110**				**20**	**15**	**5**	**1533**
390	| STN-C19A	1518	1545		111			27	15	12	1518	1547		111			29	15	14	1518	1544		110			26	15	11	1519	1547		111			28	14	14	1533
390	| STN-C23A	1511	1539		102			28	22	6	1511	1541		103			30	22	8	1510	1538		98.2			28	23	5	1511	1541		103			30	22	8	1533

Number	SITE & sample	A from	A to	A Phase A_n	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	AS from	AS to	AS Phase A_n	AS Sample	AS 2nd test	AS 3rd test	AS Range	AS beg range	AS end range	B from	B to	B Phase A_n	B Sample	B 2nd test	B 3rd test	B Range	B beg range	B end range	C from	C to	C Phase A_n	C Sample	C 2nd test	C 3rd test	C Range	C beg range	C end range	Real date
391	**Combine STANHOPE2**	**1586**	**1609**	**76.9**				**23**	**6**	**17**	**1587**	**1610**	**78.7**				**23**	**5**	**18**	**1586**	**1608**	**73.8**				**22**	**6**	**16**	**1588**	**1612**	**76.7**				**24**	**4**	**20**	**1592**
391	STN-B22A	1588	1627		101			39	4	35	1588	1628		102			40	4	36	1588	1624		99.9			36	4	32	1589	1631		101			42	3	39	1592
391	STN-B23A	1576	1606		68.2			30	16	14	1576	1608		70			32	16	16	1576	1604		65.1			28	16	12	1577	1608		68.3			31	15	16	1592
392	**Combine STANLEY**	**1376**	**1394**	**46.6**	**n=2 A= 46.6%(A**			**18**	**12**	**6**	**1376**	**1396**	**49.4**	**n=2 A= 49.4%(**			**20**	**12**	**8**	**1375**	**1394**	**41.3**	**n=2 A= 41.3%(**			**19**	**13**	**6**	**1376**	**1396**	**46.5**	**n=2 A= 46.5%(**			**20**	**12**	**8**	**1388**
392	spl2	1361	1388		35.2			27	27	0	1362	1389		37.8			27	26	1	1361	1386		29.9			25	27	-2	1362	1388		35.1			26	26	0	1388
392	spl3	1378	1409		96.4			31	10	21	1378	1410		97.7			32	10	22	1377	1407		95.6			30	11	19	1378	1411		96.3			33	10	23	1388
393	**Combine DUCKEND**	**1415**	**1430**	**108**				**15**	**9**	**6**	**1416**	**1431**	**110**				**15**	**8**	**7**	**1415**	**1430**	**104**				**15**	**9**	**6**	**1416**	**1432**	**109**				**16**	**8**	**8**	**1424**
393	lfde2	1405	1432		79.1			27	19	8	1405	1434		81.5			29	19	10	1405	1431		75.2			26	19	7	1406	1434		81			28	18	10	1424
393	lfde4	1415	1443		116			28	9	19	1415	1445		117			30	9	21	1415	1442		115			27	9	18	1415	1446		116			31	9	22	1424
393	lfde5	1413	1441		124			28	11	17	1413	1443		124			30	11	19	1413	1440		124			27	11	16	1414	1443		124			29	10	19	1424
394	**Combine STANTON1**	**1298**	**1318**	**123**				**20**	**7**	**13**	**1299**	**1319**	**123**				**20**	**6**	**14**	**1298**	**1316**	**122**				**18**	**7**	**11**	**1299**	**1319**	**122**				**20**	**6**	**14**	**1305**
394	ssj1	1294	1323		114			29	9	20	1295	1325		115			30	8	22	1294	1322		114			28	9	19	1295	1325		114			30	8	22	1303
394	ssj3	1297	1327		117			30	8	22	1297	1329		117			32	8	24	1297	1325		116			28	8	20	1298	1329		117			31	7	24	1305
395	**Combine STANTON2**	**1641**	**1649**	**123**				**8**	**6**	**2**	**1642**	**1650**	**131**				**8**	**5**	**3**	**1641**	**1649**	**113**				**8**	**6**	**2**	**1642**	**1650**	**137**				**8**	**5**	**3**	**1647**
395	ssj41	1641	1668		89.8			27	6	21	1641	1670		92.2			29	6	23	1641	1666		86			25	6	19	1641	1670		95.1			29	6	23	1647
395	ssj42	1631	1663		127			32	16	16	1631	1664		128			33	16	17	1631	1661		126			30	16	14	1632	1665		132			33	15	18	1647
395	ssj44	1627	1656		76.7			29	20	9	1628	1657		79.8			29	19	10	1627	1654		72.2			27	20	7	1628	1657		80.4			29	19	10	1647
395	ssj45	1633	1660		127			27	14	13	1633	1662		128			29	14	15	1633	1658		125			25	14	11	1633	1662		127			29	14	15	1647
395	ssj61	1637	1671		121			34	10	24	1638	1673		122			35	9	26	1637	1669		123			32	10	22	1638	1674		119			36	9	27	1647
395	ssj62	1634	1660		127			26	13	13	1634	1661		129			27	13	14	1633	1659		127			26	14	12	1634	1661		127			27	13	14	1647
395	ssj63	1633	1662		134			29	14	15	1633	1664		135			31	14	17	1633	1661		134			28	14	14	1634	1665		136			31	13	18	1647
395	ssj64	1626	1659		91.7			33	20	13	1626	1661		94.3			35	20	15	1626	1656		85.4			30	20	10	1627	1661		99			34	19	15	1646
395	ssj66	1637	1663		136			26	10	16	1637	1664		137			27	10	17	1637	1662		136			25	10	15	1638	1664		137			26	9	17	1647
395	ssj67	1640	1669		92.8			29	7	22	1641	1671		94.8			30	6	24	1640	1668		89.6			28	7	21	1641	1671		95.7			30	6	24	1647
395	ssj68	1625	1656		75.3			31	22	9	1626	1658		78.2			32	21	11	1625	1655		71.1			30	22	8	1626	1659		83.3			33	21	12	1647
396	**Combine STANTON3**	**1792**	**1810**	**125**				**18**	**9**	**9**	**1793**	**1811**	**126**				**18**	**8**	**10**	**1793**	**1809**	**125**				**16**	**8**	**8**	**1793**	**1812**	**126**				**19**	**8**	**11**	**1801**
396	ssj51	1789	1818		119			29	12	17	1790	1819		120			29	11	18	1789	1816		119			27	12	15	1790	1819		119			29	11	18	1801
396	ssj57	1791	1816		115			25	10	15	1791	1818		116			27	10	17	1791	1816		116			25	10	15	1792	1818		116			26	9	17	1801
397	**Combine STANTON4**	**1349**	**1363**	**137**				**14**	**1**	**13**	**1349**	**1364**	**138**				**15**	**1**	**14**	**1349**	**1362**	**137**				**13**	**1**	**12**	**1350**	**1364**	**138**				**14**	**0**	**14**	**1350**
397	ssj52	1347	1373		124			26	3	23	1347	1374		125			27	3	24	1347	1372		125			25	3	22	1347	1375		125			28	3	25	1350
397	ssj53	1347	1375		123			28	2	26	1347	1376		123			29	2	27	1347	1374		123			27	2	25	1348	1377		123			29	1	28	1349
397	ssj55	1343	1369		113			26	7	19	1343	1370		114			27	7	20	1343	1368		113			25	7	18	1344	1370		113			26	6	20	1350
398	**Combine STAPLEHURST1**	**1740**	**1754**	**144**				**14**	**4**	**10**	**1741**	**1755**	**146**				**14**	**3**	**11**	**1740**	**1754**	**146**				**14**	**4**	**10**	**1741**	**1755**	**147**				**14**	**3**	**11**	**1744**
398	KST-A01A	1739	1763		120			24	5	19	1739	1765		121			26	5	21	1739	1762		121			23	5	18	1739	1765		121			26	5	21	1744
398	KST-A04A	1735	1764		126			29	9	20	1736	1765		126			29	8	21	1735	1763		126			28	9	19	1736	1765		127			29	8	21	1744
398	KST-A12A	1736	1763		125			27	8	19	1736	1765		126			29	8	21	1736	1762		126			26	8	18	1737	1765		126			28	7	21	1744
399	**Combine STAPLEHURST2**	**1762**	**1774**	**68.6**				**12**	**4**	**8**	**1762**	**1775**	**72.9**				**13**	**4**	**9**	**1762**	**1773**	**62.4**				**11**	**4**	**7**	**1762**	**1775**	**72**				**13**	**4**	**9**	**1766**
399	**Combine STAPLEHURST2**	**1763**	**1777**	**122**				**14**	**3**	**11**	**1763**	**1778**	**125**				**15**	**3**	**12**	**1763**	**1776**	**120**				**13**	**3**	**10**	**1763**	**1778**	**125**				**15**	**3**	**12**	**1766**
399	KST-A15A	1759	1785		126	124		26	7	19	1760	1787		126	124		27	6	21	1759	1784		126	124		25	7	18	1760	1786		127	124		26	6	20	1766
399	KST-A20A	1762	1789		98.8	114		27	4	23	1762	1791		101	115		29	4	25	1762	1789		96.1	113		27	4	23	1763	1792		98.8	114		29	3	26	1766
399	KST-A21A	1745	1771		32.3			26	21	5	1745	1772		35.4			27	21	6	1745	1770		27.7			25	21	4	1745	1772		34.6			27	21	6	1766
399	KST-A23B	1754	1781		117	100		27	12	15	1754	1783		118	102		29	12	17	1754	1781		116	98.7		27	12	15	1755	1784		120	104		29	11	18	1766
400	**Combine STAPLEHURST3**	**1774**	**1788**	**57**				**14**	**6**	**8**	**1775**	**1790**	**60.6**				**15**	**5**	**10**	**1774**	**1788**	**52.8**				**14**	**6**	**8**	**1775**	**1790**	**59**				**15**	**5**	**10**	**1780**
400	**Combine STAPLEHURST3**	**1775**	**1794**	**124**				**19**	**5**	**14**	**1776**	**1795**	**124**				**19**	**4**	**15**	**1775**	**1793**	**124**				**18**	**5**	**13**	**1776**	**1796**	**124**				**20**	**4**	**16**	**1780**
400	KST-A27A	1758	1783		28.4			25	21	4	1758	1785		31.1			27	21	6	1758	1782		25			24	21	3	1759	1785		30.1			26	20	6	1779
400	KST-A32A	1774	1803		110	118		29	6	23	1774	1805		112	115		31	6	25	1774	1802		110	119		28	6	22	1774	1805		110	119		31	6	25	1780
400	KST-A36B	1773	1799		120	114		26	6	20	1773	1801		121	119		28	6	22	1773	1798		120	115		25	6	19	1773	1801		121	114		28	6	22	1779
401	**Combine TANKERDALE**	**1615**	**1628**	**95.8**				**13**	**7**	**6**	**1615**	**1629**	**99.1**				**14**	**7**	**7**	**1615**	**1627**	**92.2**				**12**	**7**	**5**	**1615**	**1629**	**96**				**14**	**7**	**7**	**1622**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
401	| tnk10	1616	1642		95.3			26	6	20	1616	1644		97			28	6	22	1616	1641		93.4			25	6	19	1616	1644		95			28	6	22	1622
401	| tnk38	1607	1630		86.5			23	15	8	1607	1632		89.2			25	15	10	1606	1629		82.8			23	16	7	1607	1631		86.7			24	15	9	1622
401	| tnk7	1609	1633		112			24	13	11	1610	1634		114			24	12	12	1609	1632		112			23	13	10	1610	1634		113			24	12	12	1622
402	**Combine PRIORYCT**	**1562**	**1580**	**116**				**18**	**9**	**9**	**1563**	**1581**	**117**				**18**	**8**	**10**	**1562**	**1579**	**114**				**17**	**9**	**8**	**1563**	**1582**	**116**				**19**	**8**	**11**	**1571**
402	| pcs21	1562	1589		113			27	9	18	1562	1591		114			29	9	20	1562	1588		113			26	9	17	1563	1591		113			28	8	20	1571
402	| pcs22	1557	1584		109			27	14	13	1557	1586		109			29	14	15	1557	1583		107			26	14	12	1557	1586		109			29	14	15	1571
403	**Combine CHARLTONCT**	**1404**	**1413**	**59.2**				**9**	**1**	**8**	**1405**	**1413**	**64.8**				**8**	**0**	**8**	**1404**	**1412**	**48.3**				**8**	**1**	**7**	**1405**	**1413**	**65.5**				**8**	**0**	**8**	**1405**
403	**Combine CHARLTONCT**	**1405**	**1415**	**108**				**10**	**0**	**10**	**1405**	**1416**	**113**				**11**	**0**	**11**	**1405**	**1414**	**98.7**				**9**	**0**	**9**	**1406**	**1416**	**117**				**10**	**-1**	**11**	**1405**
403	**Combine CHARLTONCT**	**1405**	**1416**	**130**				**11**	**0**	**11**										**1406**	**1416**	**165**				**10**	**-1**	**11**										**1405**
403	**Combine CHARLTONCT**	**1406**	**1417**	**168**				**11**	**-1**	**12**																												**1405**
403	| st1	1404	1435		75.3	96.7	106	31	0	31	1405	1436		77.9	98.6		31	-1	32	1404	1432		71.4	93.8	114	28	0	28	1405	1436		78.3	99.4		31	-1	32	1404
403	| st11	1388	1418		72.2	60.6	55.2	30	16	14	1388	1420		75.1	63.5		32	16	16	1388	1417		66.9	55.5		29	16	13	1389	1420		77.5	65.5		31	15	16	1404
403	| st12	1403	1432		102	119	125	29	1	28	1403	1433		104	120		30	1	29	1402	1430		100	118	129	28	2	26	1403	1433		106	122		30	1	29	1404
403	| st13	1383	1414		40.4			31	21	10	1384	1416		43.4			32	20	12	1383	1412		32.7			29	21	8	1384	1415		42.6			31	20	11	1404
403	| st14	1396	1425		133	122	115	29	8	21	1397	1426		133	123		29	7	22	1396	1423		132	121	105	27	8	19	1397	1426		133	122		29	7	22	1404
403	| st15	1401	1433		120	131	133	32	3	29	1401	1434		121	131		33	3	30	1401	1430		119	130	135	29	3	26	1401	1435		119	130		34	3	31	1404
403	| st16	1398	1428		138	136	132	30	6	24	1398	1430		139	136		32	6	26	1398	1426		139	135	125	28	6	22	1399	1430		138	136		31	5	26	1404
403	| st2	1398	1430		137	137	135	32	6	26	1399	1431		137	138		32	5	27	1398	1428		137	138	131	30	6	24	1399	1432		136	138		33	5	28	1404
403	| st4	1387	1419		70.5	59.7		32	18	14	1387	1420		73.3	62.5		33	18	15	1387	1417		64	53.5		30	18	12	1388	1421		76.9	65.6		33	17	16	1405
403	| st6	1385	1414		40			29	19	10	1385	1415		43			30	19	11	1384	1412		33.4			28	20	8	1385	1415		41.6			30	19	11	1404
404	**Combine STAIRCASE1**	**1615**	**1628**	**146**				**13**	**5**	**8**	**1616**	**1629**	**148**				**13**	**4**	**9**	**1615**	**1628**	**146**				**13**	**5**	**8**	**1616**	**1630**	**148**				**14**	**4**	**10**	**1620**
404	| STKA108A	1614	1640		123			26	4	22	1614	1641		124			27	4	23	1614	1639		124			25	4	21	1614	1641		125			27	4	23	1618
404	| STKA112A	1607	1634		104			27	5	22	1607	1636		106			29	5	24	1607	1633		103			26	5	21	1608	1636		107			28	4	24	1612
404	| STKA116A	1612	1643		130			31	8	23	1612	1645		130			33	8	25	1612	1642		130			30	8	22	1613	1646		128			33	7	26	1620
404	| STK-A97A	1612	1638		128			26	5	21	1612	1640		129			28	5	23	1612	1637		129			25	5	20	1612	1640		129			28	5	23	1617
405	**Combine STAIRCASE2**	**1635**	**1654**	**125**				**19**	**21**	**-2**	**1635**	**1656**	**125**				**21**	**21**	**0**	**1635**	**1653**	**126**				**18**	**21**	**-3**	**1636**	**1656**	**125**				**20**	**20**	**0**	**1656**
405	| STKA128A	1632	1665		121			33	20	13	1632	1667		121			35	20	15	1632	1663		121			31	20	11	1633	1667		121			34	19	15	1652
405	| STKA130A	1633	1659		113			26	23	3	1633	1661		114			28	23	5	1633	1658		114			25	23	2	1633	1662		113			29	23	6	1656
406	**Combine STOKESAY1**	**1246**	**1266**	**122**				**20**	**17**	**3**	**1246**	**1267**	**122**				**21**	**17**	**4**	**1246**	**1264**	**122**				**18**	**17**	**1**	**1247**	**1267**	**122**				**20**	**16**	**4**	**1263**
406	| sc63	1242	1271		114			29	20	9	1242	1273		115			31	20	11	1242	1269		114			27	20	7	1242	1273		115			31	20	11	1262
406	| sc64	1245	1274		116			29	18	11	1245	1277		116			32	18	14	1245	1273		116			28	18	10	1245	1277		116			32	18	14	1263
407	**Combine STOKESAY2**	**1279**	**1287**	**30.4**				**8**	**11**	**-3**	**1280**	**1288**	**35**				**8**	**10**	**-2**	**1279**	**1286**	**22.3**				**7**	**11**	**-4**	**1280**	**1288**	**34.4**				**8**	**10**	**-2**	**1290**
407	**Combine STOKESAY2**	**1281**	**1290**	**123**				**9**	**9**	**0**	**1281**	**1291**	**129**				**10**	**9**	**1**	**1279**	**1288**	**129**				**9**	**11**	**-2**	**1281**	**1291**	**125**				**10**	**9**	**1**	**1290**
407	**Combine STOKESAY2**	**1281**	**1291**	**152**				**10**	**9**	**1**																			**1282**	**1292**	**155**				**10**	**8**	**2**	**1290**
407	| sc11	1278	1306		100	123	129	28	7	21	1278	1307		102	124		29	7	22	1278	1304		95.9	102		26	7	19	1279	1307		101	123	129	28	6	22	1285
407	| sc15	1247	1279		7.9			32	38	-6	1248	1280		9.4			32	37	-5	1247	1277		5.8			30	38	-8	1248	1281		10			33	37	-4	1285
407	| sc16	1268	1292		77.1	57.6		24	17	7	1269	1293		80.6	61		24	16	8	1268	1291		76.6	71		23	17	6	1269	1293		77.6	58.1		24	16	8	1285
407	| sc20	1276	1305		127	136	136	29	12	17	1276	1306		128	136		30	12	18	1276	1303		127	128		27	12	15	1276	1307		127	136	136	31	12	19	1288
407	| sc21	1267	1302		127	113	105	35	20	15	1268	1303		128	114		35	19	16	1267	1299		121	116		32	20	12	1268	1304		130	117	109	36	19	17	1287
407	| sc31	1271	1298		127	109	99.1	27	19	8	1271	1300		128	111		29	19	10	1271	1296		124	118		25	19	6	1271	1300		127	109	99.2	29	19	10	1290
407	| sc39	1254	1289		34.2			35	35	0	1255	1290		36.9			35	34	1	1254	1286		25.3			32	35	-3	1255	1290		38.1			35	34	1	1289
407	| sc41	1280	1309		60.7	91.7	105	29	10	19	1281	1310		63.7	94.1		29	9	20	1280	1307		53.9			27	10	17	1281	1310		61.6	92.2	105	29	9	20	1290
407	| sc45	1277	1306		114	131	134	29	12	17	1277	1308		115	131		31	12	19	1277	1304		115	119		27	12	15	1277	1308		116	131	134	31	12	19	1289
407	| sc7	1271	1302		137	126	118	31	19	12	1271	1303		138	127		32	19	13	1271	1299		135	130		28	19	9	1272	1303		138	126	118	31	18	13	1290
407	| sc8	1263	1289		47.3			26	21	5	1263	1291		50.8			28	21	7	1263	1288		40.1			25	21	4	1263	1290		47.6			27	21	6	1284
408	**Combine STOKESAY3**	**1629**	**1640**	**58.8**				**11**	**12**	**-1**	**1629**	**1641**	**63.4**				**12**	**12**	**0**	**1629**	**1639**	**55.6**				**10**	**12**	**-2**	**1630**	**1641**	**66.3**				**11**	**11**	**0**	**1641**
408	**Combine STOKESAY3**	**1630**	**1642**	**70.4**				**12**	**11**	**1**										**1629**	**1641**	**68.5**				**12**	**12**	**0**	**1630**	**1643**	**79.2**				**13**	**11**	**2**	**1641**
408	| sc24	1631	1663		61.6	78.5		32	10	22	1631	1665		64.1			34	10	24	1631	1661		59.7	76.9		30	10	20	1631	1665		64.6	81.4		34	10	24	1641

Number	SITE & sample	A from	A to	A $Phase A_n$	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	AS from	AS to	AS $Phase A_n$	AS Sample	AS 2nd test	AS 3rd test	AS Range	AS beg range	AS end range	B from	B to	B $Phase A_n$	B Sample	B 2nd test	B 3rd test	B Range	B beg range	B end range	C from	C to	C $Phase A_n$	C Sample	C 2nd test	C 3rd test	C Range	C beg range	C end range	Real date
408	sc35	1627	1659		109	119		32	12	20	1628	1660		110			32	11	21	1627	1656		110	120		29	12	17	1628	1660		111	121		32	11	21	1639
408	sc52	1615	1641		56.9			26	25	1	1615	1643		60.1			28	25	3	1615	1640		52.9			25	25	0	1615	1643		58.7			28	25	3	1640
408	sc54	1617	1644		81.5	70.3		27	24	3	1617	1646		84.3			29	24	5	1617	1644		83.3	71.9		27	24	3	1618	1647		88.7	77.1		29	23	6	1641
408	sc55	1614	1644		71.8	62.2		30	27	3	1614	1646		74.7			32	27	5	1614	1643		69.2	59.6		29	27	2	1615	1647		79.5	69.4		32	26	6	1641
408	sc57	1620	1650		122	112		30	20	10	1620	1652		123			32	20	12	1620	1648		119	108		28	20	8	1621	1652		123	113		31	19	12	1640
409	**Combine STOKESAY4**	**1659**	**1671**	**61.2**				**12**	**4**	**8**	**1660**	**1672**	**65.6**				**12**	**3**	**9**	**1659**	**1671**	**58.7**				**12**	**4**	**8**	**1660**	**1672**	**67.7**				**12**	**3**	**9**	**1663**
409	**Combine STOKESAY4**	**1660**	**1674**	**102**				**14**	**3**	**11**	**1661**	**1675**	**105**				**14**	**2**	**12**	**1660**	**1673**	**101**				**13**	**3**	**10**	**1661**	**1675**	**107**				**14**	**2**	**12**	**1663**
409	sc47i	1649	1675		88.8	71.5		26	14	12	1650	1677		91.2	74.3		27	13	14	1649	1675		87	70.2		26	14	12	1650	1677		93.9	77		27	13	14	1663
409	sc59	1659	1685		113	122		26	4	22	1659	1686		114	123		27	4	23	1658	1684		113	122		26	5	21	1659	1686		114	122		27	4	23	1663
409	sc60	1659	1685		106	118		26	4	22	1660	1687		107	119		27	3	24	1659	1684		106	118		25	4	21	1660	1686		108	119		26	3	23	1663
409	sc62	1644	1669		35.4			25	18	7	1644	1671		38.6			27	18	9	1644	1668		33			24	18	6	1644	1671		39.6			27	18	9	1662
410	**Combine STOWE**	**1748**	**1765**	**146**				**17**	**4**	**13**	**1748**	**1766**	**147**				**18**	**4**	**14**	**1747**	**1764**	**146**				**17**	**5**	**12**	**1749**	**1767**	**146**				**18**	**3**	**15**	**1752**
410	stw2	1744	1777		125			33	7	26	1744	1779		125			35	7	28	1744	1774		125			30	7	23	1745	1779		125			34	6	28	1751
410	stw4	1744	1777		125			33	7	26	1744	1779		125			35	7	28	1744	1774		125			30	7	23	1745	1779		125			34	6	28	1751
410	stw6	1743	1775		123			32	9	23	1743	1776		124			33	9	24	1743	1773		123			30	9	21	1743	1777		123			34	9	25	1752
411	**Combine HALLSCROFT1**	**1611**	**1619**	**173**				**8**	**2**	**6**	**1611**	**1620**	**179**				**9**	**2**	**7**	**1610**	**1619**	**163**				**9**	**3**	**6**	**1612**	**1621**	**179**				**9**	**1**	**8**	**1613**
411	hc-14567	1601	1635		134			34	12	22	1601	1636		135			35	12	23	1600	1632		131			32	13	19	1601	1637		135			36	12	24	1613
411	hc-I11	1602	1629		123			27	11	16	1602	1631		124			29	11	18	1602	1630		130			28	11	17	1603	1633		129			30	10	20	1613
411	hc-I12	1609	1641		96.2			32	4	28	1610	1642		98.3			32	3	29	1609	1639		92.9			30	4	26	1610	1643		101			33	3	30	1613
411	hc-I13	1606	1640		126			34	7	27	1607	1642		127			35	6	29	1606	1638		126			32	7	25	1607	1643		127			36	6	30	1613
411	hc-I16	1605	1639		136			34	8	26	1605	1641		136			36	8	28	1604	1637		137			33	9	24	1605	1642		136			37	8	29	1613
411	hc-I2	1606	1639		130			33	7	26	1606	1641		130			35	7	28	1606	1637		129			31	7	24	1607	1641		130			34	6	28	1613
411	hc-I3	1594	1626		78			32	19	13	1594	1628		80.4			34	19	15	1594	1624		69.1			30	19	11	1595	1629		79.6			34	18	16	1613
411	hc-I4	1600	1629		114			29	13	16	1600	1631		115			31	13	18	1600	1628		112			28	13	15	1600	1632		114			32	13	19	1613
411	hc-I5	1605	1642		131			37	8	29	1606	1643		131			37	7	30	1605	1639		130			34	8	26	1606	1645		128			39	7	32	1613
411	hc-I6910	1604	1630		131			26	9	17	1604	1632		132			28	9	19	1604	1629		131			25	9	16	1604	1631		128			27	9	18	1613
411	hc-I8	1597	1632		114			35	16	19	1597	1634		116			37	16	21	1597	1629		109			32	16	16	1598	1635		119			37	15	22	1613
412	**Combine HALLSCROFT2**	**1628**	**1642**	**123**				**14**	**3**	**11**	**1628**	**1643**	**126**				**15**	**3**	**12**	**1627**	**1640**	**117**				**13**	**4**	**9**	**1629**	**1643**	**126**				**14**	**2**	**12**	**1631**
412	hc-V1	1625	1662		118			37	6	31	1626	1663		119			37	5	32	1625	1659		116			34	6	28	1626	1664		118			38	5	33	1631
412	hc-V2	1617	1651		111			34	14	20	1617	1652		112			35	14	21	1616	1648		107			32	15	17	1617	1653		112			36	14	22	1631
412	hc-V4	1624	1656		127			32	7	25	1625	1657		128			32	6	26	1624	1654		127			30	7	23	1625	1657		128			32	6	26	1631
412	hc-V5	1613	1646		76.2			33	18	15	1613	1648		78.4			35	18	17	1613	1643		71.7			30	18	12	1614	1648		79			34	17	17	1631
412	hc-V6	1624	1661		126			37	7	30	1624	1663		126			39	7	32	1624	1658		125			34	7	27	1625	1664		125			39	6	33	1631
413	**Combine NEWSHIPTON**	**1415**	**1431**	**107**				**16**	**10**	**6**	**1416**	**1432**	**109**				**16**	**9**	**7**	**1415**	**1430**	**105**				**15**	**10**	**5**	**1416**	**1431**	**108**				**15**	**9**	**6**	**1425**
413	nsf1	1415	1439		111			24	9	15	1416	1440		111			24	8	16	1415	1438		110			23	9	14	1416	1440		111			24	8	16	1424
413	nsf2	1409	1433		99.6			24	16	8	1410	1434		101			24	15	9	1409	1432		97.6			23	16	7	1410	1434		101			24	15	9	1425
414	**Combine MANORCT**	**1311**	**1321**	**86.2**				**10**	**7**	**3**	**1311**	**1323**	**90.9**				**12**	**7**	**5**	**1311**	**1321**	**79.3**				**10**	**7**	**3**	**1311**	**1322**	**89.6**				**11**	**7**	**4**	**1318**
414	**Combine MANORCT**	**1311**	**1324**	**112**				**13**	**7**	**6**										**1311**	**1323**	**109**				**12**	**7**	**5**										**1318**
414	mcsc01	1306	1333		132	126		27	12	15	1307	1334		132			27	11	16	1306	1331		132	125		25	12	13	1307	1334		132			27	11	16	1318
414	mcsc03	1303	1327		105	89.9		24	15	9	1304	1328		107			24	14	10	1303	1326		103	86.9		23	15	8	1304	1328		106			24	14	10	1318
414	mcsc21	1297	1323		58.1			26	20	6	1298	1325		61.7			27	19	8	1297	1322		51.7			25	20	5	1298	1324		61			26	19	7	1317
414	mcsc23	1312	1335		92.5	107		23	6	17	1312	1337		94.6			25	6	19	1311	1334		89.7	106		23	7	16	1312	1336		94.4			24	6	18	1318
415	**Combine TANWORTH**	**1439**	**1450**	**97**				**11**	**9**	**2**	**1440**	**1451**	**101**				**11**	**8**	**3**	**1439**	**1450**	**92.7**				**11**	**9**	**2**	**1440**	**1451**	**104**				**11**	**8**	**3**	**1448**
415	mbt3	1436	1464		129			28	11	17	1436	1466		129			30	11	19	1436	1463		130			27	11	16	1437	1466		128			29	10	19	1447
415	mbt5	1439	1462		106			23	7	16	1440	1464		108			24	6	18	1439	1462		103			23	7	16	1440	1464		107			24	6	18	1446
415	mbt6	1424	1453		63.2			29	24	5	1424	1455		66.4			31	24	7	1424	1452		59.5			28	24	4	1425	1456		73.7			31	23	8	1448
415	mbt8	1434	1455		109			21	12	9	1434	1456		111			22	12	10	1434	1454		108			20	12	8	1434	1456		107			22	12	10	1446
416	**Combine TUDORTAVERN**	**1318**	**1336**	**121**				**18**	**6**	**12**	**1318**	**1337**	**122**				**19**	**6**	**13**	**1318**	**1335**	**122**				**17**	**6**	**11**	**1318**	**1338**	**119**				**20**	**6**	**14**	**1324**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
416	ttt1	1316	1339		108			23	8	15	1316	1340		109			24	8	16	1315	1338		109			23	9	14	1316	1340		107			24	8	16	1324
416	ttt6	1315	1350		121			35	9	26	1316	1351		121			35	8	27	1315	1347		121			32	9	23	1316	1352		120			36	8	28	1324
417	**Combine THETFORD**	**1528**	**1540**	**153**				**12**	**8**	**4**	**1528**	**1541**	**155**				**13**	**8**	**5**	**1528**	**1539**	**155**				**11**	**8**	**3**	**1529**	**1542**	**153**				**13**	**7**	**6**	**1536**
417	THT-A01	1524	1551		130			27	9	18	1524	1553		130			29	9	20	1524	1550		130			26	9	17	1524	1553		130			29	9	20	1533
417	THT-A17B	1522	1551		130			29	11	18	1523	1553		131			30	10	20	1523	1550		131			27	10	17	1523	1554		131			31	10	21	1533
417	THT-A33	1522	1559		133			37	12	25	1523	1561		133			38	11	27	1522	1557		134			35	12	23	1524	1562		132			38	10	28	1534
417	THT-A49B	1526	1558		117			32	7	25	1526	1560		118			34	7	27	1526	1556		117			30	7	23	1527	1561		117			34	6	28	1533
417	THT-A50A	1519	1545		97.6			26	17	9	1520	1546		99.4			26	16	10	1519	1545		100			26	17	9	1520	1547		99.2			27	16	11	1536
418	**Combine NETHERFOLD**	**1483**	**1500**	**124**				**17**	**11**	**6**	**1483**	**1502**	**124**				**19**	**11**	**8**	**1483**	**1499**	**124**				**16**	**11**	**5**	**1483**	**1502**	**124**				**19**	**11**	**8**	**1494**
418	nf1	1480	1506		116			26	14	12	1480	1507		116			27	14	13	1480	1505		116			25	14	11	1480	1508		116			28	14	14	1494
418	nf2	1482	1508		116			26	12	14	1482	1510		117			28	12	16	1482	1507		117			25	12	13	1482	1510		117			28	12	16	1494
419	**Combine STBRIAVELS**	**1579**	**1592**	**69**				**13**	**13**	**0**	**1579**	**1593**	**72.7**				**14**	**13**	**1**	**1578**	**1591**	**59.7**				**13**	**14**	**-1**	**1579**	**1593**	**76.5**				**14**	**13**	**1**	**1592**
419	**Combine STBRIAVELS**	**1579**	**1594**	**107**				**15**	**13**	**2**	**1580**	**1595**	**110**				**15**	**12**	**3**	**1579**	**1593**	**99.5**				**14**	**13**	**1**	**1580**	**1596**	**110**				**16**	**12**	**4**	**1592**
419	SBC-B08	1579	1613		95.1	109		34	13	21	1579	1615		96.3	110		36	13	23	1578	1611		92.2	107		33	14	19	1580	1616		95.6	109		36	12	24	1592
419	SBC-B23A	1568	1601		112	100		33	24	9	1568	1603		113	102		35	24	11	1568	1599		109	96.8		31	24	7	1569	1603		115	103		34	23	11	1592
419	SBC-B25A	1554	1591		36.4			37	38	-1	1555	1592		38.9			37	37	0	1554	1589		30.7			35	38	-3	1555	1594		43.5			39	37	2	1592
419	SBC-B32A	1577	1609		114	122		32	15	17	1578	1610		115	122		32	14	18	1577	1607		112	121		30	15	15	1578	1610		116	123		32	14	18	1592
419	SBC-B34A	1566	1600		98.8	86.8		34	26	8	1567	1601		101	88.8		34	25	9	1566	1596		91.5	79.3		30	26	4	1567	1601		99.7	88.1		34	25	9	1592
420	**Combine SMARGARETS**	**1620**	**1627**	**177**				**7**	**3**	**4**	**1620**	**1628**	**185**				**8**	**3**	**5**	**1619**	**1626**	**169**				**7**	**4**	**3**	**1621**	**1628**	**178**				**7**	**2**	**5**	**1623**
420	smp1	1605	1633		72.5			28	18	10	1605	1635		75.4			30	18	12	1605	1631		65.9			26	18	8	1606	1634		73.7			28	17	11	1623
420	smp10	1612	1641		138			29	11	18	1613	1642		138			29	10	19	1612	1639		138			27	11	16	1613	1642		138			29	10	19	1623
420	smp12	1612	1637		126			25	10	15	1612	1639		127			27	10	17	1612	1636		128			24	10	14	1613	1639		127			26	9	17	1622
420	smp13	1614	1640		139			26	8	18	1614	1642		139			28	8	20	1614	1639		139			25	8	17	1614	1643		139			29	8	21	1622
420	smp15	1620	1649		72.7			29	3	26	1620	1650		75.8			30	3	27	1620	1647		68			27	3	24	1620	1651		75.4			31	3	28	1623
420	smp16	1615	1649		129			34	7	27	1615	1650		129			35	7	28	1614	1647		129			33	8	25	1616	1652		125			36	6	30	1622
420	smp2	1611	1637		120			26	11	15	1611	1638		122			27	11	16	1611	1636		121			25	11	14	1612	1638		121			26	10	16	1622
420	smp3	1611	1635		112			24	11	13	1611	1637		114			26	11	15	1611	1634		110			23	11	12	1611	1637		109			26	11	15	1622
420	smp4	1610	1642		136			32	11	21	1611	1643		136			32	10	22	1610	1640		133			30	11	19	1611	1644		137			33	10	23	1621
420	smp58	1614	1645		138			31	9	22	1614	1647		138			33	9	24	1614	1644		138			30	9	21	1614	1648		137			34	9	25	1623
420	smp7	1615	1647		129			32	8	24	1616	1648		129			32	7	25	1615	1645		128			30	8	22	1616	1649		127			33	7	26	1623
420	smp9	1614	1640		138			26	8	18	1615	1642		139			27	7	20	1614	1639		139			25	8	17	1615	1641		138			26	7	19	1622
421	**Combine THEJETTY**	**1408**	**1421**	**74.3**				**13**	**5**	**8**	**1408**	**1422**	**78.3**				**14**	**5**	**9**	**1408**	**1421**	**74.3**				**13**	**5**	**8**	**1409**	**1422**	**81**				**13**	**4**	**9**	**1413**
421	**Combine THEJETTY**	**1409**	**1425**	**122**				**16**	**4**	**12**	**1409**	**1427**	**123**				**18**	**4**	**14**	**1409**	**1425**	**123**				**16**	**4**	**12**	**1410**	**1427**	**125**				**17**	**3**	**14**	**1413**
421	jty2	1395	1419		44			24	18	6	1396	1420		47.4			24	17	7	1396	1419		43.5			23	17	6	1396	1421		49.5			25	17	8	1413
421	jty4	1408	1432		106	114		24	5	19	1409	1433		108	114		24	4	20	1408	1431		107	114		23	5	18	1409	1433		110	114		24	4	20	1413
421	jty5	1405	1431		128	117		26	8	18	1405	1432		128	117		27	8	19	1405	1430		128	118		25	8	17	1405	1434		128	119		29	8	21	1413
422	**Combine TITCHFIELD**	**1398**	**1411**	**51.6**				**13**	**11**	**2**	**1398**	**1412**	**55.5**				**14**	**11**	**3**	**1398**	**1410**	**42.5**				**12**	**11**	**1**	**1398**	**1412**	**53.5**				**14**	**11**	**3**	**1409**
422	**Combine TITCHFIELD**	**1399**	**1416**	**101**				**17**	**10**	**7**	**1399**	**1417**	**103**				**18**	**10**	**8**	**1398**	**1415**	**97.3**				**17**	**11**	**6**	**1399**	**1417**	**104**				**18**	**10**	**8**	**1409**
422	titch1	1399	1424		94.5	109		25	10	15	1399	1426		96	110		27	10	17	1399	1422		91.9	108		23	10	13	1399	1425		95.6	110		26	10	16	1409
422	titch3	1379	1407		29.4			28	28	0	1379	1409		32.5			30	28	2	1379	1405		22.3			26	28	-2	1379	1408		30.4			29	28	1	1407
422	titch5	1390	1418		114	93.4		28	19	9	1391	1420		116	95.3		29	18	11	1390	1416		111	88.8		26	19	7	1391	1420		117	95.9		29	18	11	1409
423	**Combine TYRONE1**	**597**	**621**	**94.7**				**24**	**12**	**12**	**597**	**622**	**96.1**				**25**	**12**	**13**	**597**	**620**	**90.1**				**23**	**12**	**11**	**598**	**624**	**101**				**26**	**11**	**15**	**609**
423	Q5693	582	624		85.6			42	27	15	583	625		87.2			42	26	16	582	622		80.4			40	27	13	584	629		93.3			45	25	20	609
423	Q6151	598	632		108			34	11	23	598	633		108			35	11	24	598	630		107			32	11	21	599	635		109			36	10	26	609
424	**Combine TYRONE2**	**609**	**637**	**115**				**28**	**5**	**23**	**610**	**637**	**115**				**27**	**4**	**23**	**609**	**635**	**112**				**26**	**5**	**21**	**611**	**640**	**117**				**29**	**3**	**26**	**614**
424	Q5692	599	644		109			45	15	30	600	645		109			45	14	31	599	640		106			41	15	26	601	648		112			47	13	34	614
424	Q5695	609	648		112			39	5	34	610	649		112			39	4	35	609	646		111			37	5	32	611	652		112			41	3	38	614
425	**Combine TYRONE3**	**636**	**660**	**54.9**				**24**	**7**	**17**	**637**	**660**	**57**				**23**	**6**	**17**	**636**	**658**	**44.5**	**n=2 A= 44.5%(**			**22**	**7**	**15**	**637**	**662**	**65.2**				**25**	**6**	**19**	**643**

Number	SITE & sample	A from	A to	A Phase A_n	A Sample	A 2nd test	A 3rd test	A Range	A beg range	A end range	S from	S to	S Phase A_n	S Sample	S 2nd test	S 3rd test	S Range	S beg range	S end range	B from	B to	B Phase A_n	B Sample	B 2nd test	B 3rd test	B Range	B beg range	B end range	C from	C to	C Phase A_n	C Sample	C 2nd test	C 3rd test	C Range	C beg range	C end range	Real date
425	Q6147	637	669		106			32	6	26	638	670		106			32	5	27	638	668		105			30	5	25	639	672		106			33	4	29	**643**
425	Q6148	606	656		40.5			50	37	13	606	658		42.6			52	37	15	606	651		30.4			45	37	8	608	662		51.4			54	35	19	**643**
426	**Combine UCKFIELD**	**1427**	**1440**	**13.9**	**n=3 A= 13.9%(A**			**13**	**9**	**4**	**1427**	**1442**	**16.9**	**n=3 A= 16.9%(**			**15**	**9**	**6**	**1427**	**1440**	**12.7**	**n=3 A= 12.7%(**			**13**	**9**	**4**	**1427**	**1442**	**14.8**	**FAILED**	**n=3 A**		**15**	**9**	**6**	**1436**
426	**Combine UCKFIELD**	**1428**	**1447**	**102**				**19**	**8**	**11**	**1429**	**1448**	**103**				**19**	**7**	**12**	**1428**	**1446**	**103**				**18**	**8**	**10**	**1429**	**1448**	**98.9**				**19**	**7**	**12**	**1436**
426	uck10	1402	1425		3.5			23	33	-10	1403	1427		4.7			24	32	-8	1402	1425		2.9			23	33	-10	1403	1426		4			23	32	-9	1435
426	uck16	1424	1446		120	94.2		22	12	10	1424	1448		119	95.2		24	12	12	1424	1446		119	95.3		22	12	10	1424	1448		118	92.2		24	12	12	1436
426	uck19	1428	1462		78	108		34	8	26	1429	1463		82.6	109		34	7	27	1428	1460		82.8	109		32	8	24	1429	1465		78.3	107		36	7	29	1436
427	**Combine GABLEEND**	**1568**	**1583**	**146**				**15**	**8**	**7**	**1569**	**1583**	**147**				**14**	**7**	**7**	**1568**	**1581**	**146**				**13**	**8**	**5**	**1569**	**1583**	**147**				**14**	**7**	**7**	**1576**
427	chu2	1564	1593		127			29	12	17	1565	1594		127			29	11	18	1564	1592		127			28	12	16	1565	1595		128			30	11	19	1576
427	chu3	1566	1591		122			25	10	15	1566	1593		123			27	10	17	1566	1590		**123**			24	10	14	1567	1593		123			26	9	17	1576
427	chu67	1564	1590		124			26	12	14	1564	1592		124			28	12	16	1564	1589		124			25	12	13	1564	1592		124			28	12	16	1576
428	**Combine LANCIN**	**1527**	**1540**	**142**				**13**	**6**	**7**	**1528**	**1541**	**144**				**13**	**5**	**8**	**1527**	**1540**	**142**				**13**	**6**	**7**	**1528**	**1541**	**143**				**13**	**5**	**8**	**1533**
428	lancin4m	1526	1549		121			23	7	16	1526	1551		122			25	7	18	1526	1549		122			23	7	16	1526	1551		122			25	7	18	1533
428	lancin5	1524	1549		126			25	9	16	1524	1551		126			27	9	18	1524	1548		126			24	9	15	1525	1551		126			26	8	18	1533
428	lancin6	1522	1547		121			25	11	14	1522	1549		121			27	11	16	1522	1546		120			24	11	13	1522	1549		121			27	11	16	1533
429	**Combine WARNDON**	**1486**	**1501**	**92.5**				**15**	**12**	**3**	**1486**	**1502**	**95.3**				**16**	**12**	**4**	**1486**	**1500**	**90.2**				**14**	**12**	**2**	**1487**	**1502**	**94.9**				**15**	**11**	**4**	**1498**
429	wsn03	1485	1514		117			29	13	16	1485	1516		118			31	13	18	1485	1513		118			28	13	15	1486	1517		118			31	12	19	1498
429	wsn04	1484	1513		120			29	13	16	1485	1514		121			29	12	17	1485	1512		120			27	12	15	1485	1516		120			31	12	19	1497
429	wsn05	1474	1500		62			26	23	3	1475	1502		64.6			27	22	5	1475	1500		59.5			25	22	3	1475	1502		**64.4**			27	22	5	1497
430	**Combine BEREFARM**	**1514**	**1532**	**116**				**18**	**15**	**3**	**1514**	**1533**	**117**				**19**	**15**	**4**	**1514**	**1531**	**114**				**17**	**15**	**2**	**1514**	**1534**	**118**				**20**	**15**	**5**	**1529**
430	bere2	1507	1537		111			30	22	8	1507	1539		111			32	22	10	1507	1535		108			28	22	6	1508	1539		112			31	21	10	1529
430	bere3	1513	1540		112			27	16	11	1514	1541		112			27	15	12	1514	1539		112			25	15	10	1514	1541		112			27	15	12	1529
431	**Combine RIVERSDOWN**	**1309**	**1327**	**111**				**18**	**18**	**0**	**1309**	**1328**	**113**				**19**	**18**	**1**	**1309**	**1325**	**109**				**16**	**18**	**-2**	**1309**	**1328**	**114**				**19**	**18**	**1**	**1327**
431	riv12	1302	1331		105			29	25	4	1302	1332		106			30	25	5	1302	1329		102			27	25	2	1302	1333		108			31	25	6	1327
431	riv3	1309	1334		111			25	16	9	1309	1336		111			27	16	11	1309	1333		111			24	16	8	1309	1335		112			26	16	10	1325
432	**Combine HOWARDS**	**1553**	**1570**	**107**				**17**	**18**	**-1**	**1553**	**1572**	**109**				**19**	**18**	**1**	**1553**	**1569**	**102**				**16**	**18**	**-2**	**1554**	**1572**	**104**				**18**	**17**	**1**	**1571**
432	wkb-a02a	1548	1584		128			36	22	14	1549	1586		128			37	21	16	1548	1581		127			33	22	11	1549	1586		127			37	21	16	1570
432	wkb-a03a	1543	1572		81.5			29	10	19	1544	1573		83.3			29	9	20	1543	1570		77.8			27	10	17	1544	1573		78.8			29	9	20	1553
432	wkb-a04a	1553	1588		108			35	18	17	1553	1590		108			37	18	19	1553	1586		104			33	18	15	1554	1592		106			38	17	21	1571
433	**Combine WELLESBOURNE**	**1625**	**1645**	**125**				**20**	**14**	**6**	**1625**	**1646**	**126**				**21**	**14**	**7**	**1624**	**1644**	**126**				**20**	**15**	**5**	**1625**	**1647**	**126**				**22**	**14**	**8**	**1639**
433	wel29	1622	1654		120			32	17	15	1622	1656		120			34	17	17	1622	1652		120			30	17	13	1623	1656		120			33	16	17	1639
433	wel8	1623	1651		115			28	16	12	1623	1653		115			30	16	14	1622	1650		116			28	17	11	1623	1653		115			30	16	14	1639
434	**Combine WELLS1**	**1440**	**1452**	**55.6**				**12**	**4**	**8**	**1440**	**1453**	**59.9**				**13**	**4**	**9**	**1440**	**1451**	**50.6**				**11**	**4**	**7**	**1440**	**1453**	**60.3**				**13**	**4**	**9**	**1444**
434	**Combine WELLS1**	**1440**	**1455**	**94.3**				**15**	**4**	**11**	**1441**	**1456**	**97.3**				**15**	**3**	**12**	**1440**	**1454**	**92.4**				**14**	**4**	**10**	**1441**	**1457**	**99.9**				**16**	**3**	**13**	**1444**
434	csw1	1423	1449		32.7			26	21	5	1423	1450		35.8			27	21	6	1423	1448		28.1			25	21	4	1423	1451		34.8			28	21	7	1444
434	csw24	1441	1469		81.6	103		28	3	25	1441	1471		84	104		30	3	27	1441	1468		80.3	102		27	3	24	1442	1471		84.7	105		29	2	27	1444
434	csw35	1429	1456		88.6	71.2		27	15	12	1429	1458		91.1	74		29	15	14	1429	1455		86.8	69.4		26	15	11	1430	1458		94.1	76.5		28	14	14	1444
434	csw6	1435	1464		131	124		29	9	20	1436	1465		131	124		29	8	21	1435	1463		131	124		28	9	19	1436	1466		131	125		30	8	22	1444
435	**Combine WELLS2**	**1456**	**1470**	**24.5**	**n=3 A= 24.5%(A**			**14**	**10**	**4**	**1456**	**1471**	**27.4**	**n=3 A= 27.4%(**			**15**	**10**	**5**	**1456**	**1470**	**20.9**	**n=3 A= 20.9%(**			**14**	**10**	**4**	**1456**	**1472**	**29.1**	**FAILED**	**n=3 A:**		**16**	**10**	**6**	**1466**
435	**Combine WELLS2**	**1457**	**1475**	**125**				**18**	**9**	**9**	**1457**	**1476**	**126**				**19**	**9**	**10**	**1457**	**1474**	**125**				**17**	**9**	**8**	**1458**	**1477**	**125**				**19**	**8**	**11**	**1466**
435	vcw1	1454	1482		123	119		28	12	16	1454	1484		123	119		30	12	18	1453	1481		124	118		28	13	15	1454	1484		123	119		30	12	18	1466
435	vcw2	1425	1456		6.4			31	41	-10	1426	1458		7.6			32	40	-8	1425	1455		4.9			30	41	-11	1426	1459		8.5			33	40	-7	1466
435	vcw3	1456	1482		112	115		26	10	16	1456	1483		113	116		27	10	17	1456	1481		110	116		25	10	15	1456	1484		112	116		28	10	18	1466
436	**Combine WELLS3**	**1309**	**1320**	**5**	**n=5 A= 5.0%(An=**			**11**	**6**	**5**	**1309**	**1321**	**6.2**	**n=5 A= 6.2%(An=**			**12**	**6**	**6**	**1309**	**1319**	**3.7**	**n=5 A= 3.7%(An**			**10**	**6**	**4**	**1310**	**1321**	**6.7**	**FAILED**	**n=5 A=**		**11**	**5**	**6**	**1315**
436	**Combine WELLS3**	**1303**	**1321**	**124**				**18**	**12**	**6**	**1303**	**1322**	**125**				**19**	**12**	**7**	**1303**	**1320**	**124**				**17**	**12**	**5**	**1303**	**1322**	**125**				**19**	**12**	**7**	**1315**
436	sjp1	1302	1328		119	116		26	12	14	1302	1330		120	116		28	12	16	1302	1327		116	116		25	12	13	1302	1330		119	116		28	12	16	1314
436	sjp2	1299	1328		106	118		29	16	13	1300	1329		108	118		29	15	14	1299	1326		101	117		27	16	11	1300	1329		107	118		29	15	14	1315
436	sjp3	1277	1310		9.2			33	38	-5	1277	1312		10.7			35	38	-3	1277	1308		6.5			31	38	-7	1278	1312		11.8			34	37	-3	1315

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	AS from	AS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	BS from	BS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	CS from	CS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
436	sjp5	1313	1345		38.7			32	1	31	1313	1347		40.7			34	1	33	1313	1343		36.4			30	1	29	1314	1348		39			34	0	34	1314
436	sjp6	1274	1303		2.7			29	37	-8	1274	1305		3.5			31	37	-6	1274	1302		2.2			28	37	-9	1275	1306		4.1			31	36	-5	1311
437	**Combine WELLS4**	**1448**	**1465**	**119**				**17**	**3**	**14**	**1448**	**1466**	**120**				**18**	**3**	**15**	**1448**	**1464**	**120**				**16**	**3**	**13**	**1448**	**1466**	**118**				**18**	**3**	**15**	**1451**
437	WLS-C04	1445	1468		109			23	6	17	1445	1470		109			25	6	19	1445	1467		109			22	6	16	1445	1469		108			24	6	18	1451
437	WLS-C14	1447	1476		118			29	3	26	1447	1477		118			30	3	27	1447	1474		118			27	3	24	1447	1478		117			31	3	28	1450
438	**Combine CULLACOTT**	**1473**	**1485**	**120**				**12**	**8**	**4**	**1473**	**1486**	**122**				**13**	**8**	**5**	**1473**	**1485**	**118**				**12**	**8**	**4**	**1473**	**1487**	**121**				**14**	**8**	**6**	**1481**
438	c11	1468	1494		127			26	13	13	1468	1496		127			28	13	15	1468	1493		126			25	13	12	1468	1497		127			29	13	16	1481
438	c14	1473	1497		110			24	5	19	1473	1498		111			25	5	20	1473	1496		108			23	5	18	1473	1499		110			26	5	21	1478
438	c16	1466	1489		97.9			23	6	17	1466	1490		100			24	6	18	1466	1489		97.9			23	6	17	1467	1490		99.2			23	5	18	1472
439	**Combine FELLOWSGRN**	**1550**	**1570**	**116**				**20**	**5**	**15**	**1551**	**1570**	**117**				**19**	**4**	**15**	**1550**	**1569**	**114**				**19**	**5**	**14**	**1551**	**1571**	**117**				**20**	**4**	**16**	**1555**
439	fgh11	1544	1575		110			31	11	20	1544	1576		111			32	11	21	1544	1573		107			29	11	18	1545	1576		110			31	10	21	1555
439	fgh16	1550	1578		113			28	5	23	1550	1580		113			30	5	25	1550	1577		112			27	5	22	1551	1580		113			29	4	25	1555
440	**Combine GARDENCOT**	**1442**	**1452**	**86.9**				**10**	**-1**	**11**	**1442**	**1453**	**92.8**				**11**	**-1**	**12**	**1442**	**1452**	**78.7**				**10**	**-1**	**11**	**1443**	**1454**	**97.6**				**11**	**-2**	**13**	**1441**
440	gc1	1444	1467		73.9			23	-3	26	1444	1469		75.9			25	-3	28	1444	1467		68.9			23	-3	26	1444	1470		77.8			26	-3	29	1441
440	gc5	1431	1457		85.7			26	10	16	1431	1459		89.4			28	10	18	1431	1456		79.6			25	10	15	1431	1459		87.7			28	10	18	1441
440	gc6	1430	1459		95.6			29	11	18	1430	1461		98.8			31	11	20	1430	1458		92.8			28	11	17	1431	1462		104			31	10	21	1441
440	gc7	1430	1459		96.7			29	11	18	1430	1461		99.8			31	11	20	1430	1458		93.3			28	11	17	1431	1462		105			31	10	21	1441
440	gc9	1434	1462		125			28	7	21	1434	1464		127			30	7	23	1434	1461		123			27	7	20	1435	1464		127			29	6	23	1441
441	**Combine WWYCOMBE**	**1531**	**1541**	**127**				**10**	**1**	**9**	**1532**	**1542**	**134**				**10**	**0**	**10**	**1531**	**1540**	**118**				**9**	**1**	**8**	**1532**	**1542**	**147**				**10**	**0**	**10**	**1532**
441	wwa1	1524	1555		135			31	7	24	1524	1556		136			32	7	25	1523	1553		134			30	8	22	1524	1557		137			33	7	26	1531
441	wwa2	1516	1550		91.2			34	16	18	1517	1551		94.5			34	15	19	1516	1548		84.1			32	16	16	1517	1552		101			35	15	20	1532
441	wwa3	1521	1549		108			28	9	19	1521	1551		111			30	9	21	1521	1548		105			27	9	18	1522	1551		112			29	8	21	1530
441	wwa4	1519	1552		113			33	13	20	1519	1554		115			35	13	22	1519	1551		110			32	13	19	1520	1555		122			35	12	23	1532
441	wwa5	1523	1554		132			31	8	23	1523	1555		133			32	8	24	1523	1553		131			30	8	22	1523	1557		136			34	8	26	1531
441	wwa6	1532	1553		91.1			21	0	21	1532	1554		93.1			22	0	22	1532	1552		86.8			20	0	20	1532	1554		99.6			22	0	22	1532
442	**Combine UPPERLAKE**	**1543**	**1555**	**69.4**				**12**	**4**	**8**	**1543**	**1556**	**74**				**13**	**4**	**9**	**1543**	**1554**	**59.5**				**11**	**4**	**7**	**1544**	**1556**	**70**				**12**	**3**	**9**	**1547**
442	**Combine UPPERLAKE**	**1538**	**1551**	**134**				**13**	**9**	**4**										**1538**	**1550**	**130**				**12**	**9**	**3**	**1538**	**1552**	**136**				**14**	**9**	**5**	**1547**
442	upl3	1533	1559		88.9	124		26	14	12	1534	1560		91.7			26	13	13	1533	1557		83.2	124		24	14	10	1534	1560		85.9	123		26	13	13	1547
442	upl4	1546	1577		58.1			31	-1	32	1546	1579		60.3			33	-1	34	1546	1576		52			30	-1	31	1547	1580		56.6			33	-2	35	1545
442	upl5	1528	1560		75.3	113		32	17	15	1529	1561		78.2			32	16	16	1528	1558		68.7	111		30	17	13	1529	1562		80.5	117		33	16	17	1545
442	upl7	1531	1560		85.5	123		29	14	15	1532	1561		88.3			29	13	16	1531	1558		79	122		27	14	13	1532	1561		86.2	123		29	13	16	1545
442	upl8	1538	1567		133	104		29	8	21	1538	1569		133			31	8	23	1538	1565		133	100		27	8	19	1538	1569		133	103		31	8	23	1546
443	**Combine WETTON1**	**1630**	**1643**	**148**				**13**	**0**	**13**	**1630**	**1644**	**150**				**14**	**0**	**14**	**1630**	**1642**	**145**				**12**	**0**	**12**	**1630**	**1644**	**152**				**14**	**0**	**14**	**1630**
443	WET-A01A	1627	1655		127			28	3	25	1627	1657		127			30	3	27	1627	1653		127			26	3	23	1628	1656		127			28	2	26	1630
443	WET-A02A	1627	1654		125			27	3	24	1628	1655		126			27	2	25	1627	1652		125			25	3	22	1628	1655		126			27	2	25	1630
443	WET-A05A	1625	1656		131			31	5	26	1626	1657		132			31	4	27	1625	1653		131			28	5	23	1626	1657		131			31	4	27	1630
443	WET-A08A	1619	1651		105			32	11	21	1620	1652		107			32	10	22	1619	1649		102			30	11	19	1620	1652		109			32	10	22	1630
444	**Combine WETTON2**	**1570**	**1587**	**143**				**17**	**20**	**-3**	**1571**	**1588**	**144**				**17**	**19**	**-2**	**1570**	**1585**	**143**				**15**	**20**	**-5**	**1571**	**1588**	**144**				**17**	**19**	**-2**	**1590**
444	WET-A09A	1567	1599		125			32	23	9	1568	1600		125			32	22	10	1567	1596		125			29	23	6	1568	1600		125			32	22	10	1590
444	WET-A10A	1564	1596		121			32	26	6	1564	1597		121			33	26	7	1564	1593		120			29	26	3	1564	1598		122			34	26	8	1590
444	WET-A11A	1568	1597		123			29	22	7	1568	1598		123			30	22	8	1567	1595		123			28	23	5	1568	1598		123			30	22	8	1590
445	**Combine TINTERN**	**1566**	**1589**	**135**				**23**	**4**	**19**	**1567**	**1589**	**136**				**22**	**3**	**19**	**1566**	**1586**	**133**				**20**	**4**	**16**	**1568**	**1592**	**137**				**24**	**2**	**22**	**1570**
445	q5495	1557	1600		119			43	13	30	1558	1601		119			43	12	31	1557	1597		118			40	13	27	1559	1604		120			45	11	34	1570
445	q5496	1565	1607		116			42	5	37	1566	1608		116			42	4	38	1565	1603		115			38	5	33	1567	1611		117			44	3	41	1570
445	q5498	1559	1600		122			41	11	30	1559	1602		122			43	11	32	1559	1597		121			38	11	27	1560	1604		122			44	10	34	1570
446	**Combine WHERRELL1**	**1245**	**1256**	**126**				**11**	**5**	**6**	**1245**	**1257**	**129**				**12**	**5**	**7**	**1245**	**1255**	**126**				**10**	**5**	**5**	**1245**	**1257**	**130**				**12**	**5**	**7**	**1250**
446	wrl1	1239	1263		118			24	10	14	1239	1264		119			25	10	15	1239	1262		116			23	10	13	1239	1264		117			25	10	15	1249
446	wrl2	1240	1264		125			24	9	15	1241	1265		126			24	8	16	1240	1263		126			23	9	14	1241	1265		125			24	8	16	1249

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	AS from	AS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	BS from	BS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	CS from	CS to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
446	wrl3	1245	1272		97.6			27	4	23	1245	1274		99.4			29	4	25	1245	1270		97.3			25	4	21	1245	1274		99.4			29	4	25	1249
446	wrl4	1236	1263		110			27	14	13	1236	1265		112			29	14	15	1236	1263		111			27	14	13	1237	1266		116			29	13	16	1250
447	**Combine WHERRELL2**	**1275**	**1287**	**92.7**				**12**	**5**	**7**	**1275**	**1288**	**96.5**				**13**	**5**	**8**	**1275**	**1286**	**87.1**				**11**	**5**	**6**	**1276**	**1288**	**90.9**				**12**	**4**	**8**	**1280**
447	**Combine WHERRELL2**	**1276**	**1290**	**124**				**14**	**4**	**10**										**1276**	**1290**	**121**				**14**	**4**	**10**	**1277**	**1292**	**123**				**15**	**3**	**12**	**1280**
447	wrl5	1272	1298		127	120		26	8	18	1272	1299		128			27	8	19	1272	1296		127	120		24	8	16	1273	1299		128	119		26	7	19	1280
447	wrl6	1264	1287		58.4			23	15	8	1264	1289		61.5			25	15	10	1263	1286		53.7			23	16	7	1264	1288		56.9			24	15	9	1279
447	wrl7	1275	1306		93.8	112		31	5	26	1276	1308		95.7			32	4	28	1275	1305		90.6	110		30	5	25	1276	1309		91.2	110		33	4	29	1280
447	wrl8	1268	1296		124	107		28	12	16	1268	1298		124			30	12	18	1268	1295		122	106		27	12	15	1269	1298		125	109		29	11	18	1280
448	**Combine WATERGATE**	**1584**	**1599**	**69.3**				**15**	**13**	**2**	**1585**	**1600**	**72.6**				**15**	**12**	**3**	**1584**	**1599**	**61**				**15**	**13**	**2**	**1585**	**1601**	**67.5**				**16**	**12**	**4**	**1597**
448	**Combine WATERGATE**	**1586**	**1604**	**109**				**18**	**11**	**7**	**1586**	**1605**	**110**				**19**	**11**	**8**	**1586**	**1603**	**108**				**17**	**11**	**6**	**1586**	**1606**	**107**				**20**	**11**	**9**	**1597**
448	wch10	1570	1597		46.1			27	23	4	1570	1599		49			29	23	6	1570	1595		38.1			25	23	2	1570	1598		45.4			28	23	5	1593
448	wch5	1581	1606		121	101		25	12	13	1581	1608		121	102		27	12	15	1581	1605		121	100		24	12	12	1581	1607		120	99.1		26	12	14	1593
448	wch6	1585	1617		95.2	112		32	12	20	1586	1618		96.8	113		32	11	21	1585	1615		92.4	111		30	12	18	1586	1620		92.8	111		34	11	23	1597
449	**Combine NEWBURYST**	**1576**	**1586**	**171**				**10**	**6**	**4**	**1577**	**1587**	**173**				**10**	**5**	**5**	**1576**	**1585**	**170**				**9**	**6**	**3**	**1577**	**1587**	**172**				**10**	**5**	**5**	**1582**
449	nsw1	1573	1597		131			24	9	15	1573	1599		132			26	9	17	1573	1596		132			23	9	14	1573	1598		132			25	9	16	1582
449	nsw2	1571	1597		132			26	11	15	1572	1598		133			26	10	16	1571	1596		133			25	11	14	1572	1598		133			26	10	16	1582
449	nsw3	1574	1600		122			26	8	18	1574	1601		123			27	8	19	1574	1599		122			25	8	17	1575	1601		123			26	7	19	1582
449	nsw4	1572	1595		130			23	10	13	1572	1597		131			25	10	15	1572	1594		131			22	10	12	1572	1596		131			24	10	14	1582
449	nsw5	1569	1594		120			25	13	12	1569	1596		121			27	13	14	1569	1593		118			24	13	11	1569	1595		120			26	13	13	1582
450	**Combine BELLST**	**1432**	**1453**	**125**				**21**	**9**	**12**	**1433**	**1454**	**126**				**21**	**8**	**13**	**1432**	**1452**	**126**				**20**	**9**	**11**	**1433**	**1455**	**126**				**22**	**8**	**14**	**1441**
450	bll7	1429	1461		117			32	12	20	1430	1462		118			32	11	21	1429	1459		118			30	12	18	1430	1463		118			33	11	22	1441
450	bll8	1430	1461		117			31	11	20	1431	1463		117			32	10	22	1430	1460		117			30	11	19	1431	1464		117			33	10	23	1441
451	**Combine COMBERMERE1**	**1497**	**1516**	**125**				**19**	**5**	**14**	**1497**	**1517**	**126**				**20**	**5**	**15**	**1497**	**1514**	**126**				**17**	**5**	**12**	**1497**	**1517**	**126**				**20**	**5**	**15**	**1502**
451	CBM-A16A	1495	1522		116			27	7	20	1495	1524		116			29	7	22	1495	1520		116			25	7	18	1495	1524		116			29	7	22	1502
451	CBM-A23A	1494	1523		119			29	8	21	1494	1525		119			31	8	23	1494	1522		119			28	8	20	1494	1525		119			31	8	23	1502
452	**Combine COMBERMERE2**	**1720**	**1733**	**11.5 n=4 A= 11.5%(A**				**13**	**7**	**6**	**1720**	**1734**	**13.9 n=4 A= 13.9%(**				**14**	**7**	**7**	**1720**	**1732**	**9 n=4 A= 9.0%(An=**				**12**	**7**	**5**	**1721**	**1734**	**13.5 FAILED n=4 A**				**13**	**6**	**7**	**1727**
452	**Combine COMBERMERE2**	**1722**	**1741**	**101**				**19**	**5**	**14**	**1723**	**1742**	**102**				**19**	**4**	**15**	**1722**	**1740**	**96.9**				**18**	**5**	**13**	**1722**	**1737**	**66.1**				**15**	**5**	**10**	**1727**
452	**Combine COMBERMERE2**																												**1723**	**1742**	**101**				**19**	**4**	**15**	**1727**
452	CBM-A31A	1714	1743		129	92.7		29	13	16	1715	1744		129	94.3		29	12	17	1714	1741		127	88.7		27	13	14	1715	1744		129	115	93	29	12	17	1727
452	CBM-A32	1705	1733		55.1			28	22	6	1705	1735		58.1			30	22	8	1705	1732		48.5			27	22	5	1705	1736		59.8	45.8		31	22	9	1727
452	CBM-A33A	1723	1752		66.3	109		29	4	25	1723	1753		69	110		30	4	26	1723	1750		64.2	108		27	4	23	1723	1754		67.5	92.7	109	31	4	27	1727
452	CBM-A39A	1688	1716		2.8			28	14	14	1688	1718		3.7			30	14	16	1688	1714		2.1			26	14	12	1689	1717		3.5			28	13	15	1702
453	**Combine COMBERMERE3**	**1560**	**1570**	**122**				**10**	**4**	**6**	**1560**	**1571**	**126**				**11**	**4**	**7**	**1560**	**1570**	**117**				**10**	**4**	**6**	**1560**	**1571**	**127**				**11**	**4**	**7**	**1564**
453	CBM-A43A	1547	1574		74.4			27	17	10	1547	1576		77.5			29	17	12	1547	1573		68			26	17	9	1547	1576		79.7			29	17	12	1564
453	CBM-A61A	1558	1581		121			23	6	17	1558	1583		122			25	6	19	1558	1581		121			23	6	17	1559	1582		122			23	5	18	1564
453	CBM-A63A	1557	1580		127			23	7	16	1557	1582		128			25	7	18	1557	1580		128			23	7	16	1558	1581		128			23	6	17	1564
453	CBM-A64A	1556	1580		129			24	8	16	1557	1581		130			24	7	17	1556	1579		130			23	8	15	1557	1581		130			24	7	17	1564
454	**Combine IGHTFIELD**	**1559**	**1569**	**36.9**				**10**	**7**	**3**	**1559**	**1571**	**41.7**				**12**	**7**	**5**	**1560**	**1571**	**112**				**11**	**6**	**5**	**1559**	**1571**	**39.4**				**12**	**7**	**5**	**1566**
454	**Combine IGHTFIELD**	**1560**	**1572**	**116**				**12**	**6**	**6**	**1560**	**1573**	**119**				**13**	**6**	**7**	**1559**	**1569**	**32.2**				**10**	**7**	**3**	**1560**	**1573**	**120**				**13**	**6**	**7**	**1566**
454	ihb01	1536	1560		8			24	30	-6	1536	1562		9.9			26	30	-4	1536	1559		6.2			23	30	-7	1536	1561		8.6			25	30	-5	1566
454	ihb02	1560	1589		81.8	103		29	6	23	1560	1591		84.8	104		31	6	25	1559	1587		84	103		28	7	21	1560	1590		84.8	104		30	6	24	1566
454	ihb07	1550	1579		117	102		29	16	13	1551	1580		118	104		29	15	14	1550	1577		113	98.3		27	16	11	1551	1580		119	105		29	15	14	1566
454	ihb10	1558	1581		120	125		23	8	15	1558	1583		121	126		25	8	17	1558	1581		118	125		23	8	15	1558	1583		121	126		25	8	17	1566
454	ihb13	1551	1578		118	102		27	15	12	1551	1580		119	104		29	15	14	1551	1576		114	98.9		25	15	10	1551	1580		119	104		29	15	14	1566
455	**Combine ALKINGTON**	**1546**	**1566**	**112**				**20**	**10**	**10**	**1546**	**1568**	**113**				**22**	**10**	**12**	**1546**	**1565**	**111**				**19**	**10**	**9**	**1547**	**1568**	**112**				**21**	**9**	**12**	**1556**
455	pfa1	1546	1578		113			32	9	23	1546	1580		113			34	9	25	1546	1576		112			30	9	21	1547	1581		113			34	8	26	1555
455	pfa4	1540	1569		104			29	16	13	1541	1570		105			29	15	14	1540	1568		103			28	16	12	1541	1571		104			30	15	15	1556
456	**Combine WILLINGTON1**	**1532**	**1548**	**123**				**16**	**12**	**4**	**1533**	**1549**	**125**				**16**	**11**	**5**	**1532**	**1547**	**119**				**15**	**12**	**3**	**1533**	**1549**	**122**				**16**	**11**	**5**	**1544**

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
456	wl3	1530	1561		121			31	13	18	1531	1563		122			32	12	20	1530	1559		121			29	13	16	1531	1563		121			32	12	20	1543
456	wl5	1530	1560		123			30	14	16	1530	1562		123			32	14	18	1530	1558		122			28	14	14	1531	1562		122			31	13	18	1544
456	wl6	1523	1552		96.8			29	20	9	1524	1553		98.4			29	19	10	1523	1550		91.3			27	20	7	1524	1553		94.7			29	19	10	1543
457	**Combine WILLINGTON2**	**1531**	**1544**	**113**				**13**	**9**	**4**	**1532**	**1545**	**117**				**13**	**8**	**5**	**1531**	**1543**	**107**				**12**	**9**	**3**	**1532**	**1545**	**116**				**13**	**8**	**5**	**1540**
457	wl11	1530	1554		121			24	10	14	1530	1556		122			26	10	16	1530	1553		121			23	10	13	1530	1555		123			25	10	15	1540
457	wl13	1522	1551		107			29	18	11	1523	1552		109			29	17	12	1522	1549		104			27	18	9	1523	1552		109			29	17	12	1540
457	wl15	1530	1561		110			31	10	21	1531	1563		111			32	9	23	1530	1559		109			29	10	19	1531	1563		108			32	9	23	1540
457	wl17	1520	1549		89.3			29	19	10	1520	1550		91.7			30	19	11	1520	1547		84.4			27	19	8	1520	1551		93.3			31	19	12	1539
458	**Combine ARDEN1**	**1507**	**1524**	**125**				**17**	**6**	**11**	**1507**	**1525**	**126**				**18**	**6**	**12**	**1507**	**1523**	**126**				**16**	**6**	**10**	**1508**	**1525**	**126**				**17**	**5**	**12**	**1513**
458	ardn3	1505	1531		117			26	8	18	1505	1532		117			27	8	19	1505	1530		117			25	8	17	1506	1532		117			26	7	19	1513
458	ardn7	1505	1531		118			26	7	19	1505	1532		118			27	7	20	1505	1530		118			25	7	18	1505	1533		118			28	7	21	1512
459	**Combine ARDEN2**	**1564**	**1575**	**107**				**11**	**15**	**-4**	**1564**	**1576**	**111**				**12**	**15**	**-3**	**1564**	**1575**	**109**				**11**	**15**	**-4**	**1564**	**1576**	**115**				**12**	**15**	**-3**	**1579**
459	**Combine ARDEN2**	**1564**	**1578**	**144**				**14**	**15**	**-1**																												**1579**
459	ardn21	1560	1587		131	126		27	19	8	1560	1589		131			29	19	10	1560	1586		131			26	19	7	1560	1589		131			29	19	10	1579
459	ardn22	1563	1587		112	119		24	16	8	1564	1588		113			24	15	9	1563	1586		111			23	16	7	1564	1588		115			24	15	9	1579
459	ardn237	1559	1587		132	126		28	20	8	1559	1589		133			30	20	10	1559	1586		132			27	20	7	1560	1589		132			29	19	10	1579
459	ardn26	1552	1576		59.4			24	27	-3	1553	1577		62.8			24	26	-2	1553	1576		61.4			23	26	-3	1553	1578		66.1			25	26	-1	1579
460	**Combine ARDEN3**	**1569**	**1585**	**115**				**16**	**11**	**5**	**1570**	**1586**	**117**				**16**	**10**	**6**	**1569**	**1584**	**111**				**15**	**11**	**4**	**1570**	**1587**	**117**				**17**	**10**	**7**	**1580**
460	ardn312	1559	1588		89.1			29	21	8	1559	1590		91.1			31	21	10	1559	1587		83.9			28	21	7	1559	1591		90.5			32	21	11	1580
460	ardn33	1569	1598		112			29	11	18	1570	1599		113			29	10	19	1569	1596		111			27	11	16	1570	1599		114			29	10	19	1580
460	ardn34	1565	1597		128			32	14	18	1565	1598		128			33	14	19	1565	1595		128			30	14	16	1566	1599		128			33	13	20	1579
461	**Combine WILSFORD**	**1302**	**1321**	**125**				**19**	**6**	**13**	**1303**	**1322**	**126**				**19**	**5**	**14**	**1302**	**1319**	**126**				**17**	**6**	**11**	**1303**	**1322**	**126**				**19**	**5**	**14**	**1308**
461	wlsf2	1300	1329		118			29	8	21	1301	1330		118			29	7	22	1300	1327		118			27	8	19	1301	1330		118			29	7	22	1308
461	wlsf3	1300	1326		116			26	8	18	1300	1328		117			28	8	20	1300	1325		117			25	8	17	1300	1329		117			29	8	21	1308
462	**Combine WILTON**	**1624**	**1642**	**61.5**				**18**	**12**	**6**	**1624**	**1643**	**64.3**				**19**	**12**	**7**	**1624**	**1641**	**56.5**				**17**	**12**	**5**	**1625**	**1643**	**63**				**18**	**11**	**7**	**1636**
462	wh02m	1612	1638		49.7			26	24	2	1612	1639		52.5			27	24	3	1612	1637		44.6			25	24	1	1612	1639		51.3			27	24	3	1636
462	wh10	1625	1654		101			29	10	19	1626	1655		102			29	9	20	1625	1653		100			28	10	18	1626	1656		101			30	9	21	1635
463	**Combine 10THECLOSE**	**1436**	**1456**	**122**				**20**	**8**	**12**	**1436**	**1457**	**123**				**21**	**8**	**13**	**1436**	**1454**	**123**				**18**	**8**	**10**	**1437**	**1457**	**122**				**20**	**7**	**13**	**1444**
463	xwc1	1435	1466		117			31	9	22	1435	1467		118			32	9	23	1434	1464		117			30	10	20	1435	1468		117			33	9	24	1444
463	xwc10	1432	1461		113			29	4	25	1433	1462		114			29	3	26	1432	1460		114			28	4	24	1433	1463		113			30	3	27	1436
464	**Combine WINCHESTER1**	**1454**	**1466**	**137**				**12**	**10**	**2**	**1455**	**1467**	**140**				**12**	**9**	**3**	**1454**	**1465**	**133**				**11**	**10**	**1**	**1455**	**1467**	**139**				**12**	**9**	**3**	**1464**
464	hsw1	1447	1477		129			30	12	18	1447	1479		129			32	12	20	1447	1475		126			28	12	16	1448	1479		130			31	11	20	1459
464	hsw2	1448	1474		120			26	11	15	1448	1475		122			27	11	16	1448	1473		120			25	11	14	1449	1475		121			26	10	16	1459
464	hsw3	1454	1480		104			26	10	16	1455	1482		106			27	9	18	1454	1479		101			25	10	15	1455	1482		105			27	9	18	1464
464	hsw4	1448	1473		117			25	11	14	1448	1475		118			27	11	16	1448	1472		116			24	11	13	1448	1474		116			26	11	15	1459
465	**Combine WINCHESTER2**	**1326**	**1342**	**118**				**16**	**14**	**2**	**1326**	**1343**	**119**				**17**	**14**	**3**	**1326**	**1341**	**117**				**15**	**14**	**1**	**1327**	**1343**	**118**				**16**	**13**	**3**	**1340**
465	bts2	1326	1349		114			23	14	9	1326	1351		115			25	14	11	1326	1349		114			23	14	9	1326	1351		115			25	14	11	1340
465	bts3	1322	1345		110			23	18	5	1322	1347		111			25	18	7	1322	1344		110			22	18	4	1323	1346		110			23	17	6	1340
466	**Combine CHESIL**	**1279**	**1296**	**125**				**17**	**14**	**3**	**1280**	**1297**	**126**				**17**	**13**	**4**	**1279**	**1295**	**126**				**16**	**14**	**2**	**1280**	**1297**	**126**				**17**	**13**	**4**	**1293**
466	csl1	1277	1304		120			27	7	20	1277	1305		120			28	7	21	1277	1302		120			25	7	18	1277	1306		120			29	7	22	1284
466	csl4	1277	1301		115			24	16	8	1278	1302		115			24	15	9	1278	1301		116			23	15	8	1278	1302		115			24	15	9	1293
467	**Combine ABBOTSBARTON**	**1480**	**1494**	**83.9**				**14**	**12**	**2**	**1480**	**1495**	**87.3**				**15**	**12**	**3**	**1480**	**1493**	**78.6**				**13**	**12**	**1**	**1480**	**1495**	**86.4**				**15**	**12**	**3**	**1492**
467	**Combine ABBOTSBARTON**	**1481**	**1499**	**116**				**18**	**11**	**7**										**1481**	**1498**	**115**				**17**	**11**	**6**	**1481**	**1500**	**118**				**19**	**11**	**8**	**1492**
467	abf2	1475	1504		127	109		29	16	13	1475	1505		127			30	16	14	1475	1502		126	108		27	16	11	1475	1506		127	111		31	16	15	1491
467	abf7	1481	1507		102	112		26	10	16	1481	1508		103			27	10	17	1481	1506		100	112		25	10	15	1481	1509		103	113		28	10	18	1491
467	abf8	1467	1493		57.3			26	25	1	1468	1495		60.4			27	24	3	1467	1492		52.2			25	25	0	1468	1495		59			27	24	3	1492
468	**Combine GODBEGOT**	**1456**	**1468**	**111**				**12**	**7**	**5**	**1457**	**1469**	**115**				**12**	**6**	**6**	**1456**	**1467**	**103**				**11**	**7**	**4**	**1457**	**1470**	**115**				**13**	**6**	**7**	**1463**
468	gbg1	1445	1474		95.6			29	18	11	1445	1476		97.7			31	18	13	1445	1473		91.4			28	18	10	1446	1477		98.3			31	17	14	1463

Number	SITE & sample	A from	to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	S to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
468	gbg2	1457	1487		90.6			30	6	24	1457	1489		92.5			32	6	26	1457	1485		86.9			28	6	22	1458	1489		92.9			31	5	26	1463
468	gbg3	1444	1473		82.3			29	19	10	1444	1474		84.8			30	19	11	1444	1471		76.5			27	19	8	1444	1475		84			31	19	12	1463
468	gbg4	1451	1480		132			29	12	17	1451	1482		133			31	12	19	1451	1479		133			28	12	16	1452	1483		133			31	11	20	1463
468	gbg5	1451	1482		133			31	12	19	1452	1484		133			32	11	21	1451	1480		133			29	12	17	1452	1484		133			32	11	21	1463
469	**Combine PILGRIMS**	**1306**	**1317**	**125**				**11**	**4**	**7**	**1307**	**1318**	**129**				**11**	**3**	**8**	**1306**	**1316**	**117**				**10**	**4**	**6**	**1307**	**1318**	**125**				**11**	**3**	**8**	**1310**
469	**Combine PILGRIMS**																			**1306**	**1318**	**165**				**12**	**4**	**8**										**1310**
469	phw1	1302	1332		132			30	7	23	1302	1334		132			32	7	25	1302	1330		132	133		28	7	21	1303	1334		131			31	6	25	1309
469	phw3	1303	1329		128			26	4	22	1304	1331		128			27	3	24	1303	1328		128	129		25	4	21	1304	1330		129			26	3	23	1307
469	phw4	1292	1319		60.8			27	8	19	1292	1321		63.8			29	8	21	1292	1317		51.2			25	8	17	1292	1320		60.2			28	8	20	1300
469	phw6	1304	1330		126			26	6	20	1304	1331		127			27	6	21	1303	1329		126	129		26	7	19	1304	1331		127			27	6	21	1310
469	phw7	1302	1325		128			23	0	23	1302	1327		129			25	0	25	1302	1325		130	123		23	0	23	1303	1327		129			24	-1	25	1302
470	**Combine WINCATH1**	**1243**	**1253**	**115**				**10**	**7**	**3**	**1244**	**1253**	**120**				**9**	**6**	**3**	**1243**	**1252**	**116**				**9**	**7**	**2**	**1244**	**1253**	**119**				**9**	**6**	**3**	**1250**
470	wcn1	1237	1261		127			24	12	12	1237	1263		128			26	12	14	1237	1260		126			23	12	11	1237	1263		128			26	12	14	1249
470	wcn2	1238	1261		128			23	12	11	1238	1263		129			25	12	13	1238	1260		127			22	12	10	1238	1262		128			24	12	12	1250
470	wcn3	1238	1260		125			22	9	13	1238	1262		126			24	9	15	1238	1259		125			21	9	12	1238	1262		125			24	9	15	1247
470	wcn4	1235	1256		89.6			21	12	9	1236	1258		92.9			22	11	11	1236	1256		93.2			20	11	9	1236	1258		94.2			22	11	11	1247
470	wcn6	1244	1270		75.4			26	5	21	1245	1272		78.2			27	4	23	1244	1269		74.5			25	5	20	1245	1271		77			26	4	22	1249
471	**Combine WINCATH2**	**1307**	**1315**	**78**				**8**	**11**	**-3**	**1307**	**1316**	**85.3**				**9**	**11**	**-2**	**1306**	**1314**	**65.2**				**8**	**12**	**-4**	**1308**	**1316**	**83.7**				**8**	**10**	**-2**	**1318**
471	**Combine WINCATH2**	**1303**	**1312**	**162**				**9**	**15**	**-6**	**1304**	**1313**	**168**				**9**	**14**	**-5**	**1303**	**1311**	**153**				**8**	**15**	**-7**	**1304**	**1313**	**164**				**9**	**14**	**-5**	**1318**
471	wcst10	1295	1324		103	130		29	22	7	1296	1325		106	131		29	21	8	1295	1322		97.7	128		27	22	5	1296	1325		104	129		29	21	8	1317
471	wcst11	1292	1321		74.6	106		29	25	4	1293	1322		78.2	108		29	24	5	1292	1319		67.3	101		27	25	2	1293	1322		76.2	106		29	24	5	1317
471	wcst12	1310	1340		29.3			30	8	22	1310	1342		31.6			32	8	24	1310	1338		24.1			28	8	20	1311	1342		31.2			31	7	24	1318
471	wcst13	1296	1322		98.1	127		26	10	16	1296	1324		101	128		28	10	18	1296	1321		96.3	128		25	10	15	1296	1324		101	128		28	10	18	1306
471	wcst2	1297	1328		128	139		31	20	11	1297	1329		130	139		32	20	12	1296	1326		126	139		30	21	9	1297	1331		132	139		34	20	14	1317
471	wcst3	1304	1334		115	67.9		30	13	17	1304	1336		115	70.7		32	13	19	1304	1333		113	61.1		29	13	16	1305	1336		114	69.2		31	12	19	1317
471	wcst4	1294	1323		91.4	121		29	23	6	1294	1324		94.6	122		30	23	7	1294	1321		86.4	119		27	23	4	1294	1325		95.2	122		31	23	8	1317
471	wcst7	1297	1324		116	136		27	20	7	1297	1326		119	136		29	20	9	1297	1323		116	137		26	20	6	1298	1326		119	136		28	19	9	1317
471	wcst8	1298	1332		140	130		34	19	15	1299	1334		140	131		35	18	17	1298	1329		139	132		31	19	12	1299	1334		140	130		35	18	17	1317
471	wcst9	1293	1323		93.6	122		30	15	15	1293	1325		96.7	123		32	15	17	1293	1321		85.7	118		28	15	13	1294	1325		96.2	122		31	14	17	1308
472	**Combine WINDSOR1**	**1341**	**1354**	**57.4**				**13**	**11**	**2**	**1342**	**1355**	**61.6**				**13**	**10**	**3**	**1342**	**1354**	**53.6**				**12**	**10**	**2**	**1342**	**1355**	**63.4**				**13**	**10**	**3**	**1352**
472	**Combine WINDSOR1**	**1342**	**1358**	**124**				**16**	**10**	**6**	**1343**	**1359**	**125**				**16**	**9**	**7**	**1342**	**1357**	**124**				**15**	**10**	**5**	**1343**	**1359**	**126**				**16**	**9**	**7**	**1352**
472	wcc4	1342	1363		109	113		21	10	11	1342	1364		110	114		22	10	12	1342	1363		109	114		21	10	11	1342	1364		111	114		22	10	12	1352
472	wcc6	1338	1364		128	120		26	13	13	1339	1366		128	120		27	12	15	1338	1364		128	120		26	13	13	1339	1366		128	121		27	12	15	1351
472	wcc7	1324	1350		27.5			26	11	15	1324	1351		30.6			27	11	16	1324	1349		24.4			25	11	14	1325	1351		32.1			26	10	16	1335
473	**Combine WINDSOR2**	**1346**	**1363**	**109**				**17**	**9**	**8**	**1346**	**1364**	**111**				**18**	**9**	**9**	**1346**	**1362**	**109**				**16**	**9**	**7**	**1347**	**1364**	**112**				**17**	**8**	**9**	**1355**
473	w16	1346	1372		111			26	9	17	1346	1373		112			27	9	18	1346	1370		111			24	9	15	1346	1373		112			27	9	18	1355
473	w17	1340	1366		102			26	14	12	1340	1368		104			28	14	14	1340	1365		102			25	14	11	1340	1368		105			28	14	14	1354
474	**Combine WINSCOMBE**	**1270**	**1286**	**51.2**				**16**	**9**	**7**	**1271**	**1287**	**54.4**				**16**	**8**	**8**	**1270**	**1285**	**42.5**				**15**	**9**	**6**	**1271**	**1287**	**52.4**				**16**	**8**	**8**	**1279**
474	**Combine WINSCOMBE**	**1271**	**1292**	**125**				**21**	**8**	**13**	**1272**	**1292**	**125**				**20**	**7**	**13**	**1271**	**1290**	**125**				**19**	**8**	**11**	**1272**	**1293**	**126**				**21**	**7**	**14**	**1279**
474	wef1	1268	1299		122	118		31	10	21	1269	1300		122	118		31	9	22	1268	1297		121	118		29	10	19	1269	1301		121	118		32	9	23	1278
474	wef2	1270	1299		113	116		29	9	20	1270	1301		114	117		31	9	22	1270	1297		112	117		27	9	18	1270	1301		114	117		31	9	22	1279
474	wef3	1248	1279		22.8			31	29	2	1249	1281		25.1			32	28	4	1248	1276		16.7			28	29	-1	1249	1280		23.7			31	28	3	1277
475	**Combine WINTERBOURNE**	**1334**	**1350**	**125**				**16**	**8**	**8**	**1334**	**1351**	**126**				**17**	**8**	**9**	**1334**	**1349**	**122**				**15**	**8**	**7**	**1335**	**1351**	**124**				**16**	**7**	**9**	**1342**
475	wtb1	1329	1358		121			29	12	17	1329	1360		122			31	12	19	1329	1356		121			27	12	15	1329	1360		121			31	12	19	1341
475	wtb5	1327	1356		109			29	15	14	1327	1357		110			30	15	15	1327	1354		107			27	15	12	1327	1358		109			31	15	16	1342
475	wtb6	1334	1366		111			32	6	26	1334	1368		111			34	6	28	1334	1364		109			30	6	24	1334	1368		110			34	6	28	1340
476	**Combine WITHINGTON**	**1419**	**1442**	**121**				**23**	**10**	**13**	**1420**	**1442**	**121**				**22**	**9**	**13**	**1419**	**1440**	**119**				**21**	**10**	**11**	**1421**	**1444**	**120**				**23**	**8**	**15**	**1429**
476	WTH-A08A	1415	1447		113			32	14	18	1415	1448		113			33	14	19	1415	1445		111			30	14	16	1416	1449		112			33	13	20	1429

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	B to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	C to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
476	| WTH-A17A	1418	1452		116			34	11	23	1419	1454		116			35	10	25	1419	1451		115			32	10	22	1420	1456		116			36	9	27	1429
477	**Combine COGGES**	**1618**	**1635**	**79.4**				**17**	**10**	**7**	**1619**	**1636**	**82.1**				**17**	**9**	**8**	**1618**	**1634**	**77.9**				**16**	**10**	**6**	**1619**	**1635**	**81.2**				**16**	**9**	**7**	**1628**
477	| cgg31	1619	1645		104			26	9	17	1620	1647		104			27	8	19	1619	1644		103			25	9	16	1620	1646		104			26	8	18	1628
477	| cgg33	1610	1633		69.8			23	18	5	1610	1635		72.5			25	18	7	1610	1632		68.2			22	18	4	1611	1634		71.7			23	17	6	1628
478	**Combine LANGMANS**	**1526**	**1540**	**57.8**				**14**	**11**	**3**	**1527**	**1540**	**62**				**13**	**10**	**3**	**1526**	**1539**	**54**				**13**	**11**	**2**	**1527**	**1541**	**64.1**				**14**	**10**	**4**	**1537**
478	**Combine LANGMANS**	**1527**	**1543**	**126**				**16**	**10**	**6**	**1528**	**1544**	**128**				**16**	**9**	**7**	**1527**	**1542**	**123**				**15**	**10**	**5**	**1528**	**1545**	**129**				**17**	**9**	**8**	**1537**
478	| lms1	1521	1550		130	117		29	15	14	1521	1552		130	118		31	15	16	1521	1549		129	115		28	15	13	1522	1553		129	117		31	14	17	1536
478	| lms5	1527	1556		91.7	111		29	10	19	1528	1557		93.8	112		29	9	20	1528	1555		88.9	109		27	9	18	1528	1559		94	112		31	9	22	1537
478	| lms6	1519	1551		129	116		32	17	15	1520	1552		130	117		32	16	16	1520	1550		128	114		30	16	14	1520	1554		130	118		34	16	18	1536
478	| lms8	1506	1534		21.8			28	16	12	1506	1535		24.4			29	16	13	1506	1533		19.9			27	16	11	1507	1536		26			29	15	14	1522
479	**Combine STOLAFS**	**1531**	**1543**	**85**				**12**	**5**	**7**	**1532**	**1543**	**89.7**				**11**	**4**	**7**	**1531**	**1541**	**73.3**				**10**	**5**	**5**	**1532**	**1543**	**89.2**				**11**	**4**	**7**	**1536**
479	| sopc1	1522	1549		107			27	13	14	1522	1551		109			29	13	16	1522	1548		103			26	13	13	1522	1551		108			29	13	16	1535
479	| sopc2	1532	1559		89.6			27	4	23	1532	1561		91.5			29	4	25	1532	1558		83.5			26	4	22	1533	1561		89.5			28	3	25	1536
479	| sopc3	1518	1547		78.8			29	18	11	1519	1548		81.8			29	17	12	1518	1545		70.7			27	18	9	1519	1548		80			29	17	12	1536
479	| sopc4	1516	1548		75.5			32	19	13	1516	1549		78.4			33	19	14	1516	1545		67.1			29	19	10	1516	1550		81.2			34	19	15	1535
479	| sopc6	1529	1557		123			28	6	22	1529	1559		123			30	6	24	1529	1555		123			26	6	20	1529	1558		124			29	6	23	1535
480	**Combine WORCSCATH1**	**1718**	**1730**	**71.6**				**12**	**9**	**3**	**1718**	**1731**	**76.2**				**13**	**9**	**4**	**1718**	**1729**	**67.3**				**11**	**9**	**2**	**1718**	**1731**	**73.8**				**13**	**9**	**4**	**1727**
480	**Combine WORCSCATH1**	**1719**	**1734**	**107**				**15**	**8**	**7**	**1719**	**1735**	**109**				**16**	**8**	**8**	**1719**	**1733**	**107**				**14**	**8**	**6**	**1719**	**1735**	**110**				**16**	**8**	**8**	**1727**
480	| WOR-C02B	1719	1741		95.7	111		22	8	14	1719	1743		97.6	111		24	8	16	1719	1740		94.7	111		21	8	13	1719	1743		97.3	111		24	8	16	1727
480	| WOR-C04A	1707	1728		48.6			21	20	1	1707	1730		52.6			23	20	3	1707	1728		44			21	20	1	1707	1729		49.6			22	20	2	1727
480	| WOR-E82A	1713	1736		121	99.7		23	12	11	1713	1738		122	102		25	12	13	1713	1736		121	99.4		23	12	11	1714	1737		122	102		23	11	12	1725
481	**Combine WORCSCATH2**	**1651**	**1670**	**122**				**19**	**2**	**17**	**1652**	**1671**	**124**				**19**	**1**	**18**	**1651**	**1668**	**118**				**17**	**2**	**15**	**1652**	**1672**	**127**				**20**	**1**	**19**	**1653**
481	| WOR-B28B	1651	1682		115			31	2	29	1651	1684		115			33	2	31	1650	1680		114			30	3	27	1651	1685		116			34	2	32	1653
481	| WOR-C23B	1646	1683		127			37	6	31	1647	1684		127			37	5	32	1646	1680		127			34	6	28	1647	1685		127			38	5	33	1652
481	| WOR-C24A	1638	1676		97.5			38	12	26	1638	1678		99			40	12	28	1638	1673		92.7			35	12	23	1639	1680		103			41	11	30	1650
482	**Combine WORCSCATH3**	**1713**	**1732**	**115**				**19**	**13**	**6**	**1713**	**1733**	**115**				**20**	**13**	**7**	**1713**	**1731**	**113**				**18**	**13**	**5**	**1713**	**1734**	**113**				**21**	**13**	**8**	**1726**
482	| WOR-B42B	1708	1735		106			27	18	9	1708	1737		107			29	18	11	1708	1733		105			25	18	7	1708	1737		105			29	18	11	1726
482	| WOR-B44A	1712	1743		114			31	13	18	1712	1744		114			32	13	19	1712	1742		113			30	13	17	1713	1746		113			33	12	21	1725
483	**Combine WORCSCATH4**	**1736**	**1746**	**136**				**10**	**10**	**0**	**1737**	**1746**	**141**				**9**	**9**	**0**	**1736**	**1745**	**132**				**9**	**10**	**-1**	**1737**	**1746**	**139**				**9**	**9**	**0**	**1746**
483	| WORC101A	1735	1755		126			20	11	9	1735	1757		127			22	11	11	1735	1755		126			20	11	9	1735	1756		127			21	11	10	1746
483	| WORC102A	1736	1759		108			23	7	16	1736	1761		110			25	7	18	1736	1759		106			23	7	16	1736	1761		108			25	7	18	1743
483	| WORC104A	1732	1753		130			21	11	10	1732	1756		131			24	11	13	1732	1753		130			21	11	10	1732	1755		130			23	11	12	1743
483	| WORC105A	1728	1751		99.9			23	15	8	1728	1753		103			25	15	10	1728	1750		95.9			22	15	7	1728	1752		102			24	15	9	1743
483	| WORC111A	1729	1752		114			23	14	9	1730	1754		116			24	13	11	1729	1752		112			23	14	9	1730	1753		115			23	13	10	1743
484	**Combine WORCSCATH5**	**1739**	**1748**	**132**				**9**	**7**	**2**	**1739**	**1750**	**137**				**11**	**7**	**4**	**1739**	**1748**	**130**				**9**	**7**	**2**	**1739**	**1749**	**137**				**10**	**7**	**3**	**1746**
484	| WORC128A	1730	1753		92.3			23	13	10	1730	1755		95.3			25	13	12	1730	1753		88.8			23	13	10	1730	1755		96.9			25	13	12	1743
484	| WORC129A	1735	1756		126			21	11	10	1735	1757		127			22	11	11	1735	1755		126			20	11	9	1735	1757		127			22	11	11	1746
484	| WORC130A	1737	1758		122			21	9	12	1738	1760		123			22	8	14	1737	1758		122			21	9	12	1738	1759		123			21	8	13	1746
484	| WORC132A	1737	1758		123			21	9	12	1738	1760		124			22	8	14	1737	1758		124			21	9	12	1738	1759		124			21	8	13	1746
485	**Combine WORCSCATH6**	**1765**	**1776**	**178**				**11**	**7**	**4**	**1766**	**1776**	**180**				**10**	**6**	**4**	**1765**	**1775**	**178**				**10**	**7**	**3**	**1766**	**1776**	**181**				**10**	**6**	**4**	**1772**
485	| WORC144A	1761	1785		132			24	11	13	1761	1787		133			26	11	15	1761	1784		132			23	11	12	1761	1787		133			26	11	15	1772
485	| WORC145A	1763	1786		130			23	9	14	1763	1788		131			25	9	16	1762	1785		131			23	10	13	1763	1787		131			24	9	15	1772
485	| WORC146A	1759	1786		130			27	13	14	1759	1788		131			29	13	16	1759	1784		129			25	13	12	1759	1788		132			29	13	16	1772
485	| WORC151A	1760	1784		128			24	12	12	1761	1785		129			24	11	13	1760	1783		129			23	12	11	1761	1785		129			24	11	13	1772
485	| WORC153A	1763	1787		126			24	9	15	1764	1788		127			24	8	16	1763	1786		126			23	9	14	1764	1788		127			24	8	16	1772
486	**Combine WORCSCATH7**	**1734**	**1751**	**115**				**17**	**8**	**9**	**1734**	**1752**	**116**				**18**	**8**	**10**	**1734**	**1750**	**113**				**16**	**8**	**8**	**1735**	**1752**	**119**				**17**	**7**	**10**	**1742**
486	| WORC188A	1734	1757		110			23	8	15	1734	1759		111			25	8	17	1734	1756		110			22	8	14	1734	1758		111			24	8	16	1742
486	| WORC192A	1726	1758		111			32	1	31	1726	1759		112			33	1	32	1726	1756		108			30	1	29	1727	1760		116			33	0	33	1727

Number	SITE & sample	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	A from	A to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	B from	B to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	C from	C to	Phase A_n	Sample	2nd test	3rd test	Range	beg range	end range	Real date
487	**Combine WORFIELD**	**1483**	**1495**	**57**				**12**	**4**	**8**	**1483**	**1496**	**61.2**				**13**	**4**	**9**	**1483**	**1495**	**59.3**				**12**	**4**	**8**	**1483**	**1496**	**64.8**				**13**	**4**	**9**	**1487**
487	**Combine WORFIELD**	**1484**	**1500**	**124**				**16**	**3**	**13**	**1484**	**1501**	**125**				**17**	**3**	**14**	**1484**	**1499**	**124**				**15**	**3**	**12**	**1484**	**1501**	**126**				**17**	**3**	**14**	**1487**
487	worf3	1483	1505		106	113		22	4	18	1483	1507		107	113		24	4	20	1483	1505		106	113		22	4	18	1483	1507		109	113		24	4	20	1487
487	worf48	1479	1508		129	121		29	8	21	1480	1509		129	121		29	7	22	1479	1506		129	120		27	8	19	1480	1509		128	122		29	7	22	1487
487	worf6	1469	1490		27.8			21	18	3	1469	1492		31			23	18	5	1469	1491		29.6			22	18	4	1469	1493		33.9			24	18	6	1487
488	**Combine BIRDCOMBE**	**1434**	**1449**	**62.8**				**15**	**8**	**7**	**1435**	**1450**	**66.6**				**15**	**7**	**8**	**1434**	**1448**	**55.5**				**14**	**8**	**6**	**1435**	**1450**	**67**				**15**	**7**	**8**	**1442**
488	bcc1	1423	1449		67.5			26	19	7	1424	1450		70.8			26	18	8	1423	1448		64.5			25	19	6	1424	1450		70.3			26	18	8	1442
488	bcc2	1420	1452		75.7			32	22	10	1420	1454		78.5			34	22	12	1420	1450		66.1			30	22	8	1421	1454		80.3			33	21	12	1442
488	bcc6	1436	1464		87.5			28	5	23	1436	1466		89			30	5	25	1436	1463		84.5			27	5	22	1437	1466		88.5			29	4	25	1441
489	**Combine YATTON**	**1681**	**1697**	**144**				**16**	**10**	**6**	**1681**	**1698**	**145**				**17**	**10**	**7**	**1681**	**1696**	**143**				**15**	**10**	**5**	**1682**	**1699**	**144**				**17**	**9**	**8**	**1691**
489	yat02	1679	1709		122			30	12	18	1679	1711		122			32	12	20	1679	1708		122			29	12	17	1680	1711		122			31	11	20	1691
489	yat03	1677	1706		123			29	14	15	1677	1708		124			31	14	17	1677	1705		124			28	14	14	1677	1709		124			32	14	18	1691
489	yat04	1676	1707		125			31	15	16	1676	1709		125			33	15	18	1676	1705		124			29	15	14	1676	1710		125			34	15	19	1691
490	**Combine YELFORD**	**1490**	**1506**	**21.8**	**n=2 A= 21.8%(A**			**16**	**10**	**6**	**1490**	**1508**	**24.7**	**n=2 A= 24.7%(**			**18**	**10**	**8**	**1490**	**1506**	**17.9**	**n=2 A= 17.9%(**			**16**	**10**	**6**	**1490**	**1508**	**23.2**	**FAILED**	**n=2 A:**		**18**	**10**	**8**	**1500**
490	yel3	1469	1495		12			26	30	-4	1470	1497		14			27	29	-2	1469	1494		9			25	30	-5	1470	1496		12.9			26	29	-3	1499
490	yel5	1492	1518		97.3			26	8	18	1492	1519		98.9			27	8	19	1491	1517		97.7			26	9	17	1492	1519		98.3			27	8	19	1500
491	**Combine QUEENSHOTEL**	**1028**	**1041**	**53**				**13**	**3**	**10**	**1028**	**1042**	**56.9**				**14**	**3**	**11**	**1027**	**1041**	**48.1**	**n=2 A= 48.1%(**			**14**	**4**	**10**	**1028**	**1042**	**53.6**				**14**	**3**	**11**	**1031**
491	qhy272	1016	1037		40.3			21	15	6	1017	1039		44.1			22	14	8	1016	1037		35.5			21	15	6	1017	1038		40.9			21	14	7	1031
491	qhy273	1029	1050		101			21	2	19	1029	1051		102			22	2	20	1029	1049		100			20	2	18	1029	1051		101			22	2	20	1031
492	**Combine SARUMIRISH**	**1214**	**1231**	**136**				**17**	**8**	**9**	**1214**	**1232**	**137**				**18**	**8**	**10**	**1214**	**1230**	**136**				**16**	**8**	**8**	**1215**	**1233**	**137**				**18**	**7**	**11**	**1222**
492	scec1	1212	1246		120			34	10	24	1213	1247		121			34	9	25	1212	1243		120			31	10	21	1213	1247		121			34	9	25	1222
492	scec2	1210	1243		126			33	12	21	1210	1245		126			35	12	23	1210	1240		126			30	12	18	1211	1245		126			34	11	23	1222
492	scec4	1207	1238		113			31	15	16	1208	1239		114			31	14	17	1207	1236		114			29	15	14	1208	1240		114			32	14	18	1222

APPENDIX 6: TABLE OF TEST RESULTS WITH INDEPENDENT DATA

This section contains the results of testing 579 samples and 123 combined phases from independent date as detailed in *Section 9.2*. The first column gives the phase number, with the rows giving the combined phase information is in **bold**. Each sample and phase have been tested against model C+S as detailed in *Section 9.2*.

As in **Appendix 5**, the details of the testing are shown. The first two columns in each section give the *from* and *to* (beginning and end of the estimated range) for each sample or combined phase. The next column gives the *Phase Ag* or agreement level for the combined phases. Where these are below acceptable limits, details are shown to the right of this figure.

The individual agreement index for each sample is given under the *Sample* heading, as detailed in *Section 8.3.5*. Where these are below 60, the sample is eliminated and the combined phase calculated a second time, with the revised agreement figures given. The re-calculated combined phase range is also given below the first one. Where there are still samples with poor agreement levels within the phase after the second test, this procedure is repeated and a third test is performed, with the results tabulated in the *3rd test* column.

Next, the calculated width of each of the individual and combined phase ranges is given in years under *Range*. Finally the *beg range* and *end range* gives the number of years within the lower and outer ends of the predicted range. Where one of the figures in either of these two columns is negative, i.e. (-3), then the real date for this sample or phase has fallen outside the predicted range and has therefore failed the test.

In the last section, space has permitted some details of the individual samples to be given. They include the heartwood/sapwood boundary date, the number of heartwood rings, sapwood rings, and total number of rings in the complete sample. In addition, the real date represents the felling date for the sample, or the earliest felling date for the combined phase date. The latest felling date for the combined phase is given in the final column *Phase date*.

Some individual samples do not have any phase agreement results or phase dates associated with them. These are additional samples which are clearly identified with a phase of building, but do not have complete sapwood. These have been used in further tests to demonstrate the changes resulting from the inclusion with additional samples.

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H/S bdy	H/W	Sapwood	Total rings	H/W MRW	Real date	Phase date
1	**Combine CORINTHIAN**	**1758**	**1767**	**186**					**9**	**7**	**2**	**1765**					**1764**	**1765**
1	| stw70+Stockpile	1746	1773		81				27	19	8	1737	36	28	64	1.97	1765	1765
1	| stw71+Stockpile	1751	1777		128				26	14	12	1742	69	23	92	2.36	1765	1765
1	| stw72+Stockpile	1752	1783		138				31	12	19	1741	89	23	112	1.39	1764	1765
1	| stw74+Stockpile	1755	1784		125				29	9	20	1745	34	19	53	1.48	1764	1765
1	| stw75+Stockpile	1755	1784		127				29	9	20	1744	65	20	85	1.52	1764	1765
1	| stw76+Stockpile	1754	1783		134				29	10	19	1743	58	21	79	1.5	1764	1765
1	| stw78+Stockpile	1752	1782		138				30	13	17	1741	56	24	80	1.39	1765	1765
1	| stw779+Stockpile	1751	1781		137				30	13	17	1740	52	24	76	1.31	1764	1765
	| stw73+Stockpile	1759	1781		100				22	6	16	1752	34	13	47	4.13	1765	1765
2	**Combine CHENIES1**	**1530**	**1545**	**47.4**					**15**	**7**	**8**	**1534**					**1534**	**1537**
2	| chny1+Stockpile	1525	1554		125				29	12	17	1514	83	23	106	1.63	1537	1537
2	| chny4+Stockpile	1531	1559		98.6				28	3	25	1521	49	13	62	1.7	1534	1537
2	| chny5+Stockpile	1509	1538		22.3				29	27	2	1498	107	38	145	1.69	1536	1537
3	**Combine CHENIES2**	**1541**	**1553**	**139**					**12**	**10**	**2**	**1546**					**1546**	**1551**
3	| chny11+Stockpile	1540	1564		120				24	6	18	1531	63	15	78	2.76	1546	1551
3	| chny13+Stockpile	1527	1560		91.1				33	22	11	1514	145	35	180	1.15	1549	1551
3	| chny14+Stockpile	1533	1561		115				28	16	12	1523	47	26	73	1.73	1549	1551
3	| chny1567+Stockpile	1535	1566		135				31	16	15	1523	76	28	104	1.19	1551	1551
3	| chny19+Stockpile	1539	1568		123				29	11	18	1528	86	22	108	1.63	1550	1551
	| chny12+Stockpile	1534	1561		100				27	17	10	1524	46	27	73	1.76	1551	1551
	| rom3+Stockpile	1224	1253						29	1	28	1214	49	11	60	1.62	1225	
	| rom4+Stockpile	1220	1240						20	5	15	1213	22	12	34	4.48	1225	
	| rom12+Stockpile	1343	1363						20	7	13	1336	30	14	44	4.78	1350	
	| rom13+Stockpile	1341	1365						24	9	15	1333	19	17	36	2.42	1350	
	| rom14+Stockpile	1343	1362						19	7	12	1336	22	14	36	4.76	1350	
	| rom15+Stockpile	1341	1365						24	9	15	1333	34	17	51	2.96	1350	
4	**Combine WITNEYPRIORY**	**1490**	**1509**	**113**					**19**	**7**	**12**	**1497**					**1497**	**1497**
4	| wpb1+Stockpile	1484	1513		105				29	13	16	1474	100	23	123	1.98	1497	1497
4	| wpb2+Stockpile	1490	1518		112				28	5	23	1480	75	15	90	1.87	1495	1497
5	**Combine WCBAKEHOUSE**	**1655**	**1665**	**128**					**10**	**7**	**3**	**1662**	**0**	**0**		**0.248**	**1662**	**1662**
5	| bhw12+Stockpile	1653	1679		121				26	9	17	1643	47	19	66	1.88	1662	1662
5	| bhw3+Stockpile	1644	1670		84.7				26	18	8	1635	43	27	70	2.21	1662	1662
5	| bhw5+Stockpile	1653	1675		126				22	9	13	1645	32	17	49	3.41	1662	1662
5	| bhw6+Stockpile	1651	1673		127				22	11	11	1644	31	18	49	3.86	1662	1662
6	**Combine SKYERSFM**	**1574**	**1587**	**92.9**					**13**	**5**	**8**	**1579**					**1579**	**1579**
6	| skr2+Stockpile	1561	1587		49.7				26	18	8	1552	58	27	85	2.47	1579	1579
6	| skr3+Stockpile	1573	1602		120				29	6	23	1562	84	17	101	1.69	1579	1579
6	| skr4+Stockpile	1570	1596		126				26	9	17	1560	71	19	90	2.27	1579	1579
6	| skr5+Stockpile	1573	1603		115				30	6	24	1562	137	17	154	1.71	1579	1579
7	**Combine PRIORYCT**	**1454**	**1469**	**123**					**15**	**8**	**7**	**1462**					**1462**	**1462**
7	| pcs43+Stockpile	1445	1474		100				29	16	13	1435	55	26	81	1.66	1461	1462
7	| pcs46+Stockpile	1452	1476		122				24	9	15	1443	34	18	52	2.41	1461	1462
7	| pcs49+Stockpile	1453	1483		117				30	9	21	1442	90	20	110	1.56	1462	1462
	| pcs31+Stockpile	1461	1485		95				24	0	24	1452	34	9	43	2.4	1461	1462
	| pcs44+Stockpile	1455	1479		120				24	7	17	1447	26	15	41	2.65	1462	1462
	| pcs47+Stockpile	1440	1466		17.2				26	22	4	1431	50	31	81	2.33	1462	1462
	| dps1+Stockpile	1609	1634						25	17	8	1600	47	26	73	2.46	1626	
	| dps21+Stockpile	1470	1501						31	6	25	1459	106	17	123	1.53	1476	
	| dps22+Stockpile	1465	1495						30	11	19	1454	57	22	79	1.4	1476	
	| dps27+Stockpile	1488	1517						29	12	17	1477	77	23	100	1.52	1500	
	| dps32+Stockpile	1484	1515						31	16	15	1473	80	27	107	1.44	1500	
	| dps41+Stockpile	1496	1522						26	4	22	1486	50	14	64	2.09	1500	
	| dps51+Stockpile	1532	1558						26	15	11	1523	69	24	93	2.48	1547	
	| dps61+Stockpile	1598	1629						31	13	18	1587	164	24	188	1.64	1611	
	| dps72a2+Stockpile	1554	1579						25	24	1	1545	30	33	63	2.14	1578	
	| dps75+Stockpile	1555	1579						24	23	1	1546	47	32	79	2.79	1578	
	| dps81+Stockpile	1752	1778						26	8	18	1742	49	18	67	2.08	1760	
	| dps83+Stockpile	1754	1781						27	6	21	1744	56	16	72	1.94	1760	
8	**Combine NEWHALL**	**1552**	**1565**	**129**					**13**	**12**	**1**	**1564**					**1562**	**1564**
8	| euh1+Stockpile	1545	1574		121				29	19	10	1535	79	29	108	1.84	1564	

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H/S bdy	H/W	Sapwood	Total rings	H/W MRW	Real date	Phase date
8	euh3+Stockpile	1541	1572		102				31	21	10	1529	97	33	130	1.3	1562	
8	euh4+Stockpile	1547	1576		129				29	16	13	1536	68	27	95	1.51	1563	
8	euh9+Stockpile	1552	1583		104				31	10	21	1540	121	22	143	1.47	1562	
	euh5+Stockpile	1689	1718						29	12	17	1679	69	22	91	1.76	1701	
	euh6+Stockpile	1592	1624						32	8	24	1580	65	20	85	1.08	1600	
	euh7+Stockpile	1590	1614						24	10	14	1581	32	19	51	2.42	1600	
	euh1012+Stockpile	1741	1774						33	11	22	1729	124	23	147	1.22	1752	
9	**Combine BROUGHALL**	**1536**	**1553**	**126**					**17**	**32**	**-15**	**1568**					**1568**	**1568**
9	brhl1+Stockpile	1534	1561		118				27	34	-7	1524	102	44	146	2.21	1568	
9	brhl14+Stockpile	1533	1560		117				27	35	-8	1524	109	44	153	2.63	1568	
10	**Combine WHITTINGTON**	**1477**	**1498**	**125**					**21**	**0**	**21**	**1477**					**1476**	**1477**
10	wit4+Stockpile	1475	1506		117				31	2	29	1464	67	13	80	1.36	1477	
10	wit5+Stockpile	1474	1505		118				31	2	29	1462	71	14	85	1.23	1476	
	wit1+Stockpile	1460	1484						24	17	7	1451	67	26	93	2.95	1477	
	wit13+Stockpile	1563	1599						36	14	22	1550	82	27	109	0.86	1577	
	wit15+Stockpile	1481	1510						29	4	25	1470	49	15	64	1.41	1485	
	wit38+Stockpile	1611	1644						33	17	16	1598	132	30	162	1.14	1628	
	wit40+Stockpile	1624	1659						35	4	31	1611	53	17	70	0.8	1628	
11	**Combine WELLS**	**1494**	**1511**	**92.6**					**17**	**16**	**1**	**1510**					**1510**	**1510**
11	stsw21+Stockpile	1494	1523		107				29	16	13	1484	82	26	108	1.86	1510	
11	stsw22+Stockpile	1486	1512		83.8				26	24	2	1476	52	34	86	2.08	1510	
12	**Combine HOLNICOTE1**	**1548**	**1564**	**84.1**					**16**	**2**	**14**	**1550**					**1550**	**1550**
12	hln7a+Stockpile	1549	1582		91.8				33	1	32	1537	131	13	144	1.23	1550	
12	hln8+Stockpile	1539	1574		120				35	11	24	1526	125	24	149	1	1550	
12	hln9+Stockpile	1537	1564		67.4				27	13	14	1528	36	22	58	1.98	1550	
13	**Combine HOLNICOTE2**	**1497**	**1512**	**120**					**15**	**11**	**4**	**1508**					**1508**	**1508**
13	hln212+Stockpile	1493	1517		113				24	15	9	1485	38	23	61	2.98	1508	
13	hln234+Stockpile	1496	1520		115				24	12	12	1488	44	20	64	2.99	1508	
	hln3+Stockpile	1806	1842						36	17	19	1793	162	30	192	1	1823	
	hln12+Stockpile	1532	1559						27	12	15	1522	119	22	141	2.3	1544	
	hfh1+Stockpile	1435	1465						30	24	6	1424	119	35	154	1.68	1459	
14	**Combine CLIFFORD**	**1429**	**1441**	**125**					**12**	**4**	**8**	**1433**					**1433**	**1433**
14	orcc12+Stockpile	1423	1451		128				28	10	18	1413	70	20	90	1.87	1433	
14	orcc3+Stockpile	1429	1454		108				25	4	21	1420	49	13	62	2.49	1433	
14	orcc4+Stockpile	1418	1446		86.9				28	15	13	1408	65	25	90	1.87	1433	
14	orcc67+Stockpile	1425	1451		131				26	8	18	1415	53	18	71	1.95	1433	
15	**Combine NETHERSTD1**	**1644**	**1657**	**47.7**					**13**	**8**	**5**	**1652**					**1638**	**1652**
15	nsh1+Stockpile	1617	1650		16.8				33	21	12	1605	53	33	86	1	1638	1652
15	nsh2+Stockpile	1638	1667		127				29	12	17	1628	48	22	70	1.54	1650	1652
15	nsh4+Stockpile	1645	1674		89.2				29	3	26	1634	80	14	94	1.54	1648	1652
15	nsh7+Stockpile	1633	1669		120				36	19	17	1619	113	33	146	0.84	1652	1652
16	**Combine NETHERSTD2**	**1785**	**1795**	**109**					**10**	**1**	**9**	**1786**					**1785**	**1786**
16	nsh21+Stockpile	1778	1802		113				24	8	16	1769	47	17	64	2.79	1786	1786
16	nsh22+Stockpile	1778	1802		116				24	7	17	1769	35	16	51	2.47	1785	1786
16	nsh23+Stockpile	1779	1805		132				26	6	20	1770	47	15	62	2.14	1785	1786
16	nsh25+Stockpile	1776	1801		104				25	10	15	1767	41	19	60	2.31	1786	1786
16	nsh26+Stockpile	1786	1816		67.5				30	0	30	1775	57	11	68	1.34	1786	1786
	nsh3+Stockpile	1640	1666						26	12	14	1631	19	21	40	1.69	1652	
	nsh6+Stockpile	1644	1670						26	8	18	1634	57	18	75	2.13	1652	
	nsh9+Stockpile	1653	1679						26	-1	27	1644	61	8	69	2.47	1652	
	nsh31+Stockpile	1697	1726						29	8	21	1687	60	18	78	1.66	1705	
	nsh32+Stockpile	1693	1725						32	12	20	1681	87	24	111	1.18	1705	
17	**Combine KENNELFM**	**1575**	**1596**	**94.8**					**21**	**13**	**8**	**1588**					**1587**	**1588**
17	kfc1+Stockpile	1565	1597		86.3				32	23	9	1553	167	35	202	1.41	1588	1588
17	kfc14+Stockpile	1576	1609		108				33	11	22	1563	112	24	136	1.11	1587	1588
	kfc6+Stockpile	1514	1540						26	18	8	1505	44	27	71	2.18	1532	
	kfc7+Stockpile	1424	1451						27	15	12	1414	39	25	64	1.72	1439	
18	**Combine CLARENDON**	**1794**	**1805**	**52.1**					**11**	**6**	**5**	**1800**					**1797**	**1800**
18	eoc1+Stockpile	1780	1811		82.3				31	20	11	1769	59	31	90	1.34	1800	1800
18	eoc2+Stockpile	1796	1827		55.2				31	4	27	1785	57	15	72	1.27	1800	1800
18	eoc3+Stockpile	1774	1805		40.7				31	23	8	1763	61	34	95	1.3	1797	1800
18	eoc6+Stockpile	1789	1815		130				26	11	15	1779	38	21	59	1.96	1800	1800
18	eoc7+Stockpile	1784	1810		97				26	16	10	1774	29	26	55	1.67	1800	1800
	tfn4+Stockpile	1589	1622						33	17	16	1576	153	30	183	1.2	1606	

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H S bdy	H W	Sapwood	Total rings	H W MRW	Real date	Phase date
	| tfn13+Stockpile	1572	1604						32	9	23	1560	137	21	158	1.33	1581	
	| hge1+Stockpile	1400	1422						22	1	21	1392	64	9	73	3.8	1401	
	| hge2+Stockpile	1393	1423						30	8	22	1382	107	19	126	1.63	1401	
19	**Combine LLANYWATHEN**	**1409**	**1422**	**109**					**13**	**8**	**5**	**1417**					**1416**	**1417**
19	| lhw1+Stockpile	1400	1424		82.9				24	16	8	1391	73	25	98	2.82	1416	1417
19	| lhw2+Stockpile	1409	1434		108				25	8	17	1400	76	17	93	2.73	1417	1417
19	| lhw3a2+Stockpile	1403	1434		129				31	13	18	1392	61	24	85	1.31	1416	1417
	| lhw4+Stockpile	1410	1438						28	7	21	1400	53	17	70	1.73	1417	
	| nnc1+Stockpile	1486	1519						33	16	17	1473	87	29	116	1.04	1502	
	| nnc11+Stockpile	1510	1539						29	25	4	1499	75	36	111	1.55	1535	
	| lyn2+Stockpile	1508	1534						26	16	10	1498	67	26	93	2.14	1524	
20	**Combine EGRYN1**	**1502**	**1512**	**150**					**10**	**7**	**3**	**1509**					**1506**	**1509**
20	| egr1+Stockpile	1494	1518		104				24	15	9	1485	32	24	56	2.44	1509	1509
20	| egr2+Stockpile	1492	1518		101				26	16	10	1483	33	25	58	1.95	1508	1509
20	| egr4+Stockpile	1500	1529		112				29	6	23	1490	57	16	73	1.62	1506	1509
20	| egr5+Stockpile	1499	1525		129				26	10	16	1490	41	19	60	2.19	1509	1509
20	| egr6+Stockpile	1498	1522		134				24	8	16	1489	36	17	53	2.4	1506	1509
20	| egr7+Stockpile	1498	1524		134				26	9	17	1489	57	18	75	2.31	1507	1509
21	**Combine EGRYN2**	**1589**	**1610**	**119**					**21**	**28**	**-7**	**1617**					**1614**	**1617**
21	| egr11+Stockpile	1586	1613		109				27	28	-1	1576	99	38	137	2.19	1614	1617
21	| egr12+Stockpile	1588	1623		118				35	29	6	1575	104	42	146	0.97	1617	1617
	| egr3+Stockpile	1498	1522						24	10	14	1489	43	19	62	2.75	1508	
	| egr15+Stockpile	1582	1616						34	34	0	1569	113	47	160	1	1616	
22	**Combine ROYALHS1**	**1557**	**1570**	**153**					**13**	**3**	**10**	**1560**					**1558**	**1560**
22	| rhm1+Stockpile	1553	1589		127				36	7	29	1540	85	20	105	0.83	1560	1560
22	| rhm2+Stockpile	1549	1580		124				31	9	22	1537	75	21	96	1.19	1558	1560
22	| rhm8+Stockpile	1549	1581		125				32	10	22	1537	116	22	138	1.31	1559	1560
22	| rhm14+Stockpile	1556	1577		119				21	4	17	1549	20	11	31	3.81	1560	1560
	| rhm6+Stockpile	1551	1575		67.4				24	8	16	1542	46	17	63	2.7	1559	
	| rhm12+Stockpile	1548	1574		53.7				26	12	14	1538	65	22	87	2.17	1560	
	| rhm22+Stockpile	1548	1570		29.1				22	12	10	1540	21	20	41	3.04	1560	
	| rhm23+Stockpile	1547	1576		62.8				29	13	16	1536	60	24	84	1.52	1560	
	| rhm24+Stockpile	1538	1564		10.5				26	19	7	1528	55	29	84	1.97	1557	
	| rhm2678+Stockpile	1540	1567		16.6				27	17	10	1530	56	27	83	1.89	1557	
	| rhm37+Stockpile	1567	1590		18.2				23	8	15	1559	51	16	67	3.4	1575	
23	**Combine ROYALHS2**	**1573**	**1588**	**142**					**15**	**2**	**13**	**1575**					**1575**	**1575**
23	| rhm32+Stockpile	1571	1597		123				26	4	22	1561	72	14	86	2.12	1575	1575
23	| rhm33+Stockpile	1571	1600		124				29	4	25	1560	121	15	136	1.81	1575	1575
23	| rhm38+Stockpile	1567	1596		120				29	8	21	1556	100	19	119	1.65	1575	1575
24	**Combine PARLIAMENT**	**1467**	**1479**	**127**					**12**	**2**	**10**	**1469**					**1469**	**1469**
24	| phm1+Stockpile	1466	1487		123				21	3	18	1458	17	11	28	3.01	1469	1469
24	| phm3+Stockpile	1461	1483		101				22	8	14	1453	33	16	49	3.5	1469	1469
24	| phm12+Stockpile	1466	1488		122				22	3	19	1458	22	11	33	3.08	1469	1469
25	**Combine LMISS1**	**1620**	**1637**	**126**					**17**	**3**	**14**	**1623**					**1623**	**1623**
25	| lmss2+Stockpile	1618	1645		118				27	5	22	1609	64	14	78	2.26	1623	1623
25	| lmss3+Stockpile	1617	1643		117				26	6	20	1608	60	15	75	2.27	1623	1623
26	**Combine LMISS2**	**1540**	**1556**	**96.5**					**16**	**5**	**11**	**1545**					**1544**	**1545**
26	| lmss11+Stockpile	1540	1569		114				29	5	24	1529	60	16	76	1.51	1545	1545
26	| lmss12+Stockpile	1538	1569		125				31	7	24	1526	98	19	117	1.38	1545	1545
26	| lmss16+Stockpile	1529	1556		66.3				27	15	12	1519	53	25	78	1.92	1544	1545
	| lmss4+Stockpile	1618	1641						23	5	18	1610	31	13	44	2.96	1623	
	| lmss15+Stockpile	1536	1567						31	9	22	1525	54	20	74	1.22	1545	
	| fpg06+Stockpile	1483	1512						29	11	18	1473	118	21	139	1.94	1494	
27	**Combine JERUSALEM**	**1359**	**1378**	**72.1**					**19**	**10**	**9**	**1369**					**1368**	**1369**
27	| wa24+Stockpile	1347	1375		61.1				28	22	6	1337	76	32	108	1.87	1369	1369
27	| wa28+Stockpile	1360	1390		103				30	8	22	1349	82	19	101	1.53	1368	1369
27	| wa32+Stockpile	1609	1640						31	7	24	1597	58	19	77	1.15	1616	
27	| omw2+Stockpile	1480	1509						29	12	17	1469	66	23	89	1.53	1492	
27	| obm7+Stockpile	1473	1502						29	9	20	1462	61	20	81	1.56	1482	
27	| sad5+Stockpile	1731	1757						26	15	11	1721	48	25	73	2.05	1746	
28	**Combine FARDELS**	**1558**	**1570**	**87.3**					**12**	**13**	**-1**	**1571**					**1569**	**1571**
28	| frdl1+Stockpile	1549	1577		109				28	20	8	1538	60	31	91	1.57	1569	1571

No.	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H S bdy	H:W	Sapwood	Total rings	H/W MRW	Real date	Phase date
28	frdl2+Stockpile	1544	1568		41.2				24	27	-3	1535	51	36	87	2.63	1571	1571
28	frdl4+Stockpile	1559	1586		90.6				27	10	17	1549	70	20	90	2.02	1569	1571
28	frdl5+Stockpile	1551	1587		137				36	18	18	1537	137	32	169	0.88	1569	1571
28	frdl6+Stockpile	1554	1583		132				29	17	12	1544	68	27	95	1.8	1571	1571
29	**Combine BURGHCLERE**	**1473**	**1488**	**82.3**					**15**	**9**	**6**	**1482**					**1482**	**1482**
29	obm5+Stockpile	1464	1492		94.6				28	18	10	1453	57	29	86	1.54	1482	1482
29	obm6+Stockpile	1475	1506		89.3				31	7	24	1463	45	19	64	1.08	1482	1482
29	obm8+Stockpile	1463	1491		84.5				28	19	9	1452	80	30	110	1.72	1482	1482
30	**Combine SADDLERS**	**1741**	**1755**	**121**					**14**	**6**	**8**	**1747**					**1746**	**1747**
30	sad2+Stockpile	1732	1759		96.7				27	14	13	1722	59	24	83	1.87	1746	1747
30	sad3+Stockpile	1733	1764		118				31	14	17	1721	71	26	97	1.27	1747	1747
30	sad9+Stockpile	1741	1773		102				32	6	26	1729	80	18	98	1.15	1747	1747
30	sad78+Stockpile	1738	1764		126				26	8	18	1729	55	17	72	2.23	1746	1747
31	**Combine DEANE**	**1521**	**1533**	**70.5**					**12**	**9**	**3**	**1530**					**1523**	**1530**
31	tfd1+Stockpile	1522	1548		95.4				26	8	18	1512	58	18	76	2.12	1530	1530
31	tfd3+Stockpile	1519	1545		126				26	4	22	1509	62	14	76	2.13	1523	1530
31	tfd4+Stockpile	1505	1534		54.3				29	18	11	1494	88	29	117	1.62	1523	1530
31	tfd5+Stockpile	1511	1535		76.3				24	12	12	1502	52	21	73	2.67	1523	1530
32	**Combine OVERTON**	**1526**	**1548**	**99.3**					**22**	**19**	**3**	**1545**					**1545**	**1545**
32	pro11+Stockpile	1526	1560		109				34	19	15	1514	128	31	159	1.2	1545	1545
32	pro12+Stockpile	1516	1550		91				34	29	5	1503	160	42	202	1.16	1545	1545
33	**Combine KNGSWORTHY**	**1607**	**1617**	**184**					**10**	**2**	**8**	**1609**					**1606**	**1609**
33	kww2+Stockpile	1604	1637		125				33	5	28	1591	105	18	123	1.05	1609	1609
33	kww012+Stockpile	1600	1633		138				33	9	24	1588	102	21	123	1.16	1609	1609
33	kww5+Stockpile	1601	1627		129				26	7	19	1592	31	16	47	1.96	1608	1609
33	kww6+Stockpile	1599	1631		134				32	7	25	1587	59	19	78	1.06	1606	1609
33	kww47+Stockpile	1600	1628		129				28	9	19	1589	100	20	120	1.78	1609	1609
33	kww8+Stockpile	1606	1632		113				26	3	23	1597	41	12	53	2.12	1609	1609
33	kww113+Stockpile	1599	1626		117				27	10	17	1589	56	20	76	1.9	1609	1609
	syd3+Stockpile	1726	1753		101				27	3	24	1717	50	12	62	2.13	1729	
	syd5+Stockpile	1717	1739		61				22	5	17	1709	43	13	56	3.72	1722	
34	**Combine SHERBORNE**	**1558**	**1568**	**100**					**10**	**2**	**8**	**1560**					**1560**	**1560**
34	pfh1+Stockpile	1541	1575		76.6				34	19	15	1528	81	32	113	0.96	1560	1560
34	pfh2+Stockpile	1554	1585		126				31	6	25	1543	93	17	110	1.41	1560	1560
34	pfh3+Stockpile	1557	1593		87.6				36	3	33	1544	122	16	138	0.96	1560	1560
34	pfh4+Stockpile	1539	1573		63.4				34	21	13	1527	90	33	123	1.06	1560	1560
34	pfh5+Stockpile	1554	1581		132				27	6	21	1544	43	16	59	1.77	1560	1560
34	pfh6+Stockpile	1552	1586		136				34	8	26	1539	110	21	131	1.03	1560	1560
34	pfh11+Stockpile	1546	1577		105				31	14	17	1535	102	25	127	1.48	1560	1560
	cst1+Stockpile	1599	1631						32	11	21	1587	114	23	137	1.28	1610	
	cst7+Stockpile	1456	1482						26	19	7	1447	54	28	82	2.39	1475	
35	**Combine CHASTLETON1**	**1595**	**1613**	**93.3**					**18**	**14**	**4**	**1609**					**1608**	**1609**
35	cst112+Stockpile	1587	1613		84.9				26	21	5	1578	95	30	125	2.59	1608	1609
35	cst135+Stockpile	1596	1624		107				28	13	15	1585	126	24	150	1.9	1609	1609
36	**Combine CHASTLETON2**	**1775**	**1794**	**115**					**19**	**13**	**6**	**1788**					**1788**	**1788**
36	cst16+Stockpile	1769	1799		109				30	19	11	1758	86	30	116	1.55	1788	1788
36	cst17+Stockpile	1775	1803		112				28	13	15	1765	94	23	117	2.05	1788	1788
37	**Combine ESTATEYD**	**1621**	**1629**	**75.1**					**8**	**3**	**5**	**1624**					**1623**	**1624**
37	oey1+Stockpile	1616	1641		138				25	7	18	1607	47	16	63	2.4	1623	1624
37	oey2+Stockpile	1610	1635		85.5				25	13	12	1601	58	22	80	2.57	1623	1624
37	oey3+Stockpile	1622	1647		69				25	1	24	1613	27	10	37	2.04	1623	1624
37	oey4+Stockpile	1604	1630		37.5				26	19	7	1595	48	28	76	2.25	1623	1624
37	oey5+Stockpile	1621	1649		82.3				28	3	25	1611	59	13	72	1.83	1624	1624
37	oey6+Stockpile	1615	1641		137				26	9	17	1605	40	19	59	1.88	1624	1624
37	oey7+Stockpile	1614	1641		134				27	10	17	1604	55	20	75	1.93	1624	1624
37	oey8+Stockpile	1613	1645		139				32	10	22	1601	72	22	94	1.15	1623	1624
37	oey9+Stockpile	1602	1633		52				31	22	9	1590	66	34	100	1.19	1624	1624
37	oey10+Stockpile	1613	1639		122				26	10	16	1603	62	20	82	2.16	1623	1624
	cct1+Stockpile	1442	1466						24	3	21	1434	49	11	60	3.17	1445	
	img3+Stockpile	1641	1673						32	9	23	1629	66	21	87	1.12	1650	
	img4+Stockpile	1643	1679						36	7	29	1630	136	20	156	0.96	1650	
	img5a2+Stockpile	1639	1670						31	11	20	1628	54	22	76	1.27	1650	
	cbf3 - Stockpile	1280	1303						23	15	8	1272	28	23	51	2.91	1295	

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H S bdy	H W	Sapwood	Total rings	H W MRW	Real date	Phase date
	| cbf4+Stockpile	1292	1311						19	3	16	1285	13	10	23	4.64	1295	
	| cbf8+Stockpile	1297	1323						26	-2	28	1288	32	7	39	2.06	1295	
	| cbf11+Stockpile	1295	1316						21	0	21	1288	35	7	42	4.58	1295	
38	**Combine CHENNELLS**	**1292**	**1303**	**72**					**11**	**3**	**8**	**1295**					**1295**	**1295**
38	| cbf2+Stockpile	1276	1302		39.9				26	19	7	1267	47	28	75	2.14	1295	1295
38	| cbf6+Stockpile	1289	1318		127				29	6	23	1269	55	16	71	1.69	1295	1295
38	| cbf7+Stockpile	1284	1308		102				24	11	13	1275	43	20	63	2.46	1295	1295
38	| cbf10+Stockpile	1292	1316		101				24	3	21	1284	41	11	52	2.85	1295	1295
39	**Combine WESTCOURT**	**1312**	**1323**	**41.2**					**11**	**7**	**4**	**1319**					**1315**	**1319**
39	| wfs1+Stockpile	1307	1335		134				28	8	20	1296	91	19	110	1.74	1315	1319
39	| wfs2+Stockpile	1283	1315		12.2				32	35	-3	1271	95	47	142	1.21	1318	1319
39	| wfs4+Stockpile	1313	1339		87.8				26	6	20	1304	41	15	56	2.23	1319	1319
39	| wfs5+Stockpile	1307	1336		134				29	11	18	1297	55	21	76	1.65	1318	1319
39	| wfs367+Stockpile	1297	1328		71.8				31	22	9	1285	84	34	118	1.29	1319	1319
40	**Combine MEREHALL**	**1604**	**1615**	**45.2**					**11**	**6**	**5**	**1610**					**1606**	**1610**
40	| mere1+Stockpile	1586	1618		54				32	20	12	1574	144	32	176	1.39	1606	1610
40	| mere2+Stockpile	1598	1632		137				34	12	22	1585	147	25	172	1.07	1610	1610
40	| mere3+Stockpile	1603	1634		113				31	7	24	1591	116	19	135	1.45	1610	1610
40	| mere4+Stockpile	1571	1607		12.5				36	37	-1	1558	147	50	197	0.95	1608	1610
40	| mere5+Stockpile	1600	1633		133				33	9	24	1587	180	22	202	1.26	1609	1610
40	| mere6+Stockpile	1594	1622		98.6				28	13	15	1584	87	23	110	2.03	1607	1610
40	| mere9+Stockpile	1604	1637		89.3				33	6	27	1592	127	18	145	1.25	1610	1610
41	**Combine RHOSFAWR**	**1565**	**1578**	**149**					**13**	**11**	**2**	**1576**					**1575**	**1576**
41	| rfm1+Stockpile	1561	1592		129				31	15	16	1550	84	26	110	1.44	1576	1576
41	| rfm3+Stockpile	1563	1592		122				29	13	16	1552	102	24	126	1.74	1576	1576
41	| rfm5+Stockpile	1556	1585		111				29	19	10	1545	81	30	111	1.55	1575	1576
41	| rfm6+Stockpile	1560	1588		128				28	16	12	1549	69	27	96	1.68	1576	1576
	| rfm7+Stockpile	1579	1611		0.1				32	21	11	1567	133	33	166	1.34	1600	
	| rfm8+Stockpile	1641	1667		74.6				26	9	17	1632	59	18	77	2.27	1650	
	| mere10+Stockpile	1606	1630		0.8				24	4	20	1597	41	13	54	2.67	1610	
42	**Combine BLAEN1**	**1580**	**1592**	**Warning! Poor a**					**12**	**8**	**4**	**1588**					**1587**	**1588**
42	| byc4+Stockpile	1549	1578		4.8				29	38	-9	1538	77	49	126	1.57	1587	1588
42	| byc5+Stockpile	1568	1599		93.5				31	19	12	1557	86	30	116	1.46	1587	1588
42	| byc123+Stockpile	1565	1591		44.3				26	22	4	1555	121	32	153	2.46	1587	1588
42	| byc6+Stockpile	1583	1611		59.8				28	5	23	1573	58	15	73	1.8	1588	1588
43	**Combine BLAEN2**	**1631**	**1645**	**71.7**					**14**	**15**	**-1**	**1646**					**1646**	**1646**
43	| byc14+Stockpile	1619	1652		98.1				33	27	6	1607	53	39	92	1.02	1646	1646
43	| byc17+Stockpile	1633	1667		73.4				34	13	21	1620	97	26	123	0.97	1646	1646
43	| byc1213+Stockpile	1614	1646		59				32	32	0	1602	92	44	136	1.19	1646	1646
43	| byc1156+Stockpile	1624	1653		121				29	22	7	1613	135	33	168	1.77	1646	1646
	| byc21+Stockpile	1613	1640		104				27	21	6	1603	95	31	126	2.21	1634	
	| byc25+Stockpile	1616	1652		115				36	18	18	1603	110	31	141	0.92	1634	
44	**Combine HENGOED**	**1436**	**1451**	**96.3**					**15**	**10**	**5**	**1446**					**1437**	**1446**
44	| hnr1a5+Stockpile	1413	1460		79.3				47	26	21	1396	208	43	251	0.46	1439	1446
44	| hnr3+Stockpile	1436	1460		107				24	10	14	1428	63	18	81	3.25	1446	1446
44	| hnr5+Stockpile	1426	1459		110				33	11	22	1413	185	24	209	1.26	1437	1446
45	**Combine YSTUM1**	**1648**	**1670**	**125**					**22**	**20**	**2**	**1668**					**1662**	**1668**
45	| yst1+Stockpile	1647	1678		114				31	21	10	1635	135	33	168	1.47	1668	1668
45	| yst3+Stockpile	1643	1679		120				36	19	17	1629	135	33	168	0.88	1662	1668
46	**Combine YSTUM2**	**1546**	**1563**	**116**					**17**	**12**	**5**	**1558**					**1558**	**1558**
46	| yst13+Stockpile	1545	1573		114				28	13	15	1535	120	23	143	2.21	1558	1558
46	| yst14+Stockpile	1541	1567		108				26	17	9	1532	94	26	120	2.79	1558	1558
	| yst2a2+Stockpile	1650	1683						33	18	15	1637	33	31	64	0.79	1668	
	| yst21+Stockpile	1687	1716						29	13	16	1676	73	24	97	1.62	1700	
	| yst22+Stockpile	1682	1711						29	18	11	1671	72	29	101	1.62	1700	
	| yst23+Stockpile	1684	1711						27	16	11	1674	74	26	100	2.01	1700	
	| yst24+Stockpile	1676	1702						26	24	2	1666	62	34	96	2.03	1700	
	| yst32+Stockpile	1669	1699						30	31	-1	1658	68	42	110	1.4	1700	
	| yst33+Stockpile	1679	1706						27	21	6	1669	68	31	99	1.97	1700	
	| yst34+Stockpile	1692	1720						28	8	20	1681	70	19	89	1.67	1700	
	| pws1+Stockpile	1616	1642						26	13	13	1607	92	22	114	2.77	1629	

No.	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H S bdy	H W	Sapwood	Total rings	H/W MRW	Real date	Phase date
	pws2+Stockpile	1649	1679						30	14	16	1638	139	25	164	1.69	1663	
	pws3+Stockpile	1689	1716						27	11	16	1679	49	21	70	1.82	1700	
	pws4+Stockpile	1688	1711						23	12	11	1679	26	21	47	2.47	1700	
	pws5+Stockpile	1688	1713						25	12	13	1679	35	21	56	2.26	1700	
	pws6+Stockpile	1692	1716						24	8	16	1683	62	17	79	2.74	1700	
	pws78+Stockpile	1804	1835						31	9	22	1792	92	21	113	1.36	1813	
	pws9+Stockpile	1579	1612						33	7	26	1567	88	19	107	1.12	1586	
47	**Combine CHAPEL**	**1550**	**1571**	**92.4**					**21**	**16**	**5**	**1566**					**1554**	**1566**
47	chapel1+Stockpile	1534	1575		82.8				41	20	21	1519	373	35	408	0.83	1554	1566
47	chapel4+Stockpile	1551	1579		108				28	15	13	1540	56	26	82	1.59	1566	1566
	nwr1+Stockpile	1410	1429						19	10	9	1403	29	17	46	5.21	1420	
	nhrb1+Stockpile	1608	1639						31	16	15	1596	92	28	120	1.36	1624	
	nhrc1+Stockpile	1702	1733						31	31	0	1690	70	43	113	1.25	1733	
	nhrc2+Stockpile	1633	1660						27	28	-1	1624	73	37	110	2.35	1661	
	nhrd2+Stockpile	1679	1703						24	13	11	1671	36	21	57	2.76	1692	
	nhre3+Stockpile	1660	1687						27	2	25	1650	85	12	97	2.08	1662	
	nhrf45+Stockpile	1605	1627						22	13	9	1597	32	21	53	3.39	1618	
48	**Combine NANTCLWYD1**	**1429**	**1438**	**86.7**					**9**	**5**	**4**	**1434**					**1434**	**1434**
48	nhra1+Stockpile	1427	1453		110				26	7	19	1418	49	16	65	2.21	1434	1434
48	nhra4+Stockpile	1427	1456		105				29	7	22	1417	82	17	99	1.86	1434	1434
48	nhra5+Stockpile	1420	1446		112				26	14	12	1411	36	23	59	2.19	1434	1434
48	nhra6+Stockpile	1427	1458		108				31	7	24	1415	71	19	90	1.26	1434	1434
48	nhra7+Stockpile	1416	1444		86.7				28	18	10	1406	40	28	68	1.61	1434	1434
48	nhra8+Stockpile	1414	1440		51.7				26	20	6	1404	35	30	65	1.92	1434	1434
48	nhra9+Stockpile	1419	1446		110				27	14	13	1410	45	23	68	2.08	1433	1434
49	**Combine NANTCLWYD2**	**1670**	**1689**	**Warning! Poor agreement**					**19**	**22**	**-3**	**1692**					**1692**	**1692**
49	nhrd1+Stockpile	1655	1681		29.7				26	37	-11	1646	18	46	64	1.79	1692	1692
49	nhrd4+Stockpile	1672	1703		95.2				31	20	11	1671	36	21	57	2.76	1692	1692
50	**Combine NANTCLWYD3**	**1656**	**1668**	**130**					**12**	**6**	**6**	**1662**					**1662**	**1662**
50	nhre4+Stockpile	1647	1674		104				27	15	12	1637	47	25	72	1.87	1662	1662
50	nhre5+Stockpile	1654	1680		124				26	8	18	1644	36	18	54	1.92	1662	1662
50	nhre6+Stockpile	1648	1675		113				27	14	13	1639	77	23	100	2.42	1662	1662
50	nhre7+Stockpile	1654	1683		115				29	8	21	1644	54	18	72	1.67	1662	1662
51	**Combine NANTCLWYD4**	**1596**	**1609**	**Warning! Poor agreement**					**13**	**22**	**-9**	**1618**					**1618**	**1618**
51	nhrf3b+Stockpile	1575	1608		39.8				33	43	-10	1562	60	56	116	0.93	1618	1618
51	nhrf6+Stockpile	1598	1621		90				23	20	3	1589	25	29	54	2.43	1618	1618
51	nhrf7+Stockpile	1569	1600		13				31	49	-18	1557	71	61	132	1.22	1618	1618
	nhrg1+Stockpile	1684	1713		129				29	16	13	1674	79	26	105	1.84	1700	
	nhrg2+Stockpile	1677	1706		77				29	23	6	1667	69	33	102	1.72	1700	
	nhrg3+Stockpile	1692	1718		79.2				26	8	18	1682	56	18	74	2	1700	
	nhrh1+Stockpile	1660	1691		7.8				31	16	15	1648	106	28	134	1.41	1676	
52	**Combine BROCKLEY**	**1321**	**1335**	**85.5**					**14**	**-4**	**18**	**1317**					**1306**	**1317**
52	bky01+Stockpile	1322	1352		87.9				30	-5	35	1311	107	6	113	1.57	1317	1317
52	bky02+Stockpile	1311	1339		91.7				28	6	22	1301	47	16	63	1.71	1317	1317
52	bky06+Stockpile	1314	1338		94.5				24	3	21	1305	57	12	69	2.94	1317	1317
53	**Combine BATTLES**	**1602**	**1614**	**51**					**12**	**4**	**8**	**1606**					**1606**	**1606**
53	btl03+Stockpile	1586	1614		47.8				28	20	8	1575	48	31	79	1.49	1606	1606
53	btl04+Stockpile	1592	1620		99.1				28	14	14	1581	50	25	75	1.5	1606	1606
53	btl06+Stockpile	1606	1637		45.2				31	0	31	1594	80	12	92	1.22	1606	1606
53	btl07+Stockpile	1592	1620		100				28	14	14	1582	41	24	65	1.59	1606	1606
53	btl08+Stockpile	1593	1620		104				27	13	14	1583	41	23	64	1.72	1606	1606
54	**Combine EASINGTON**	**1728**	**1745**	**82.9**					**17**	**-2**	**19**	**1726**					**1725**	**1726**
54	esf06+Stockpile	1729	1755		106				26	-3	29	1719	39	7	46	1.92	1726	1726
54	esf07+Stockpile	1717	1745		72.3				28	8	20	1707	54	18	72	1.74	1725	1726
	hxw01+Stockpile	1802	1826		105				24	11	13	1793	65	20	85	2.87	1813	
	hxw04+Stockpile	1812	1841		53.1				29	-10	39	1802	50	0	50	1.58	1802	
	hxw05+Stockpile	1800	1827		105				27	-10	37	1790	52	0	52	1.8	1790	
	hxw06+Stockpile	1801	1825		89.9				24	12	12	1792	82	21	103	3.22	1813	
	hxw07+Stockpile	1806	1830		133				24	6	18	1798	45	14	59	2.9	1812	
	hxw10+Stockpile	1800	1829		114				29	13	16	1790	66	23	89	1.7	1813	
55	**Combine WHITEHART1**	**1521**	**1529**	**172**					**8**	**8**	**0**	**1529**					**1529**	**1529**
55	NWC-D04+Stockpile	1516	1541		139				25	13	12	1507	50	22	72	2.43	1529	1529

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H/S bdy	H/W	Sapwood	Total rings	H/W MRW	Real date	Phase date
55	NWC-D05+Stockpile	1515	1539		135				24	14	10	1506	52	23	75	2.57	1529	1529
55	NWC-D06+Stockpile	1516	1543		139				27	13	14	1507	52	22	74	2.18	1529	1529
55	NWC-D07+Stockpile	1512	1536		106				24	17	7	1504	51	25	76	3.07	1529	1529
55	NWC-D09+Stockpile	1516	1539		136				23	13	10	1508	42	21	63	3.22	1529	1529
55	NWC-D10+Stockpile	1521	1547		81.9				26	8	18	1512	68	17	85	2.51	1529	1529
55	NWC-D11+Stockpile	1513	1539		124				26	16	10	1504	58	25	83	2.44	1529	1529
55	NWC-D15+Stockpile	1511	1537		104				26	18	8	1502	43	27	70	2.25	1529	1529
55	NWC-D16+Stockpile	1519	1548		112				29	10	19	1508	72	21	93	1.56	1529	1529
55	NWC-D19+Stockpile	1513	1539		127				26	16	10	1503	49	26	75	1.91	1529	1529
56	**Combine WHITEHART2**	**1526**	**1537**	**94.9**					**11**	**1**	**10**	**1527**					**1527**	**1527**
56	NWC-D25+Stockpile	1517	1543		106				26	10	16	1505	34	22	56	1.8	1527	1527
56	NWC-D28+Stockpile	1516	1538		68.8				22	11	11	1506	39	21	60	3.49	1527	1527
56	NWC-D32+Stockpile	1523	1547		129				24	4	20	1512	59	15	74	2.73	1527	1527
56	NWC-D33+Stockpile	1526	1551		96.3				25	1	24	1515	44	12	56	2.37	1527	1527
57	**Combine LWYMONDLEY**	**1368**	**1377**	**105**					**9**	**11**	**-2**	**1379**					**1378**	**1379**
57	wb01+Stockpile	1363	1392		137				29	15	14	1353	78	25	103	1.77	1378	1379
57	wb02+Stockpile	1352	1388		97.8				36	26	10	1339	121	39	160	0.91	1378	1379
57	wb03+Stockpile	1367	1396		104				29	12	17	1356	76	23	99	1.52	1379	1379
57	wb04+Stockpile	1367	1401		97				34	11	23	1354	164	24	188	1.16	1378	1379
57	wb15+Stockpile	1351	1380		53.1				29	27	2	1340	44	38	82	1.33	1378	1379
57	wb22+Stockpile	1366	1394		124				28	12	16	1355	50	23	73	1.54	1378	1379
57	wb23+Stockpile	1354	1383		74.5				29	24	5	1344	49	34	83	1.59	1378	1379
57	wb26+Stockpile	1361	1389		133				28	17	11	1351	54	27	81	1.71	1378	1379
57	wb29+Stockpile	1361	1389		131				28	17	11	1350	47	28	75	1.5	1378	1379
58	**Combine RADLEY**	**1510**	**1529**	**123**					**19**	**12**	**7**	**1522**					**1521**	**1522**
58	RADA4+Stockpile	1506	1535		116				29	16	13	1496	19	0	45	1.25	1522	1522
58	RADA5+Stockpile	1509	1537		116				28	12	16	1499	52	0	74	1.74	1521	1522
59	**Combine ABBOTSFM**	**1559**	**1577**	**80.8**					**18**	**2**	**16**	**1561**					**1560**	**1561**
59	abbots1+Stockpile	1545	1578		67.6				33	16	17	1532	166	0	195	1.23	1561	1561
59	abbots2+Stockpile	1561	1596		92.8				35	-1	36	1548	126	0	138	1	1560	1561
59	abbots3+Stockpile	1551	1584		110				33	9	24	1539	100	0	121	1.19	1560	1561
60	**Combine BURROWFM1**	**1438**	**1452**	**143**					**14**	**4**	**10**	**1442**					**1442**	**1442**
60	bfb1+Stockpile	1434	1460		124				26	8	18	1424	53	0	71	1.98	1442	1442
60	bfb2+Stockpile	1433	1461		124				28	9	19	1423	70	0	89	1.86	1442	1442
60	bfb4+Stockpile	1437	1463		121	117			26	5	21	1427	42	0	57	1.93	1442	1442
61	**Combine BURROWFM2**	**1489**	**1503**	**134**		**117**			**14**	**5**	**9**	**1494**					**1493**	**1494**
61	bfh1+Stockpile	1489	1512		116				23	4	19	1480	68	0	81	3.12	1493	1494
61	bfh3+Stockpile	1481	1510		112				29	13	16	1471	83	0	106	1.81	1494	1494
61	bfh6+Stockpile	1485	1512		127				27	9	18	1475	89	0	108	2.12	1494	1494
62	**Combine SEECHEM**	**1470**	**1482**	**124**					**12**	**4**	**8**	**1474**					**1473**	**1474**
62	see1+Stockpile	1469	1492		124				23	5	18	1460	51	0	65	2.97	1474	1474
62	see2+Stockpile	1465	1491		128				26	8	18	1455	103	0	121	2.34	1473	1474
62	see3+Stockpile	1458	1487		80.8				29	15	14	1447	83	0	109	1.69	1473	1474
62	see4+Stockpile	1469	1495		121				26	4	22	1459	58	0	72	2.11	1473	1474
63	**Combine BURNHAM**	**1502**	**1510**	**162**		**126**			**8**	**3**	**5**	**1505**					**1504**	**1505**
63	hp1+Stockpile	1497	1525		137				28	8	20	1487	63	0	81	1.86	1505	1505
63	hp2+Stockpile	1495	1517		113	128			22	10	12	1488	34	0	51	3.98	1505	1505
63	hp4+Stockpile	1491	1515		82.1	119			24	13	11	1483	32	0	53	2.68	1504	1505
63	hp5+Stockpile	1499	1525		126	117			26	5	21	1490	60	0	74	2.4	1504	1505
63	hp6+Stockpile	1500	1524		120	128			24	4	20	1492	28	0	40	2.78	1504	1505
63	hp7+Stockpile	1497	1521		136	124			24	7	17	1488	62	0	78	2.7	1504	1505
63	hp89+Stockpile	1495	1529		138				34	9	25	1483	184	0	205	1.28	1504	1505
64	**Combine POLLICOT**	**1576**	**1595**	**70.3**					**19**	**7**	**12**	**1583**					**1581**	**1583**
64	lp89+Stockpile	1562	1593		58.2				31	19	12	1550	71	0	102	1.25	1581	1583
64	lp11+Stockpile	1577	1606		104				29	6	23	1566	81	0	98	1.6	1583	1583
65	**Combine EXTON**	**1536**	**1551**	**134**					**15**	**10**	**5**	**1546**					**1545**	**1546**
65	ex134+Stockpile	1533	1561		125				28	13	15	1523	69	0	92	1.87	1546	1546
65	ex256+Stockpile	1535	1563		120				28	11	17	1524	108	0	130	1.86	1546	1546
65	ex7+Stockpile	1530	1556		110				26	15	11	1520	40	0	65	1.88	1545	1546
66	**Combine LITTLETON**	**1480**	**1498**	**143**					**18**	**4**	**14**	**1484**					**1484**	**1484**
66	lm2+Stockpile	1477	1510		125				33	7	26	1464	99	0	119	1.04	1484	1484
66	lm3+Stockpile	1477	1511		125				34	7	27	1464	128	0	148	1.05	1484	1484
66	lm6+Stockpile	1474	1505		118				31	10	21	1463	84	0	105	1.37	1484	1484

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H/S bdy	H/W	Sapwood	Total rings	H/W MRW	Real date	Phase date
67	**Combine GEORGE**	**1464**	**1477**	**89.6**					**13**	**9**	**4**	**1473**					**1473**	**1473**
67	gh1+Stockpile	1462	1488		122				26	11	15	1453	81	0	101	2.46	1473	1473
67	gh2+Stockpile	1452	1477		57.7	112	123		25	21	4	1443	60	0	90	2.6	1473	1473
67	gh3+Stockpile	1463	1487		118				24	10	14	1455	45	0	63	3.2	1473	1473
68	**Combine STHELENS1**	**1422**	**1431**	**129**					**9**	**6**	**3**	**1428**					**1427**	**1428**
68	sth1+Stockpile	1418	1441		136	139	138		23	10	13	1409	20	0	39	2.33	1428	1428
68	sth2+Stockpile	1420	1445		122	127	135		25	7	18	1411	66	0	82	2.64	1427	1428
68	sth3+Stockpile	1415	1438		115				23	13	10	1406	56	0	78	3.04	1428	1428
68	sth4+Stockpile	1416	1440		128	123	132		24	12	12	1407	34	0	55	2.5	1428	1428
68	sth5+Stockpile	1422	1446		101	111	124		24	6	18	1413	41	0	56	2.66	1428	1428
68	sth6+Stockpile	1417	1442		136	56.8			25	11	14	1408	37	0	57	2.32	1428	1428
68	sth7+Stockpile	1406	1435		58.5	100	114		29	22	7	1396	64	0	96	1.76	1428	1428
69	**Combine STHELENS2**	**1420**	**1433**	**67.6**		**136**	**131**		**13**	**10**	**3**	**1430**					**1428**	**1430**
69	sth12+Stockpile	1422	1448		91.7	139	136		26	6	20	1412	67	0	83	2.2	1428	1430
69	sth13+Stockpile	1416	1438		113	122	106		22	14	8	1408	19	0	41	2.94	1430	1430
69	sth14+Stockpile	1406	1433		48.9				27	22	5	1397	44	0	75	2.06	1428	1430
70	**Combine HASELEY1**	**1304**	**1317**	**138**		**140**	**134**		**13**	**8**	**5**	**1312**					**1311**	**1312**
70	gth1+Stockpile	1303	1332		115				29	8	21	1292	92	0	111	1.65	1311	1312
70	gth3+Stockpile	1295	1322		97.1				27	17	10	1286	38	0	64	2	1312	1312
70	gth5+Stockpile	1300	1327		129				27	11	16	1290	96	0	117	2.15	1311	1312
70	gth6+Stockpile	1299	1330		132				31	12	19	1288	127	0	150	1.62	1311	1312
71	**Combine HASELEY2**	**1484**	**1501**	**139**					**17**	**10**	**7**	**1494**					**1494**	**1494**
71	gth11+Stockpile	1478	1509		119				31	16	15	1467	117	0	144	1.6	1494	1494
71	gth12+Stockpile	1482	1515		119				33	12	21	1470	141	0	165	1.3	1494	1494
71	gth14+Stockpile	1478	1511		125				33	16	17	1466	133	0	161	1.26	1494	1494
72	**Combine STGEORGE**	**1550**	**1561**	**56.3**					**11**	**1**	**10**	**1551**					**1551**	**1551**
72	oxp2+Stockpile	1550	1579		97.2	124	129		29	1	28	1539	103	0	115	1.67	1551	1551
72	oxp3+Stockpile	1536	1567		82.9	52.7			31	15	16	1524	114	0	141	1.35	1551	1551
72	oxp6+Stockpile	1529	1559		30.2	136	135		30	22	8	1518	92	0	125	1.53	1551	1551
72	oxp7+Stockpile	1549	1578		107	130	131		29	2	27	1539	81	0	93	1.86	1551	1551
72	oxp8+Stockpile	1539	1570		106	132	126		31	12	19	1528	93	0	116	1.48	1551	1551
73	**Combine WHITCHURCH**	**1555**	**1567**	**44.5**					**12**	**4**	**8**	**1559**					**1559**	**1559**
73	cyn1+Stockpile	1554	1580		113	124	129		26	5	21	1545	46	0	60	2.33	1559	1559
73	cyn2+Stockpile	1554	1579		115	129	122		25	5	20	1545	45	0	59	2.42	1559	1559
73	cyn3+Stockpile	1542	1561		18.9				19	17	2	1535	22	0	46	5.05	1559	1559
74	**Combine BEDSTONE1**	**1443**	**1454**	**47.2**					**11**	**5**	**6**	**1448**					**1447**	**1448**
74	bed1+Stockpile	1442	1468		119				26	5	21	1432	93	0	108	2.4	1447	1448
74	bed2+Stockpile	1441	1460		125				19	7	12	1434	25	0	39	5.03	1448	1448
74	bed3+Stockpile	1442	1464		122				22	6	16	1434	24	0	38	3.04	1448	1448
74	bed5+Stockpile	1420	1447		12.3				27	28	-1	1411	59	0	96	2.21	1448	1448
75	**Combine BEDSTONE2**	**1551**	**1567**	**146**					**16**	**9**	**7**	**1560**					**1559**	**1560**
75	bed6+Stockpile	1546	1577		124				31	14	17	1535	90	0	115	1.47	1560	1560
75	bed7+Stockpile	1547	1578		125				31	12	19	1536	53	0	76	1.3	1559	1560
75	bed8+Stockpile	1548	1580		124				32	12	20	1537	68	0	91	1.27	1560	1560
76	**Combine HABBERLEY**	**1543**	**1558**	**82.9**					**15**	**11**	**4**	**1554**					**1553**	**1554**
76	hab1+Stockpile	1529	1558		54.1				29	25	4	1519	64	0	99	1.76	1554	1554
76	hab3+Stockpile	1544	1572		104				28	10	18	1533	108	0	129	1.83	1554	1554
76	hab4+Stockpile	1538	1570		128				32	15	17	1526	141	0	168	1.35	1553	1554
77	**Combine HODNET**	**1459**	**1479**	**118**		**67.5**			**20**	**8**	**12**	**1467**					**1466**	**1467**
77	hod1+Stockpile	1455	1482		108	66.1			27	12	15	1445	113	0	135	2.34	1467	1467
77	hod2+Stockpile	1458	1491		116	86.8			33	8	25	1445	97	0	118	1.07	1466	1467
78	**Combine LUDLOW1**	**1390**	**1406**	**113**					**16**	**13**	**3**	**1403**					**1402**	**1403**
78	lwd1+Stockpile	1390	1412		111				22	13	9	1383	49	0	69	4.37	1403	1403
78	lwd2+Stockpile	1384	1410		107				26	18	8	1374	51	0	79	2.02	1402	1403
79	**Combine PREES**	**1550**	**1561**	**144**		**91.4**			**11**	**3**	**8**	**1553**					**1550**	**1553**
79	mc1+Stockpile	1544	1570		123				26	7	19	1534	107	0	124	2.5	1551	1553
79	mc2 +Stockpile	1549	1578		106				29	1	28	1539	120	0	131	1.99	1550	1553
79	mc3+Stockpile	1547	1576		129	109			29	6	23	1536	102	0	119	1.77	1553	1553
79	mc4+Stockpile	1541	1572		120	78.5			31	9	22	1529	109	0	130	1.4	1550	1553
79	mc5+Stockpile	1541	1569		112				28	12	16	1531	104	0	126	2.02	1553	1553
80	**Combine KINGSHEAD**	**1400**	**1416**	**119**					**16**	**3**	**13**	**1403**					**1402**	**1403**
80	kh2+Stockpile	1400	1423		114				23	3	20	1391	39	0	51	2.73	1403	1403
80	kh3+Stockpile	1395	1421		113				26	7	19	1386	34	0	50	2.08	1402	1403
81	**Combine NAGSHEAD**	**1418**	**1429**	**Warning! Poor agreement**					**11**	**3**	**8**	**1421**					**1419**	**1421**

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H/S bdy	H W	Sapwood	Total rings	H W MRW	Real date	Phase date
81	nag1+Stockpile	1400	1424		17.1				24	21	3	1392	42	0	71	3.03	1421	1421
81	nag2+Stockpile	1410	1438		120				28	10	18	1400	79	0	99	1.88	1420	1421
81	nag3+Stockpile	1418	1446		104				28	2	26	1407	63	0	76	1.58	1420	1421
81	nag4+Stockpile	1419	1445		85				26	1	25	1410	55	0	65	2.25	1420	1421
81	nag5+Stockpile	1399	1426		24.5				27	20	7	1390	70	0	99	2.31	1419	1421
82	**Combine FORESTERS1**	**1624**	**1637**	**147**					**13**	**8**	**5**	**1632**					**1632**	**1632**
82	for1+Stockpile	**1621**	1647		125				**26**	11	15	1612	98	0	118	2.77	1632	1632
82	for2+Stockpile	**1621**	1645		125				**24**	11	13	1612	51	0	71	2.67	1632	1632
82	for3+Stockpile	1619	1645		125				26	13	13	1610	97	0	119	2.6	1632	1632
83	**Combine FORESTERS2**	**1442**	**1461**	**99.6**					**19**	**8**	**11**	**1450**					**1450**	**1450**
83	for4+Stockpile	1443	1472		108				29	7	22	1432	68	0	86	1.5	1450	1450
83	for5+Stockpile	1436	1462		91.8				26	14	12	1427	76	0	99	2.65	1450	1450
84	**Combine UPTONMAG1**	**1264**	**1283**	**50.2**					**19**	**4**	**15**	**1268**					**1268**	**1268**
84	um2+Stockpile	1244	1278		36.4				34	24	10	1232	92	0	128	1.1	1268	1268
84	um3+Stockpile	1265	1293		104				28	3	25	1255	83	0	96	1.97	1268	1268
85	**Combine UPTONMAG2**	**1418**	**1431**	**130**					**13**	**7**	**6**	**1425**					**1423**	**1425**
85	um4+Stockpile	1416	1443		125				27	7	20	1406	51	0	68	1.79	1423	1425
85	um5+Stockpile	1417	1438		120	99.4			21	8	13	1410	15	0	30	3.75	1425	1425
85	um6+Stockpile	1412	1435		106	111			23	13	10	1404	35	0	56	3.1	1425	1425
86	**Combine BOWDLERS2**	**1396**	**1406**	**143**					**10**	**3**	**7**	**1399**					**1398**	**1399**
86	bow1+Stockpile	1395	1419		118				24	3	21	1386	46	0	58	2.65	1398	1399
86	bow2+Stockpile	1394	1417		128				23	4	19	1385	50	0	63	2.87	1398	1399
86	bow3+Stockpile	1392	1413		125				21	7	14	1384	38	0	53	3.72	1399	1399
86	bow6+Stockpile	1391	1410		108				19	8	11	1384	25	0	40	4.76	1399	1399
87	**Combine CONDOVER**	**1441**	**1454**	**99.5**					**13**	**3**	**10**	**1444**					**1441**	**1444**
87	cond1+Stockpile	1438	1470		127				32	6	26	1426	84	0	102	1.17	1444	1444
87	cond2+Stockpile	1439	1470		121				31	5	26	1428	111	0	127	1.58	1444	1444
87	cond3+Stockpile	1426	1454		51.5				28	16	12	1416	73	0	99	1.84	1442	1444
87	cond4+Stockpile	1439	1463		125	116			24	2	22	1430	57	0	68	2.86	1441	1444
88	**Combine WOLVERTON1**	**1464**	**1474**	**138**					**10**	**10**	**0**	**1474**					**1471**	**1474**
88	wm1+Stockpile	1457	1485		131	125			28	17	11	1447	51	0	78	1.7	1474	1474
88	wm2+Stockpile	1461	1487		129	121			26	13	13	1452	33	0	55	2.11	1474	1474
88	wm3+Stockpile	1455	1481		102				26	17	9	1445	77	0	104	2.34	1472	1474
88	wm4+Stockpile	1452	1480		88.6				28	19	9	1442	65	0	94	1.81	1471	1474
88	wm6+Stockpile	1459	1493		132				34	15	19	1447	81	0	108	1.07	1474	1474
88	wm8+Stockpile	1463	1489		109				26	10	16	1454	46	0	65	2.26	1473	1474
89	**Combine WOLVERTON2**	**1568**	**1581**	**92.4**					**13**	**12**	**1**	**1580**					**1579**	**1580**
89	wm11+Stockpile	1564	1598		129				34	16	18	1552	141	0	169	1.23	1580	1580
89	wm12+Stockpile	1567	1593		116				26	12	14	1558	68	0	89	2.39	1579	1580
89	wm13+Stockpile	1553	1580		44.7				27	26	1	1543	67	0	103	2.04	1579	1580
89	wm14+Stockpile	1564	1591		128				27	15	12	1555	71	0	95	2.36	1579	1580
90	**Combine LUDLOW2**	**1407**	**1423**	**Warning! Poor agreement**					**16**	**3**	**13**	**1410**					**1410**	**1410**
90	lgh1+Stockpile	1389	1416		25.5				27	21	6	1379	57	0	88	1.85	1410	1410
90	lgh5+Stockpile	1408	1432		103				24	2	22	1400	24	0	34	2.6	1410	1410
91	**Combine MOATHOUSE**	**1458**	**1470**	**153**					**12**	**8**	**4**	**1466**					**1462**	**1466**
91	mh1+Stockpile	1456	1482		125				26	10	16	1447	57	0	76	2.46	1466	1466
91	mh2+Stockpile	1454	1485		133				31	10	21	1442	100	0	122	1.38	1464	1466
91	mh3+Stockpile	1451	1476		110				25	11	14	1442	40	0	60	2.31	1462	1466
91	mh4+Stockpile	1455	1480		128				25	11	14	1446	56	0	76	2.53	1466	1466
92	**Combine PLOWDEN1**	**1285**	**1299**	**85.8**					**14**	**16**	**-2**	**1301**					**1299**	**1301**
92	plow1+Stockpile	1283	1309		120				26	16	10	1274	81	0	106	2.54	1299	1301
92	plow3+Stockpile	1280	1315		131				35	21	14	1267	161	0	195	1.07	1301	1301
92	plow4b+Stockpile	1264	1297		37.4	132			33	36	-3	1252	28	0	76	0.84	1300	1301
92	plow6c+Stockpile	1281	1319		125	121			38	18	20	1267	101	0	133	0.74	1299	1301
93	**Combine PLOWDEN2**	**1443**	**1459**	**111**		**136**			**16**	**10**	**6**	**1453**					**1453**	**1453**
93	plow7+Stockpile	1443	1466		111	133			23	10	13	1435	27	0	45	2.93	1453	1453
93	plow8+Stockpile	1435	1464		105	82.5			29	18	11	1425	96	0	124	1.88	1453	1453
94	**Combine GRTOXENBLD**	**1235**	**1246**	**47.6**					**11**	**11**	**0**	**1246**					**1241**	**1246**
94	grtox1+Stockpile	1228	1254		121	133			26	18	8	1218	103	0	131	2.39	1246	1246
94	grtox5+Stockpile	1230	1256		132				26	16	10	1220	113	0	139	2.44	1246	1246
94	grtox7+Stockpile	1218	1247		50				29	28	1	1208	105	0	143	1.88	1246	1246
94	grtox8+Stockpile	1217	1246		39	91			29	24	5	1207	100	0	134	1.99	1241	1246
94	grtox9+Stockpile	1237	1266		61.2				29	4	25	1227	147	0	161	2.19	1241	1246
95	**Combine WENLOCK1**	**1394**	**1411**	**118**		**91.4**			**17**	**13**	**4**	**1407**					**1404**	**1407**

No	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H/S bdy	H/W	Sapwood	Total rings	H/W MRW	Real date	Phase date
95	mwb1+Stockpile	1390	1415		111	96.3			25	17	8	1381	78	0	104	2.75	1407	1407
95	mwb3+Stockpile	1394	1419		114	113			25	10	15	1385	75	0	94	2.74	1404	1407
96	**Combine BROOKGATE**	**1485**	**1493**	**47.2**		**120**			**8**	**4**	**4**	**1489**					**1486**	**1489**
96	bg1+Stockpile	1487	1512		50.3				25	1	24	1478	38	0	48	2.29	1488	1489
96	bg2+Stockpile	1480	1504		136				24	8	16	1471	58	0	75	2.81	1488	1489
96	bg3+Stockpile	1482	1513		121	107			31	5	26	1470	99	0	116	1.36	1487	1489
96	bg4+Stockpile	1472	1501		95.2	134			29	17	12	1461	80	0	108	1.54	1489	1489
96	bg5+Stockpile	1479	1506		137				27	10	17	1470	27	0	46	1.83	1489	1489
96	bg6+Stockpile	1466	1494		38.2	97.8			28	21	7	1456	67	0	98	1.81	1487	1489
96	bg7+Stockpile	1472	1493		42.1	127			21	14	7	1464	6	0	28	2.26	1486	1489
96	bg8+Stockpile	1467	1500		69.4	127			33	22	11	1455	89	0	123	1.15	1489	1489
97	**Combine ASHWOOD**	**1546**	**1564**	**125**		**104**			**18**	**3**	**15**	**1549**					**1548**	**1549**
97	ash3+Stockpile	1544	1572		118				28	5	23	1533	81	0	97	1.74	1549	1549
97	ash4+Stockpile	1543	1570		116				27	5	22	1533	63	0	78	1.95	1548	1549
98	**Combine HGROSVENER**	**1371**	**1386**	**126**					**15**	**5**	**10**	**1376**					**1374**	**1376**
98	hg1+Stockpile	1368	1395		122				27	8	19	1359	70	0	87	2.35	1376	1376
98	hg3+Stockpile	1370	1391		114				21	4	17	1362	50	0	62	4.14	1374	1376
99	**Combine FULWAY**	**1595**	**1614**	**120**					**19**	**7**	**12**	**1602**					**1602**	**1602**
99	fc1+Stockpile	1589	1620		113				31	13	18	1578	94	0	118	1.47	1602	1602
99	fc2+Stockpile	1594	1623		114				29	8	21	1584	53	0	71	1.66	1602	1602
100	**Combine GOLDING**	**1638**	**1655**	**85.7**					**17**	**21**	**-4**	**1659**					**1659**	**1659**
100	g1+Stockpile	1640	1672		95.9				32	19	13	1628	123	0	154	1.34	1659	1659
100	g2+Stockpile	1626	1655		68.1				29	33	-4	1615	125	0	169	1.74	1659	1659
100	g3+Stockpile	1630	1664		117				34	29	5	1617	115	0	157	1.03	1659	1659
101	**Combine EASTHOPE1**	**1427**	**1438**	**114**					**11**	**3**	**8**	**1430**					**1429**	**1430**
101	eh1+Stockpile	1418	1446		112				28	11	17	1407	100	0	122	1.84	1429	1430
101	eh2+Stockpile	1422	1440		95.7				18	7	11	1415	23	0	37	5.41	1429	1430
101	eh3+Stockpile	1427	1455		94.8				28	2	26	1417	97	0	109	2.07	1429	1430
101	eh4+Stockpile	1424	1448		129	140			24	6	18	1416	30	0	44	2.87	1430	1430
102	**Combine EASTHOPE2**	**1449**	**1460**	**114**		**122**			**11**	**4**	**7**	**1453**					**1447**	**1453**
102	eh11+Stockpile	1442	1465		103	135			23	9	14	1434	39	0	56	3.2	1451	1453
102	eh12+Stockpile	1441	1465		96.5	134			24	6	18	1432	59	0	74	2.9	1447	1453
102	eh13+Stockpile	1447	1470		127	135			23	6	17	1439	48	0	62	3.44	1453	1453
102	eh15+Stockpile	1449	1474		103	141			25	-1	26	1440	62	0	70	2.55	1448	1453
103	**Combine WENLOCK2**	**1412**	**1430**	**96.5**		**138**			**18**	**12**	**6**	**1424**					**1424**	**1424**
103	mwc3b+Stockpile	1404	1431		87.9	96.3			27	20	7	1394	46	0	76	1.78	1424	1424
103	mwc5+Stockpile	1413	1439		108	106			26	11	15	1403	59	0	80	2	1424	1424
104	**Combine WENLOCK3**	**1405**	**1418**	**110**		**138**			**13**	**10**	**3**	**1415**					**1414**	**1415**
104	mwd1+Stockpile	1405	1433		102	126			28	10	18	1395	81	0	101	1.99	1415	1415
104	mwd2+Stockpile	1399	1425		119				26	15	11	1390	59	0	83	2.36	1414	1415
104	mwd3+Stockpile	1398	1421		97.9	134			23	17	6	1390	29	0	54	2.88	1415	1415
105	**Combine WENLOCK4**	**1426**	**1445**	**125**					**19**	**8**	**11**	**1434**					**1434**	**1434**
105	mwe1+Stockpile	1424	1453		118	106			29	10	19	1414	95	0	115	1.86	1434	1434
105	mwe2+Stockpile	1423	1451		117				28	11	17	1413	95	0	116	1.99	1434	1434
106	**Combine ABBOTSHS**	**1448**	**1461**	**115**					**13**	**9**	**4**	**1457**					**1456**	**1457**
106	ah2+Stockpile	1448	1471		112				23	9	14	1440	28	0	45	2.95	1457	1457
106	ah3+Stockpile	1440	1464		88.6				24	17	7	1432	15	0	40	2.32	1457	1457
106	ah4+Stockpile	1445	1471		129				26	11	15	1435	53	0	74	2.14	1456	1457
107	**Combine CRESSETT**	**1423**	**1434**	**117**					**11**	**8**	**3**	**1431**					**1427**	**1431**
107	uc2+Stockpile	1415	1440		108				25	12	13	1406	66	0	87	2.57	1427	1431
107	uc4+Stockpile	1416	1443		123				27	15	12	1406	50	0	75	1.87	1431	1431
107	uc5+Stockpile	1416	1442		116				26	14	12	1406	57	0	81	2.18	1430	1431
107	uc11+Stockpile	1417	1443		127				26	10	16	1408	74	0	93	2.47	1427	1431
107	uc13+Stockpile	1424	1455		71.7				31	5	26	1413	90	0	106	1.4	1429	1431
108	**Combine MARLBOROUGH**	**1649**	**1660**	**80.8**					**11**	**6**	**5**	**1655**					**1654**	**1655**
108	marl1+Stockpile	1644	1670		130				26	11	15	1635	58	0	78	2.39	1655	1655
108	marl3+Stockpile	1644	1673		133				29	11	18	1634	58	0	79	1.68	1655	1655
108	marl4+Stockpile	1649	1673		102				24	6	18	1640	39	0	54	2.42	1655	1655
108	marl8+Stockpile	1635	1658		37.2				23	19	4	1627	16	0	43	2.5	1654	1655
109	**Combine TICKENHAM**	**1469**	**1481**	**123**					**12**	**2**	**10**	**1471**					**1471**	**1471**
109	tc1+Stockpile	1464	1489		124				25	7	18	1455	61	0	77	2.57	1471	1471

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H S bdy	H W	Sapwood	Total rings	H W MRW	Real date	Phase date
109	| tc5+Stockpile	1460	1487		103				27	11	16	1450	36	0	57	1.69	1471	1471
109	| tc6+Stockpile	1468	1492		112				24	3	21	1460	50	0	61	3.07	1471	1471
110	**Combine MISSENDEN**	**1403**	**1411**	**152**					**8**	**2**	**6**	**1405**					**1404**	**1405**
110	| miss2+Stockpile	1394	1418		100				24	11	13	1386	33	0	52	2.83	1405	1405
110	| miss13+Stockpile	1396	1423		133				27	9	18	1387	39	0	57	2	1405	1405
110	| miss17+Stockpile	1396	1417		106				21	9	12	1388	19	0	36	3.11	1405	1405
110	| miss19+Stockpile	1403	1432		83.7				29	2	27	1392	63	0	76	1.5	1405	1405
110	| miss41+Stockpile	1392	1419		96.7				27	13	14	1383	51	0	73	2.15	1405	1405
110	| miss42+Stockpile	1400	1429		127				29	5	24	1389	55	0	71	1.51	1405	1405
110	| miss43+Stockpile	1399	1426		136				27	5	22	1389	47	0	62	1.82	1404	1405
110	| miss44+Stockpile	1396	1425		137				29	9	20	1385	57	0	77	1.47	1405	1405
110	| miss45+Stockpile	1400	1427		129				27	5	22	1390	53	0	68	1.89	1405	1405
111	**Combine SHERFORD**	**1382**	**1394**	**112**					**12**	**8**	**4**	**1390**					**1389**	**1390**
111	| sher1+Stockpile	1370	1395		62.1				25	19	6	1361	83	0	111	2.78	1389	1390
111	| sher2+Stockpile	1380	1405		125				25	10	15	1371	85	0	104	2.79	1390	1390
111	| sher3+Stockpile	1380	1405		125				25	9	16	1371	102	0	120	2.9	1389	1390
111	| sher4+Stockpile	1378	1407		131				29	11	18	1368	118	0	139	1.97	1389	1390
112	**Combine SWINBROOK1**	**1400**	**1412**	**45.3**		**116**			**12**	**1**	**11**	**1401**					**1401**	**1401**
112	| swin2+Stockpile	1401	1425		92.2	126			24	0	24	1392	28	0	37	2.19	1401	1401
112	| swin3+Stockpile	1397	1418		122	127			21	4	17	1389	26	0	38	3.54	1401	1401
112	| swin6+Stockpile	1385	1407		22.5	97.1			22	16	6	1378	16	0	39	3.25	1401	1401
113	**Combine YORKFARM**	**1276**	**1291**	**84.8**		**136**			**15**	**8**	**7**	**1284**					**1284**	**1284**
113	| yf2+Stockpile	1277	1301		105				24	7	17	1268	36	0	52	2.44	1284	1284
113	| yf3+Stockpile	1269	1291		75.6	132			22	15	7	1261	27	0	50	3.33	1284	1284
114	**Combine QUEEN1**	**1334**	**1353**	**126**					**19**	**7**	**12**	**1341**					**1341**	**1341**
114	| queen13+Stockpile	1330	1364		124				34	11	23	1317	115	0	139	1.06	1341	1341
114	| queen19+Stockpile	1332	1358		112				26	9	17	1323	59	0	77	2.38	1341	1341
115	**Combine QUEEN2**	**1452**	**1463**	**186**					**11**	**2**	**9**	**1454**					**1453**	**1454**
115	| queen2+Stockpile	1440	1471		99.5				31	13	18	1429	68	0	92	1.35	1453	1454
115	| queen3+Stockpile	1449	1481		124				32	4	28	1437	66	0	82	1.11	1453	1454
115	| queen4+Stockpile	1447	1478		135				31	6	25	1436	78	0	95	1.42	1453	1454
115	| queen5+Stockpile	1448	1477		133				29	5	24	1437	74	0	90	1.51	1453	1454
115	| queen6+Stockpile	1448	1478		133	105			30	5	25	1437	70	0	86	1.48	1453	1454
115	| queen7+Stockpile	1445	1476		135	120			31	9	22	1433	82	0	103	1.22	1454	1454
115	| queen8+Stockpile	1444	1475		130	107			31	10	21	1433	81	0	102	1.41	1454	1454
116	**Combine CROWMARSH**	**1427**	**1446**	**118**					**19**	**11**	**8**	**1438**					**1435**	**1438**
116	| crow1+Stockpile	1426	1455		113				29	9	20	1416	68	0	87	1.75	1435	1438
116	| crow2+Stockpile	1421	1451		112				30	17	13	1410	61	0	89	1.38	1438	1438
117	**Combine WARBOROUGH**	**1567**	**1578**	**116**					**11**	**7**	**4**	**1574**					**1574**	**1574**
117	| war1+Stockpile	1560	1588		125				28	14	14	1549	70	0	95	1.68	1574	1574
117	| war2+Stockpile	1566	1592		118				26	8	18	1556	49	0	67	1.97	1574	1574
117	| war3+Stockpile	1560	1586		119				26	14	12	1550	58	0	82	2.02	1574	1574
117	| war4+Stockpile	1566	1595		108				29	8	21	1556	63	0	81	1.72	1574	1574
117	| war5+Stockpile	1555	1582		74.1				27	19	8	1545	70	0	99	2.06	1574	1574
118	**Combine NUFFIELD**	**1621**	**1640**	**136**					**19**	**6**	**13**	**1627**					**1624**	**1627**
118	| nuff6+Stockpile	1617	1653		126				36	10	26	1603	141	0	165	0.86	1627	1627
118	| nuff8+Stockpile	1613	1647		112				34	11	23	1600	130	0	154	1.07	1624	1627
118	| nuff13+Stockpile	1619	1655		121				36	8	28	1605	154	0	176	0.91	1627	1627
119	**Combine SWINBROOK2**	**1425**	**1440**	**145**					**15**	**11**	**4**	**1436**					**1435**	**1436**
119	| peb02+Stockpile	1420	1448		123				28	16	12	1410	65	0	91	1.81	1436	1436
119	| peb03+Stockpile	1423	1449		123				26	12	14	1414	66	0	87	2.55	1435	1436
119	| peb0410+Stockpile	1422	1451		126				29	13	16	1412	119	0	142	1.99	1435	1436
120	**Combine BAYLLOLS1**	**1307**	**1323**	**140**		**118**			**16**	**16**	**0**	**1323**					**1322**	**1323**
120	| b01+Stockpile	1302	1336		130	117			34	20	14	1289	120	0	153	1.04	1322	1323
120	| b02+Stockpile	1306	1332		117				26	17	9	1297	89	0	115	2.57	1323	1323
120	| b03+Stockpile	1299	1332		119				33	23	10	1287	93	0	128	1.13	1322	1323
121	**Combine BAYLLOLS2**	**1353**	**1366**	**158**					**13**	**18**	**-5**	**1371**					**1367**	**1371**
121	| b04+Stockpile	1351	1381		121				30	19	11	1340	78	0	108	1.46	1370	1371
121	| b05+Stockpile	1348	1376		127				28	19	9	1338	81	0	110	1.95	1367	1371
121	| b07+Stockpile	1346	1377		126				31	25	6	1335	107	0	143	1.52	1371	1371
121	| b08+Stockpile	1348	1378		130				30	22	8	1337	87	0	120	1.5	1370	1371
122	**Combine HENLEY**	**1396**	**1404**	**108**					**8**	**8**	**0**	**1404**					**1404**	**1404**
122	| hen1+Stockpile	1396	1422		95.7				26	8	18	1386	46	0	63	1.98	1404	1404

No:	SITE & sample	C from	S to	Phase A_n	Sample	2nd test	3rd test	4th test	Range:	beg range	end range	H/S bdy	H/W	Sapwood	Total rings	H/W MRW	Real date	Phase date
122	hen2+Stockpile	1391	1414		132				23	13	10	1383	29	0	50	3.07	1404	1404
122	hen3+Stockpile	1390	1416		135				26	14	12	1381	38	0	61	2.2	1404	1404
122	hen4+Stockpile	1383	1404		36.7				21	21	0	1375	32	0	61	3.66	1404	1404
122	hen5+Stockpile	1395	1418		113				23	9	14	1387	33	0	50	3.03	1404	1404
122	hen6+Stockpile	1391	1413		128				22	13	9	1383	36	0	57	3.54	1404	1404
122	hen7+Stockpile	1391	1415		135				24	13	11	1383	46	0	67	3.05	1404	1404
123	**Combine TREES**	**1358**	**1369**	**159**					**11**	**1**	**10**	**1359**					**1359**	**1359**
123	tr1+Stockpile	1354	1377		127				23	5	18	1345	29	0	43	2.51	1359	1359
123	tr2+Stockpile	1356	1382		127				26	3	23	1346	39	0	52	1.88	1359	1359
123	tr3+Stockpile	1356	1380		128				24	3	21	1347	34	0	46	2.49	1359	1359
123	tr5+Stockpile	1353	1377		123				24	6	18	1345	52	0	66	3.23	1359	1359
124	**Combine CEELY**	**1468**	**1478**	**86.2**					**10**	**4**	**6**	**1472**					**1472**	**1472**
124	c02+Stockpile	1457	1479		54.5				22	15	7	1450	33	0	55	4.14	1472	1472
124	c04+Stockpile	1458	1486		108				28	14	14	1448	72	0	96	1.89	1472	1472
124	c05+Stockpile	1465	1489		128				24	7	17	1457	42	0	57	3.08	1472	1472
124	c06+Stockpile	1468	1491		98.1				23	4	19	1460	7	0	19	2.02	1472	1472
55	**Combine WHITEHART1X**	**1522**	**1528**	**222**					**6**	**7**	**-1**	**1529**					**1529**	**1529**
55	NWC-D02+Stockpile	1508	1532		64.7				24	###	###	1499	51	17	68	2.6		1529
55	NWC-D03+Stockpile	1515	1541		141				26	###	###	1505	59	22	81	2.07		1529
55	NWC-D04+Stockpile	1516	1541		141				25	13	12	1507	50	22	72	2.43	1529	1529
55	NWC-D05+Stockpile	1515	1539		138				24	14	10	1506	52	23	75	2.57	1529	1529
55	NWC-D06+Stockpile	1516	1543		140				27	13	14	1507	52	22	74	2.18	1529	1529
55	NWC-D07+Stockpile	1512	1536		109				24	17	7	1504	51	25	76	3.07	1529	1529
55	NWC-D09+Stockpile	1516	1539		140				23	13	10	1508	42	21	63	3.22	1529	1529
55	NWC-D10+Stockpile	1521	1547		77				26	8	18	1512	68	17	85	2.51	1529	1529
55	NWC-D11+Stockpile	1513	1539		128				26	16	10	1504	58	25	83	2.44	1529	1529
55	NWC-D12+Stockpile	1514	1541		138				27	###	###	1504	36	15	51	1.7		1529
55	NWC-D13+Stockpile	1515	1541		141				26	###	###	1506	58	0	58	2.39		1529
55	NWC-D15+Stockpile	1511	1537		107				26	18	8	1502	43	27	70	2.25	1529	1529
55	NWC-D16+Stockpile	1519	1548		109				29	10	19	1508	72	21	93	1.56	1529	1529
55	NWC-D17+Stockpile	1515	1546		139				31	###	###	1504	68	12	80	1.29		1529
55	NWC-D19+Stockpile	1513	1539		130				26	16	10	1503	49	26	75	1.91	1529	1529
55	NWC-D20+Stockpile	1517	1547		130				30	###	###	1506	93	0	93	1.57		1529
55	NWC-D23+Stockpile	1516	1548		134				32	###	###	1504	67	24	91	1.13		1529
56	**Combine WHITEHART2X**	**1525**	**1534**	**101**					**9**	**2**	**7**	**1527**					**1527**	**1527**
56	NWC-D25+Stockpile	1517	1543		118				26	10	16	1505	34	22	56	1.8	1527	1527
56	NWC-D27+Stockpile	1513	1539		79.8				26	###	###	1503	50	15	65	1.92		1527
56	NWC-D28+Stockpile	1516	1538		81.3				22	11	11	1506	39	21	60	3.49	1527	1527
56	NWC-D32+Stockpile	1523	1547		126				24	4	20	1512	59	15	74	2.73	1527	1527
56	NWC-D33+Stockpile	1526	1551		79.7				25	1	24	1515	44	12	56	2.37	1527	1527
56	NWC-D35+Stockpile	1519	1546		134				27	###	###	1509	71	15	86	2.05		1527
57	**Combine LWYMONDLEYX**	**1373**	**1380**	**38.8**					**7**	**6**	**1**	**1379**					**1378**	**1379**
57	wb01+Stockpile	1363	1392		127				29	15	14	1353	78	25	103	1.77	1378	1379
57	wb02+Stockpile	1352	1388		68.7				36	26	10	1339	121	39	160	0.91	1378	1379
57	wb03+Stockpile	1367	1396		141				29	12	17	1356	76	23	99	1.52	1379	1379
57	wb04+Stockpile	1367	1401		137				34	11	23	1354	164	24	188	1.16	1378	1379
57	wb06+Stockpile	1363	1392		125				29	###	###	1353	92	0	92	1.9		1379
57	wb08+Stockpile	1345	1379		23.1				34	###	###	1332	106	46	152	1.02		1379
57	wb12+Stockpile	1362	1390		110				28	###	###	1351	48	25	73	1.51		1379
57	wb13+Stockpile	1363	1394		132				31	###	###	1351	57	21	78	1.14		1379
57	wb15+Stockpile	1351	1380		30.2				29	27	2	1340	44	38	82	1.33	1378	1379
57	wb17+Stockpile	1374	1404		50				30	###	###	1363	59	12	71	1.37		1379
57	wb18+Stockpile	1370	1402		107				32	###	###	1359	56	15	71	1.21		1379
57	wb19+Stockpile	1354	1383		42.5				29	###	###	1344	30	33	63	1.42		1379
57	wb20+Stockpile	1368	1396		140				28	###	###	1357	46	16	62	1.48		1379
57	wb21+Stockpile	1370	1399		119				29	###	###	1359	42	11	53	1.33		1379
57	wb22+Stockpile	1366	1394		140				28	12	16	1355	50	23	73	1.54	1378	1379
57	wb23+Stockpile	1354	1383		43.5				29	24	5	1344	49	34	83	1.59	1378	1379
57	wb24+Stockpile	1375	1406		31.9				31	###	###	1364	59	10	69	1.29		1379
57	wb26+Stockpile	1361	1389		103				28	17	11	1351	54	27	81	1.71	1378	1379
57	wb29+Stockpile	1361	1389		100				28	17	11	1350	47	28	75	1.5	1378	1379