



THE ARCHAEOLOGY OF
POWER: UNDERSTANDING
THE EMERGENCE AND
DEVELOPMENT OF NEOLITHIC
MONUMENT COMPLEXES IN
BRITAIN AND IRELAND

Volume 2
Appendices

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1 Stonehenge, Wiltshire

Adjacent to the River Avon in south Wiltshire lies an area of chalk downland intersected by dry valleys, forming part of Salisbury Plain. Here a cluster of monuments was built in the Neolithic period, including the famous stone circle of Stonehenge (Figure A1-1). The geology is largely Upper Chalk, although patches of clay-with-flint capping have been recorded in upland areas (Canti 2013, 5). The river valleys contain gravels, which extend into the upper reaches of the dry valley at Stonehenge Bottom showing that this was once a flowing stream. The course of the River Avon has not altered significantly but was marshier and more braided in the past (French *et al.* 2012). The landscape has been eroded by periglacial weathering, resulting in the rolling landscape, building up coombe rock deposits in the dry valleys such as Durrington (Ballantyne and Harris 1994) and in some areas creating periglacial ridges and stripes (see Chapter 5, Case Study 9). Solution hollows or sinkholes in the chalk are known along both river valleys and elsewhere (Hopson *et al.* 2007, fig 77; Wessex Archaeology 2019; Gaffney *et al.* 2020, fig 9).

Although the Stonehenge monument complex largely lies within a World Heritage Site, the boundaries of the designated area exclude significant sites to the north, including two causewayed enclosures, and to the east, where much evidence has been uncovered during developer-funded archaeological excavations in the Amesbury area. For the purposes of this case study, an arbitrary rectangular boundary (from SU 1000 4600 in the north-west to SU 1800 3900 in the south-east) has been defined for the case study area (Figure A1-1).

1.1 Landscape history

In the Neolithic, the landscape around Stonehenge was a complex mosaic of open woodland, with upland areas becoming increasingly open throughout the period. Pollen and land snail evidence from pits near Stonehenge show the presence of open woodland conditions in the Mesolithic, with both deciduous and coniferous components (Allen 1995; Scaife 1995). A sample from the early Neolithic pit known as the Coneybury Anomaly indicates that was dug in open woodland (Bell and Jones 1990), which was cleared before nearby Coneybury henge was constructed in the late Neolithic (Bell and Shackleton 1982). To the north, the two cursus monuments and Amesbury 42 long barrow were built in long-established open downland, with short-grazed grassland and few trees nearby (Allen *et al.* 1990; Allen 1997; Parker Pearson *et al.* 2020, 475–98). This open grassland persisted, as shown by land snails from the buried soil below the bank of Stonehenge (Evans 1984; Allen 1995; Scaife 1995).

A different story is evident on the slopes of the Avon valley. Deciduous woodland pre-dated the monuments at Durrington Walls and Woodhenge, as shown by numerous tree-throws and associated charcoal evidence (Hazell and Allen 2013, 20; Parker Pearson *et al.* 2020, 136). Two pollen core profiles from the valley show that it was wooded with oak, elm, lime and especially hazel during the early and middle Neolithic, with alder dominating the river floodplain. From the middle to the late Neolithic, the

landscape became more open, with increasing amounts of bracken and ferns (Evans 1971; Parker Pearson *et al.* 2020, 481–92). Although the landscape was largely open grassland, clearly woodland remained easily accessible in the surrounding landscape especially in the river valleys. Large quantities of oak posts were used to build multiple timber monuments in the late Neolithic, although these may have been transported over some distance.

1.2 Mesolithic

A major Mesolithic 'homebase' has been identified at Blick Mead, on a river terrace adjacent to a spring below the ridge later occupied by Vespasian's Camp hillfort (Figure A1-4). Here, large quantities of worked and burnt flint, as well as animal bones, mostly aurochs, were dumped into shallow or slow-flowing water and two tree-throw hollows (Jacques *et al.* 2018). Radiocarbon dates from these occupation layers range from the mid-8th millennium BC to the mid-5th millennium BC, suggesting repeated occupation over a period of roughly 3000 years (Jacques *et al.* 2018, table 2.1). Mesolithic blade-working and flint working took place at various places along the River Avon valley (Richards 1990, 263; Leivers *et al.* 2008, 14–9; Parker Pearson *et al.* 2020, 293), including at Woodhenge (Evans and Wainwright 1979, 162) and within the western end of the later Greater Cursus (Christie 1963). Although surface collection has revealed scant trace of any Mesolithic artefacts (Richards 1990, 16), stray Mesolithic finds have been found (Darvill 2005, map F). A large pit, 2 m deep and up to 3 m across at the surface, has recently been excavated on the slope of the Stonehenge Bottom dry valley. It has been interpreted as a probable hunting trap and dates to the early Mesolithic (Paul Garwood pers. comm.).

The most significant Mesolithic features were an alignment of large pits approximately 250 m north-west of Stonehenge (Vatcher and Vatcher 1973; Cleal *et al.* 1995, 43, fig 25). Four of the pits were 1.5–2 m diameter and approximately 1.5 m deep, with abundant pine charcoal and dark soil cores that led to their interpretation as postholes (Figure A1-2). A fifth, shallower (0.7 m deep) feature was discovered to the west on the same alignment, interpreted as a tree-throw. Samples of pine charcoal from three of the pits have provided widely differing Mesolithic radiocarbon determinations (Allen and Bayliss 1995, table 62), indicating that they may not have stood at the same time (Allen and Gardiner 2002, 143). Another large posthole, 1.4 m in diameter and over 1.5 m deep has been excavated on Amesbury Down, with a clearly defined post-pipe and 9th millennium radiocarbon dates on short-lived charcoal samples, although most of the charcoal was again pine (Powell and Barclay forthcoming; see Figure A1-4).

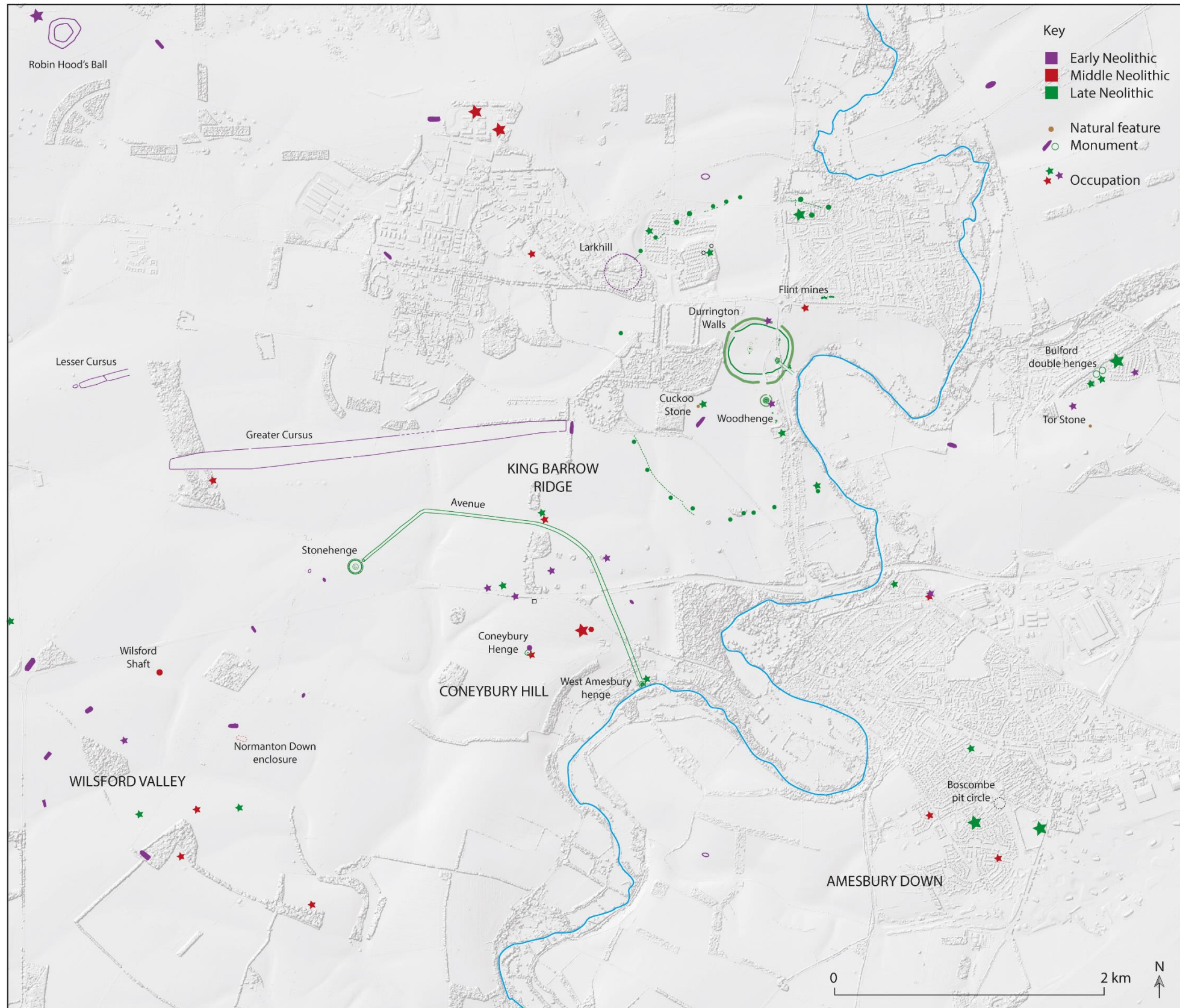


Figure A1-1 Overall map of Stonehenge complex. Basemap is APGB 2m derived height data, provided by Historic England



Figure A1-2 One of the Mesolithic pits excavated in 1966, during the construction of the old Stonehenge car park. Courtesy of The Salisbury Museum, A_V12 2

The Mesolithic pits near Stonehenge have tended to be described as postholes for monumental ‘totem poles’, markers of a route or place of ritual significance (Allen 1995, 56; Darvill 2006, 62; Richards and Thomas 2012, 30). However, Pollard (2017) has argued that the Stonehenge pits were not postholes, but simply large pits allowed to backfill through weathering and partial backfilling, before they were re-cut. The charcoal may derive from nearby burning (Campbell *et al.* forthcoming) instead of from posts, helping to explain the discrepancies in the radiocarbon dates. Whether these were postholes or pits, they must have related to repeated acts of place-making, fitting within a wider pattern of Mesolithic pit digging now recognised across Britain and Ireland (Pollard 2017; Blinkhorn and Little 2018). It is possible that the hollows of these backfilled pits were still visible in the Neolithic period when the first phase of Stonehenge was built. An animal bone from the packing of Stonehole 27 has been dated to 4340–3980 cal BC (Cleal *et al.* 1995, 188–90, 529; Table A1-2: OxA-4902) suggesting activity in the intervening late Mesolithic. Together with the evidence of extensive occupation along the Avon valley, they show relatively intense use of this landscape during the Mesolithic.

1.3 Early Neolithic

1.3.1 Settlement

Early Neolithic occupation has been identified at a variety of locations within the Stonehenge landscape, although is concentrated in a swatch across the eastern half of the area (Figure A1-1: purple stars). At Woodhenge, tree-throw hollows with lithics and early Neolithic carinated bowls have been found (Parker Pearson *et al.* 2020, 137–44). These hollows survived until the late Neolithic when one was filled with

rammed chalk. Another tree-throw containing a leaf-shaped arrowhead has been found nearby under the eastern bank of the later Durrington Walls henge (Parker Pearson 2007, 141) and a scatter of over 370 sherds of early Neolithic pottery and leaf-shaped arrowheads were found under the northern bank of this monument (Wainwright and Longworth 1971, 14).

Further occupation is attested by dispersed pits containing early Neolithic pottery at the southern end of King Barrow Ridge (Figure A1-1; Ashbee 1981; Gingell 1988, 40–1; Richards 1990, 65–6; Cleal and Allen 1994, 60–5; Roberts and Marshall 2019, 6). At the heart of this was a flint scatter associated with several pits and a cluster of stake holes (Richards 1990, 109–16). An isolated pit was also excavated at the Old Dairy in Amesbury (Harding and Stoodley 2017, 60). Carbonised hazelnut shell from this latter pit has been dated to 3790–3640 cal BC (Table A1-2: SUERC-54203). Excavations at Bulford have revealed a spread of flint-knapping waste and nine pits containing South-Western style pottery belonging to the second half of the early Neolithic, as well as leaf-shaped arrowheads, flint-working debris, animal bone, burnt flint and sarsen fragments (Figure A1-1; Leivers 2019). Radiocarbon dates from these pits suggest a prolonged period of occupation, but with pit digging activity likely taking place in 3650–3520 cal BC (Table A1-2: OxA-37383). In the western part of the study area, a pit containing a leaf-shaped arrowhead and an early Neolithic flint scatter have been recorded on Wilsford Down where there is also a concentration of long barrows (Section A1.3.4; Figure A1-4; Richards 1990, 163). An early Neolithic flint scatter has also been identified north of the western end of the cursus (Richards 1990, fig 157).

1.3.2 Coneybury Anomaly

An isolated large pit, 1.23 m deep and c.1.9 m in diameter, was dug on Coneybury Hill in the early Neolithic, close to the site of the later Coneybury Henge (Figures A1-1 and A1-15; Richards 1990, 40–61). Deposited within was a unique faunal assemblage comprising both wild and domestic species (female domestic cattle, roe deer, brown trout, and beaver), at least 40 carinated and non-carinated round-based bowls and a flint assemblage including Mesolithic blade-working (Richards 1990; Gron *et al.* 2018).

Radiocarbon dates on carbonised food residues, articulated animal bones and an antler pick (Table A1-2) have been modelled to show that this pit was dug in 3815–3655 cal BC (95% probability; Barclay *et al.* 2018, fig 10: *start_coneybury_anomaly*), probably 3725–3655 cal BC (68% probability). It seems that the pit represents a short-lived event, perhaps a single feast (Richards 1990, 43), with isotopic evidence suggesting that the domestic animals had been brought from several regional locations, perhaps representing different groups (Gron *et al.* 2018, 23–4). This suggests a long tradition of the Stonehenge area being a suitable, accessible place for gatherings of people from varied places.

1.3.3 Causewayed enclosures

Robin Hood's Ball causewayed enclosure lies on a south-facing slope on the edge of higher ground to the north of the study area (Figure A1-1). It has two circuits of interrupted ditches enclosing an area of 3.5 ha, with the outer one angular in plan (Figure A1-3; Oswald *et al.* 2001, 43, 39, 76). Excavations have

shown the inner ditch to be deeper (2.2 m) than the outer (1.2 m), although similar in width (4–4.5 m) (Thomas 1964, 5–7). There is evidence for intensive occupation, both within the ditches but also preserved under the outer bank. Dates obtained on residues from pottery sherds from the inner ditch (Table A1-2), suggest that it was constructed in 3640–3500 cal BC (91% probability; Whittle *et al.* 2011, fig 4.51: *build Robin Hood's Ball*), probably in 3635–3570 cal BC (68% probability).

To the north and north-east of the enclosure a series of pits have been excavated within a significant early Neolithic flint scatter. These pits were found to contain flint tools including 200 scrapers and leaf-shaped arrowheads, as well as animal bones (mostly cattle) and early Neolithic pottery, including Gabbroic wares from the south-west of Britain (Richards 1990, 61–5). Dates on animal bone from these pits (Table A1-2) suggest that some of these were deposited at the same time as the construction of the enclosure (Whittle *et al.* 2011, 199). Like the area to the south of Windmill Hill (Appendix 2.3.1), the area surrounding the enclosure saw repeated and intense occupation in the early Neolithic period.

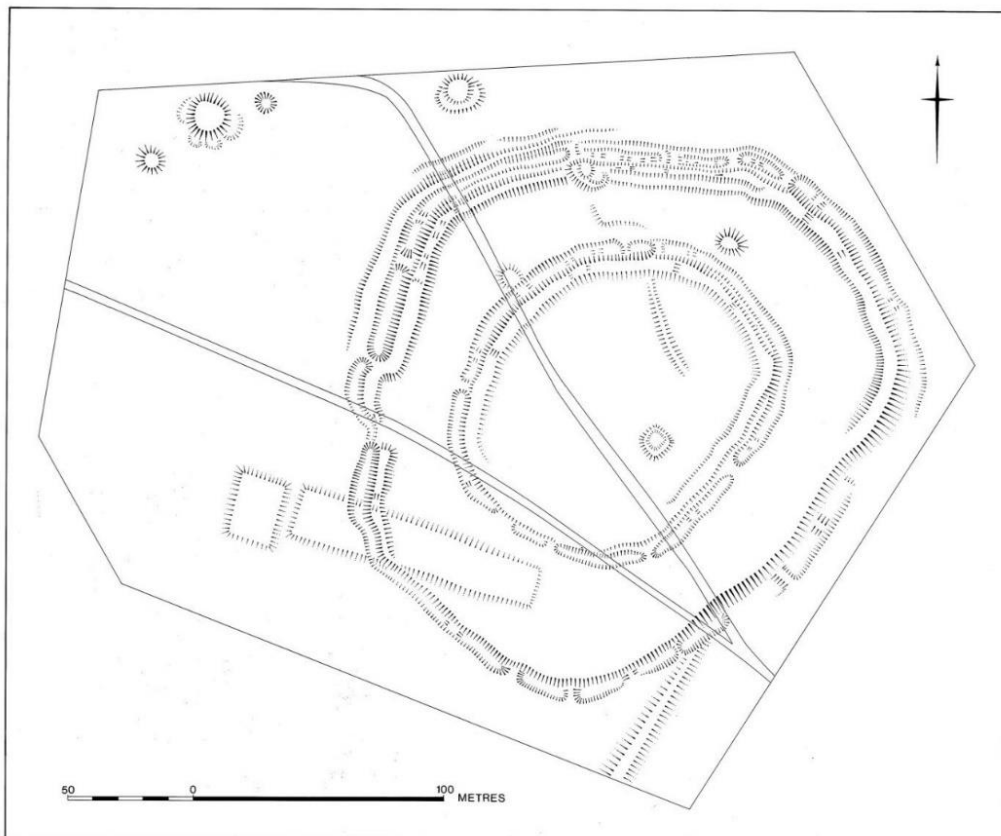


Figure A1-3 Plan of Robin Hood's Ball © Historic England ME000056

A second causewayed enclosure was built to the west on the summit of Larkhill, at the head of a dry valley that leads down to the River Avon (Figure A1-1). A 125 m-long curving arc of five segments on the north-east side of the circuit has been excavated (Leivers 2021). If the enclosure is roughly circular, it must be c.200 m in diameter, similar to the outer circuit of Robin Hood's Ball. The ditches contained struck flint, antler picks, early Neolithic pottery, pieces of human skull and a quernstone, and appear to

have been recut several times. A possible entrance causeway was occupied by a large shallow pit containing early Neolithic pottery (Leivers 2021) and led to a dry valley that contains several large pits or solution hollows and a later posthole alignment (see Section A1.5.8).

An initial radiocarbon date on a cattle tibia from the ditch of 3780–3650 cal BC (Table A1-2: SUERC-70507; Leivers 2021), indicates that this Lark Hill enclosure may be earlier than Robin Hood's Ball and contemporary with the Coneybury Anomaly, although the dated pottery sherds from Robin Hood's Ball do not come from the lowest fills of the ditch. Pairs of causewayed enclosures are known elsewhere in Britain, such as Rybury and Knap Hill, located about 3.5 km apart on the edge of the Marlborough Downs to the north, but are relatively unusual. Perhaps the two enclosures, located 4.2 km apart, were referenced by the two cursus monuments built slightly later to the south (Sections A1.3.5–6), the respective terminals of which lie a similar distance apart.

1.3.4 Long barrows

Long barrows are not evenly distributed across the study area but have a distinct clustering at the head of a branching valley at Wilsford which was probably seasonally wet in prehistory (Bowden *et al.* 2015, 64; Figure A1-4; Table A1-1). Their landscape positions are largely on ridge tops or low rises, although some are on relatively flat land (Bowden *et al.* 2015, 18; Parker Pearson *et al.* 2020, table 2.3). Most of the long barrows have a larger or more elaborate end, most orientated towards the east, supporting Burl's pattern for Salisbury Plain (Figure 5-3). Leivers (2021) has suggested that Durrington 24 and Figcheldean 27 (Figure A1-4: 11 and 12) were deliberately placed on the viewshed limits of both causewayed enclosures, but other patterns of intervisibility (e.g., those discussed by Parker Pearson *et al.* 2020, 42–7) are difficult to substantiate without more accurate chronologies.

Only four radiocarbon dates are available from long barrows in the study area. An antler pick from the base of the flanking ditch of Amesbury 42 at the end of the Greater Cursus (Figure A1-4: 13; Table A1-2) provides an estimate for its construction in 3520–3360 cal BC (SUERC-24308), similar to a date obtained on an antler pick from the ditch of Netheravon Bake, outside the study area to the north, of 3710–3350 cal BC (Richards 1990, 40–61, 259). The single primary burial from Winterbourne Stoke 1 (Figure A1-4: 1) dates to 3530–3370 cal BC (SUERC-42530) and a fragment of human femur which may have come from within the mound of Amesbury 42 is slightly later, 3370–3090 cal BC (OxA-21961). This suggests that long barrows in the Stonehenge area were being constructed and used for burial throughout the mid-4th millennium BC.

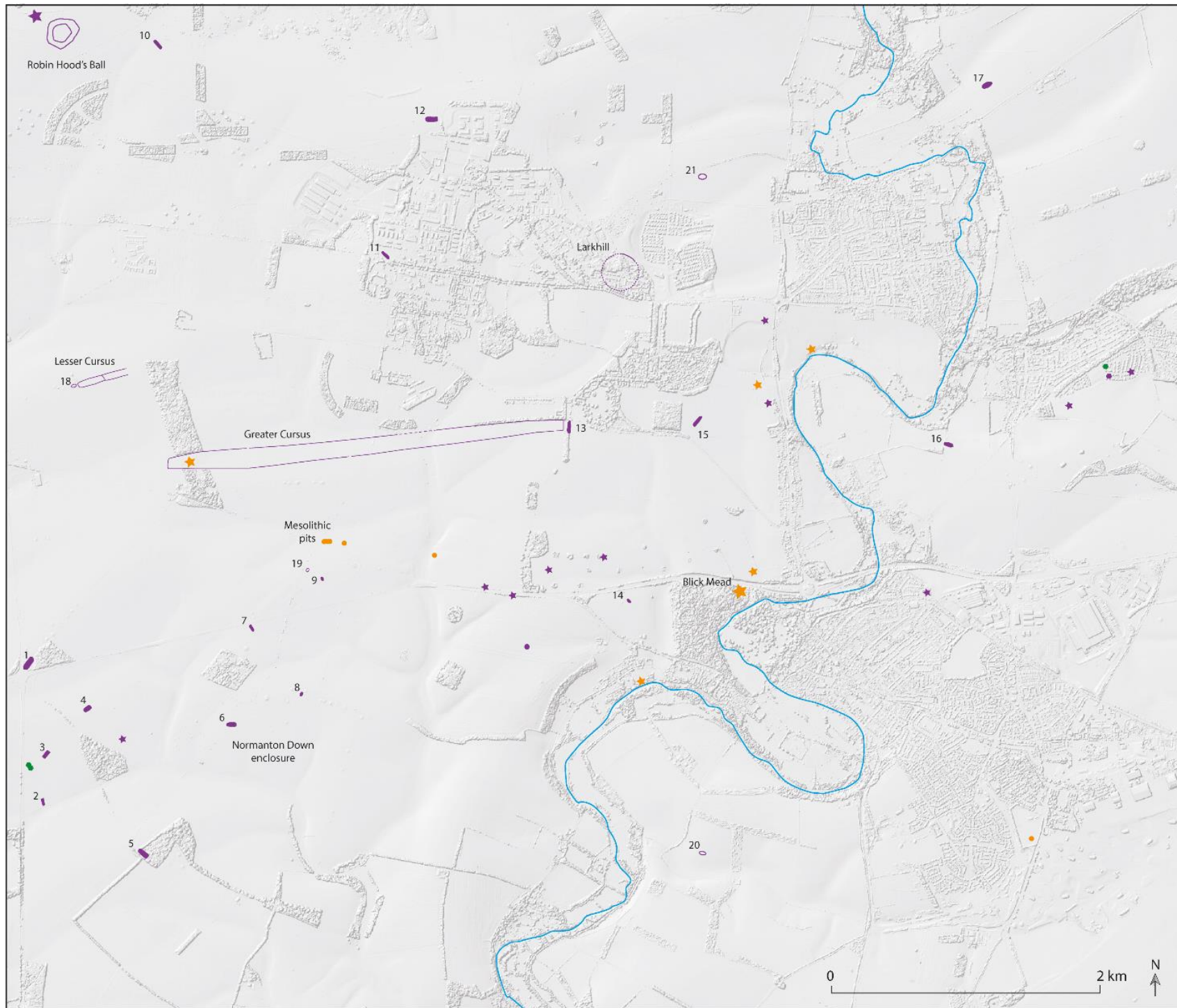


Figure A1-4 Map showing all long barrows in the Stonehenge landscape, together with Mesolithic occupation, and early Neolithic and monuments. Numbers relate to long barrows in Table A1-1



Figure A1-5 a) Aerial view of Winterbourne Stoke long barrow. The trench excavated by Thurnam at the south-west end is clearly visible. © Historic England 27520_010; b) The phallic-like flint core found with the primary burial in this barrow © British Museum, with thanks to Dr Neil Wilkin

The long barrows vary in size; although Winterbourne Stoke 1 is the largest (Figure A1-5a) and Amesbury 7 the smallest, with the majority are between 30 and 50 m in length (Table A1-1). Most have parallel ditches, although some are completely enclosed, including Netheravon 6 and Amesbury 7 (Bowden *et al.* 2015, fig 2.12), possibly representing earlier constructions. Some had elaborate timber components, including a horned façade and internal structure revealed by geophysical survey at Durrington 76 (LBI ArchPro 2014). None of the long barrows are known to have stone chambers, although there are substantial sarsens remaining in the ditch of Figcheldean 31 and burials were sometimes placed under or on a flint cairn.

Excavation records are patchy, as most long barrows were excavated by antiquaries, but the number of burials in each seems low, with between one and four people interred, usually at the eastern end. The majority of these were inhumations, although cremated bones were found at Figcheldean 31. Quantities of animal bones were sometimes discovered, as at Amesbury 42 where Thurnam found ox skulls and feet. At Winterbourne Stoke 35 an oval or round barrow was built over the burial of an adult male, accompanied by four finely made lozenge arrowheads (Thurnam 1864; Figure A1-6). The position of this burial, just beyond the western end of the Lesser Cursus (Figure A1-4: 18), may suggest a direct chronological relationship; these lozenge type arrowheads are generally dated to the end of the early Neolithic (Josh Pollard pers. comm.).



Figure A1-6 Four lozenge-shaped flint arrowheads accompanying a probable early–middle Neolithic burial at Winterbourne Stoke 35 © British Museum, with thanks to Dr Neil Wilkin

Other burials from the early Neolithic period were not placed into monuments but buried in pits. At Bulford, near an extensive pit cluster (Figure A1-14), a single crouched inhumation of a young adult, possibly male, was placed on a mound of chalk in a pit with a deposit of animal bones and burnt flint (Leivers 2021). The human bones had been manipulated, with the long bones of the lower limbs placed in a square. This burial has been dated to 3520–3370 cal BC (Table A1-2: SUERC-80712). Another early Neolithic pit on Larkhill contained the fragmented remains of another young adult, possibly female (Leivers 2021). Human remains were therefore deposited in a variety of places including long barrows, causewayed enclosure ditches and pits, but overall numbers remain small; most of the dead must have been deposited in archaeologically invisible ways.

Table A1-1 List of long and oval barrows in the Stonehenge study area and beyond. Numbers relate to Figure A1-4

No on map	Parish number (Grinsell)	Grid ref	Orientation	Mound size (max)	Excavation	Description
1	Winterbourne Stoke 1	SU 1000 4151	NE–SW	84 m x 27 m	Thurnam 1863	Thurnam describes finding the primary single burial in a contracted posture on the right side, accompanied by elongated flint core (Figure A1-5b), as well as six secondary burials (Thurnam 1869, 184, 194). He also noted three pits below the mound. Survives as mound up to 3 m high, flanked by ditches (Bax <i>et al.</i> 2010, 5–7, 37–8). Primary inhumation radiocarbon dated (Table A1-2: SUERC-42530).
2	Winterbourne Stoke 86	SU 1009 4059	NNW–SSE	45 m x 15 m	Wessex Archaeology 2016	Two parallel ditches, with anomalies showing internal pits/postholes relating to barrow showing on geophysical survey (Wessex Archaeology 2018, 22, figs 21, 46–8). Excavation found postholes had cut the primary fills within segmented ditch eastern ditch at its northern end, with latest dating evidence from ditches being middle Neolithic (Powell and Barclay 2017; Roberts <i>et al.</i> 2018).
3	Winterbourne Stoke 71	SU 1010 4091	NE–SW	54 m x 24 m	Historic England 2017 Wessex Archaeology 2016	Ploughed out long barrow, confirmed by geophysical survey (Wessex Archaeology 2018, 20–1, figs 20, 43–5) and excavation. Excavations (three trenches) across ditches showed inner and outer ditches at SE end, 2 m apart, with NW ditch having substantial re-cut, probably in the late Neolithic (Powell and Barclay 2017, 16–17, figs 9-10 and 9-11; Roberts <i>et al.</i> 2018). Features between and beyond the ditches not excavated.
4	Wilsford 34	SU 1040 4118	NE-SW	28 m x 17 m	Thurnam 1866	Located about 200 m north of The Diamond. Simple barrow survives as a mound 1.2–5 m high, with ditches up to 0.3 m deep. Thurnam found five contracted inhumations high in mound, one accompanied by Beaker, and all assumed to be secondary (Thurnam 1869, 196).
5	Wilsford 41	SU 1079 4019	NW–SE	45 m x 25 m		South-west side ditch is 9.3 m wide and 1m deep. Mound has uneven profile, with saddle in top with north-western end higher (4.8 m), possibly a later round barrow. Part of Lake Barrow Group (Bowden <i>et al.</i> 2012, 10).
6	Wilsford 30	SU 1141 4106	E–W	43 m x 20 m	Hoare c.1810	Hoare found primary deposit of four skeletons on the ‘floor’ at the eastern end (Hoare 1812, 206). Mound measures 2.3 m high. At least three phases of construction are suggested by the earthworks. Northern ditch survives up to 0.7m deep (Barrett and Bowden 2010, 6–7).
7	Amesbury 14	SU 1154 4175	SSE–NNW	33 m x 18 m	Hoare c.1810; Thurnam c. 1860	Long spread or bank on top of barrow (4 m x 16 m). Side ditches are 8 m wide, the westernmost slightly longer (Field and Pearson 2011). Hoare placed a trench across the southern, broadest end but found nothing (Hoare 1812, 206). Thurnam found a primary interment and two disarticulated skulls, as well as secondary burials ‘closely intermingled’ with bones of domestic cattle, red deer and a goose (Thurnam 1869, 183; Cunnington 1914, 382–3). Evaluation trenches dug at northern end showed severe disturbance (Wessex Archaeology 1993).
8	Wilsford 13	SU 1188 4129	NNE–SSW	21 m x 10 m		Small long barrow with side ditches (Barrett and Bowden 2010, 14–5).

9	Amesbury 7	SU 1202 4210	S–N	13 m x 12 m	Hoare c.1810	Small, slightly oval mound with wide encompassing ditch. Two causeways or entrance at southern end (Bowden <i>et al.</i> 2015, fig 2.12). Hoare (1812, 128) did not find an interment.
10	Figheldean 31, 'Alton Down'	SU 1089 4588	SE–NW	47 m x 15 m	Thurnam c.1860	Thurnam found stratum of black earth on or near ground level and bones of primary skeleton in a small pile to E of centre of mound, and burnt bones (Thurnam 1869, 184). Three sarsen boulders survive in ditch (McOmish <i>et al.</i> 2002, 151–2). Burial was a middle-aged adult of indeterminate sex (Cuthbert 2019, table 5.6). Much damage by military (Cunnington 1914, 391).
11	Durrington 24 'Larkhill Camp'	SU 1247 4437	SE–NW	45 m x 16 m		Only flanking ditch on north side remains visible, survives as earthwork among buildings of Larkhill Camp (McOmish <i>et al.</i> 2002, fig 2.8).
12	Figheldean 27, 'Knighton Barrow'	SU 1279 4535	E–W	55 m x 21 m	Stukeley c.1720	Survives as large earthwork up to 3 m high, lower part of mound is raised rectangular platform (McOmish <i>et al.</i> 2002, fig 2.8). Stukeley recorded finding a bronze axe.
13	Amesbury 42	SU 1375 4318	S–N	62 m x 20 m	Thurnam 1866; Richards 1983; Thomas 2008	Located at end of Stonehenge Cursus. Thurnam found animal bones including part of an ox skull, a complete ox skull with vertebrae and a great number of ox feet bones, and secondary internments (Thurnam 1869, 182). Excavations of ditch have found a flint-knapping cluster (Richards 1990, 96–109) and a series of pits cut into inner lip of ditch perhaps to re-surface mound (Parker Pearson <i>et al.</i> 2020, 103–4). Fragment of femur from ditch may derive from burial (Table A1-2: OxA-21961) but antler pick from primary fill of ditch dates construction (SUERC-24308).
14	Amesbury 140	SU 1418 4194	NNW–SSE	21.5 m x 13 m	Lukis 1863	Geophysical survey shows as pair of parallel ditches 20 m long and 12 m apart (Wessex Archaeology 2018, 37–9, figs 36–7, 42, 61–3). Probably the site recorded by Lukis (1863, 155) as having a 'cist' at one end, likely part of round barrow lying to south. There is a square arrangement of postholes within (Roberts <i>et al.</i> 2018, fig 11).
15	Durrington 76 'Cuckoo Stone'	SU 1464 4324	NE–SW	40 m x 28 m		Levelled long barrow, recorded from aerial photographs in 1990. Investigated by Colt Hoare who described it as like three conjoined barrows, finding 'a circular cist like a little well, but it contained no interment' (Cunnington 1914, 389). Geophysical survey has revealed an elaborate timber façade and mortuary structure within.
16	Bulford 1	SU 1636 4304	E–W	47 m x 27 m		250 m south of Watergate Farm buildings at Longbarrow Clump. Ditches survive as buried features up to 8 m wide, survives as earthwork (Historic England 2021).
17	(Milston)	SU 1664 4561	NE–SW	35 m x <30 m		Long barrow defined by pair of slightly curved ditches, visible as cropmark (Historic England 2021, warden ID 1352463).
Possible long barrows						
18	Winterbourne Stoke 35	SU 1032 4345	E–W	43 m x 21 m	Thurnam 1860	Located at western end of Lesser Cursus. Thurnam and Hoare describe this as an oval barrow with continuous surrounding ditch (Thurnam 1864), although it has since been re-interpreted as three round barrows. Thurnam found a crouched burial with Beaker pot under eastern end, and a crouched burial with four flint lozenge arrowheads under the western end (Figure A1-6).
19	Amesbury 10a	SU 1194 4216	NNE–SSW	26 m x ?	Hoare c.1810	Low oval mound excavated by Hoare without result. Geophysical survey failed to trace flanking ditches, may be a bowl barrow (Historic England 2021).

20		SU 1469 4018		22 m x 14 m		Oval enclosure defined by single ditch, crop mark (Historic England 2021).
21		SU 1460 4490	E–W	c. 20 m long		Pair of curving parallel ditches c.20 m long identified during geophysical survey for Army Basing Programme, identified as possible long barrow (Wessex Archaeology 2014).
Wider area						
	Winterbourne Stoke 53	SU 0916 4279	E–W	36 m x 18 m	Hoare and Cunnington c.1810	Hoare found possible primary cremation, covered with a large pile of burnt flints, towards the E end. Further E two ‘cists’ containing large quantity of wood charcoal (Hoare 1812, 117), probably postholes. Visible earthwork varies in height up to 1.5 m.
	Woodford 2	SU 1007 3772	N–S	20 m x 14 m	Vatcher and Vatcher 1964	On steep slope at the head of narrow coombe. Below long barrow were six large pits and then two successive timber structures (one possibly a mortuary chamber), before the mound was raised. Within was a rectangular flint cairn covering a few weathered human bones, capped by a chalk mound. Ditches re-cut in late Bronze Age (Harding and Gingell 1986). Human remains comprised at least three adults and one juvenile (Carton <i>et al.</i> 2016).
	Milston 1	SU 1897 4597	NE–SW	46 m x 25 m		Long barrow completely enclosed by ditch visible on aerial photograph, mound stands to 2 m high (Historic England 2021). No recorded opening (Cunnington 1914, 394).
	Wilsford 3, ‘Eil Barrow’	SU 0730 5136	ENE-WSW	53 m x 27 m	Thurnam c.1860	On low ridge, mound almost 2 m high at east end with flanking ditches slightly curved. Severely damaged by military activity (Historic England 2021). Thurnam found a secondary Saxon inhumation (Thurnam 1869, 196).
	Netheravon 6	SU 1123 4687	NE-SW	57 m x 22 m	Thurnam c.1860	Thurnam found primary deposit of one or two adult skeletons on ground near SSE end and suggested previously disturbed (Thurnam 1869, 180). Short, low mound stands to 0.5 m high, west ditch continues around end of mound (McOmish <i>et al.</i> 2002, fig 2.4). Skeletons were young adult (20-35 years) and middle-aged adult (35-50 years) (Cuthbert 2019, table 5.6).
	Netheravon Bake	SU 1143 4667	SSE-NNW	33 m x 18 m	Richards 1984/6	Two Neolithic phases prior to modification into round barrow (Richards 1990, 265). Antler from base of Phase 1 ditch dated. Side ditch to east, western ditch curves part-way around S and N ends (McOmish <i>et al.</i> 2002, fig 2.8). Excavation remains unpublished, archive in Salisbury Museum.
	Sheerbarrow	SU 1686 4822	NNW-SSE	c. 30 m x 20 m		Probable long barrow visible as faint earthwork on aerial photographs, ditches that continue around end of mound and possible internal structures have been revealed by geophysical survey (RCHME 1995).

1.3.5 Greater Cursus

The Greater Cursus is a rectangular enclosure nearly 3 km long and up to 130 m wide, extending from Winterbourne Stoke Down to King Barrow Ridge, where Amesbury 42 long barrow lies parallel to the terminal (Figure A1-7). Defined by a single enclosing ditch with internal bank, it is still visible as an earthwork along much of its perimeter. It crosses the north–south dry valley of Stonehenge Bottom, just at the point where the valley forks to the north. There may have been original entrances within Stonehenge Bottom (Pearson and Field 2011, 27) but three narrow (3.5–4 m wide) entrances along the longer sides have been identified by geophysical survey (Figure A1-7; Darvill *et al.* 2013, fig 3, 69) and a large gap in the northern boundary may also be original (Gaffney *et al.* 2012, fig 3).

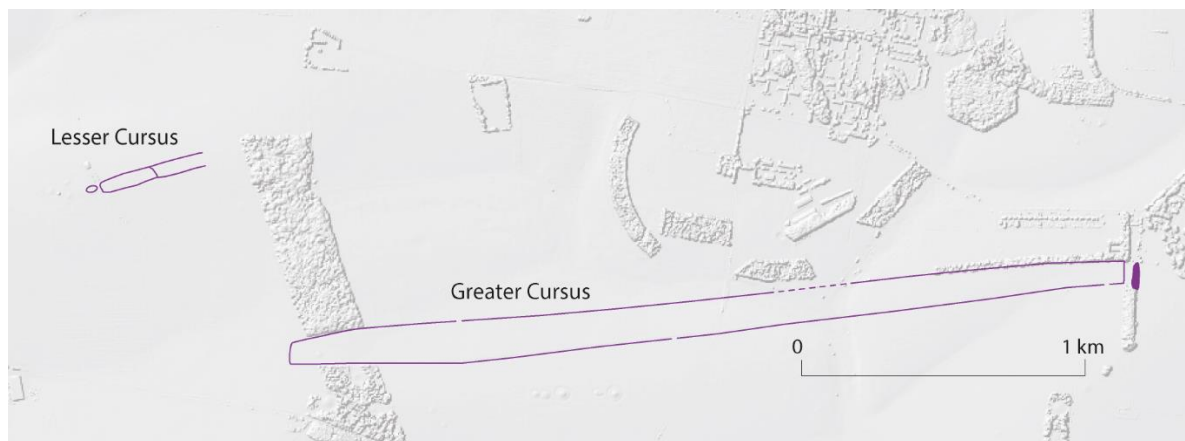


Figure A1-7 Plan of Lesser and Greater Cursus monuments (entrances of cursus derived from Darvill *et al.* 2013, fig 3)

The cursus ditches were dug as a series of conjoined pits, with U-shaped profiles (Stone 1947; Christie 1963; Richards 1990; Thomas *et al.* 2009; Parker Pearson *et al.* 2020, 66–87) and the western terminal ditch was larger, probably with a corresponding larger bank. This terminal ditch had far more flint knapping debris than other parts of the cursus (Parker Pearson *et al.* 2020, 128). A fragment of antler pick recovered from the base of the ditch provides an estimate for the digging of the cursus ditch of 3625–3370 cal BC (Table A1-2: weighted mean, antler 32). Later, a series of small pits or ‘embayments’ were dug into the silted ditches, apparently reinstating the outline of the entire cursus in white chalk. This took place in 2900–2460 cal BC (Table A1-2: OxA-1403), indicating that the cursus ditches were made visible during the period that later major monuments were being built (Parker Pearson *et al.* 2020, 97). Excavations within the cursus have revealed very little activity associated with the cursus and no internal features of a contemporary date, although geophysical survey has revealed a small number of possible pits or shafts (Payne 2007, 5; Darvill *et al.* 2013, 69) and two larger anomalies, possibly natural sinkholes (Gaffney *et al.* 2012) (see Chapter 5.4 for discussion of possible astronomical alignments of these and the cursus as a whole).

1.3.6 Lesser Cursus

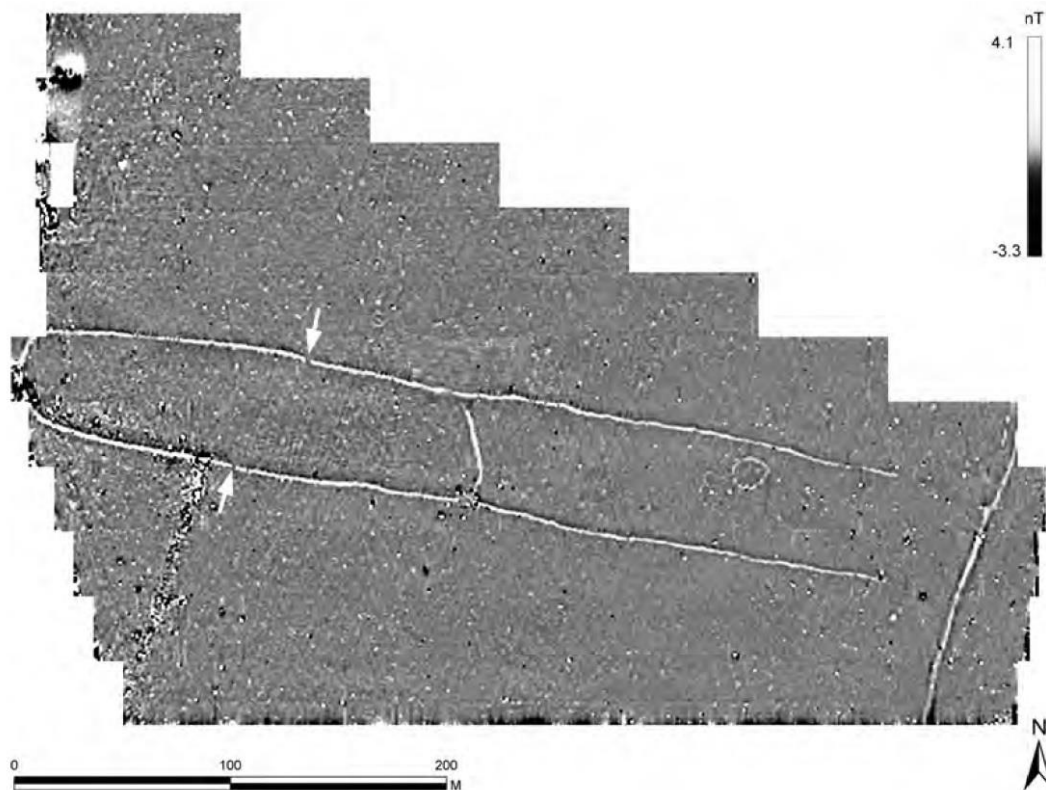


Figure A1-8 Geophysical survey of the Lesser Cursus, with narrow entrances marked by arrows © Historic England, survey by Alastair Bartlett

The smaller cursus monument lies along a flat ridge to the west of the Greater Cursus, and the ditch with internal bank measures 400 m long and 60 m wide. The cursus has a closed terminal at the western end, but is open to the east, and is divided roughly halfway by a curving ditch. Geophysical survey has shown the position of two narrow entrances (Figure A1-8). Excavations have shown that an original (Phase 1) cursus was located at the western end, with a shallow ditch 0.6–0.8 m deep forming a complete circuit (Richards 1990, 76). Shortly afterwards, the ditches of this monument were re-cut deeper and wider, and the monument extended to the east (Phase 2). Radiocarbon dates on an antler fragment from the primary fill of the primary ditch and on an antler rake from the floor of the secondary ditch can be combined to estimate that the cursus was first constructed in the 3520–3340 cal BC (Parker Pearson *et al.* 2020, 117; Table A1-2: antlers SF 219 and 217).

1.3.7 Summary

Although the quantities of material are less than survives from the later Neolithic, the archaeological evidence suggests intensive occupation of parts of the Stonehenge landscape in the early Neolithic period. On current, and admittedly partial, dating evidence, it appears that the early Neolithic of the Stonehenge area can be roughly divided into two – an earlier period when the causewayed enclosures were constructed, when there was occupation on King Barrow Ridge and a significant gathering at Coneybury Anomaly. This may have been a period when people were gathering in the landscape from

dispersed locations. Slightly later, in the mid-3rd millennium BC, the focus shifted to the construction and use of long barrows, concentrated in the Wilsford valley, and the construction of cursus monuments. Although the two cursus monuments appear to replace the causewayed enclosures, it is clear that very different types of activities took place within and around them; the clean nature of the cursus monuments contrasting with the cultural debris found at the enclosures. The cursus monuments appear to have been integral with funerary monuments; the Greater Cursus being closely associated and perhaps aligned upon Amesbury 42, and the Lesser Cursus placed in relation to the probable oval barrow Winterbourne Stoke 32.

1.4 Middle Neolithic

1.4.1 Settlement

Evidence of middle Neolithic settlement comprises flint and pottery scatters, isolated pits and pit clusters. These are thinly spread across the study area (Figure A1-1). On King Barrow Ridge a spread of Peterborough Ware, a concentration of stake holes with two hollows and at least one pit dates to this period (Richards 1990, 116), activity which continued under round barrows to the south (Cleal and Allen 1994, 62). At the southern end of the ridge at West Amesbury Farm, five middle Neolithic circular pits have been excavated, with apparently contemporary postholes in a curving line and two short linear features nearby, both of which contained Peterborough Ware pottery (Roberts *et al.* 2020, 193–4). The pits had ‘ashy’ dark fills which contained a variety of material – flint tools, animal bone (mostly cattle and pig), carved chalk pieces, worked stone, shell and stone beads, antler tools, hazelnuts and Peterborough Ware pottery, likely from repeated episodes of occupation nearby (Roberts *et al.* 2020).



Figure A1-9 Intercutting pit group at West Amesbury Farm, dating to the middle Neolithic period and associated with Peterborough Ware © Dr Matt Nicholas

Some of these pits appear to have been re-cut and filled with stone rubble, and in one example, marked with a standing post. Pre-dating some of these pits, and cut by them, was a rectilinear grave with a partial or complete inhumation of a 30–50-year-old adult male who died in 3245–3110 cal BC (90% probability; Roberts *et al.* 2020, table 7). Isotope studies show that he had a diet rich in meat, and that he moved to the chalk from the west, perhaps Ireland, during adulthood (Mays *et al.* 2018, 704–5). The style of burial recalls that of earlier pit burials at Bulford and Larkhill (Section A1.3.4). Overall, the activity at West Amesbury Farm has been modelled as beginning in 3370–3155 cal BC (94% probability; Roberts *et al.* 2020, fig 10: *start_west_amesbury_farm*) and ending in 3235–3060 cal BC (90% probability; *end_west_amesbury_farm*). Anomalies identified in geophysical surveys at the southern end of King Barrow Ridge may indicate similar pits (Linford *et al.* 2015, fig 12) and a few sherds of Peterborough Ware pottery from Coneybury Henge suggest that occupation extended to the south (Richards 1990, 148).

To the north, at Larkhill Camp, 16 pits were found in an area to the east of the earlier Knighton long barrow, most of which contained Peterborough Ware pottery, and two similar pits were found to the west of Larkhill causewayed enclosure (Figure A1-1; Leivers 2021). A middle Neolithic pit has also been found to the north of Durrington Walls, containing a red deer antler dating to 3340–2930 cal BC (Table A1-2: UBA-34949; Wessex Archaeology 1992). On the eastern side of the River Avon at the Old Dairy site in Amesbury, three pits containing middle Neolithic pottery were located within a flint scatter associated with a possibly contemporary ring-ditch (Harding and Stoodley 2017). Two of these pits have been dated to the middle Neolithic (Table A1-2: SUERC-54202 and SUERC-54201). Another small, isolated cluster of middle Neolithic pits with Peterborough Ware pottery has been excavated further south on Amesbury Down (Powell and Barclay, forthcoming), with one containing a hazelnut shell dating to 3340–3020 cal BC (Table A1-2: SUERC-73267) and a further pit and tree throw containing Peterborough Ware pottery have been excavated on Boscombe Down (Wessex Archaeology 2011, 10).

In the south-western part of the study area, Peterborough Ware sherds of a variety of sub-types have been found in pre-barrow contexts under several round barrows in the Wilsford (Smith 1991, 34–7) and Lake groups (Grimes 1964; Figure A1-1), and a nearby nucleated flint scatter with Peterborough Ware, chisel arrowheads and a scatter of pottery from under the nearby bank of the North Kite enclosure further attests to occupation in this area (Richards 1990, 158–71, 184–92). To the north, sherds were found at Fargo plantation (Stone 1938). It is possible that the Wilsford Shaft was dug as a well or ritual shaft in the middle Neolithic period, as a wooden bucket from the base has been dated to 3640–3100 cal BC (Table A1-2: OxA-1089; see Chapter 3, Case Study 1). Beyond the study area to the west further pits with middle Neolithic pottery have been found at Winterbourne Stoke (Wessex Archaeology 2019, 20). The impression is that isolated or small clusters of middle Neolithic pits are quite common across most of the Stonehenge landscape.

1.4.2 Long enclosures

It is possible that long barrows continued to be built and used in the Stonehenge area into the middle Neolithic period. One indication is the 'mortuary enclosure' on Normanton Down, a rectangular enclosure 36 m by 16m consisting of a causewayed ditch with internal turf bank (Vatcher 1961; Bowden *et al.* 2015, 18). The fact that the enclosure is slightly wider towards the east and has internal bedding trenches forming some sort of entrance or structure, suggests that it was closely related to long barrows (Figure A1-10). It also lies just to the south of long barrow Wilsford 30 (Figure A1-4: 6). An antler pick from one of the bedding trenches has been dated to 3520–2910 cal BC (Table A1-2: BM-505) indicating a broad middle Neolithic date. No human remains were found despite complete excavation of the site, although ploughing had led to severe truncation. A square enclosure at the southern end of King Barrow Ridge may also be early or middle Neolithic but remains undated (Valdez-Tullett and Roberts 2017).

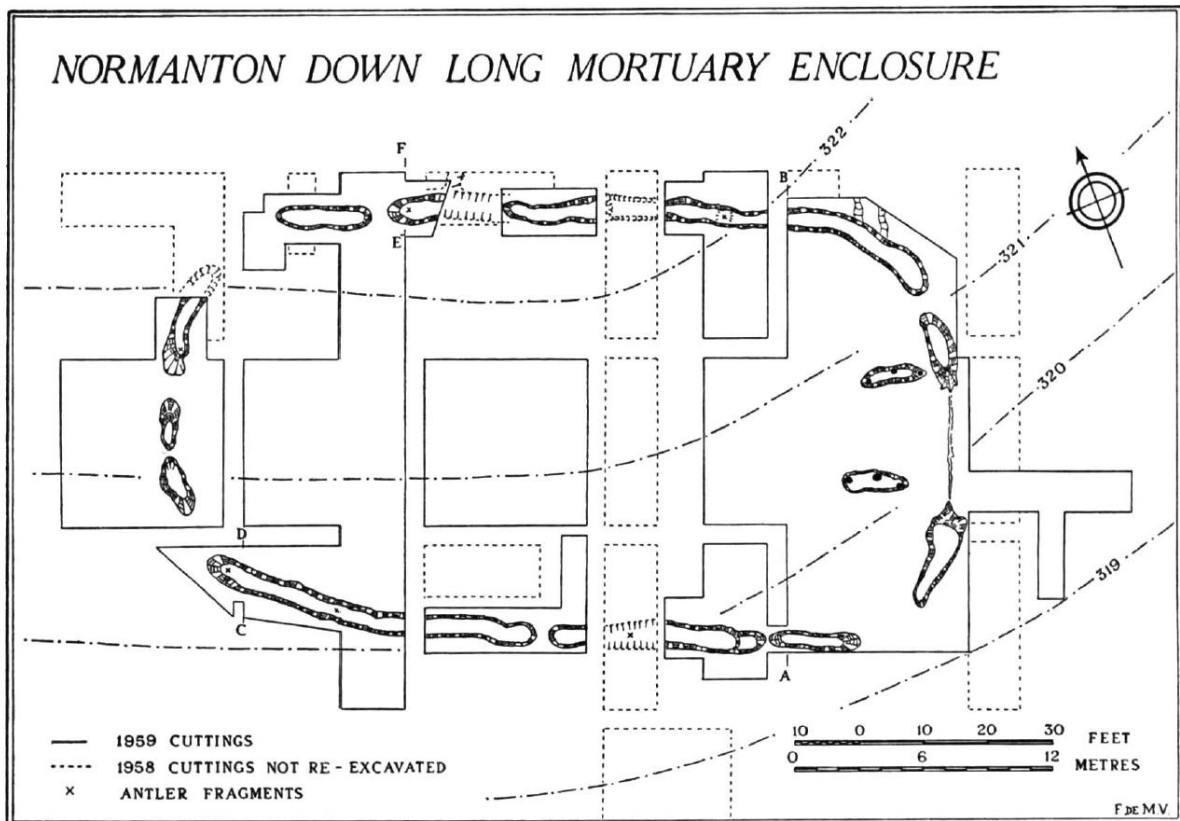


Figure A1-10 Plan of Normanton Down mortuary enclosure after excavation in 1958–9 (Vatcher 1961, fig 2)

1.4.3 Earliest Stonehenge

The only major monument that may have been constructed during the middle Neolithic was the earliest phase of Stonehenge. Although the circular ditch was dug during the 30th century BC (Section A1.5.3), it is possible that there was an earlier phase of activity. Some of the earliest radiocarbon dates from Stonehenge have been obtained on animal bones (a cattle skull, two cattle jaws and a red deer tibia) deposited at the base of the ditch on either side of the southern entrance, and near one terminal of a nearby entrance that was later blocked (Cleal *et al.* 1995, 71, 108; Table A1-2). These bones can be

modelled as dating to between 3415–3035 cal BC (95% probability: Figure A1-12: *start_structured_deposit*), probably 3325–3115 cal BC (68% probability), and 3320–2880 cal BC (95% probability; *end_structured_deposit*) or 3185–2995 cal BC (66% probability).

These bones appear to have been deposited following a long-established pattern of placing cattle skulls at the entrances and ditch terminals of causewayed enclosures and long barrows (Pollard and Ruggles 2001, 75). Because of their early radiocarbon dates these animal bones have been described as ‘curated’ (Allen and Bayliss 1995, 529). This interpretation is by no means certain; the red deer tibia had been partly chewed by a dog or other carnivore (Cleal *et al.* 1995, fig 249) suggesting that it was not a particularly treasured object (Figure A1-11). One of the cattle jaws has isotope values suggesting that this animal was raised in south-west Britain (Evans *et al.* 2019, SH 01). Although it may have been brought here as a relic after death, it may also have been herded to the Stonehenge area while alive. These ‘curated’ animal bones, often referred to as ‘structured deposits’ are modelled in the most recent radiocarbon models for Stonehenge to constrain the digging of the ditch, as evidenced by antler picks from the base (Parker Pearson *et al.* 2020, 536–7). However, as their status as ‘curated’ objects is not certain, using them to constrain the date of the ditch is a somewhat circular argument, and they need to be separated out in the model, as done in the revised version shown in Figure A1-12.



Figure A1-11 One of the cattle mandibles and the red deer tibia from the southern entrance terminals of the Stonehenge ditch, pre-dating the ditch. The red deer bone has been gnawed and appears to be weathered © Historic England DP158961 and DP158882

It is possible that these animal bones may relate to an earlier phase of the monument, perhaps a series of pits or more segmented version of the ditch, that was later re-dug to form a continuous ditch. The deeper pits at the entrances may not have been fully re-cut and thereby preserved earlier material. Hawley distinctly records deeper areas of the ditch which he called ‘craters’ flanking the north-east and south entrances (Cleal *et al.* 1995, 109–10). One reason for favouring an early phase is the date obtained for the

closely comparable monument at Flagstones in Dorchester (see Appendix 3.4.1 and Chapter 6, Case Study 10b). It is possible that this early phase includes the Aubrey Holes with their upright stone pillars and some of the earliest cremations on the site, as some cremation burials from the site pre-date the construction of the ditch (Section A1.5.3).

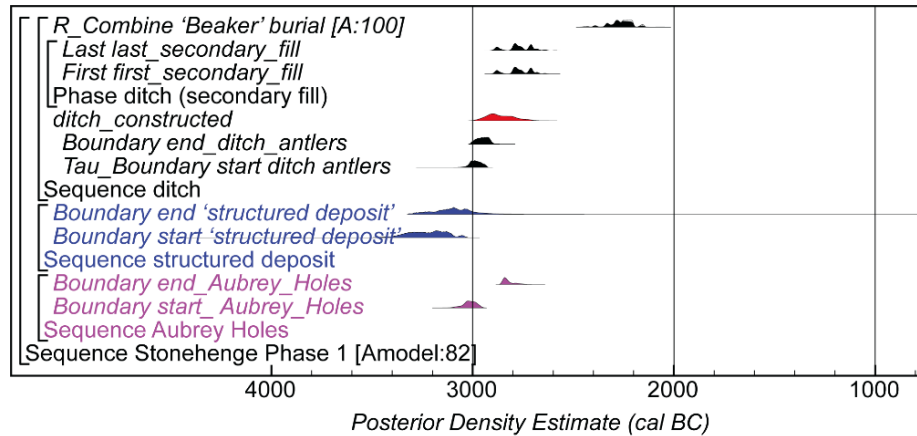


Figure A1-12 Model and schematic diagram of the radiocarbon dates for the construction of the enclosure, the structured deposits and the cremations in the Aubrey Holes at Stonehenge. Note that this based on the most recent published model (Parker Pearson et al. 2020, fig 11.2) but slightly revised so that the 'structured deposit' animal bones do not constrain the dates for the digging of the ditch. With thanks to Dr Peter Marshall.

The 'North Barrow', a crescentic ditch c.20 m in diameter with external bank partly destroyed by a later trackway, may also pre-date the ditch, as it appears to lie beneath the main enclosure bank (Bowden *et al.* 2015, 26–7). It bears comparison with small penannular ditches sometimes found in association with proto-henges, such as Flagstones. Hoare is reported to have found a cremation here (Newall 1929, 82), although this may derive from an Aubrey Hole, rather than the 'barrow' itself (Roberts *et al.* 2020, 199). The clean nature of the ditch in the section excavated by Atkinson (Cleal *et al.* 1995, 276), with no sarsen or bluestone chips, supports an early date for this feature.

1.4.4 Summary

In the Stonehenge area, people in the middle Neolithic continued to occupy some areas that had been a focus for early Neolithic settlement, particularly King Barrow Ridge extending south to Coneybury Hill but also Wilsford Down (Figure A1-1). The evidence for settlement comprises sporadic pits and flint scatters

suggesting low-level occupation on a seasonal or temporary basis across the area, although more intensive occupation is suggested by the number of pits at both West Amesbury Farm and Larkhill Camp. Although some long barrows and long enclosures, such as the Normanton Down mortuary enclosure, may have been constructed in this period, in general there was a lack of monument construction, with the only possible major monument being a possible pit enclosure at Stonehenge, potentially constructed at the end of the middle Neolithic.

1.5 Late Neolithic

1.5.1 Settlement

Evidence for late Neolithic settlement in the Stonehenge area is extensive, with flint scatters suggesting dense occupation and aggregation; it was a 'busy place', even compared with other monument complexes (Chan 2011). The period can be roughly divided into two – an earlier part characterised by the use of Grooved Ware pottery of Woodlands type, by diagnostic flint tools such as chisel arrowheads and continued deposition in 'ashy' pits, and a second phase characterised by later styles of Grooved Ware and objects such as oblique arrowheads. Woodlands style pottery is named after a house south of Woodhenge, where two pits each over a metre in diameter were excavated (Stone and Young 1948; Stone 1949; Smith 1965; Figures A1-1 and A1-13). These pits had rich ashy contents including hundreds of flint flakes, cores and tools, a complete flint axe, antler picks, bone pins, flint balls, fragments of sandstone and sarsen, marine shells, hammerstones, burnt flint, hazelnut shells and a fragment of Graig Llwyd axe. One was capped with flint nodules. At Ratfyn on the opposite bank of the River Avon, another cluster of four pits with similar contents indicate contemporary occupation (Figure A1-1). One was sealed by a shell-rich layer containing a large scallop shell, and contained among other finds chisel arrowheads, Grooved Ware pottery and the scapula of a brown bear (Stone 1935). Although these pits may relate to settlement in the vicinity, their unusual and varied contents suggest far-flung contacts, communal feasts, and ritual activity. It has been suggested that these were the location of fires set on the river cliffs as part of calendrical or funerary celebrations (Parker Pearson *et al.* 2006, 244). The fact that two of the pits were capped suggests that it was important to maintain their visibility after the event.

On King Barrow Ridge to the north of the later avenue, a pit has been excavated with an upper fill containing animal remains including many pig bones and a Grooved Ware assemblage with Woodlands style affinities (Richards 1990, 114). Chisel arrowheads found at West Amesbury henge may also indicate occupation at this location in this period (Parker Pearson *et al.* 2020, 284). Away from the River Avon valley, pits associated with Woodland-style Grooved Ware are far less common, with a single example known at Winterbourne Stoke roundabout on the far western side of the study area (Wessex Archaeology 2019, 33; Figure A1-1). A few sherds of this type of pottery were also found under Wilsford G51 (Smith 1991, 37–8).

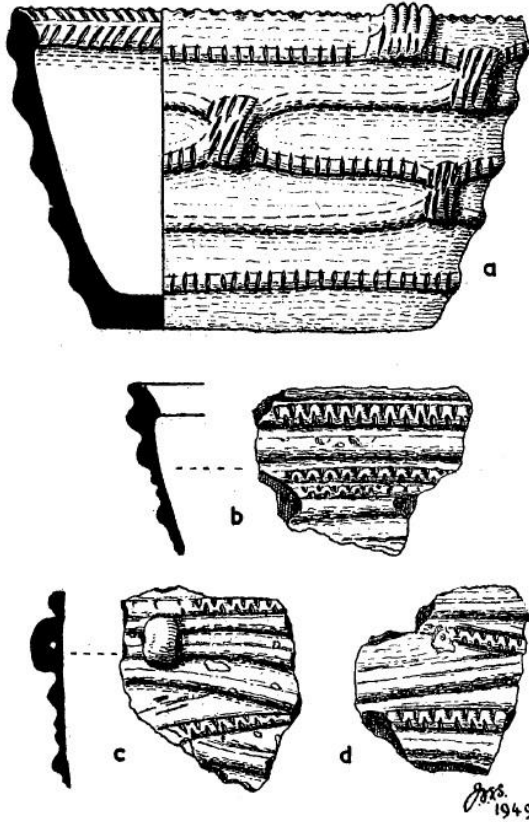


Figure A1-13 Grooved Ware pottery from Pit 4 at Woodlands demonstrating the decorative style of this type, with converging cordons and knots of clay (Stone 1949, fig 1)

A major site of late Neolithic occupation has been excavated at Bulford, where 48 pits of various sizes were located along the crest of a ridge at the top of a coombe (Leivers 2019; 2021). Most were sub-circular in plan, with an average diameter of 1 m and contained a variety of objects, sometimes deliberately placed. These included Woodlands-style Grooved Ware pottery, worked flint (including chisel arrowheads) and animal bones (mostly pig), as well as fragments of flint and stone axes, fossil sponges, worked chalk objects (balls, cups and incised plaques), flint balls and sea eagle bones (Leivers 2019, 30). The presence of slabs of fired clay, the sheer density of pits and quantities of cultural material strongly suggest a settlement, even if only temporarily occupied.

Modelling of 18 radiocarbon dates from the site suggests that the pits were dug over a short period of time starting in 3020–2990 cal BC (37.8% probability) or 2945–2920 cal BC (30.4% probability) and ending in 3000–2985 cal BC (9.7% probability), or 2930–2905 cal BC (58.5% probability) (Leivers 2019, 102). This is contemporary with the creation of the henge ditch and cremations at Stonehenge; perhaps people were settled at this location when they were burying their dead at the monument. The significance of Bulford continued into the later Neolithic when it was marked by the construction of a double henge (Section A1.5.7).

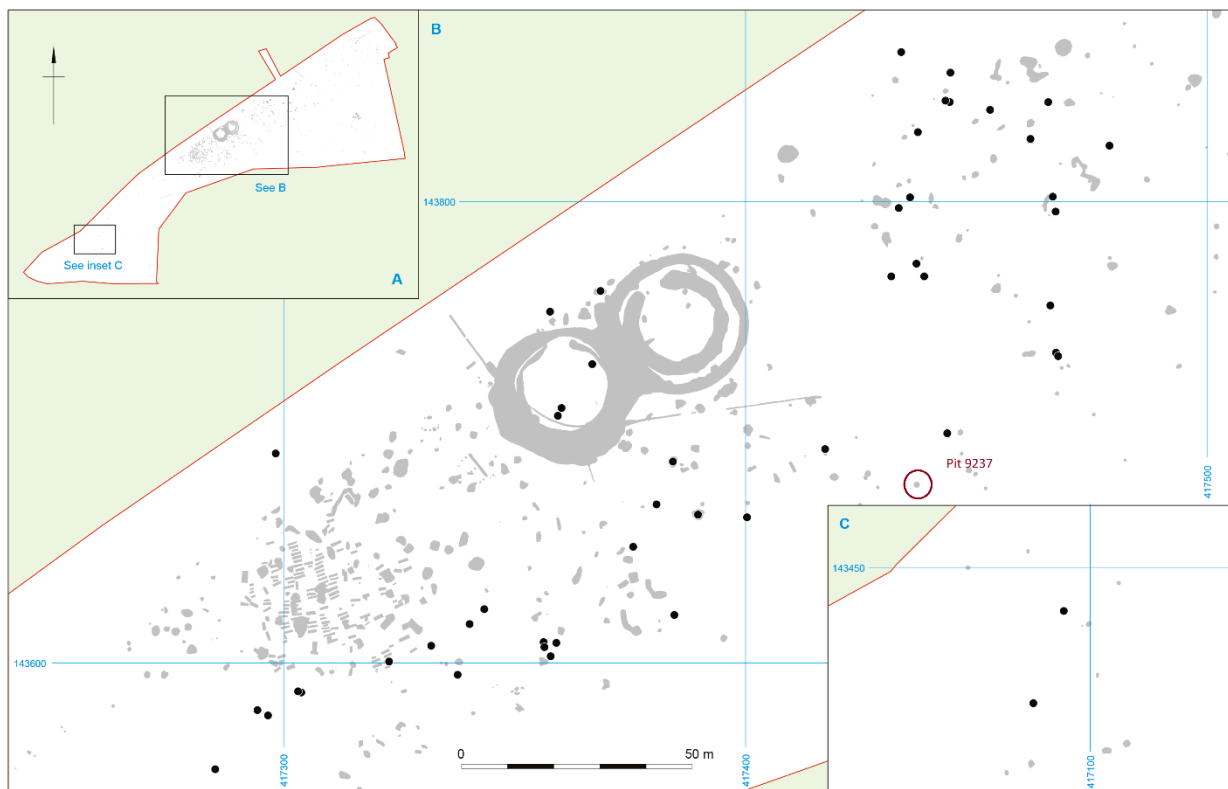


Figure A1-14 Pits (black dots) containing Woodland-style Grooved Ware pottery at Bulford, and the site of the later double henges. A handful of the other pits shown here are early Neolithic in date, including that circled in red which contained a crouched inhumation (Leivers 2021, fig 10: CC BY 3.0)

The concentration of occupation along the Avon valley continued into the mid-3rd millennium BC, with the main settlement shifting to Durrington Walls (Section A1.5.11). Other areas of occupation in the latest Neolithic include a cluster of pits to the north of Durrington, in the western part of the former MoD Headquarters. At least eight shallow pits here contained Grooved Ware pottery of Durrington sub-style and late Neolithic oblique arrowheads, as well as animal bone, hazelnut shells and worked flint. Other similar pits indicating late Neolithic occupation have been found near the earlier Larkhill causewayed enclosure (Leivers 2021), at Countess East (Wessex Archaeology 2003, 4) and on King Barrow Ridge (Roberts and Marshall 2019, 9 and table 3). In addition, a pit towards the southern end of King Barrow Ridge containing Grooved Ware pottery, animal bone, a few flint tools and two unusual, incised chalk plaques has radiocarbon dates indicating a broad late Neolithic date (Vatcher 1969, Harding 1988, Cleal *et al.* 1994; Table A1-2). A further pit containing late Neolithic material has been excavated to the north of the study area, at SPTA 'C' crossing (Wessex Archaeology 2001).

On the eastern side of the River Avon, isolated and loose groupings of pits attest to further occupation. Two pits with late Neolithic material were found at New Covert, Amesbury (Wessex Archaeology 2000). At Amesbury Down at least 40 late Neolithic pits have been excavated (Powell and Barclay forthcoming). Preliminary modelling of radiocarbon dates from 19 of these pits suggest that they start being dug in 2910–2685 cal BC (95% probability; Roberts and Marshall 2019, fig 5: *start_amesbury_down*), ending in

2465–2335 cal BC (95% probability; *end_amesbury_down*). At the nearby Boscombe Down sports field, a further at least seven pits date to the late Neolithic (Lawson 2007, 97). At least six further pits and two larger features suggest further occupation at Bulford, east of the double henges (Leivers 2021; Section A1.5.7). These contained antler picks, flint tools and knapping debris and animal bones, providing a series of mid-3rd millennium BC dates (Table A1-2).

Most of these pits or pits clusters are located on prominent rises in the landscape, suggesting a preference for settlement in elevated positions above the river valley, or at least for deposition and pit digging in such locations. Again, the pattern of occupation looks sparser on the western side of the study area, although in-situ knapping clusters dating to the late Neolithic have been found within a flint scatter on Wilsford Down (Richards 1990, 163) and a concentration of late Neolithic flint artefacts have been found by fieldwalking to the east of Lake barrow group (Lawson 2007, 96). Overall, however, there is an extraordinary density of occupation activity on the slopes and elevated ground on either side of the River Avon, which clearly provided the focus for gatherings and settlement.

1.5.2 Coneybury henge

Located on Coneybury Hill, this henge is an oval enclosure with a single north-east facing entrance (Richards 1990, 123–58; Figures A1-1). The irregular segmented ditch was up to 5 m wide and 2.5 m deep, originally with an outer bank. The primary fills produced 13 bones of a white-tailed sea eagle and part of the skeleton of a dog, pig and cattle bone, worked flint, Peterborough Ware and Grooved Ware (Richards 1990, 129).

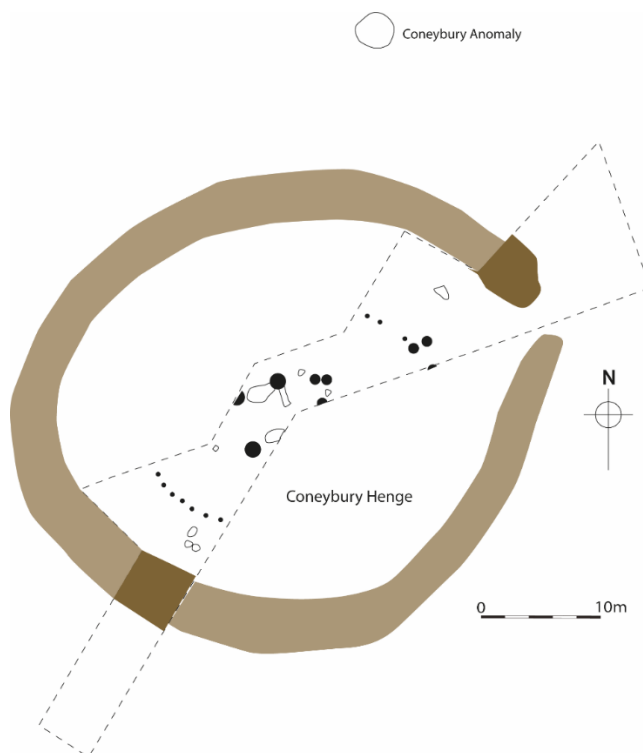


Figure A1-15 Plan of Coneybury Henge (after Richards 1990, fig 97)

Internal features within the henge comprise a late Neolithic 'square-in-circle' monument (Figure A1-15; Figure 5-16). Centrally positioned large pits over 1 m in diameter form the sides of a c.3.5 m square. These are linked by shallow slots to the north and south, and partly by three conjoined postholes to the east. To the east of this square setting were two further shallower pits, which contained Grooved Ware pottery and cattle bone (Richards 1990, 135–7). These features were set within a post enclosure, with two more substantial pits forming an entrance. Unfortunately, only two radiocarbon dates are available from the site, giving a broad late Neolithic date for the structure (Table A1-2: OxA-1408 and OxA-1409), although oblique arrowheads and Durrington Walls style Grooved Ware pottery suggest activity here towards the end of Neolithic. The proximity of the much earlier feasting pit known as the Coneybury Anomaly (Section A1.3.2), only 12 m to the north-west, is likely to be a coincidence of location given the long period between the two activities, and the lack of early Neolithic artefacts from the henge (Richards 1990, 144).

1.5.3 Stonehenge I

The henge enclosure at Stonehenge comprised a circular ditch 110 m in diameter, located at the east end of a broad spur above the dry valley of Stonehenge Bottom (Figure A1-1). The enclosure had a wide entrance to the north-east and two narrower ones to the south and south-south-west and the ditch was dug in segments of variable width, up to 1.2–1.3 m deep (Cleal *et al.* 1995, 67, fig 36) with banks both inside and out (Field and Pearson 2010). The most numerous finds from the ditch other than worked flint were antler tools, including a stack of picks on the floor of Segment 100 (Cleal *et al.* 1995, 69). Radiocarbon dates on nine of these tools provide an estimate for its completion in 2980–2725 *cal BC* (95% probability; Figure A1-12: *ditch_constructed*), probably 2940–2800 *cal BC* (68% probability).

Lying just within the enclosure was a precisely circular ring of 56 pits, known as the Aubrey Holes, of which just over half have been excavated. These are all roughly circular, with an average diameter of 1.09 m and 0.61–1.14 m deep (Cleal *et al.* 1995, 96–7). There has been debate about whether the Aubrey Holes held uprights, and if so, whether these were stones or timber posts. Some of the holes had sloping inner sides suggesting the erection or extraction of stones (Hawley 1921, 30–1) and the majority had clean chalk rubble at the sides and base, likely to be packing for uprights (Cleal *et al.* 1995, 98). Compressed chalk was found on the base or sides of a few holes, thought to be the result of the weight of a stone or post (Cleal *et al.* 1995, 98; Parker Pearson *et al.* 2009, 32). Interestingly this was not originally noted in AH7 (where more recent re-excavation identified such a layer of compressed chalk; Figure A1-17) where instead Hawley noted wood ash on the base (Cleal *et al.* 1995, table 10). Three Aubrey Holes have evidence for having been left open for a period. A few had brown earth fills and others had wood ash or charcoal not associated with cremations, suggesting the presence of timber posts. Drawing a single conclusion about what stood in the Aubrey Holes is difficult without new excavation.

Comparison of the dimensions of the Aubrey Holes with known postholes and stone holes elsewhere makes it clear that they are unlikely to have been dug to hold timber posts (Parker Pearson *et al.* 2020, fig 4.5). However, the compressed chalk at the base of Aubrey Hole 7 is not convincing evidence for the presence of a standing stone, given the number of times this feature has been excavated (Parker Pearson *et al.* 2020, 182, 190). Although the weight of evidence now suggests these pits held standing stones, the possibility that the holes had varied histories after the removal of these, with some being re-cut for cremations, others being marked by posts or stakes and others left open, must be kept in mind. As Parker Pearson and colleagues have argued, if stone pillars were present at this early stage they must have been the smaller bluestones (Parker Pearson *et al.* 2009).

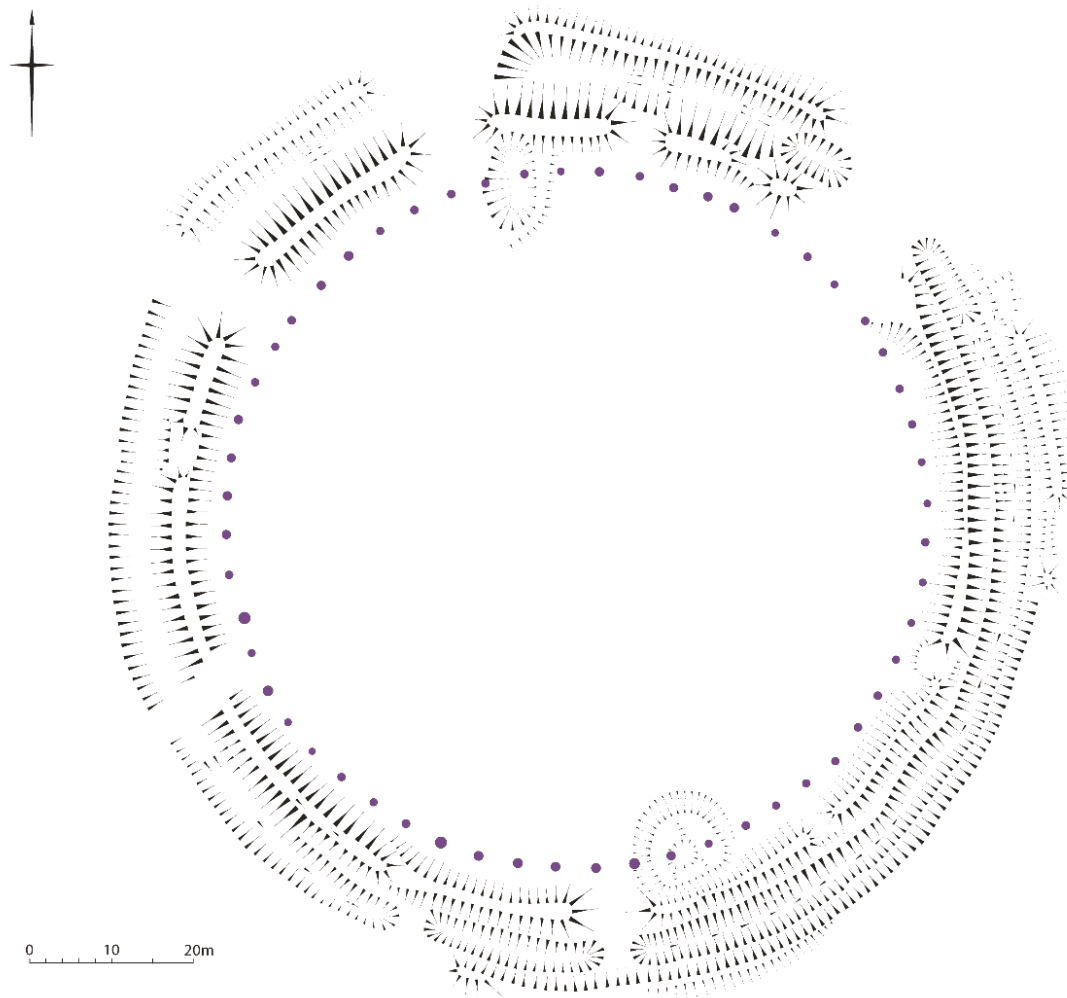


Figure A1-16 Plan of Stonehenge I earthworks and Aubrey Holes, adapted from earthwork survey © Historic England



Figure A1-17 Aubrey Hole 7 being re-excavated in 2008
© Stonehenge Riverside Project A016461-082

At least 24 out of 34 excavated Aubrey Holes have been found to contain cremated human bone, ranging from a single piece to an estimated four individuals. Some cremations were found as discrete deposits in cup-shaped recesses or hollows dug into the base or sides of the pit; others were found adjacent at the surface. The presence of cremations at the base and extending down through the pits indicates that while some were deposited before any uprights were set up, others were placed against uprights or after the uprights had been removed (Cleal *et al.* 1995, tables 10 and 57). Two or three Aubrey Holes had signs of in-situ burning, or at least the burial of cremations while still hot, causing reddening of the surrounding matrix. About 40 other cremations as well as unburnt disarticulated bone fragments have been found in the ditch fill, within or on the bank and in the interior of the monument, mainly between the Aubrey Holes and the bank. These burials have a distinct concentration in the south-east (Willis *et al.* 2016, fig 2; Figure 5-23). Those placed in the ditch were deposited after weathering and silting had occurred but were cut through to the natural chalk; it seems to have been important, at least initially, to bury cremations within the natural chalk. One cremation (in Segment 19) pre-dates the primary infilling of the ditch (Cleal *et al.* 1995, 82).

A few cremation burials at Stonehenge were associated with grave goods including burnt bone skewer pins, animal bone, quantities of wood ash, worked chalk, worked flint (including at least one fabricator) and pottery sherds (Figure A1-18). Unique items include a small, polished gneiss macehead associated with a cremation near AH14, made using raw material from Western Scotland or the Outer Hebrides

(Cleal *et al.* 1995, 394; Anderson-Whymark 2020, 245), and an unusual ceramic dish with Woodlands-style Grooved Ware affinities, like one from Flagstones (Appendix A3.4.1), associated with cremations in AH29 (Cleal *et al.* 1995, 360–1). Radiocarbon dates from both cremations and unburnt bones can be modelled to show that a coherent period of burial at Stonehenge started in 3090–2955 *cal BC* (95% probability; Figure A1-12: *start_Aubrey_Holes*), probably 3045–2975 *cal BC* (68% probability) and ended in 2865–2745 *cal BC* (95% probability; Figure A1-12: *end_Aubrey_Holes*), probably in 2860–2815 *cal BC* (68% probability). This modelling excludes a late date on a cremated bone from the uppermost fills of the ditch (Table A1-2: OxA-17958). It is possible that the Aubrey Holes, their uprights, and some of their associated cremations were earlier than the enclosing ditch, but deposition continued after the ditch had partly silted.



Figure A1-18 Grave goods accompanying cremations at Stonehenge © Historic England K870064

Analysis of the redeposited cremated bones from AH7 by Willis (2019, 188–97; Figure A1-17) has shown that a minimum of 26 individuals are represented, with at least five children from neonate to juvenile, 14 females and 9 males identified. Conditions such as degenerative changes to the spine and femur, associated with osteoarthritis, were observed (Willis *et al.* 2016, 344). Isotope analysis of bone fragments from 25 of these cremated individuals has shown that 15 had ‘local’ values compatible with having spent the last c.10 years of their lives on chalk (Snoeck *et al.* 2018). The other 10 had varied ‘non-local’ values, with their signatures representing a mixture of different sources or locations across south-west England, Wales, and further afield. Some people may have been brought to Stonehenge after death; the rates of carbonate fraction show a broad range of values, and there are different colours of bone present, both of which suggest that cremation took place under variable conditions (Snoeck *et al.* 2018; Willis 2019, 186).

Although claimed otherwise (Snoeck *et al.* 2018), only three individuals have values compatible with south-west Wales where the bluestones originated, and other areas cannot be ruled out.

Stonehenge was not the only location in this landscape where cremations were interred in the late Neolithic. Perhaps buried at the same time were some cremation burials found in association with a small enclosure at Wilsford. This penannular ditch, just 5 m wide internally and with an entrance to the south-south-east, was dug to close to an earlier long barrow (Figure A1-1; Powell and Barclay 2017, 19–21, fig 9-12). It cut several earlier features, including two pits containing human cremations dating to 3010–2770 cal BC and 2890–2630 cal BC (Table A1-2: SUERC-70557 and SUERC-70556) and a larger pit with more cremated bone and Beaker pottery (Powell and Barclay 2017, 20). The ditch probably dates to the early Bronze Age, despite the association with earlier burials. Elsewhere, at Durrington MoD Headquarters, a cremation burial was placed into a hollow and covered by flint-knapping waste. Dating to 2630–2450 cal BC, it may be associated with the nearby posthole alignments and occupation activity (Table A1-2: SUERC-49176; Section A1.5.8). Cremated human bone probably dating to a similar period was found within a post-pipe at Bulford (Section A1.5.7) and a small quantity of cremated bone dating from the late Neolithic was recovered from three pits at Amesbury Down (Leivers 2019, 110). All of these sites appear to have been used for the deposition of cremations later than the main period of burial at Stonehenge.

1.5.4 Flint mines

Six shallow flint mines were recorded immediately north-east of Durrington Walls (Booth and Stone 1952; Figure A1-21), likely part of a wider cluster. Three were shallow pits, where a seam of flint was removed from a depth of only 0.6 m, and the others were tapering shafts with galleries leading off their bases to extract the same vein of flint at a greater depth of 1.8 m (Booth and Stone 1952, 384–7). Finds including antler picks and rakes, a few flint flakes and a chisel arrowhead suggests a late Neolithic date. Chan (2009) has suggested that flint from these mines may have been used by those who occupied Durrington Walls, although the arrowheads indicate a slightly earlier date than the main settlement there.

1.5.5 Cuckoo Stone and Tor Stone

The Cuckoo Stone, a natural boulder of sarsen located not far from the later site of Woodhenge (Figures A1-19 and A1-21), provided a focus for activity in the earlier part of the late Neolithic when the stone was extracted from its resting place and erected upright. The exact sequence is somewhat unclear, but a cattle scapula placed in a pit located 4 m away to the south-west and interpreted as a tool for digging the socket of the Cuckoo Stone when it was erected has been dated to 2920–2700 cal BC (Table A1-2: OxA-18940). This may well be when the stone was raised.



Figure A1-19 Cuckoo Stone during excavation, with nearby extraction hollow © Stonehenge Riverside Project

Another pit, 9 m away from the Cuckoo Stone to the west, contained an assemblage of animal bones that appear to be a single feasting event, including bones of red deer, pigs, cattle and sheep/goat. An articulated red deer tarsal was dated to 2910–2700 cal BC (Table A1-2: SUERC-46473) and so this feast may also relate to the erection of the stone (Parker Pearson *et al.* 2020, 375, table 7.2). The digging tools and feasting remains buried nearby may be reciprocal acts of deposition during the moving or raising of the stone (Parker Pearson *et al.* 2020, 400). Excavations at similar sarsen stone near Bulford, known as the ‘Tor Stone’ have revealed its hollow, stone socket and a large pit, all thought to be Neolithic (Parker Pearson *et al.* 2020, 397). The original stone hollow was capped with a flint and sarsen cairn; a marking practice similar to that seen at the Woodlands pits, the cremation burial at MoD Headquarters and the burial at the centre of Woodhenge (Sections A1.5.1, A1.5.3, A1.5.10).

1.5.6 West Amesbury henge

Excavations at the riverside terminus of the Stonehenge Avenue (Section A1.5.13) have revealed an arc of ten stone holes set within an earthwork enclosure, or henge (Figure A1-20). Although partly lost to the encroaching river, this henge was 23.4 m in overall diameter, with a ditch 2.6 m wide and 1.2 m deep, perhaps with an outer bank and an entrance on the eastern side (Parker Pearson *et al.* 2020, 250–2). An antler pick from the ditch has provided an estimate of 2460–2205 cal BC (Table A1-2: weighted mean ARS 095 491) for its construction. The nine stone holes which range from 0.85 to 1.3 m deep and up to 1.5 m in diameter, were found to have ramps for the erection of uprights. At their bases, most had cushions of

clay with flint nodules that appear to have supported the upright stones, although one (Stonehole E) had an elaborate 'nest' of flint nodules (Parker Pearson *et al.* 2020).



Figure A1-20 Aerial view of West Amesbury henge excavations, with the stone holes marked by black buckets © Stonehenge Riverside Project

Although no bluestone chips were found, from the shape of the stone holes and indentations in some of the bases, these contained rectangular, oval and triangular cross-section stones, matching bluestones from the inner horseshoe at Stonehenge (Parker Pearson *et al.* 2020, 248). Despite a series of six Neolithic radiocarbon determinations on samples of animal bone and antler picks from the monument (Table A1-2), the chronology remains unclear; much depends on how the samples and their contexts are interpreted. However, a pig humerus from the fill of Stonehole C provides a TPQ for the removal of this stone of 2840–2460 cal BC (Table A1-2: SUERC-26460; Parker Pearson *et al.* 2020, 273). The large and multi-period flint assemblage from this site is particularly interesting, including non-local Bullhead flint, and a concentration of Neolithic chisel arrowheads suggesting occupation from the middle or late Neolithic (Section A1.4.1), although whether this material is residual within the stone holes or is contemporary with the stone circle is unknown.

1.5.7 Bulford double henge and other small henges

Two conjoining henge monuments dating to the late Neolithic were built south of Bulford (Leivers 2021; Figure A1-14). The henges have similar internal diameters: the western 17.5 m and the eastern 16 m. Both have segmented ditches, with entrances 4.6 m across on the north side (Leivers 2019, 30–3). No internal features survived, nor were there clear traces of internal or external mounds or banks. In the western henge ditch artefacts were scarce but included undecorated Grooved Ware pottery and animal bone, whereas finds of Grooved Ware pottery, animal bones, charcoal and flint-knapping debris suggest considerable activity in the vicinity of the eastern henge. Modelling of dates (Table A1-2) suggests that the double henge was constructed in the period 2515–2460 cal BC (68% probability; Leivers 2019, 102).

Scattered in the area were six pits, some of which contained placed deposits, as well as two large circular cut features, all containing late Neolithic material. A nearby post-pit contained burnt animal bone and a small quantity of burnt and degraded human bone (Leivers 2019, 77). Samples from these pits, features and post-pit returned dates contemporary with the double henges (Table A1-2).

It has been suggested that many early Bronze Age round barrows in the Stonehenge landscape cover earlier segmented or oval ditches that may represent small Neolithic mini-henges or enclosures, features that have also been identified elsewhere through geophysical survey (Bowden *et al.* 2015, 35–6). Although small Neolithic henges and ring ditches are certainly possible in the Stonehenge landscape (Bowden *et al.* 2015, table 3.1), based on analogy with those known at Wyke Down, Dorset, or Raunds, Northamptonshire, no certain examples have yet been identified. The example at Fargo plantation (Stone 1938) is often cited as a Neolithic monument but there is nothing presently to indicate that this site dates from before the early Bronze Age. Barrows such as Amesbury 50 (one of the Cursus Barrow Group) and Amesbury 9 in the Stonehenge triangle, have been shown to cover segmented ditches and post circles (Darvill *et al.* 2013, fig 11; Linford *et al.* 2012). Although there is a possibility that these are Neolithic structures, this type of causewayed barrow is known to date to the early Bronze Age elsewhere in the Stonehenge landscape (Darvill 2006, fig 54) and these features may simply be elaborate early phases of the burial monuments. Two ring ditches to the east of Larkhill causewayed enclosure (Figure A1-1), possibly dug around standing trees, are associated with late Neolithic material and may date to this period (Leivers 2021). A circle of 30 pits identified by geophysical survey to the north of Airman's Corner, with an entrance gap to the north, may also be a Neolithic structure but remains undated (Parker Pearson *et al.* 2020, 209–11).

1.5.8 Durrington shafts and associated post alignment

An extremely large enclosure, comprising a circuit of deep pits or shafts, connected by a series of post alignments, existed around Durrington Walls in the late Neolithic (Wessex Archaeology 2014; Thompson and Powell 2018, 15–8; Gaffney *et al.* 2020; Leivers 2021). These pits, up to 5 m deep and 10 m across, were discovered through geophysical survey and have been investigated through coring. The pits had weathered out to form features of 18–24 m in diameter. There is some debate as to whether these are natural sinkholes, artificial shafts or a combination of the two, but their layout looks to have been deliberately planned (Figure A1-21) and the consistent dimensions and flat bases appear to suggest artificial pits (Vince Gaffney pers. comm.). Radiocarbon dates on animal bones from Shaft 8A show that these pits were open in the late Neolithic period (Gaffney *et al.* 2020, table 1).

On this north-west side of the pit circuit, a line of six posts were erected extending 30 m out from the nearly 1000-year-old entrance of the Larkhill enclosure, just inside the arc of large pits or solution hollows (Leivers 2021). Cattle bone found in one of these postholes (Table A1-2: SUERC-70508) has been dated to 2470–2290 cal BC. It has been suggested that these postholes have a solstitial alignment towards

midsummer sunrise over Sidbury Hill on the horizon (Ruggles *et al.* 2021) but the line is slightly curved, and the wider context shows that these posts were part of a much larger circuit made up of short lines (Leivers 2021, fig 12), so this is far from certain.

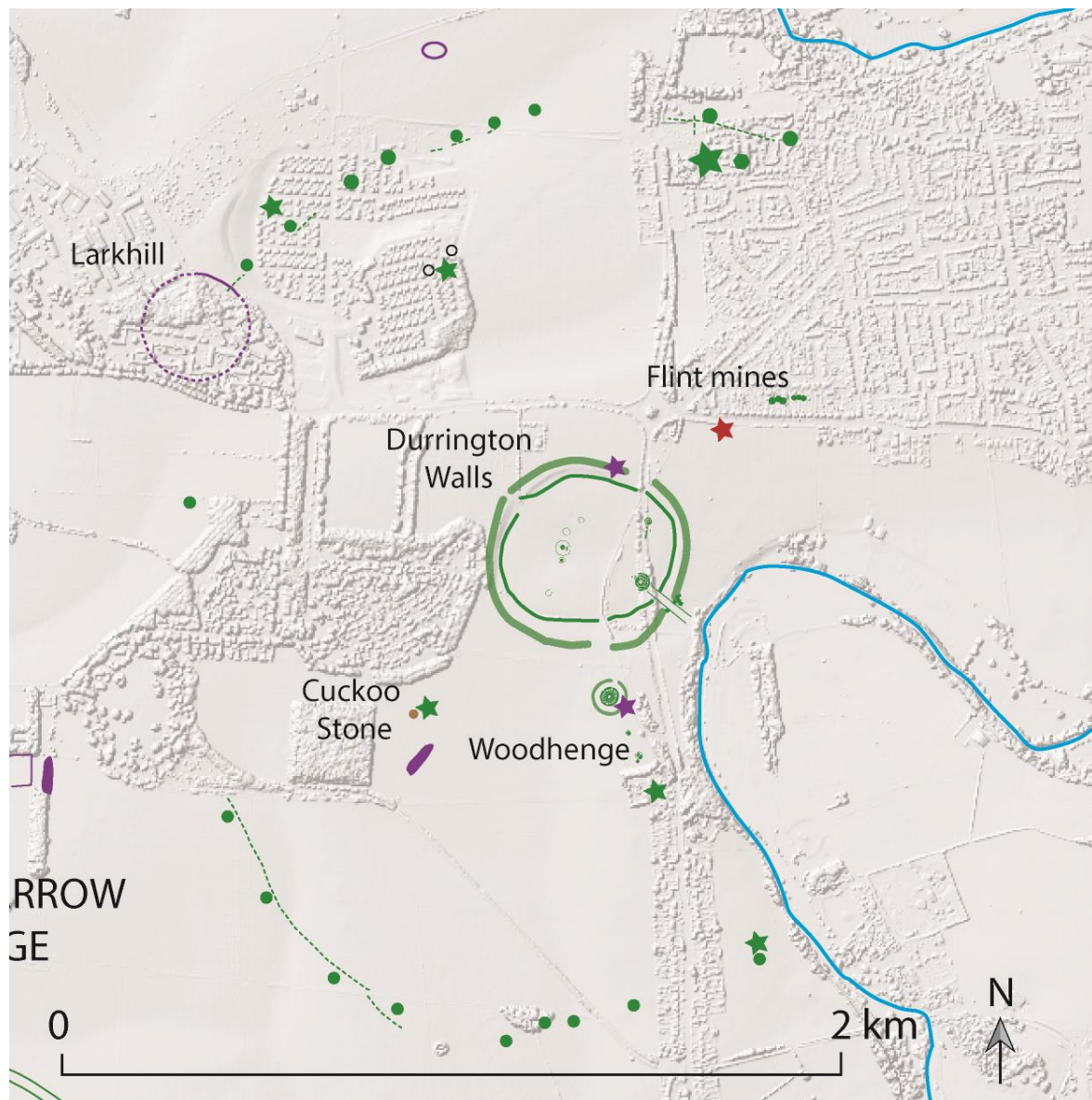


Figure A1-21 Circuit of large pits or possibly solution hollows surrounding Durrington Walls, and their associated posthole alignments (information from Gaffney *et al.* 2020, figs 3–6; Thompson and Powell 2018, fig 3.1)

A continuation of this post circuit was excavated at the MoD Headquarters site, where an alignment of 16 postholes irregularly spaced over 240 m were found (Thompson and Powell 2018, fig 3.1). Most of these had either ramps or packing material confirming the presence of posts; nine contained Grooved Ware pottery, and others had worked flint of late Neolithic date. Intersecting with this alignment was another row of postholes running north–south over 40 m (Thompson and Powell 2018, 13–4). Radiocarbon dates from these postholes (Table A1-2) have been modelled to provide an estimate of 2745–2580 *cal BC* (95% probability; Barclay *et al.* 2018, fig 7.2: *last latest sapwood*) for the construction of these alignments, with

animal bone deposits in the postholes dating to 2575–2470 cal BC (95% probability; Barclay *et al.* 2018, fig 7.2, *first earliest bone*). These dates appear to be contemporary with deposition within the open shafts, as shown by a date obtained on animal bone from Shaft 8A of 2460–2200 cal BC (Table A1-2: SUERC-92470). Two further post alignments have been excavated to the north-west (Leivers 2021) and geophysical survey suggests the circuit continued around the south-east (Gaffney *et al.* 2020, fig 4). Within this enclosure of large pits joined by post alignments was an area of extraordinarily dense occupation activity and monument construction.

1.5.9 Durrington timber monuments

The most elaborate timber setting at Durrington was the Southern Circle (Figure A1-22). This monument had at least two phases of construction, with an earlier, simple ‘square-in-circle’ monument associated with an avenue and façade to the south-east, later elaborated by the erection of six concentric rings of posts (Wainwright and Longworth 1971, 23–38). The best estimate for the construction of Phase 1 is provided by a radiocarbon date on an antler pick from posthole 187, which dates to 2670–2460 cal BC (Table A1-2: SUERC-30992; Noble *et al.* 2011, 160). The replacement of the Phase I structure with Phase II may have been relatively quick; the postholes of Ring 2D were placed between pairs of earlier postholes. As these larger postholes can be seen to cut the postpipes of the smaller in at least one instance (e.g., Wainwright and Longworth 1971, fig 129), it is unlikely that they remained standing into Phase II, as Thomas (2007, 149) has suggested. Preliminary modelling of additional dates from the monument (Table A1-2) suggests that Phase II was built in 2490–2455 cal BC (Parker Pearson *et al.* 2013, 71).

Phase II comprised six concentric rings of posts, the internal ones forming ovals and the external being circular. A wide entrance to the south-east led onto a rammed surface or roadway, leading to the river cliff (Parker Pearson 2007, 130). The outer rings of monument may not have been present on the north-west side, supporting the conclusion that this was probably not a roofed structure (Thomas 2007, 147). Postpipes in all features showed that posts of 15–21 cm diameter had decayed in situ, and charcoal indicates that these were all oak (Wainwright and Longworth 1971, 220). Finds from the primary fills of the postholes comprised a few worked flints and animal bones, as well as antler picks that were deliberately placed in significant locations (Thomas 2007, fig 13.5). Concentrations of animal bones, Grooved Ware pottery, flint and bone artefacts were mostly found in the upper posthole fills, in pits dug after the posts had rotted. These were clearly deposited during commemorative or re-animative acts (Parker Pearson *et al.* 2006, 242; Pollard and Robinson 2007, 160), activity that continued into the Chalcolithic (Cleal and Pollard 2012, 327). Both phases of the Southern Circle were aligned on the winter solstice sunrise (Parker Pearson *et al.* 2007, 630; see Chapter 5, Case Study 9).

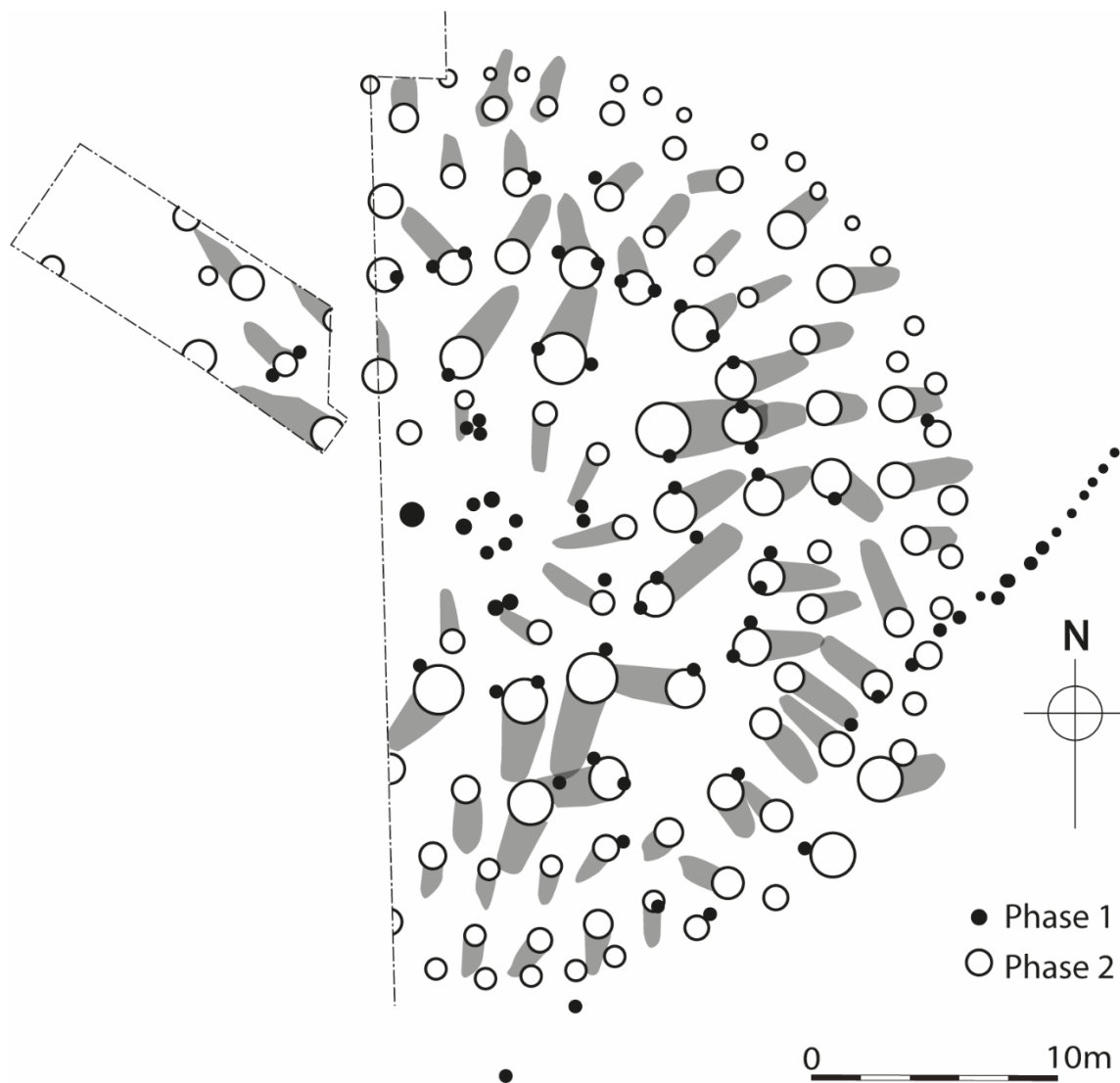


Figure A1-22 Southern Circle phases 1 and 2 (after Wainwright and Longworth 1971, fig 9; Thomas 2007, fig 13.1)

The Northern Circle, another 'square-in-circle' monument, lay 120 m to the north. Although less well preserved it is very similar to Phase 1 of the Southern Circle, and the suggestion of two phases here (Wainwright and Longworth 1971, 41) is less convincing. The four large central postholes held posts 59 cm in diameter, and the structure had a complex façade and avenue (Figures A1-23 and 5-17; Wainwright and Longworth 1971, 43). The quantities of finds were less than from the Southern Circle, but again most came from the upper parts of the postholes, where pits had been dug into the top of the rotting posts (Parker Pearson *et al.* 2004, 54).

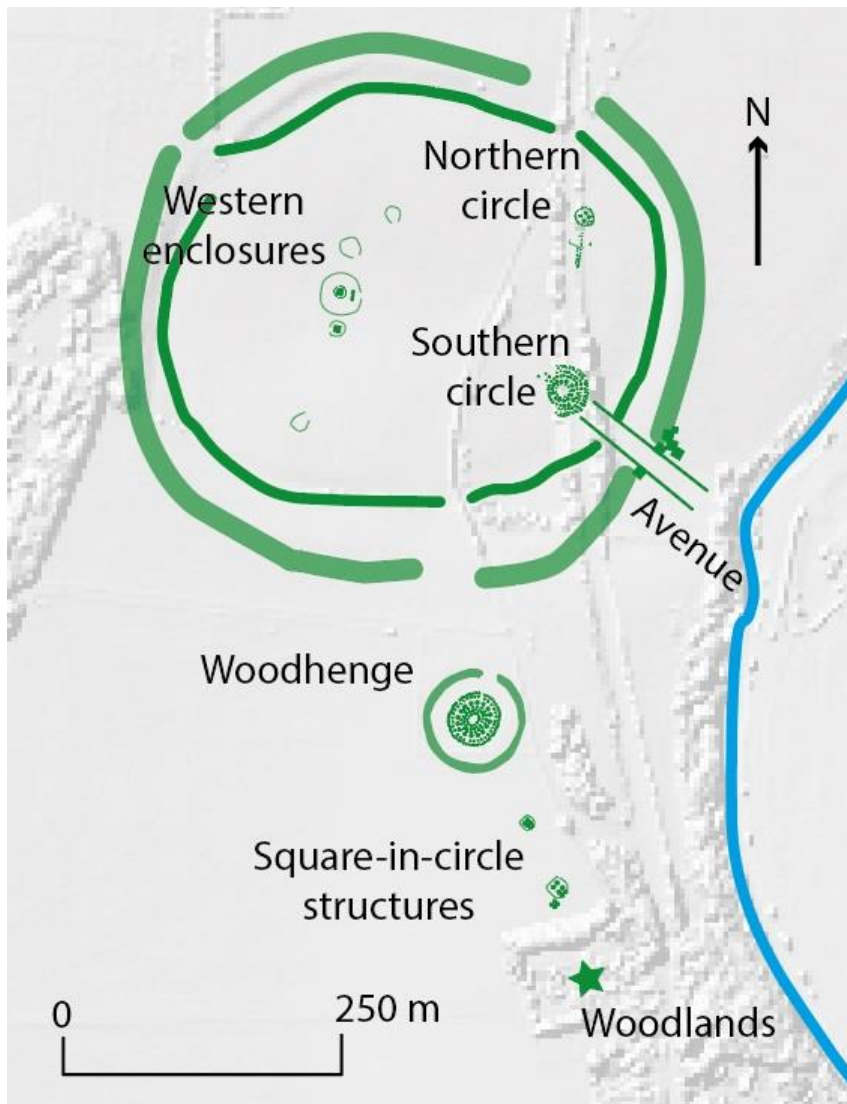


Figure A1-23 Overall map of Durrington monuments. Houses are show as small squares

Further up the coombe within the Durrington Walls henge is a line of at least five ditched enclosures, including one large circular example at 35 m across (David and Payne 1997). Excavation of this, as well as a smaller 12 m enclosure to the south, revealed similar structures to the probable houses found at the eastern entrance (Thomas 2007; Section A1.5.11). Like those, each was about 4 m square with rounded corners, central hearths, laid chalk floors and stake walls. However, here they were surrounded by a palisade of posts and a ditched enclosure. The example within the larger enclosure also had four postholes around the central hearth, perhaps supporting a roof, making it akin to square-in-circle monuments. It also had two additional pairs of very large postholes at the entrance, interpreted as possible timber ‘trilithons’ (Thomas 2007, 155). These structures have been interpreted as “monumental elaborations on the theme of the house” (Parker Pearson 2007, 142), and as possible “shrines or cult houses” (Thomas 2007, 156). They demonstrate the continuum of architectural tradition from small seemingly ‘domestic’ house structures to elaborate timber concentric monuments such as the Southern Circle, via the intermediate square-in-circle monuments.

1.5.10 Woodhenge and other timber monuments

Just to the south of Durrington Walls henge but still within the larger shaft enclosure is Woodhenge (Figures A1-23 and 24). Formed of six concentric ovals of standing posts, surrounded by a bank and ditch (Cunnington 1929), it was constructed at a site that had seen earlier occupation (Section A1.3.1). Excavations showed that the timbers had mostly rotted in situ, and that at least two large sarsen stones were placed between pairs of posts on the southern side (Cunnington 1929). These were positioned in the location of three earlier pits, also likely to be stone holes (Pollard and Robinson 2007, 162–4). The monument was built to align with the midsummer sunrise in a similar manner to Stonehenge (Chapter 5, Case Study 9).

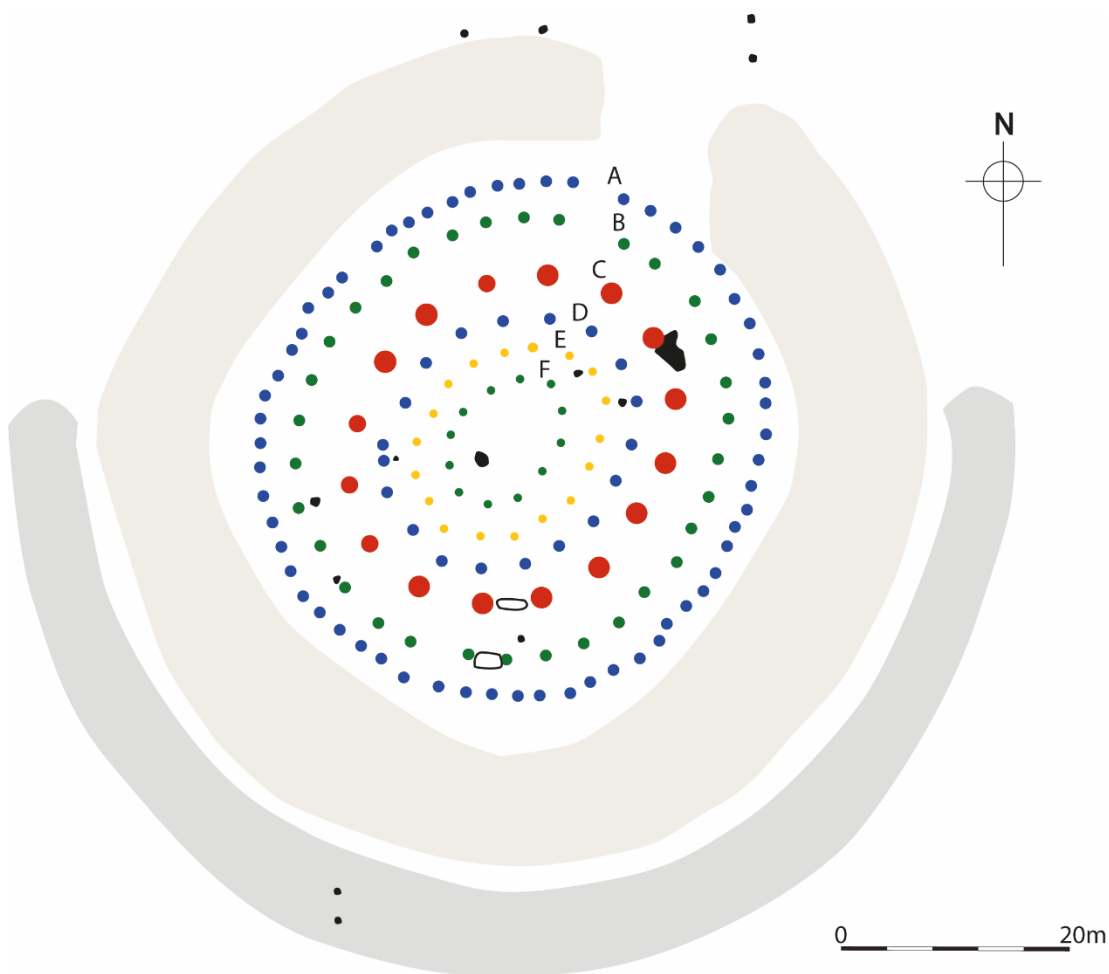


Figure A1-24 Plan of Woodhenge (after Cunnington 1929, plate 4)

Large quantities of cultural material, including Grooved Ware pottery, antler picks, carved chalk objects (including a unique skeuomorph axe), animal bones, flint tools and worked flint, fragments of human bone and at least one cremation were deposited largely in hollows left after the posts had rotted but also in the ditch on either side of the entrance (Cunnington 1929; Pollard and Robinson 2007, 160). Their positioning reflected points of transition and distinctions between interior and exterior, east and west, perhaps reflecting patterns of formal movement (Pollard 1995a). Further material was found under the

henge bank, which covered at least six pits seemingly dug and rapidly backfilled with charcoal-rich soil and late Neolithic artefacts, perhaps deriving from a nearby midden (Pollard 1995a, 141–2). A child burial on the central axis may be Neolithic; the burial of a male in the ditch is early Bronze Age in date.

Radiocarbon dates are available on an antler pick and animal bone from the base of the ditch, although these have large error ranges (Table A1-2: BM-677 and BM-678). In any case the ditch may post-date the timber setting, based on the evidence of activity associated with Grooved Ware sealed below the henge bank (Pollard 1995a, 142) and by comparison with sequences at other similar sites (Gibson 1998, 36; Gibson 2005, 46). A date on cattle bone from the top of a tree throw underneath the henge bank provides a TPQ for its construction of 2580–2350 cal BC (93% probability; Table A1-2: SUERC-32161). The cremation burial from posthole C14 has a similar date of 2580–2460 cal BC (95% probability; Table A1-2: OxA-19047; Parker Pearson *et al.* 2020, 180), suggesting that the timber monument was built shortly before the mid-3rd millennium BC. A current dating project will hopefully provide further clarity (Amanda Chadburn, pers. comm.).

To the south of Woodhenge stood at least three late Neolithic ‘square-in-circle’ monuments (Figure A1-23). Closest to Woodhenge, was a square arrangement of posts set c.3.6 m apart, with a pair of large pits or postholes to the east, under the later round barrow Durrington 70 (Pollard *et al.* 2007, 5–6). The central posts had decayed in situ, after which pits were cut into the hollows, and deposits of cattle bone, pig bone, a canid skull and a split cattle long bone placed into them. Two entrance pits to the east appeared to have held posts that were subsequently removed. Further south, a structure under later ring ditch Durrington 68 comprised four substantial postholes which held posts 4–6 m high, surrounded by a sub-rectangular post defined enclosure (Cunnington 1929, Pollard 1995b, Pollard *et al.* 2007). Two sizeable pits defined a gap in this enclosure to the south-east, likely the entrance, with a cremation associated with Grooved Ware pottery in one (Pollard 1995b, 123–4). These pits are likely to be secondary features, perhaps dug after the entrance posts themselves had been dismantled. The long axis of the structure is aligned to the south-east, towards the midwinter solstice sunrise (Pollard *et al.* 2007, 3–4; Chapter 5.6). Other late Neolithic pits and postholes were associated with this structure and the grave of a crouched adult female may be contemporary (Cunnington 1929, 59–60).

To the south-west of this structure was another smaller timber monument of similar form. Four postholes forming a square of c.2.5 m, each associated with a ramp interpreted as relating to post extraction (Pollard *et al.* 2007, 5). No trace of a surrounding enclosure was found but is likely to have been lost to the plough. All three of these ‘square-in-circle’ monuments have very similar plan forms and are closely comparable to the Northern Circle and first phase of the Southern Circle (Section A1.5.9), as well as Coneybury henge (Section A1.5.2).

Finally, at the southern end of this cluster of monuments was a small pit circle partly lying under later ring-ditch Durrington 67. Currently undated, this ring of 10 pits had varied fills, with signs of rapid backfilling and later re-cutting (Pollard *et al.* 2007, 8–9). This ridge south of Woodhenge was intensively occupied and provided a focus for the construction of ritual monuments, perhaps platforms related to funerary activities, or shrines positioned to overlook the nearby river. These forms of monument drew on the architecture of domestic houses (Pollard 2009, 344).

On the opposite side of the River Avon, a large oval of at least 32 deep pits has been excavated on Boscombe Down, measuring 65 m by 45 m and, like Woodhenge, with an axis on a north-east to south-west alignment. Although the evidence was not clear in every case, most of the pits had ramps suggesting that they had originally held wooden posts (Fitzpatrick 2004). Finds associated with this structure included Grooved Ware and Beaker pottery. Nearby was also a late Neolithic pit or post alignment, several late Neolithic pits and another square-in-circle monument (Powell and Barclay forthcoming), as well as significant Beaker burials (Fitzpatrick 2013, fig 3). Locations on both sides of the River Avon were clearly significant in the late Neolithic, presumably linked by a fording point in the Amesbury area.

Looking at a plan of all the timber structures in the Durrington area (Figure A1-23), it appears that the monuments were built in an arc reflecting the course of the river, on either side of the dry coombe, with another row of enclosures further uphill. This group of structures were located at the centre of the much larger circuit of natural or artificial shafts, linked by post alignments (Section A1.5.8). Initially these were simple square-in-circle monuments of varying sizes, but later those in the central area were elaborated, increasing in size and complexity. Although Woodhenge does not appear to have developed from a simpler square-in-circle structure like the Southern Circle, it was certainly a site of previous occupation in both the early and late Neolithic. In the latest Neolithic the area must have been a scatter of decayed and fallen posts, with large areas of midden material and vestiges of earlier occupation and structures, where people visited to deposit offerings in the hollows of these remembered earlier temples.

1.5.11 Durrington settlement and western enclosures

Durrington Walls is perhaps best known for its enormous surviving earthwork, placing it alongside sites like Avebury, Mount Pleasant and Marden as a 'mega-henge' (Figure A1-25). In addition to the timber concentric structures described in Section 1.5.10, recent excavations have uncovered a roadway or avenue and several small probable houses (Parker Pearson 2007). Although this research is not yet fully published (Parker Pearson *et al.* forthcoming), some key conclusions are available.



Figure A1-25 Aerial view of Durrington Walls henge from the east © Historic England 27522_041

The henge enclosure, comprising a ditch with external bank, surrounds a dry coombe leading down to a cliff above the River Avon (Wainwright and Longworth 1971, 1–8). The natural slopes of the coombe and side coombes were accentuated to form the enclosure (Stone *et al.* 1954, 160). The presence of the narrow north-west entrance has been questioned, as geophysical survey appears to show the ditch continuing across it (Gaffney *et al.* 2018, fig 15). The suggestion that two further entrances existed to the north and south that were later blocked (Parker Pearson *et al.* 2004, 53–4) is difficult to substantiate with any certainty, although there are indications that the ditch turns inwards either side of the old road to the south (Payne 2004). The bank, estimated to have originally stood 3 m high, overlay an early Neolithic pottery scatter to the north (Section A1.3.1) and hollows, burnt areas, chipping floors and a hearth associated with Grooved Ware pottery, flints and animal bones, to the south (Wainwright and Longworth 1971, 13–8). The henge bank was completed by 2480–2450 *cal BC* (95% probability; Parker Pearson *et al.* 2017, 5).

The enclosure ditch was over 5.5 m deep with a flat base and irregular plan that suggests it was dug in large segments of about 40 m long (Payne 2004; Parker Pearson 2007, 140–1). Only antler picks were found in the primary fills on the north side, but the southern ditch contained large amounts of Grooved Ware pottery, flint implements, bone and antler (including a cache of 57 picks), especially towards the terminal where the excavators suggested that people entering or leaving the enclosure had deposited

material (Wainwright and Longworth 1971, 22). Radiocarbon dates on charcoal, animal bones and antlers from the primary fill of the ditch in this area suggest a mid-3rd millennium date (Table A1-2).

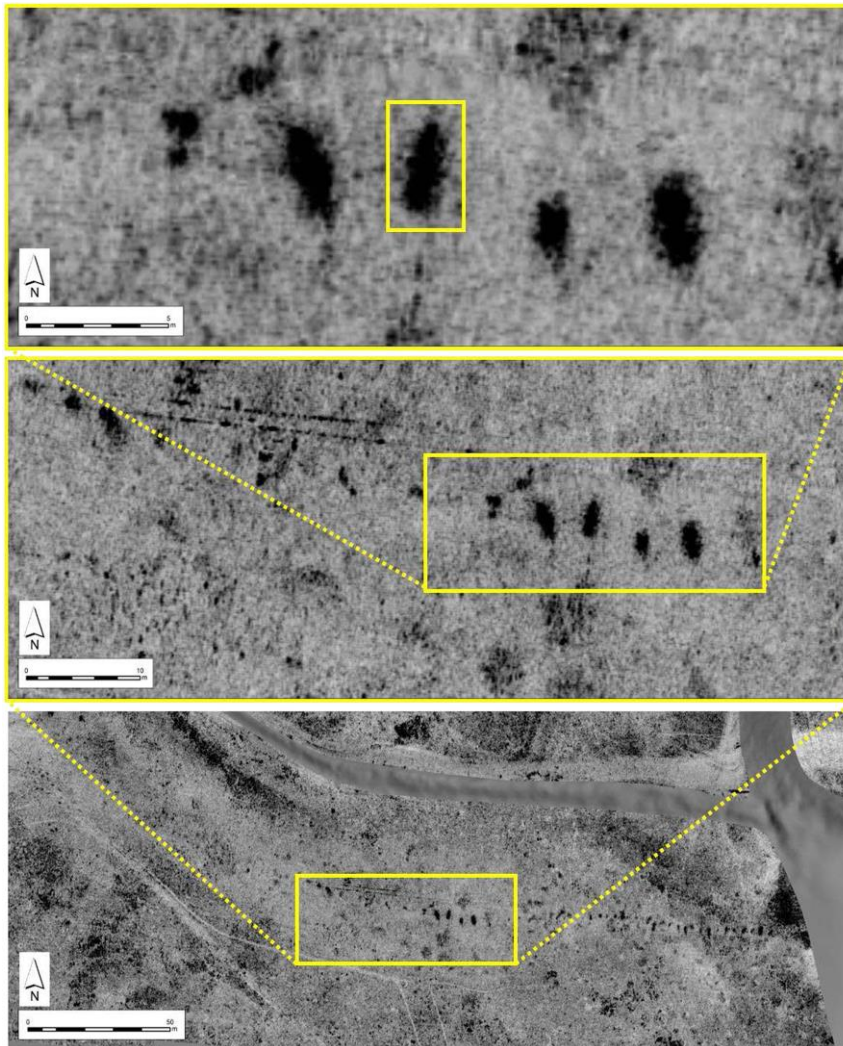


Figure A1-26 GPR anomalies underlying the southern bank of Durrington Walls (Gaffney *et al.* 2018, fig 9; CC BY 3.0)

Geophysical survey has identified a circuit of at least 130 substantial postholes underneath the henge bank (Gaffney *et al.* 2018; Figure A1-26). Excavation has revealed these to be 1.5 m deep with associated ramps, dug through a thick late Neolithic occupation layer, with the posts taken down before the bank was constructed (Parker Pearson *et al.* 2017). Six similar postholes had previously been identified on the north-eastern side of the henge (Wainwright and Longworth 1971, 15–7) and two were excavated under the henge bank on the eastern side (Parker Pearson 2007, 140), so it is likely that a complete circuit of posts once enclosed the dry valley; in other words, a palisaded enclosure. On the southern side of the enclosure, a double row of much smaller postholes was found stretching for more than 20 m along the external edge of the bank and four further postholes under the centre of the bank (Stone *et al.* 1954, 164; Wainwright and Longworth 1971, 17). Again, these pre-dated the construction of the bank and may be associated with this enclosure.

At the south-east entrance, a surfaced roadway or avenue has been discovered, originally c.100 m long and c.15 m wide, flanked by a gully and bank on each side. The avenue leads from the Southern Circle to the edge of the river cliff, with the central part of the roadway being extensive trampled from foot traffic (Parker Pearson *et al.* 2006, 238). The lower roadway surface was composed of natural weathered flints, and this had been augmented by rammed flint with quantities of animal bones, burnt flint, sarsen lumps and pottery. At the north-eastern edge were three stone holes, and a large pit midway along may have held a timber post (Parker Pearson 2007, 130). The avenue appears to be aligned on the sunset at midsummer solstice, to observers facing upslope towards the Southern Circle (Parker Pearson *et al.* 2006, 239).

Pre-dating the construction of the henge earthwork and associated with this roadway was a substantial settlement, with many small square structures, associated with pits, fence lines and extensive middens. Six of these structures, likely to be houses, were excavated near the south-east entrance to the henge where they were preserved by the overlying bank. Two stood opposite each other on the banks of the avenue, and the rest were clustered to the north. Each was roughly 5 m by 5 m square with rounded corners, with a puddled chalk floor and central oval hearth (Figure A1-27). The house walls were stake-built, probably with wattling and chalk daub. Two of the houses had evidence for wooden beams against the edge of the floor, perhaps supports for furniture, and several had re-laid and repaired floors suggesting regular episodes of occupation (for a detailed description see Parker Pearson 2007, 133–40).



Figure A1-27 Aerial view of House 851 at Durrington Walls © Stonehenge Riverside Project

Further magnetic anomalies in this area from geophysical surveys indicate the positions of more houses and intensive activity below the eastern bank of the henge (Payne 2004, fig 8). Combined with evidence for burning and occupation found under the henge bank to the south (Stone *et al.* 1954), the settlement appears to have been extensive, with potentially several hundred houses. The houses were associated with intercutting pits, some dug for the extraction of soliflucted chalk for the walls and floors, others for the deposition of midden material and some dug into the house floors after their abandonment as part of 'closing ceremonies' (Parker Pearson *et al.* 2008, 159). The settlement began in 2535–2475 *cal BC* and was abandoned by 2480–2440 *cal BC*, suggesting a relatively short duration of occupation, probably less than 55 years (95% probability; Parker Pearson *et al.* 2013, 74; Craig *et al.* 2015, 1097).

The area surrounding the houses and avenue at the eastern entrance was covered by deep middens of ash and cultural debris (Parker Pearson *et al.* 2007, 633), including a large midden in a hollow screened by two arcs of fence just outside the Southern Circle (Wainwright and Longworth 1971, 38–40). Over 80,000 pig and cattle bones have been excavated and over 12,500 sherds of Grooved Ware pottery (Craig *et al.* 2015, 1098). The people occupying this settlement appear to have been consumers, rather than producers. No cereal grains or glume fragments have been recovered despite extensive sampling, and no grinding stones have been found; any cereal products consumed must have been already processed. A few fruit parts and tubers have been found (Craig *et al.* 2015, 1103). All parts of pig and cattle skeletons are represented but no neonates are present, suggesting that the animals were brought to the site on the hoof. The sheer quantities of animal bones, some of which had not been fully processed for their nutritious parts, suggests feasting on a large scale (Arborella and Serjeantson 2002).

Multi-isotope analysis of pig and cattle teeth from Durrington Walls exhibit a varied and broad geographic distribution, suggesting origins and long-distance travel from variable places throughout Britain (Viner *et al.* 2010, Madgwick *et al.* 2012, Evans *et al.* 2019, Madgwick *et al.* 2019). Although some animals had isotope values that are consistent with a 'local' origin on southern British chalk, others have values consistent with the south-west of Britain, Wales and northern Britain, potentially even Scotland or Ireland (Madgwick *et al.* 2012). By proxy, the movement of animals suggests the movement of people to take part in feasting and monument building at Durrington. As very few human remains survive from this part of the late Neolithic, this is difficult to prove with any certainty, but a single human tooth has isotope values suggesting an origin in south-west Britain (Chan *et al.* 2016, 30).

Based on patterns of pig tooth eruption and wear, there was a killing peak of pigs at an 'immature' stage, towards the end of their first year, although post-cranial evidence suggesting an older kill-off pattern was also present (Arborella and Payne 2005; Wright *et al.* 2014). Assuming most births were likely to occur in spring, many pigs were probably slaughtered in winter. Given the solstice orientations of timber monuments, the avenue and nearby Stonehenge, it seems likely that gatherings took place at midwinter. Ceramic residue analysis of pottery from the site has shown that although some were used for cooking

pork, most were used for beef or dairy products. Pots containing dairy products, generally smaller in size, were concentrated at the Southern Circle, as well as the nearby midden and avenue, and may have been involved in ceremonies (Craig *et al.* 2015). The lithic assemblage is dominated by transverse oblique arrowheads, many of which were made by inexperienced knappers, suggesting specialist teaching activity (Chan *et al.* 2016, 39). Some of the pigs and cattle (four examples) had been shot with these flint arrows (Albarella and Serjeantson 2002) in what can only have been ceremonial or sporting occasions, perhaps relating to rites of passage. In addition, objects such as the flint phallus, balls and pelvis-shaped nodule found in a pit outside the eastern entrance, suggest ceremonies related to fertility (Parker Pearson *et al.* 2006, 252) and to wider beliefs about the underworld (Chapter 3).

1.5.12 Stonehenge II & III

The earliest phases of Stonehenge have already been described in Sections A1.4.3 and A1.5.3. The most recent published sequence and radiocarbon modelling for Stonehenge (Darvill *et al.* 2012, Marshall *et al.* 2012) is followed here; the astronomical orientations are explored in Chapter 5, Case Study 9.

Within the enclosure at Stonehenge are many postholes, most of which are undated and few of which have clear stratigraphic relationships, although where these exist the posthole is almost always earlier than the bluestone and sarsen settings (Cleal *et al.* 1995, 147–8). It is possible that a timber setting stood at the centre of the monument during an early phase of the site's history, perhaps concurrently with standing stones in the Aubrey Holes and there is some coherence to the plan (Figure A1-28). In the south is a rectangular post setting often termed the 'southern passageway', with a façade of posts crossing it (Cleal *et al.* 1995, 150–2). Most of the other postholes appear to be part of a large, roughly square arrangement, with a rectangular setting extending to the south-east, not dissimilar to some Irish late Neolithic timber settings such as Ballynahatty and Armalughley (Figure 5-19). Several of the postholes on the south-east and north-west side of this possible arrangement were particularly deep and large (Cleal *et al.* 1995, 147). The possible entrance setting to the south-east appears to fit with the concentration of cremation burials at the south-east perimeter and conforms to the pattern of south-easterly orientation of late Neolithic timber monuments (Chapter 5, Case Study 9). A fragment of pig rib from posthole 1884, part of the south-east 'entrance' setting provides a date for its filling of 2580–2350 cal BC (Table A1-2: OxA-V-2232-51). This timber arrangement may have stood immediately prior to, and indeed appears to have been replaced by, the bluestones in the Q and R holes.

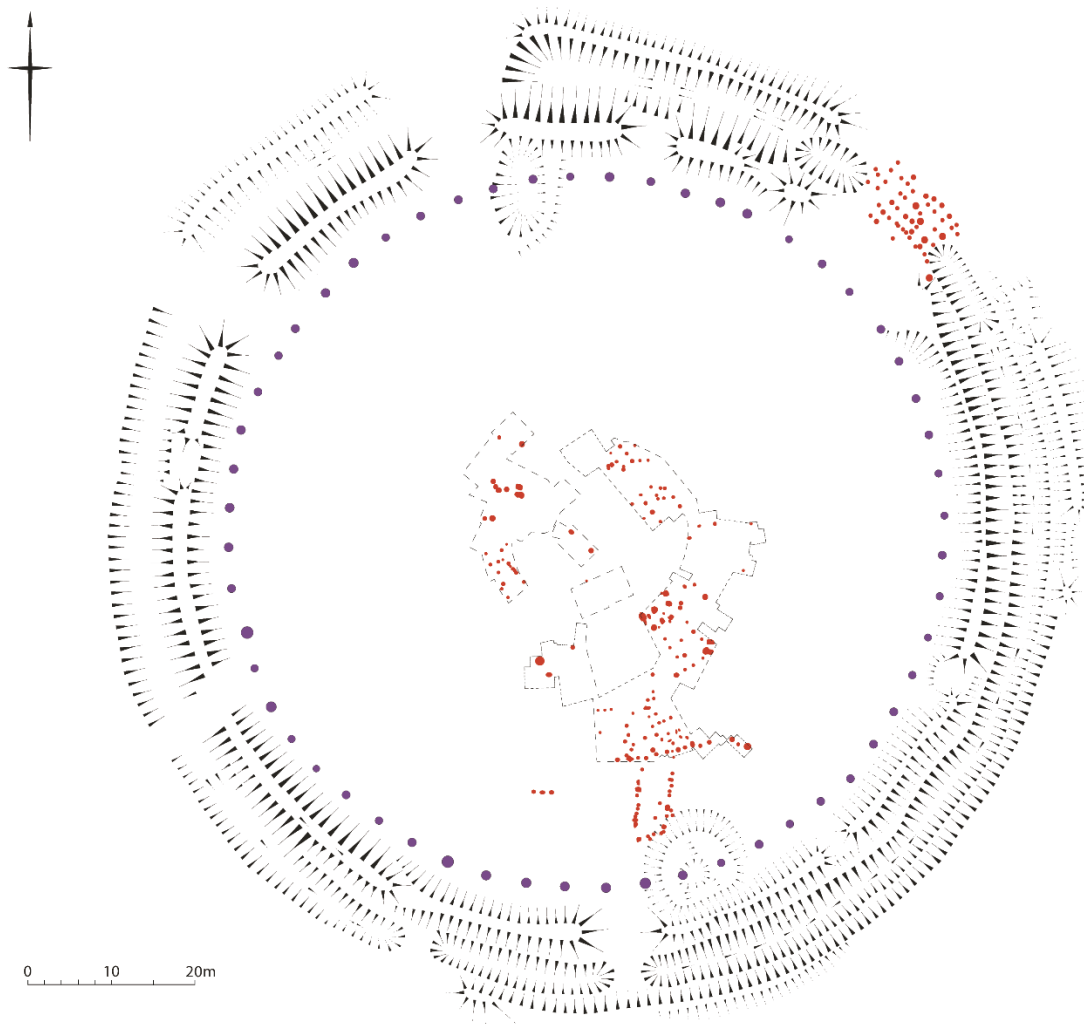


Figure A1-28 Timber elements of Stonehenge, largely pre-dating the central stone elements. Earthwork survey © Historic England, with information from Cleal *et al.* 1995, fig 66 and plan 2

The sarsen and bluestone monument at Stonehenge represents a pinnacle of late Neolithic architecture and social achievement. Most of the sarsens were extracted and transported from the West Woods area of the Marlborough Downs, 15 miles to the north (Nash *et al.* 2020). Dressing and working of these sarsens took place in the area to the north of the monument (Parker Pearson *et al.* 2020, 305–11), where the stones were worked into regular blocks with joints (mortise and tenon, and tongue and groove). The sarsens were arranged in a horseshoe of trilithons and a sarsen circle, orientated around a solstitial axis. It has been suggested that the outer circle was never completed on the south-west side, due to the number of missing stones, the small size of Stone 11 and the irregularity of the surviving uprights in this part of the circle (Bowden *et al.* 2015, 43–5). However, much stone has evidently been removed from the site and parchmarks show that stoneholes were dug to receive the missing stones (Banton *et al.* 2014). This indicates that a complete circuit was intended, and it takes special pleading to suggest that the holes were dug but never received their uprights.

The erection of the sarsen settings is not well dated, with only a single antler pick from the stonehole of trilithon 53/54 dating its construction to 2480–2200 cal BC (Table A1-2: OxA-4840), probably 2470–2300 cal BC (68% probability). Similarly, the sarsen circle is dated by a single antler tine from the base of Stonehole 1, dating its construction to 2590–2470 cal BC (Table A1-2: UBA-3821). Both appear to be secure contexts, and at face value suggest that the sarsen circle was built before the interior trilithons; unlikely, although not impossible. An antler pick from Stonehole E at the entrance dates that stone hole to 2470–2200 cal BC (Table A1-2: OxA-4838). A chronological model in which UBA-3821 is rejected as residual is perhaps the most cautiously reliable approach until further evidence is forthcoming, suggesting the sarsen circle was erected in 2580–2475 cal BC and the sarsen trilithons in 2585–2400 cal BC (93% probability, Marshall *et al.* 2012, table 10).

Between the sarsen settings the bluestones, brought from the Preseli Hills in south-west Wales, were set up in 'dumb-bell'-shaped stone holes known as the Q and R holes (Figure A1-29). Whether this was a complete circuit remains unknown, but the stones were doubled up in radially set pairs on at least the north-east side (Cleal *et al.* 1995, fig 80). The edge of Q Hole 4 may be cut by Stonehole 3 of the outer circle (Cleal *et al.* 1995, fig 140) suggesting that this bluestone arc was set up earlier than the outer sarsen circle, although this relationship has been questioned (Darvill *et al.* 2012, 1025). The clear orientation of this structure to the north-east and the fine transverse tooling on the bluestones, matched only on the uprights of the sarsen trilithons, suggest that these two elements were set up at the same time (Abbott and Anderson-Whymark 2012, fig 9). A pig humerus from the fill near the top of one Q hole provides a TPQ for the filling of it after the extraction of the bluestone, showing that the setting must have stood earlier than 2460–2040 cal BC (Table A1-2: OxA-4901). At least four stones of the inner bluestone oval had seats and traces of tenons for lintels, corresponding with the two bluestone lintels that now form part of the outer circle. A further two bluestones have vertical tongue and groove joints, showing that they were slotted together (Abbott and Anderson-Whymark 2012, 25), most likely as part of a cove or focal screen (Darvill 1997, 184). Differential dressing of the faces of these bluestones suggests that these trilithons were probably erected facing the centre of the monument, rather than radially (Abbott and Anderson-Whymark 2012, 49–50); it is logical to suggest that they may have framed the solstice axis to the north-east and south-west. The bluestones in the Q and R holes closely follow the position of the earlier postholes, suggesting that the stones may have replaced a timber monument.

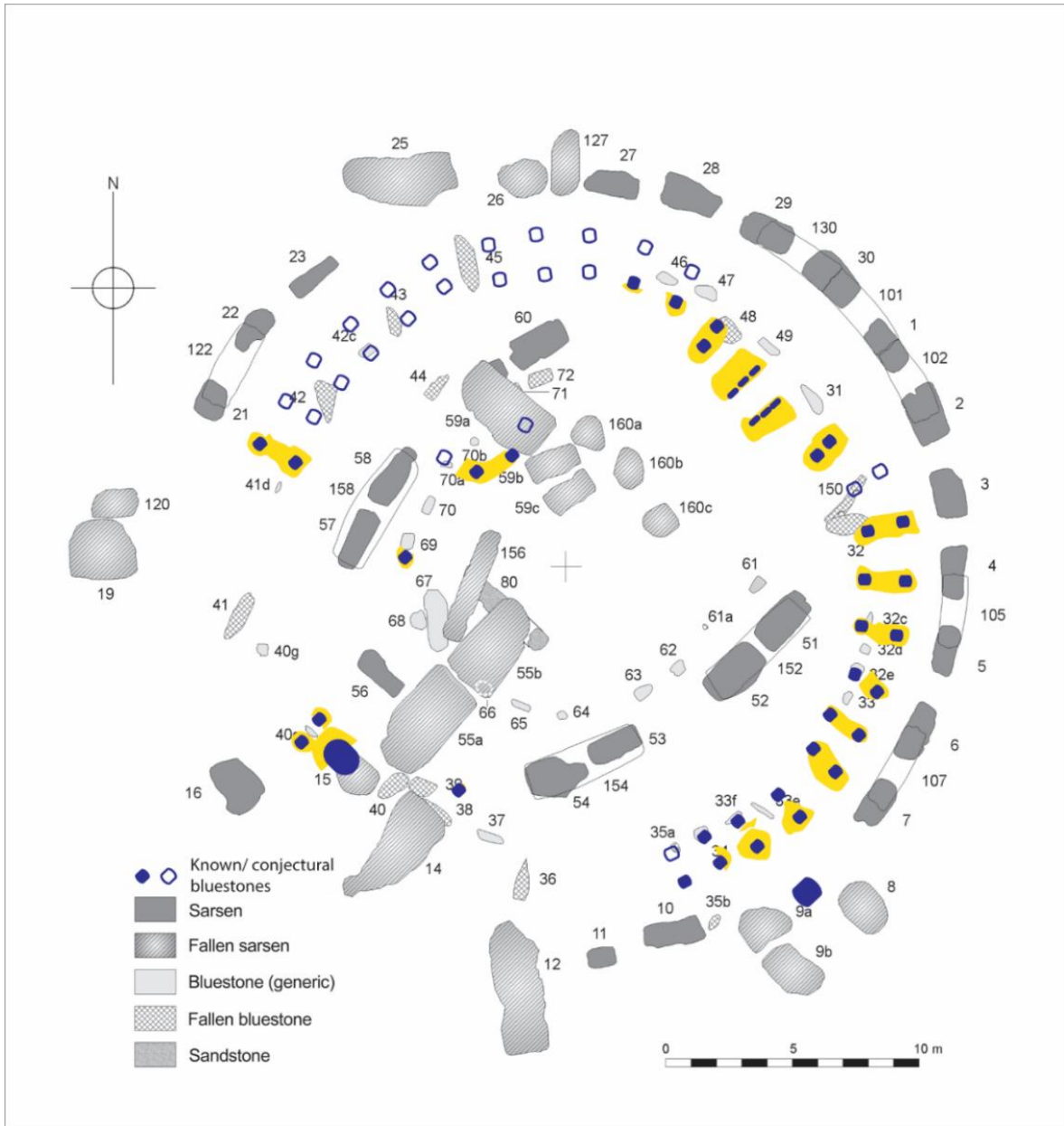


Figure A1-29 Plan of Stonehenge showing Q and R holes (yellow) and sarsen and bluestone settings. Base plan by Antony Johnson, reproduced under CC BY 3.0 licence, with additional information derived from Cleal *et al.* 1995, 109, 119–22

A large amount of geochemical and petrographic research has been carried out over the past fifteen years to identify the specific outcrops of the Preseli Hills where the bluestones originated, and to characterise and group the various non-sarsen stones from Stonehenge and the surrounding landscape (e.g., Ixer and Turner 2006; Ixer and Bevins 2010, 2016; Bevins *et al.* 2012, 2014, 2016). The bluestones are a variety of lithologies, including dolerite (mostly with a distinctive spotted appearance), rhyolites, volcanic tuffs and two different types of sandstone. Most spotted dolerites have now been provenanced to Carn Geodog and the main rhyolitic tuff debitage to Craig Rhos-y-felin; excavations at both locations have uncovered platforms, stone tools and occupation layers associated with stone extraction (Parker Pearson *et al.* 2019). The dating of this activity, and the stone setting at nearby Waun Mawn, is not

particularly clear, but it appears that all three sites were active in the last part of the 4th millennium BC (Parker Pearson *et al.* 2021). The sandstones were obtained from an area north of the Preseli Hills (Ixer *et al.* 2020) and the Altar Stone is unsourced but unlikely to come from Wales (Bevins *et al.* 2020; Richard Bevins pers. comm.).

A few of the unspotted dolerite bluestones may have formed part of a standing stone monument at Waun Mawn in the Preseli Hills, not far from their original outcrops, before being brought to Stonehenge (Parker Pearson *et al.* 2021). This monument appears to have been an arc of stones, with a 'gunsight' entrance towards the north-east, suggesting a possible solstitial orientation. Once transported, the bluestones may have stood in the Aubrey Holes around the perimeter of Stonehenge or at West Amesbury henge (Section A1.5.6), before being gathered at the centre of Stonehenge (Parker Pearson *et al.* 2020, 214).

In addition to the sarsen and bluestone settings at the centre of the henge enclosure, there were originally four sarsen Station Stones on the inner perimeter of the ditch, forming a rectangle with short sides aligned on the solstice axis. The southern Station Stone is set within the 'South Barrow', a 10–11 m diameter circular area surrounded by a shallow V-shaped ditch, which cut one of the Aubrey Holes (Cleal *et al.* 1995, 276–9). A level layer of beaten chalk mixed with clay which covered Aubrey Hole 17 within this 'barrow' was most likely a structure similar to those excavated at Durrington Walls (Parker Pearson *et al.* 2009, 33). At the north-east entrance was a complex arrangement of post facades and standing stones, including the Heel Stone, the largest and heaviest sarsen (Cleal *et al.* 1995, fig 156). These served to mark the solstice alignment, restrict access into the enclosure and mark the end of the avenue (Section A1.5.13; Pitts 1982, Cleal *et al.* 1995, 268–76).

After the sarsen stones were erected the silted up outer enclosure ditch was re-cut in a broad shallow U-shape (Parker Pearson *et al.* 2009, 29–30). This re-cutting can be dated to sometime after 2450–2230 cal BC (95% probability; Marshall *et al.* 2012, 15), probably 2400–2280 cal BC (64% probability) and took place before the burial of the 'Stonehenge Archer', who died in 2400–2140 cal BC (Table A1-2). Although this burial has been interpreted as the latest in a long sequence of funerary use of the site (Willis *et al.* 2016, 350), it is at least 350 years later than the main period of use of Stonehenge for cremation burials and represents a very different burial tradition belonging to the early Bronze Age (Pollard *et al.* 2017, 284–5).

The lintels, joints, and stone-working make Stonehenge a unique architectural monument. However, it does have parallels with other contemporary stone and timber concentric monuments such as nearby Woodhenge, the square-in-circle monuments at Durrington and Coneybury Henge, as well as monuments further afield, such as Site IV at Mount Pleasant and the Sanctuary at Avebury. Stonehenge itself may have had a significant timber phase, with elements later replaced in stone, and displays timber working techniques that were presumably present at contemporary wooden monuments (Whittle 1997, 149). As

others have noted (Pollard 2009, 246; Darvill 2016), the layout of the inner trilithons can be seen as a complex version of a square-in-circle monument, with the smaller trilithons as four settings in a square and the tallest trilithon as an 'entrance'. This central arrangement was encircled by the double bluestone arc, which has close similarities to the timber enclosures around other square-in-circle structures, such as Knowth (Figure 5-20) and may have replaced something similar in timber. It is tempting to suggest the outer sarsen circle was added later, wrapping and unifying this monument in yet another layer (cf. Richards 2013).

The last major re-organisation of Stonehenge was the dismantling of the double bluestone arc, and the re-arrangement of these stones, probably augmented by others, into a central oval and outer circle. Several radiocarbon dates on samples from the stone holes of these revised settings provide an estimate for this activity of 2240–2030 cal BC (92% probability; Marshall *et al.* 2012, table 9: *Bluestone Circle*) and 2210–1930 cal BC (93% probability; *Bluestone Horseshoe*). This shows that construction activity at Stonehenge continued well into the early Bronze Age, carried out by people who were using Beaker pottery and burying their dead in flat graves and round barrows in the surrounding landscape. It also shows the significance of the bluestones themselves, this being the last in a long sequence of movements and re-arrangements that eventually led to them being gathered at Stonehenge. Darvill (2016, 105) has argued that it was these exotic stones that provided the key to the power of the place and were perhaps present on site from the earliest phase in the Aubrey Holes. Their re-arrangement created the type of concentric monument seen elsewhere in timber monuments, but they remained enclosed and protected by the larger sarsens.

Stonehenge was created with materials brought over long distances from south-west Wales and the Marlborough Downs; its construction underlined social, spiritual and physical connections to other places and people (Chapter 4, Case Study 5). Despite the large numbers of people required for the construction of the stone monument, the space at the centre is relatively small and does not have acoustics to suggest projection out into the surrounding area (Cox *et al.* 2020), suggesting that only a limited number of people could observe the precise solstitial alignments and take part in ceremonies at the centre (Barrett 1994). This interior, the approach from the north-east and the solstitial axis were the most significant elements of the site, emphasised visually by extensive stone-working and the selection of regular stones (Abbott and Anderson-Whymark 2012, 21). The cleanliness of the site, in comparison to the monuments at Durrington, suggests that this was reserved and restricted space. All the other square-in-circle monuments in the Stonehenge landscape were located near the river; the fact that Stonehenge was not, and was built in stone, suggests that it is a fundamentally different structure. It was deliberately located within an earlier enclosure, a site of earlier funerary activities. Nevertheless, it was important to physically connect it to the river by an avenue, suggesting that the river was centrally important and perhaps viewed as a source of power.

1.5.13 Stonehenge Avenue

The avenue comprises parallel banks and ditches c. 20 m apart (Parker Pearson *et al.* 2020, 256) that extend nearly 1 km from the north-east entrance of Stonehenge, across the valley of Stonehenge Bottom, over King Barrow Ridge and down to the River Avon at West Amesbury, where a henge and stone circle was located (Section A1.5.6). The solstice alignment of the portion of the avenue nearest Stonehenge and its relationship to periglacial features is discussed in Chapter 5, Case Study 9.

Modelling of all dates from the ditches suggests that the avenue was built in 2500–2270 *cal BC* (95% probability; Parker Pearson *et al.* 2020, 460, fig 8.47), probably 2420–2285 *cal BC* (68% probability). This is closely comparable to the date of re-cutting the enclosure ditch and potentially only shortly after the sarsen settings had been built. Sarsen flakes in the buried soil below the avenue bank confirm that sarsen components of Stonehenge were dressed prior to its construction (Parker Pearson *et al.* 2020, 423). The avenue ditches were later re-cut, probably in 2250–2135 *cal BC* (67% probability; Parker Pearson *et al.* 2020, 460, fig 8.47: *re-cut*), perhaps at the time that the bluestones were re-arranged.



Figure A1-30 Reconstruction of the Stonehenge Avenue © English Heritage, drawing by Peter Lorimer

At the West Amesbury, excavations have revealed a series of nine postholes and packing material that suggest this section of the avenue originally contained a palisade (Parker Pearson *et al.* 2020, 259). Evidence for this may have been destroyed elsewhere along the Avenue length by the re-cutting of the ditches (Cleal *et al.* 1995, 307). Although it has been suggested that the Avenue was a processional route (Stukeley 1740, 34) or the route by which the bluestones were transported to Stonehenge (Atkinson 1956, 65–6), it does not appear to have been heavily used – there are no signs of erosion along the route, or any hollow forming as it ascends the steep bluff at the ‘elbow’ (Field *et al.* 2012, 34–5). This suggests that perhaps it was a pathway for spirits or beings, “a path for the ancestors” (Parker Pearson *et al.* 2020,

300) or that its primary purpose was to physically connect Stonehenge to the river, rather than the creation of a processional route.

1.5.14 Summary

The late Neolithic period saw intense settlement and monument building activity in the Stonehenge landscape, culminating in the centuries around 2500 BC when many of the timber structures and the sarsen settings at Stonehenge itself were built. In addition, much earlier monuments such as the Greater Cursus and Amesbury 42 long barrow had pits dug into their silted ditches, to re-whiten their mounds and banks with chalk (Thomas *et al.* 2009; Parker Pearson *et al.* 2020, 103–4). Another early Neolithic monument, the Larkhill causewayed enclosure, was incorporated into the circuit of deep pits surrounding the dry valley at Durrington. Throughout the Neolithic the focus for activity appears to be the looping course of the River Avon and its adjacent valley slopes, with major occupation sites located initially at Bulford and Amesbury Down, and later at Durrington Walls. The concentration of timber monuments is in this Durrington area, with other smaller monuments including Coneybury Henge, the pit circles at Boscombe Down and possibly Airman's Corner, the double henges at Bulford and even Stonehenge itself forming outliers to this main cluster. It may be no coincidence that the main entrance causeway at Stonehenge faces towards the north-east, not only towards the midsummer sunrise but in the direction of Durrington, serving as a reminder that people moved between these monuments.

It has been suggested that these late Neolithic monuments were brought together as part of a single unified scheme, with the construction of avenues linking Durrington and Stonehenge together by their avenues, via the River Avon (Parker Pearson *et al.* 2006, 229). Drawing on analogies with contemporary practices in Madagascar, where standing stones are identified with ancestors, Parker Pearson has suggested that the two areas can be contrasted as opposites: wood and stone, living and dead, clean and cluttered (Parker Pearson and Ramilisonina 1998). On the one hand Stonehenge is a stone version of the timber circles used by the living, a place belonging to the dead, kept clean and spatially isolated: the Domain of the Ancestors. On the other is Durrington, where there are significant quantities of pottery, animal bones and other cultural debris suggesting occupation, feasting and deposition, centred around several wooden monuments; the Domain of the Living. Archaeological discoveries including the presence of the avenue or roadway at Durrington and the houses there have further served to underline the contrast between the two areas and lend support to aspects of this overarching theory (Parker Pearson *et al.* 2020). Another aspect of this unified scheme is the solstice orientations of the stone and timber monuments in both locations, although these patterns of orientation at timber structures may be more widespread (Chapter 5.6).

Within the original hypothesis the exact role of the river was not specified, although the Avenue was seen 'the route of ancestral initiates' (Parker Pearson and Ramilisonina 1998, fig 7) and later publications by Parker Pearson and colleagues have argued that it was part of funerary rites of passage, with feasts held

at Durrington before the disposal of the remains of the dead in the river, completing their journey to the ancestral monument at Stonehenge via the avenue (Parker Pearson *et al.* 2006, 235). This journey has been taken literally (e.g., Parker Pearson *et al.*'s 2020 account of travelling by river), although Parker Pearson himself argues for a more metaphorical interpretation (Parker Pearson *et al.* 2020, 497). One of the key problems with this unifying funerary theory is chronology – the main funerary use of Stonehenge probably ended in 2860–2815 cal BC (Section A1.5.3), well before the erection of the sarsen settings, and the construction of the timber structures and occupation of the settlement at Durrington. The question of what people were doing with their dead in the latest Neolithic is unknown, and although it may have involved deposition of cremations in rivers, evidence for this remains very sparse. Nevertheless, Stonehenge was a significant burial place in the earlier part of the late Neolithic and funerary practices at the site were no doubt remembered and commemorated. However, the feasts at Durrington may have been related to the construction of the monument, the celebration of successful movement of stones or to ceremonies and gatherings at solstice.

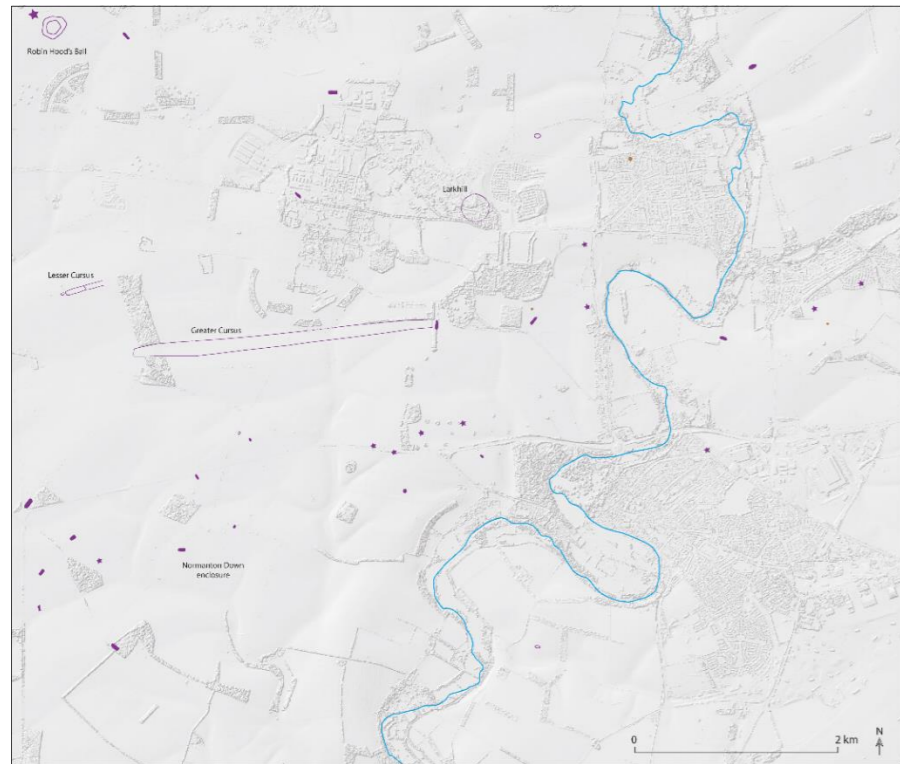
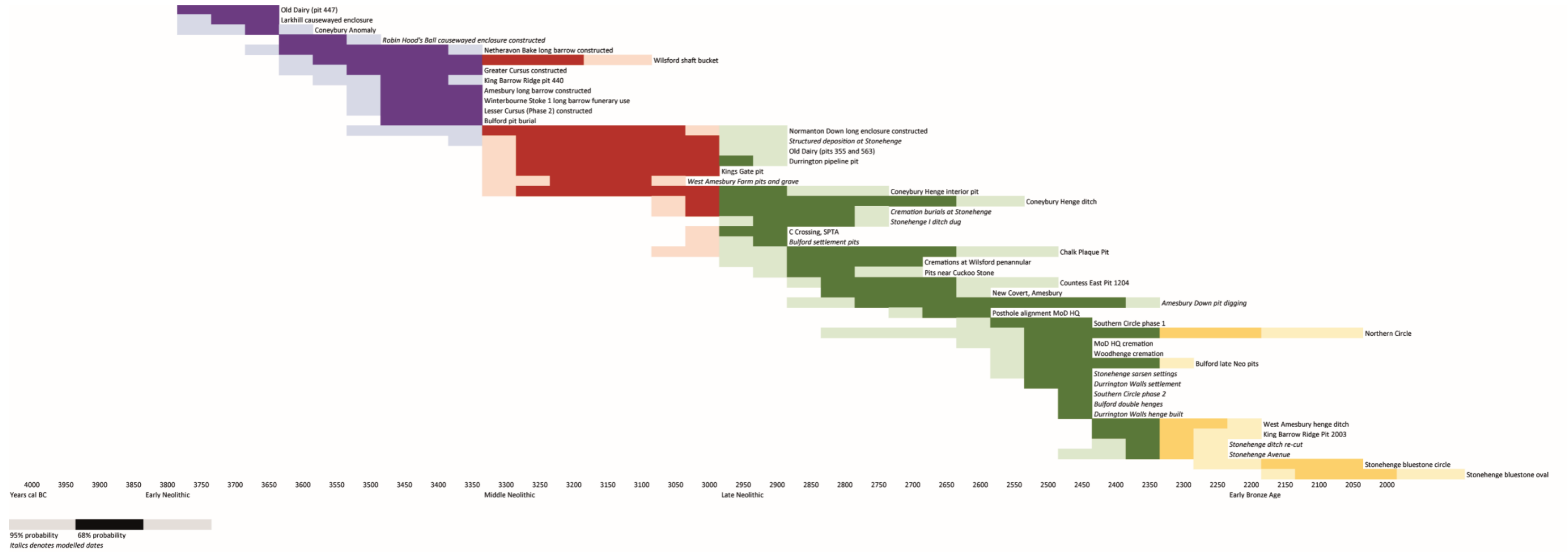
Unlike at Avebury, the avenues in the Stonehenge landscape do not connect monuments together directly. It may be that the avenues that link Durrington Walls and Stonehenge to the river are about connecting these monuments to a source of power, to a flow of energy, and to a wider world of places and meanings. In addition, the contrast between stone and timber rather breaks down when the significant timber phase at Stonehenge is acknowledged, as well as the stone settings at Woodhenge. It is unhelpful to project our own perceptions of stone as durable, hard and permanent back into the past when perceptions may have been different (Chapter 6.3).



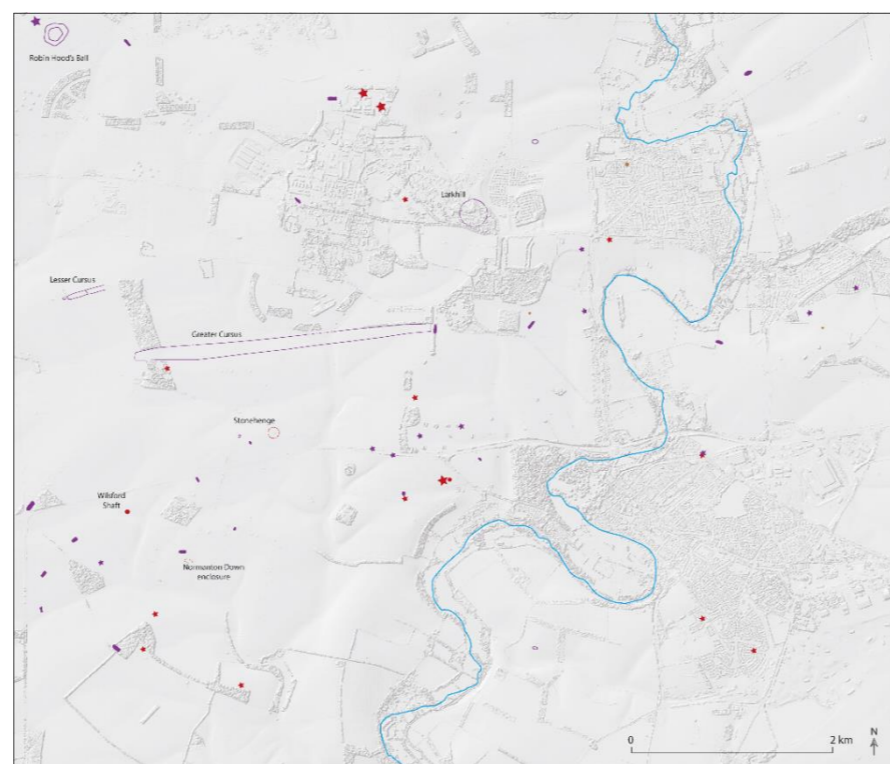
Figure A1-31 Durrington Walls reconstruction in about 2500 BC © English Heritage, drawing by Peter Lorimer

The recent discovery of the enormous circuit of pits or shafts around Durrington brings another dimension – the sense of digging and descending deep ground below into the underworld, in contrast to raising stones or timber posts up towards the skies. This circuit with its associated post alignments was one of several layers enclosing the settlement and timber structures at Durrington, with the palisaded enclosure and then enormous henge further within. There is a sense in which the activities and rituals carried out at Durrington were extraordinarily powerful and significant events, which took place in an area separated off and enclosed from the rest of the landscape, and which were later commemorated by the construction of the henge monument. The significance of Stonehenge and this area continued into the early Bronze Age, when the first burials accompanied by Beaker pottery and the earliest metals were located on Amesbury and Wilsford Downs, the bluestones were re-arranged and consolidated, the avenue banks were re-dug and deposition continued at monuments like the Southern Circle.

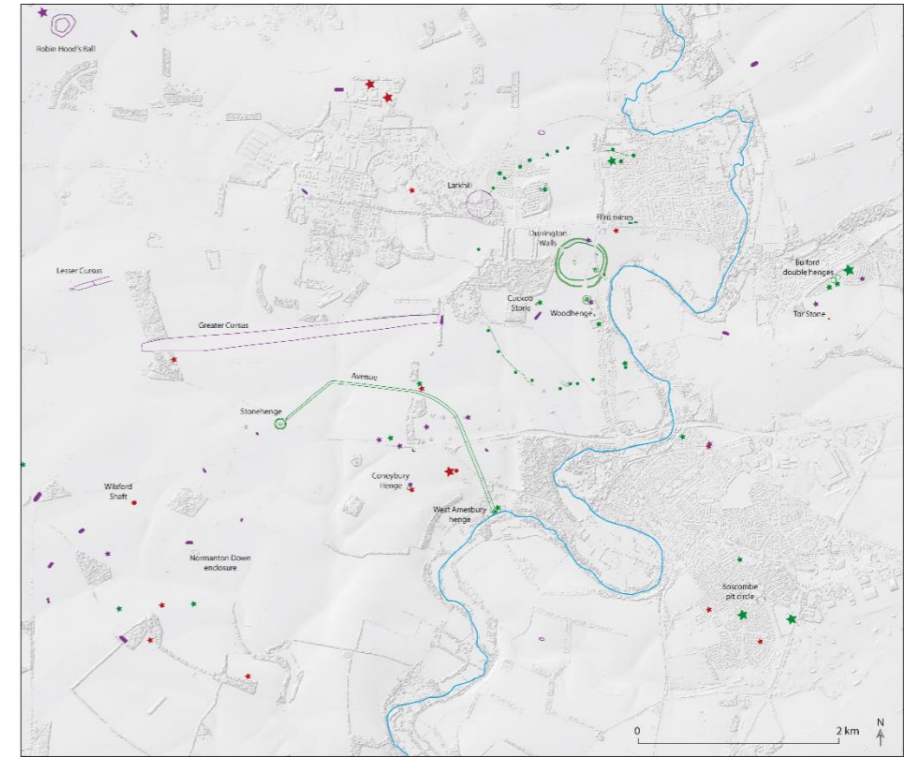
Figure A1-32 Overall chronology of the Stonehenge monument complex



Early Neolithic



Middle Neolithic



Late Neolithic

Table A1-2 – All radiocarbon dates from Neolithic monuments and occupation in the Stonehenge monument complex

Laboratory number	Sample reference	Material	Context	Radiocarbon age (BP)	$\delta^{13}\text{C}$ (‰)	$\delta^{13}\text{N}$ (‰)	C/N ratio	Calibrated date range (cal BC) (95% confidence)
DURRINGTON BIG PITS								
Shafts/ big pits (Gaffney <i>et al.</i> 2020, table 1)								
SUERC-92464		Mollusc shell, unidentified	4.8–4.85 m deep within Feature 7A	7179±28	-7.0			6080–5990
SUERC-92465		Mollusc shell, unidentified	1.5–1.55 m deep within Feature 8A	5788±28	-6.6			4720–4550
SUERC-92466		Mollusc shell, unidentified	4.35–4.4 m deep within Feature 8A	4988±28	-8.1			3940–3650
SUERC-92470		Animal bone, unidentified	4.79 m deep within Feature 8A	3852±28	-22.9	4.3	3.3	2460–2200
SUERC-92471		Animal bone, unidentified	5.18 m deep within Feature 5A	3013±28	-21.9	5.9	3.3	1390–1120
Larkhill post alignment (Leivers 2021)								
SUERC-70508		Cattle atlas vertebra	Posthole P2 of alignment from enclosure entrance	3911±29				2470–2290
Former MoD Headquarters post alignments (Barclay <i>et al.</i> 2018)								
SUERC-50618		Charcoal, <i>Quercus</i> sp. sapwood	Fill (5923) of Posthole 5918, part of post alignment 6255	4110±29	-24.6			2870–2570
SUERC-50614		Charcoal, <i>Quercus</i> sp. sapwood	Fill (5077) of Posthole 5074, part of post alignment 6255	4091±29	-26.0			2860–2490
SUERC-50619		Charcoal, <i>Quercus</i> sp. sapwood	Fill (6006) of Posthole 6002, part of post alignment 6255	4085±32	-25.6			2860–2490
SUERC-50621		Cattle radius	Fill (5076) of Posthole 5074, part of post alignment 6255	4010±32	-23.4	6.2		2860–2490

SUERC-50624		Cattle humerus	Fill (6006) of Posthole 6002, part of post alignment 6255	3915±31	-24.1	5.2		2480–2290
SUERC-36558		Charcoal, <i>Quercus</i> sp. sapwood	Fill (6889) of Posthole 6882, part of post alignment 6260	4060±35	-26.2			2850–2470
SUERC-50623		Pig atlas vertebra	Fill (5086B) of Posthole 5087, part of post alignment 6260	3999±32	-22.4	6.1		2620–2460
SUERC-50631		Cattle scapula	Fill (6822) of Posthole 6817, part of post alignment 6260	3987±31	-23.8	5.9		2580–2400
SUERC-50622		Aurochs femur	Fill (5086A) of Posthole 5087, part of post alignment 6260	3931±31	-22.6	5.7		2570–2290
SUERC-49176		Cremated human bone	Concentration of cremated bone (7531) of individual 30 – 50 years old, from hollow 7306 to north of posthole alignment on former MoD Headquarters Site. Covered with flint-knapping debris, probably in organic container	4000±34	-23.7			2630–2450
CONYBURY ANOMALY (Barclay <i>et al.</i> 2018, table 2)								
OxA-1402	W2, IL, 2538, 420	Cattle bone	Primary fill (Context 2538) of large pit	5050±100	-21.0 (ass.)			4050–3640
OxA-25086	ctx2247 ON365	Carbonised food residue	Sherd from primary pit fill	4966±31	-26.1±0.2			3900–3640
OxA-25087	ctx2247, ON475	Carbonised food residue	Sherd from primary pit fill	5003±30	-25.9±0.2			3950–3660
SUERC-35958	ctx 2538, ON1213 a+b	Carbonised food residue	Two refitting sherds, from primary pit fill	4905±30	-25.8±0.2			3770–3630
OxA-24988	ctx2538 AB6/7b	Cattle bone	Two first phalanges with fitting unfused epiphyses articulating with distal metatarsal shaft from a neonate, from primary pit fill	4952±32	-22.0±0.2	4.0±0.3	3.3	
OxA-24989	ctx2538 AB6/7b	Cattle bone	Replicate of OxA-24989	4997±31	-22.0±0.2	3.7±0.3	3.2	
Weighted mean of AB6/7b (T'=1.0)				4975±23				3900–3650

OxA-25766	ctx2538 AB9	Rib and radius of immature beaver	Primary pit fill	5135±30	-23.5±0.2	5.8±0.3	3.2	
SUERC-35959	ctx2538, AB9	Rib and radius of immature beaver	Replicate of OxA-25766	5149±32	-23.2±0.2	6.1±0.3	3.1	
Weighted mean of AB9 (T'=0.1)				5142±22				4040–3810
OxA-24987	ON521 AB8 (1)	Roe deer bone, articulating 1 st and 2 nd phalanges	Primary pit fill	4941±32	-23.4±0.2	4.7±0.3	3.2	
SUERC-35960	ON521 AB8 (1)	Roe deer bone, articulating 1 st and 2 nd phalanges	Replicate of OxA-24987	4900±30	-23.7±0.2	4.8±0.3	3.2	
Weighted mean of ON521 (T'=0.9)				4919±22				3770–3640
SUERC-35964	Ctx2538 AB6/7a	Mature adult cattle phalanx articulating with other phalanges	Primary pit fill	4905±30	-22.3±0.2	4.6±0.3	3.3	3770–3630
OxA-24986	ON169 AB5	Antler pick fragment	Primary pit fill.	4925±30	-21.4±0.2	3.7±0.3	3.2	3770–3640
OLD DAIRY, AMESBURY (Harding and Stoodley 2017, 60)								
SUERC-54201		Antler, red deer	Base of Pit 335 (358), part of a cluster of nine pits	4437±30	-22.8	4.9	3.3	3340–2920
SUERC-54202		Charred hazelnut shell	Fill of Pit 563, associated with sherds of middle Neolithic pottery, human bone fragments, animal bone and worked flints	4495±30	-22.5			3340–3040
SUERC-54203		Charred hazelnut shell	Primary fill of Pit 447, associated with possible early Neolithic pottery, human bone fragment, struck flint and animal bone	4950±30	-26.5			3790–3640

KING BARROW RIDGE PITS (Richards 1990, 114, 116; Roberts and Marshall 2019, 6, table 3)								
OxA-1397	SF 375	Antler, red deer, part of base and brow tine	'Rubbish' deposit 516/519, lower fill of Pit 440 in W59, Area K. Layer above had Peterborough Ware pottery sherds and one Grooved Ware sherd. Associated with animal bone – cattle, sheep/goat, pig and wild cat	4500±120	-21.0			
SUERC-74015	SF 375	Antler, red deer	Replicate of OxA-1397	4706±28	-21.4±0.2	3.9±0.3	3.2	
Weighted mean of antler SF 375 (T'=2.7, T'(5%)=3.8, v=1)				4696±28				3620–3370
OxA-35896		Large mammal thoracic vertebrae, probably part of refitting spinal section	Same context as OxA-1397	4822±38	-21.6±0.2	3.2±0.3	3.1	3660–3520
OxA-1396	SF 411	Animal bone or antler	Context 523/498, lower fill of Pit 418 in W59, Area C, upper fills contained Grooved Ware pottery and pig bones	4700±150	-21 (ass.)			3800–3010
UBA-34502		Antler, red deer	Fill (2004) of Pit 2003 containing Grooved Ware, Durrington Walls substyle	3883±35	-22.5±0.22	6.4±0.15	3.2	2470–2200
DURRINGTON PIPELINE W431 (Wessex Archaeology 1992)								
UBA-34949		Antler, red deer, shed, very slight use wear	Fill (185) of pit 184 which also contained two articulated pig metatarsals and undiagnostic Neolithic pottery	4429±40	-22.6±0.22	5.4±0.15	3.5	3340–2920
LESSER CURSUS (Richards 1990, 72–93, figs 5.5, 45, 47, 51; Parker Pearson <i>et al.</i> 2020, table 3.4)								
OxA-1404	W55, SF 219	Antler, red deer, heavily eroded fragment	Area A, ditch 44, context 51, the primary chalk rubble fill of ditch subsequently cut by ditch which extended the monument to east (Phase 1)	4550±120	-21 (ass.)			3620–2920
OxA-1405	W55, SF 217	Antler rake, red deer, used for groove-and-splinter	Area A, ditch 10, context 21, with other antlers on floor of ditch cutting ditch 44 (Phase 2)	4640±100	-21 (ass.)			
OxA-22238	W55, SF 217	Antler	Replicate of OxA-1405	4611±32	-22.0			

Weighted mean (T'=0.1, T'(5%)=3.8, v=1; Ward and Wilson 1978)				4614±31				3520–3340
OxA-1406	W55, SF 42	Antler, red deer, fragment	Area C, ditch 304, context 320, cemented chalk rubble in secondary fills, possibly derived from slighting of bank	4000±120	-21 (ass.)			2880–2200
LARKHILL CAUSEWAYED ENCLOSURE (Leivers 2021)								
SUERC-70507		Cattle tibia	Low fill within ditch (but not ditch bottom), associated with Hembury Ware	4937±31				3780–3640
ROBIN HOOD'S BALL (Thomas 1964, fig 3; Richards 1990, 61)								
OxA-1400	W83, 147, 105	Cattle bone	Pit containing bowl pottery in activity area outside the enclosure	4740±100	-21			3770–3130
OxA-1401	W83, 199, 227	Cattle bone	Pit containing bowl pottery in activity area outside the enclosure	4510±90	-21			3500–2920
OxA-15320	RHB 1 (65)	Residue on Neolithic bowl sherds, probably same vessel	Layer M, close to bottom of ditch [Lab note: warning on measurement as carbon yield more negative than usual]	5199±35	-29.4			3360–3090
OxA-15254	RHB 1 (74)	Residue on Neolithic bowl sherd	On surface and very top of Layer M. Sample formed part of a spread of sherds, some joining, and of bone, on a temporary surface	4732±30	-27.0			3640–3370
GrA-30038	RHB 1 (50)	Residue on Neolithic bowl sherd	At interface of Layers K and N	4765±40	-29.9			3640–3380
GREATER CURSUS (Richards 1990, 290; Thomas <i>et al.</i> 2009, table 1; Parker Pearson <i>et al.</i> 2020, table 3.5)								
OxA-17953	32	Antler pick, red deer, fragment, battered frontal tine	Context 033 (within cut 032), Trench 26, at base of western ditch terminal, below primary chalk rubble	4716±34	-21.7			
OxA-17954	32	Antler pick fragment	Replicate of OxA-17953	4695±34	-21.6			
Weighted mean OxA-17953+OxA-17954 (T'=0.2, T'(5%)=3.8, v=1; Ward and Wilson 1978)				4706±25				3625–3370
OxA-1403		Antler, red deer	'Recess' or 'embayment' cut in the ditch edge	4100±90	-21 (ass.)			2900–2460
SUERC-75196	GC 001 TP 33	Human femur fragment	Topsoil above ditch at west end of cursus, Trench 26	4187±30	-21.8			2890–2630

AMESBURY 42 LONG BARROW (Parker Pearson <i>et al.</i> 2020, table 3.6)								
SUERC-24308	GCE 030 SF 1407	Antler pick, red deer	Context 030, the primary fill of ditch, evidence of burnt beam	4645±30	-22.1			3520–3360
OxA-21961	GCE 017 SF 1249	Human femur fragment	Context 017, eroded mound material in tertiary fill of ditch	4520±32	-21.75			3370–3090
WINTERBOURNE STOKE 1 LONG BARROW								
SUERC-42530	EU 1.5.67	Human left humerus	Primary inhumation excavated by Thurnam	4680±29	-21.2	10.7	3.2	3530–3370
NORMANTON DOWN MORTUARY ENCLOSURE (Barker <i>et al.</i> 1971, 174)								
BM-505		Antler pick, red deer (protein)	Base of northern internal bedding trench	4510±103				3520–2910
WILSFORD SHAFT (Bayliss <i>et al.</i> 2012, 313)								
OxA-1089		Wooden bucket	Base of shaft	4640±90				3640–3100
BULFORD SOUTH AND DOUBLE HENGES (Wessex Archaeology 2019)								
Early Neolithic pits								
OxA-37382	ON681	Roe deer antler (degraded)	Fill 9353 of pit 9344, one of two isolated pits at the eastern end of the site, filled with worked flint, early Neolithic (South-Western) pottery, animal bone and burnt flint	4993±33	-22.3±0.4			3950–3650
OxA-37383		Cattle left humerus	Fill 10119 of pit 10106, one of two isolated pits at the eastern end of the site, filled with worked flint, early Neolithic (South-Western) pottery, animal bone and burnt flint	4793±33	-22.4±0.3			3650–3520
UBA-36393	1239	Charred hazelnut shell fragment	Fill 9997 of pit 9995, one of a cluster of five pits at the base of the coombe, containing worked flint, early Neolithic (South-Western) pottery, animal bone and sarsen fragments	4590±32				3510–3100
SUERC-80712		Human bone	Right femur, burial of young adult, possibly male, from pit 9237, placed on dump of chalk rubble above primary fill with animal bones	4671±25	-20.9	9.6	3.2	3520–3370
OxA-37467		Cattle left humerus	Fill 9358 of pit 9237, pit containing human burial. Primary fill with burnt and unburnt animal bones	4687±34	-22.4±0.3			3620–3360

Late Neolithic pits (with Woodlands-style Grooved Ware)								
OxA-35718		Charred hazelnut shell fragment	Fill 5018 of pit 5008, one of 48 late Neolithic pits. Contained Woodlands-style Grooved Ware pottery, animal bone, worked bone and much worked flint including micro debitage, chisel arrowheads, end scrapers, micro-denticulates, a discoidal knife and two conjoining fragments of polished axe	4383±32	-23.9±0.2			3100–2910
SUERC-73266		Charred hazelnut shell fragment	Same as OxA-35718	4346±26	-23.8±0.3			3030–2890
UBA-34499		Charred grain, <i>Hordeum vulgare</i>	Same as OxA-35718	4505±41	-25.20			3370–3030
UBA-34498		Antler pick or rake, red deer	Same as OxA-35718	4364±35	-22.9±0.22	2.7±0.15	3.2	3100–2900
OxA-37155	1074	Charred hazelnut shell fragment	Fill 8815 of pit 8802, one of 48 late Neolithic pits. Contained charcoal, large flint nodule and lots of artefacts, including Woodlands-style Grooved Ware pottery, chisel arrowheads, a broken fabricator, knives, scrapers, a carved chalk cup, another carved chalk object, mussel shell, antler rake, dog coprolite and animal bones	4402±29	-21.7±0.3			3270–2910
SUERC-77456	ON409	Red deer antler	Same as OxA-37155. Use wear on tine indicating use as rake	4342±25	-23.6	5.2	3.3	3020–2890
OxA-37384	1131	Charred hazelnut shell fragment	Fill 9107 of pit 9073, one of 48 late Neolithic pits. Contained chisel arrowhead, micro-denticulates, scrapers, perforated fossil, fired clay, animal bone (pig, cattle, dog, deer, aurochs, mustelid and raven), worked bone, charred antler	4352±31	-26.33±0.3			3090–2890
SUERC-77453	ON552	Red deer antler	Same as OxA-37384	4322±25	-22.5	4.1	3.3	3020–2890
OxA-37156	970	Charred hazelnut shell fragment	Fill 8657, part of a placed deposit of charred material in pit 8646, one of 48 late Neolithic pits. Contained Woodlands-style Grooved Ware, worked flint	4372±28	-27±0.3			3090–2900

			including micro-denticulates, axe, animal bones and a fragment of antler plaque					
OxA-37380		Red deer antler	Fill 8206 of pit 8205, one of 48 late Neolithic pits. Contained placed objects including aurochs horn and antler placed in 'horns'. Also, large vertical slab of fired clay/daub, bovine pelvis, 193 sherds of Woodlands-style Grooved Ware pottery, flakes from polished flint axe, sarsen	4478±32	-23.83±0.3			3350-3020
SUERC-77454	ON100	Aurochs horn core	Same as OxA-37380	4270±25	-23.9	5.9	3.3	2920-2870
OxA-37381		Cattle left humerus	Fill 8786 of pit 8785, one of 48 late Neolithic pits. Contained Woodlands-style Grooved Ware pottery and chisel arrowheads	4412±32	-23.56±0.3			3320-2910
SUERC-77455		Cattle horn core	Same as OxA-37381	4239±25	-23.0	5.2	3.4	2910-2700
SUERC-77445	ON581	Red deer antler	Fill 9139 of pit 9137, one of 48 late Neolithic pits. One of two antler picks found crossed on surface of primary fill as well as core tool roughouts, fabricator, discoidal core, scrapers	4338±24	-23.3	4.9	3.2	3020-2890
SUERC-77447	ON559	Roe deer antler	Fill 9112 of pit 9105, one of 48 late Neolithic pits. One of two roe deer antlers placed side by side on surface of primary fill. Finds included flint axe, reworked Graig Lwyd stone axe, core tool roughout and backed knife	4366±23	-24.3	3.6	3.2	3080-2910
SUERC-77457	ON57	Red deer antler	Fill 8051 of pit 8050, one of 48 late Neolithic pits. One of two antlers found in association with a polished discoidal knife. Pit also contained Woodlands-style Grooved Ware pottery, flint axe, chalk ball, sarsen, cattle bone	4341±23	-22.6	3.1	3.2	3020-2900
SUERC-77458		Red deer tibia	Fill 8343 of pit 8331, one of 48 late Neolithic pits. Contained 14 ball flints, a chisel arrowhead, part of a Cornish greenstone axe, core tool roughouts, fabricator, discoidal knife, worked chalk, sarsen hammer and fragments and a fossil sponge	4329±25	-23.5	4.1	3.2	3020-2890

SUERC-77448		Pig bone	Fill 9960 of pit 9938, one of two deep pits with Woodlands-style Grooved Ware pottery on spur to south-west of main site, containing two deposits of dumped refuse	4363±25	-20.7	6.0	3.2	3080–2900
Later Neolithic pits and associated features								
SUERC-77444	ON689	Red deer antler	Fill 9470 of pit 9469, one of six later Neolithic pits. Two fragments of snapped but conjoining tine, placed side by side on pit base. Pit contained unspecific prehistoric pottery	3971±25	-23.2	3.7	3.3	2580–2350
SUERC-77446	ON690	Red deer antler	Fill 9499 of pit 9498, one of six later Neolithic pits. Unused antler from which crown had been removed, found with two scrapers	3904±24	-22.7	2.9	3.3	2470–2290
UBA-36394	1102	Charcoal, roundwood	Fill 9025 of post pit 9024, charcoal fragments were concentrated towards the base of the central post pipe, associated with burnt animal and human bone	3875±30				2580–2350
SUERC-77452		Pig mandible	Fill 10265 of Pit 10192, large circular feature with animal bones, burnt flint and flint knapping debris	3964±25	-21.0	6.5	3.3	2580–2350
Double henges								
UBA-36924	992	Charred hazelnut shell	Basal fill 8772 of eastern henge ditch 8732	4347±37				3090–2890
UBA-36925	995	Charcoal, cf. <i>Populus/Salix</i> 'trunkwood' frag	Basal fill 8783 of eastern henge ditch 8732. Could be affected by old wood	4130±32				2880–2580
BRAMS-2074	995	Charcoal, cf. <i>Populus/Salix</i> 'trunkwood' frag	Replicate of UBA-36925	4094±25				2860–2500
BRAMS-2074_2	995	Charcoal, cf. <i>Populus/Salix</i> 'trunkwood' frag	Replicate of UBA-36925	4077±25				2850–2490
SUERC-78117		Pig humerus	Fill 8764, secondary silts of eastern henge ditch 8759	4394±29	-21.1	7.2	3.3	3100–2910
UBA-36926	991	Charred hazelnut shell	Secondary fill 8765 of eastern henge ditch 8759	4208±46				2910–2630

SUERC-78111	ON356	Dog skull	Fill 8772, coarser chalk rubble and flint filling central weathering cone of eastern henge ditch 8732	3948±49	-21.4	9.9	3.2	2580–2290
SUERC-78116		Pig tibia	Primary fill 8749 of western henge ditch 8743	4005±29	-20.8	5.4	3.3	2580–2460
SUERC-78118	ON337	Residue adhering to rim sherd pottery	Fill 8719, secondary silts of western henge ditch 8696. Durrington Walls substyle pottery	3989±29	-25.0			2580–2460
UBA-32271	ON337	Residue adhering to rim sherd pottery	Replicate of SUERC-78118	3866±32				2470–2200
CHALK PLAQUE PIT (Cleal <i>et al.</i> 1994, table 1)								
OxA-3316	1	Cattle bone, broken femur	Fill of pit containing two chalk plaques, chalk lumps, Grooved Ware pottery sherds, one end scraper and five flint flakes	4250±80	-21.0			3090–2580
OxA-3317	2	Antler, red deer, shed from immature/young animal	Top of lower filling of pit. No signs of use as pick	4130±80	-22.3			2900–2480
RATFYN (Cleal <i>et al.</i> 1994, table 1)								
OxA-3318		Cattle humerus		3650±90	-21.0			2300–1750
COUNTESS EAST (Roberts and Marshall 2019, table 3)								
UBA-34500		Antler, red deer	Fill (1205) of pit 2003	4086±36	-22.2±0.22	7.1±0.15	3.2	2870–2490
OxA-35721		Carbonised sloe fruit	Same context as UBA-34500	4165±34	-26.2±0.2			2890–2630
PENANNULAR DITCH WITH CREMATIONS (Powell and Barclay 2017, 19–20, table 10-5)								
SUERC-70556	5010	Cremated human bone	Fill 508 of Grave 512, truncated by Pit 513 which in turn was cut by penannular ditch. Grave contained c.1600g of cremated human bone	4167±33	-21.5			2890–2630
UBA-33147	5010	Roundwood, unidentified	Same as SUERC-70556	4469±37				3350–3020
UBA-33148	5010	Charred hazelnut shell	Same as SUERC-70556	3650±37				2140–1900

SUERC-70557	5011	Cremated human bone	Fill 524 of Grave 523, truncated by terminal of penannular ditch. Pit contained 454g of cremated human bone	4280±33	-21.7				3010–2770
UBA-33150	5011	Charred hazelnut shell	Same as SUERC-70557	3490±35					1920–1690
WEST AMESBURY FARM (Roberts <i>et al.</i> 2020, table 6)									
UBA-33222	B	Pig bone, metacarpal with refitting distal epiphysis	Primary fill (93213) of pit 93201	4518±35	-20.8±0.22	6.2±0.15	3.2		3370–3090
UBA-31619	A	Charcoal, Pomoideae (single fragment)	Primary fill (93247) of pit 93205	4509±30	-25.1±0.22				3360–3090
SUERC-66779	B	Carbonised hazelnut shell	Same as UBA-31619	4502±30	-26.8±0.2				3360–3090
SUERC-71149		Cattle tooth, mandibular M7	One of three teeth from a left mandible. Same context as UBA-31619	4492±34	-23.2±0.2	5.3±0.3	3.3		3360–3030
OxA-35148		Carbonised hazelnut shell	Fill (93242), one of three fills of pit 93205, equivalent to (93247)	4493±27	-23.4±0.2				3350–3090
UBA-31614	A	Carbonised hazelnut shell (single fragment)	Primary fill (93227) of pit 93206	4462±27	-22.7±0.22				3350–3020
SUERC-66777	B	Charcoal, Pomoideae (single fragment)	Same as UBA-31614	4492±30	-25.0±0.2				3350–3030
SUERC-71148		Pig ulna, right	Animal Bone Group from (93224) one of the fills of pit 93206	4561±34	-20.9±0.2	6.6±0.3	3.3		3490–3100
UBA-33221		Carbonised residue adhering to sherd of	SF 53213, from (93224), one of fills of pit 93206	4517±41	-28.5±0.22				3370–3040

		Peterborough Ware						
SUERC-66776	A	Cattle bone, refitting proximal epiphysis and 1 st phalanx	Basal fill (93230) of pit 93208, cut by grave 93240	4435±32	-23.5±0.2	4.8±0.3	3.3	
UBA-31615	B	Cattle bone, refitting proximal epiphysis and 1 st phalanx	Replicate of SUERC-66776	4452±47	-23.6±0.22	4.8±0.15	3.2	
Weighted mean of SUERC-66776+UBA-31615 (T'=0.1, T'(5%)=3.8, v=1)				4440±27				3340–2930
SUERC-66778	C	Carbonised hazelnut shell	Same context as SUERC-66776	4499±30	-24.0±0.2			3360–3090
SUERC-66775		Human bone, skull fragment	Grave 93240 that cuts pit 93208 and is cut by a second pit 93233	4341±30	-21.7±0.2	11.2±0.3	3.3	3080–2890
SUERC-75184	D	Human bone, skull fragment	Same context as SUERC-66775	4396±30	-21.5±0.2	11.5±0.3	3.2	3270–2910
OxA-35714	B	Human bone, skull fragment	Same context as SUERC-66775	4507±34	-21.8±0.2	11.0±0.3	3.2	
SUERC-76338	B2	Human bone, skull fragment	Replicate of OxA-35714	4535±34	-21.8±0.2	11.3±0.3	3.3	
Weighted mean of OxA-35714+SUERC-76338 (T'=0.3, T'(5%)=3.8, v=1)				4521±25				3360–3100
OxA-35181	A	Cattle bone, metacarpal with refitting epiphysis RHS	From (93236) the basal fill of pit 93233, the last of a series of intercutting pits	4497±33	-23.1±0.2	5.1±0.3	3.3	3360–3040
UBA-31618	B	Cattle bone, metacarpal with refitting epiphysis RHS	From same context as OxA-35181	4508±51	-22.9±0.22	4.4±0.15	3.2	3370–3020
UBA-31621		Fox tibia	From 93325, the fill of an old badger sett 93311	4402±42	-20.3±0.22	8.7±0.15	3.2	3330–2900

'C' CROSSING, SPTA (Roberts and Marshall 2019, table 3)								
OxA-35986		Antler	Middle fill (406) of pit [404], which contained a large group of Neolithic flintwork and 12 sherds of pottery	4308±30	-22.1±0.2			3020–2880
SUERC-74013		Carbonised hazelnut shell fragment	Same context as OxA-35986	4260±30	-25.2±0.2			2930–2700
UBA-34946		Carbonised hazelnut shell fragment	Same context as OxA-35986	4702±48	-23.5±0.22			3630–3370
NEW COVERT, AMESBURY (Roberts and Marshall 2019, table 3)								
OxA-35720		Antler, red deer	Fill (3042) of pit 3041	4173±34	-23.1±0.2	3.1±0.3	3.2	
SUERC-73430		Antler, red deer	Replicate of OxA-35720	4088±32	-22.8±0.2	3.4±0.3	3.1	
Weighted mean OxA-35720+SUERC-73430 (T' = 3.3)				4128±24				2870–2580
KINGS GATE (Roberts and Marshall 2019, table 3; Powell and Barclay forthcoming)								
SUERC-73423		Antler pick, red deer	Fill (61126) of pit 61125. Antler has use wear. One of c.40 pits on Amesbury Down dating to late Neolithic	4169±32	-22.5±0.2	3.9±0.3	3.1	2890–2630
SUERC-73267		Carbonised hazelnut shell fragment	Fill (61781) of pit 61779, one of c.40 pits on Amesbury Down dating to late Neolithic	4462±29	-23.4±0.2			3340–3020
STONEHENGE								
Henge ditch – primary filling (Allen and Bayliss 1995; Burleigh <i>et al.</i> 1982)								
UB-3788		Antler pick, red deer	Primary fill, C28.10	4381±18	-22.5			3085–2915
UB-3787		Antler pick, red deer	Primary fill 2801, C20	4375±19	-23.1			3080–2915
UB-3789		Antler pick, red deer	Primary fill 2800, C22	4430±18	-23.1			3320–2930
UB-3790		Antler pick, red deer	Primary fill 2799, C22, D-E	4367±18	-23			3075–2910

UB-3792		Antler pick, red deer	Primary fill 2935, west terminal of NE entrance, C25.2	4365±18	-22.9			3025–2910
UB-3793		Antler pick, red deer	Primary fill 2934, west terminal of NE entrance, C25.4	4393±18	-23.4			3095–2920
UB-3794		Antler pick, red deer	Primary fill 2934, west terminal of NE entrance, C25.4	4432±22	-23.7			3325–2930
BM-1583		Antler, red deer	Primary fill near west terminal of NE entrance 3895/3900, C41/2	4410±60	-22.7			3340–2900
BM-1617		Antler, red deer	Primary fill near west terminal of NE entrance 3895/3900, C41/2	4390±60	-22.7			3340–2890
OxA-4833		Red deer right tibia	Primary fill, south entrance near terminal 3928, Segment 16, C26.2	4550±60	-22.5			3500–3020
OxA-4835		Cattle right jaw with three teeth	Primary fill 2480, adjacent to ditch terminal at south entrance, Segment 18, C26.2	4455±40	-22.4			3350–2930
OxA-4834		Cattle right jaw with four teeth	Primary fill 3929, adjacent to ditch terminal at south entrance, Segment 17, C26.6	4460±45	-23.8			3350–2930
OxA-4842		Cattle skull	Primary fill, south-west entrance near terminal 3930, Segment 23, C29.4	4520±100	-23.8			3520–2910
Ditch – secondary infilling (Allen and Baylis 1995; Bronk Ramsey and Bayliss 2000; Parker Pearson <i>et al.</i> 2009, table 2; Parker Pearson <i>et al.</i> 2020, 528, tables 11.1 and 11.3)								
OxA-V-2232-46		Human skull fragment	Context 1560, ditch fill in C25. 1 of four fragments from upper filling of ditch	4169±31	-21.8	9.9	3:4	2890–2630
OxA-V-2232-47		Human skull fragment of older/mature adult	Context 2589, ditch fill in C28 (eastern section)	4127±31	-21.9	10.4	3:4	2870–2580
UB-3791		Antler pick, red deer	Secondary fill near ENE causeway 1552, C25.2	4397±18	-21.5			3100–2920
OxA-4904		Antler pick, red deer	Base of secondary fill 3893, C41. Section drawing shows that it was just below or within dark humic layer (Cleal <i>et al.</i> 1995, fig 266)	4365±55	-22.4			3330–2880
OxA-4881		Red deer metatarsal	Upper secondary fill 3899, C41, within later U-shaped recut	4300±60	-21.6			3260–2690

OxA-4841		Ox ulna, right side	Upper secondary fill 3899, C41, within later U-shaped recut	4295±60	-19.6			3100–2670
OxA-4882		Ox femur	Upper secondary fill 3899, C41, within later U-shaped recut	4270±65	-23.2			3090–2630
OxA-4880		Pig radius and ulna	Upper secondary fill 3899, C41, within later U-shaped recut	3875±55	-20.7			2480–2150
OxA-4843		Ox pelvis, left side	Within secondary fill 3893, C41, within later U-shaped recut	4315±60	-22.3			3310–2700
OxA-4883		Cattle bone worked into chisel	Possible cut within secondary fill of ditch 2475, C26.5	4300±70	-21.4			3320–2660
OxA-5981	AB49/50	Articulated piglet bone	Secondary fill of ditch 1291, C20	4220±35	-21.2			2910–2670
OxA-5982	S54: 862, 834, 854	Cattle vertebrae	Secondary fill of ditch 3898, C42	4405±30	-23.0			3320–2910
OxA-4903		Ox scapula	Upper secondary fill of ditch 3899, C42, Section LQ, in rabbit disturbance	3980±45	-23.2			2630–2340
OxA-4879		Pig tibia, fused, left hand side	Upper secondary fill of ditch 3893, C42, Section A-E, within later U-shaped recut	3885±55	-20.4			2560–2200
OxA-4844		Large ox axis vertebra	Upper secondary fill of ditch 3898, C42, Section LQ, possibly in animal burrow, within later U-shaped recut	4220±60	-22.1			2930–2580
OxA-4886		Human bone	Right femur of burial cut into secondary ditch fill (4028) [C61.1], the 'Stonehenge Archer'	3960±60	-21.2			
OxA-5044		Human bone	Replicate of OxA-4886	3785±70	-20.7			
OxA-5054		Human bone	Replicate of OxA-4886	3825±60	-20.6			
OxA-5046		Human bone	Replicate of OxA-4886	3775±55	-20.6			
BM-1582		Human bone	Replicate of OxA-4886	3715±70	-21.8			
Weighted mean ($T'=8.7$, $T'(5\%)=9.5$, $v=1$; Ward and Wilson 1978)				3819±28				2440–2140
Cremations (Atkinson <i>et al.</i> 1952; Parker Pearson <i>et al.</i> 2009, table 2; Parker Pearson <i>et al.</i> 2020, table 11.4)								
OxA-26962	110	Cremated bone	Human occipital, probable adult, ?female, Aubrey Hole 7 re-burial	4281±31	-22.0			3010–2780
OxA-26963	173	Cremated bone	Human occipital, probable adult, Aubrey Hole 7 re-burial	4358±34	-23.5			3090–2900

OxA-26964	221	Cremated bone	Human occipital, probable adult, Aubrey Hole 7 re-burial	4325±31	-24.3			3020–2890
OxA-26965	223	Cremated bone	Human occipital, adult, ?male, Aubrey Hole 7 re-burial	4101±30	-22.6			2870–2500
OxA-26966	227	Cremated bone	Human occipital, probable adult, ?female, Aubrey Hole 7 re-burial	4168±29	-23.7			
SUERC-42892	227	Cremated bone	Replicate of OxA-26966	4107±19	-19.7			
Weighted mean (T'=3.1, v=1; T'(5%)=3.8; Ward and Wilson 1978)				4125±16				2865–2580
OxA-27045	246	Cremated bone	Human occipital, adult, Aubrey Hole 7 re-burial	4456±36	-21.5			3350–2930
OxA-27046	255	Cremated bone	Human occipital, probable adult, Aubrey Hole 7 re-burial	4195±31	-18.5			
SUERC-42893	255	Cremated bone	Replicate of OxA-27046	4164±19	-20.8			
Weighted mean (T'=0.7, v=1; T'(5%)=3.8; Ward and Wilson 1978)				4173±17				2880–2670
OxA-27047	280	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4377±31	-21.8			3100–2900
OxA-27048	281	Cremated bone	Human occipital, adult, ?male, Aubrey Hole 7 re-burial	4210±31	-22.4			2900–2670
OxA-27049	288	Cremated bone	Human occipital, adult, ?male, Aubrey Hole 7 re-burial	4237±30	-22.5			2920–2700
OxA-27077	307	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4418±31	-24.9			
SUERC-42885	307	Cremated bone	Replicate of OxA-27077	4385±20	-24.4			
Weighted mean (T'=0.8, v=1; T'(5%)=3.8; Ward and Wilson 1978)				4395±17				3095–2920
OxA-27078	330	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4255±35	-24.2			2930–2700
OxA-27079	334	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4391±30	-22.8			
SUERC-42883	334	Cremated bone	Replicate of OxA-27079	4394±18	-22.3			
Weighted mean (T'=0.0, v=1; T'(5%)=3.8; Ward and Wilson 1978)				4393±16				3090–2920

OxA-27080	357	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4325±32	-22.5			
SUERC-42895	357	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4350±19	-22.6			
Weighted mean ($T'=0.5$, $v=1$; $T'(5\%)=3.8$; Ward and Wilson 1978)				4344±17				3015–2905
OxA-27081	366	Cremated bone	Human occipital, probable adult, ?female, Aubrey Hole 7 re-burial	4348±30	-23.0			3080–2890
OxA-27082	389	Cremated bone	Human occipital, probable adult, ?female, Aubrey Hole 7 re-burial	4404±26	-19.9			3270–2910
OxA-27083	390b	Cremated bone	Human occipital, adult, Aubrey Hole 7 re-burial	4261±30	-19.8			
OxA-27091	390b	Cremated bone	Replicate of OxA-27083	4255±30	-20.6			
Weighted mean ($T'=0.0$, $v=1$; $T'(5\%)=3.8$; Ward and Wilson 1978)				4258±22				2915–2785
OxA-27084	596	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4364±31	-20.3			3090–2900
OxA-27085	211	Cremated bone	Human proximal left diaphyseal humerus bone, child, 5–12 years, Aubrey Hole 7 re-burial	4340±30	-23.3			3080–2890
OxA-27089	225	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4132±31	-20.9			
SUERC-42886	225	Cremated bone	Replicate of OxA-27089	4219±20	-21.6			
Weighted mean ($T'=5.5$, $v=1$; $T'(5\%)=3.8$; Ward and Wilson 1978)				4194±17				2890–2695
OxA-27090	336	Cremated bone	Human occipital, probable adult, Aubrey Hole 7 re-burial	4413±32	-23.5			3330–2910
OxA-27092	344	Cremated bone	Human right diaphyseal humerus, child, 1–5 years, Aubrey Hole 7 re-burial	4426±33	-23.6			3330–2930
OxA-27093	382+323	Cremated bone	Human proximal left femoral diaphysis, juvenile, 12–18 years, Aubrey Hole 7 re-burial	4180±34	-23.4			2890–2630
OxA-30294	289	Cremated bone	Human occipital, adult male, Aubrey Hole 7 re-burial	4392±30	-21.7			3100–2910
OxA-27086	007	Cremated bone	Human femoral shaft fragment, adult female, from bowl-shaped pit adjacent to Aubrey Hole 7	4317±33	-21.5			

SUERC-30410	007	Cremated bone	Replicate of OxA-27086	4420±35			
Weighted mean (T'=4.6, v=1; T'(5%)=3.8; Ward and Wilson 1978)				4366±25			3090–2900
OxA-17957		Cremated bone	Humerus, young/mature adult, from C42, Context 3898, 54/841, although not part of main deposit	4271±29	-20.3		2930–2770
SUERC-42882		Cremated bone	Adult cremation in C42, Context 3898, 54/821, main deposit	4289±20	-20.4		2920–2885
OxA-17958		Cremated bone	Radius, young/mature adult. From C41, Context 3893, spread through upper ditch silt, ditch fill and upper ditch fill 54/36	3961±29	-19.2		2580–2340
OxA-18036		Cremated bone	Longbone fragment from Aubrey Hole 32, Context 3008	4332±35	-17.0		3080–2880
C-602		Charcoal (unidentified)	Aubrey Hole 32	3798±275			3010–1510
Q and R holes – bluestones (Allen and Bayliss 1995; Darvill and Wainwright 2009)							
OxA-4901		Pig humerus	Fill 3813 near top of Q hole	3800±45	-20.7		2460–2040
OxA-18658		Charcoal, <i>Quercus</i> sp.	Fill of Q Hole F12 STH08 F12 30b	3847±27	-25.9		2460–2200
OxA-18658		Charcoal, <i>Ilex</i> sp.	Fill of Q Hole F12 STH08 F12 30c	4534±35	-24.1		3370–3100
OxA-18662		Charcoal, <i>Ilex</i> sp.	Fill of F11, cut by Q Hole (F12) STH08 F11 29 95	4164±28	-24.2		2890–2630
Sarsen circle, trilithons and outliers (Piggott 1959; Barker and Mackey 1960; Allen and Bayliss 1995; Cleal <i>et al.</i> 1995, 190; Parker Pearson <i>et al.</i> 2007; Darvill and Wainwright 2009)							
UB-3821		Antler, red deer	Fourth layer 1093, at base of Stone hole 1 in the sarsen circle, C2.1	4023±21	-22.9		2590–2470
OxA-4840		Antler tine tip, red deer	Context 3516, from pit WA 2448/3773, stone hole 53/54 of sarsen trilithon, C56. Found in 'chalk rubble at the very bottom of the hole'	3895±45	-23.4		2480–2200
OxA-4838		Antler pick, red deer	Primary packing 1131 of Stone hole E on causeway, C3	3885±40	-23.9		2470–2200
OxA-4837		Antler pick, red deer	Primary packing 1131 of Stone hole E on causeway, C3	3995±60	-21.2		2850–2290

OxA-4839		Antler crown, red deer	Context 2452, Stone hole 57 of Stone 56, chalk rubble, erection ramp C17. Later interpreted as big pit	3860±40	-21.3			2470–2200
BM-46		Antler	Chalk rubble erection ramp 2449 of Stone 56, sarsen trilithon, C17. Later interpreted as big pit	3670±150				2480–1630
OxA-4902		Cow-sized long bone fragment	Amongst packing stones 3547 of Stone hole 27 in sarsen circle. Regarded as residual	5350±80	-21.7			4350–3990
OxA-18655		Charcoal, <i>Pinus</i> sp.	Socket for Stone 10 in the sarsen circle STH08 F10 37c. Must be residual	8183±36	-25.8			7330–7060
Bluestone circle and horseshoe (Allen and Bayliss 1995; Darvill and Wainwright 2009)								
OxA-4900		Antler tine, red deer	Fill 2427 of Stone hole 40c, bluestone circle, C17	3865±50	-23.1			2470–2150
OxA-4878		Canid ulna	Fill 2427 of Stone hole 40c, bluestone circle, C17	3740±40	-21.8			2290–2020
OxA-4877		Antler fragment	Fill 3511 of Stone hole 63a, bluestone horseshoe, C56	3695±55	-21.3			2290–1920
OxA-18651		Charcoal, <i>Quercus</i> sp. sapwood	Fill of socket for Stone 35a bluestone circle STH08 F6 23 89	4360±29	-24.4			3090–2900
Other central settings (Parker Pearson <i>et al.</i> 2009; Darvill and Wainwright 2009)								
OxA-V-2232-51		Pig rib fragment	From 1885, fill of posthole 1884, Hawley's no. 9, between Stones 8 and 9, C8	3977±31	-20.5	6.3	3.3	2580–2350
OxA-18649		Human tooth M2	From immediately below turf STH08.1.16	3883±31	-20.8			2470–2210
Y and Z holes (Allen and Bayliss 1995)								
UB-3822		Antler, red deer	Stacked on base of Y Hole 30, in fill 1655, C34.30	3341±22	-22.3			1690–1530
UB-3823		Antler, red deer	Stacked on base of Y Hole 30, in fill 1655, C34.30	3300±19	-22.5			1620–1515
UB-3824		Antler, red deer	Stacked on base of Y Hole 30, in fill 1655, C34.30	3449±24	-22.6			1880–1680
OxA-4836		Antler, red deer	Fill 3774 of Z Hole 29, C33.29	3540±45	-21.2			2020–1740
CUCKOO STONE (Parker Pearson <i>et al.</i> 2020, table 7.2)								
OxA-18940	136 (SF 274)	Animal bone	<i>Bos taurus</i> scapula, interpreted as a tool, from the fill (136) of a small pit [135] 4 m to the SW of the Cuckoo Stone, containing animal bones, lithics and an antler pick. The scapula is thought to have used to erect the nearby Cuckoo Stone	4253±28	-21.3			2920–2700

SUERC-46473	181 <4537>	Animal bone	Articulated tarsals of <i>Cervus elaphus</i> from fill (181) of pit [180], 9 m west of Cuckoo Stone, containing large amounts of worked flint and animal bone	4231±27	-23.5	4.2	3:3	2910–2700
CONEYBURY HENGE (Richards 1990, 123–58, table 137)								
OxA-1409		Animal bone	Context 1447, secondary fill of interior pit 1601, one of four pits at centre of monument	4370±90				3360–2780
OxA-1408		Animal bone	Context 2306, lowest primary fill of ditch [934] in southern section	4270±95				3330–2570
STONEHENGE AVENUE (Cleal <i>et al.</i> 1995, 327; Parker Pearson <i>et al.</i> 2020, 424–6, table 8.1)								
OxA-20011	SAV 045 (SF 1027)	Antler pick	Pit 056, a shallow pit within the interior of the avenue, from fill (045) associated with many sarsen chips. Pit is thought to post-date the initial digging of the avenue but pre-date the re-cutting of the ditch	3868±28	-23.1			
OxA-20350	SAV 045 (SF 1027)	Antler pick	Replicate of OxA-20011	3836±29	-23.5			
SUERC-23205	SAV 045 (SF 1027)	Antler pick	Replicate of OxA-20011	3770±30	-23.3			
Weighted mean ($T'5=5.8$, $T'(0.5\%)$; $v=2$; Ward and Wilson 1978)				3827±17				2395–2200
BM-1164	1	Antler	Northern Ditch, Stonehenge terminal (C6), 0.5m above ditch bottom	3678±68	-23.7			2290–1880
HAR-2013	9718	Antler pick	Southern Ditch, north side of A344 (C83), fill near bottom	3720±70	-23.6			2350–1900
OxA-4884	1912 (4763)	Antler pick	Northern Ditch, Stonehenge terminal (C6), on bottom of ditch at depth of 0.7m and at 2.54m from the terminal	3935±50	-20.4			2580–2230
OxA-4905	9716	Animal bone	Large bovine pelvis, Southern Ditch, 0.9km from Avon terminal (C86), resting on base of ditch, no signs of use as tool (<i>contra</i> Vatchers' interpretation)	3865±40	-22.1			2470–2200
I-3216		Animal bone (bulk)	Ox scapula from Northern Ditch near Avon terminal, and ox scapula and antler from Southern Ditch (C86)	2750±100				1220–760
BM-1079	2 (4765)	Antler	Northern Ditch near Avon terminal (C87)	3020±180	-24.8			1670–810
WEST AMESBURY HENGE (Parker Pearson <i>et al.</i> 2020, table 5.4)								
SUERC-32162	245	Animal tooth	<i>Cervus elaphus</i> tooth from primary fill (245) of Stone hole J	3890±30	-23.4			2470–2230

SUERC-27051	ARS 159 571	Antler pick	SF 529/571, from Stone hole C. The tine embedded into the top of context (183), but the main part of the pick was deposited in (159), the original packing material for the stone and pushed into (183)	3855±30	-23.3			2460–2200
OxA-21278	ARS 132 503	Antler pick	Upper part of fill (164), within 1cm of the base of the ramp for Stone hole A. Since the pick was not crushed, it was deposited after the standing stone was withdrawn from the hole. There is no means of establishing whether it was used in the stone's removal or derives from later activity	3884±30	-23.1			2470–2230
OxA-20351	ARS 095 491	Antler pick	SF 491, primary fill (095) of henge ditch in north-east sector. Found in two pieces, embedded in a pocket in bedrock (049)	3891±29	-21.6			
OxA-20357	ARS 095 491	Antler pick	Replicate of OxA-20351	3858±27	-21.3			
SUERC-23207	ARS 095 491	Antler pick	Replicate of OxA-20351	3825±30	-21.7			
Weighted mean (T'=2.5; T'(0.5%)=6.0, v=2; Ward and Wilson 1978)				3859±17				2460–2205
SUERC-26460	ARS09 SF514	Animal bone	Pig humerus, fissured and pitted fragment from fill (141) of pit [263] in Stone hole C	4040±35	-20.0			2840–2460
WOODHENGE (Burleigh <i>et al.</i> 1976, 26; Parker Pearson <i>et al.</i> 2020, 141, 180)								
BM-677		Antler pick	Floor of ditch, red deer	3817±74				2470–2030
BM-678		Domestic animal bone	Primary rubble silt of ditch	3755±54				2400–2010
OxA-19047		Human cremation	Cremation burial from posthole C14	3997±30				2580–2460
SUERC-32161		Animal bone	Cattle bone from top of layer (053), the upper fill of tree-throw hole [058] under the henge bank, associated with Grooved Ware pottery	3980±30				2580–2350
DURRINGTON WALLS								
Southern Circle (Wainwright and Longworth 1971, 30, 37, 206; Parker Pearson <i>et al.</i> 2007, 631; Noble <i>et al.</i> 2011, 164)								
OxA-14976		Antler pick	Re-cut pit in top of posthole 099 within the fourth ring, 2C	3966±33				2580–2340
BM-395		Antler	Packing material (Layer 8) of posthole 92	3900±90				2630–2050

BM-396		Charcoal, <i>Quercus robur</i>	Base of posthole 92, interpreted as being part of charred post	3950±90				2700–2140
BM-397		Animal bones	Packing material (Layer 8) of posthole 92	3850±90				2570–2030
NPL-239		Antlers (bulk)	Postholes 133, 134, 141, 193 and 194	3760±148				2580–1750
SUERC-30992		Antler pick	Posthole 1876, part of Phase 1 square-in-circle structure	4025±35				2670–2460
Northern Circle (Wainwright and Longworth 1971, 44)								
NPL-240		Antler pick	From posthole 42	3905±110				2850–2030
Henge (Piggott 1959; Stone <i>et al.</i> 1954, fig 4; Wainwright and Longworth 1971, 14, 20–1, 38, 194–5)								
Gro-901		Charcoal	Under henge bank on the southern side of the enclosure, associated with GW pottery. From Cutting III	4584±70				3530–3030
Gro-901a		Charcoal	Same context as Gro-901	4575±40				3500–3100
NPL-191		Charcoal	Under henge bank on northern side of enclosure, associated with early Neolithic and Grooved Ware pottery	4400±150				3520–2630
NPL-192		Charcoal (bulk)	From oval hollow 'midden' to the north-east of the Southern Circle, from the black ashy soil	4270±95				3330–2570
BM-398		Charcoal (<i>Corylus avellana</i> , <i>Crataegus sp.</i> , <i>Quercus robur</i>)	Base of main enclosure ditch near the south-west entrance. Layer 7, primary silts	3927±90				2840–2140
BM-399		Animal bone	Same as BM-398	3965±90				2860–2200
BM-400		Antler	Same as BM-398	4000±90				2870–2230
BM-286		Charcoal	Northern part of ditch. From Hearth 3 in secondary silt of ditch	3630±110				2200–1540
BM-285		Charcoal	Northern part of ditch. From Hearth 5 near base of ditch in lower part of Layer 5 (slower silt) at a height of 0.91m above the rock floor of the ditch. Associated with two sherds of late Beaker pottery	3560±120				2290–1540
Occupation (Parker Pearson <i>et al.</i> 2007, 633; Craig <i>et al.</i> 2015, table 1)								
OxA-14800	S-EVA 7249	Human femur	Context 109, fill of pit 178 cut into the south-west corner of House 851 after its abandonment	4104±32	-21.6	10.8		2870–2500

OxA-14801		Wild boar bone	Articulated wild boar bone from pit 178. Associated with Grooved Ware pottery and abraded human femur	4036±32				2670–2460
OxA-V-2232-41	S-EVA 3626	Human bone, male mandible	Context 1034, fill of pit 1033. Battered and toothless	4023±30	-21.2	11.3	3.3	2630–2460
OxA-V-2232-42	S-EVA 3636	Human bone, female occipital?	Context 641, artificial road avenue surface of rammed, broken flint	4032±30	-21.9	9.8	3.2	2630–2460
SUERC-34614	S-EVA 12429	Human tooth	Context 585, buried soil that formed above the avenue roadway (radiocarbon age not quoted in Craig <i>et al.</i> 2015)		-21.6	10.4		2620–2460

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2 Avebury, Wiltshire

The monument complex of Avebury is located centrally within the western half of the Marlborough Downs in North Wiltshire, where two intermittent ('winterbourne') streams merge to form the west-flowing River Kennet (Figure A2-1). The Marlborough Downs is an area of Upper and Middle Chalk downland encompassing some 20 square kilometres, surrounded by steep escarpments. The topography of the Avebury area consists of rolling valleys and rounded hills, bisected by many small branching dry valleys (coombes) descending to the Kennet valley (Geddes and Walkington 2005). For most of their post-glacial history the Upper Kennet and Winterbourne valleys contained intermittent streams and seasonal pools (Allen 2005, 85; see Chapter 4, Case Study 6). A distinctive feature of the area are large numbers of sarsen stones, blocks of silcrete that formed along former drainage lines, and which can still be seen today scattered in locations such as Lockeridge and Overton Down. The area has been famous for its prehistoric and megalithic monuments since the stone circles and henge at Avebury were re-discovered by the antiquary John Aubrey in the 17th century.

2.1 Landscape history

Charcoal and molluscan studies indicate that open woodland existed in the Avebury landscape at the start of the Neolithic period, although within this were large clearings that may have been the focus for settlement, particularly on the floodplain and in exposed upland areas (Gillings *et al.* 2008, 182). Some of these areas of chalk upland may have been pre-adapted to supporting stable open grassland from the beginning of the Holocene (Allen 2005, 130). Recent augering surveys and soil micromorphological work has shown a complete lack of major colluvial and alluvial deposits in the valleys suggesting that the area was never covered by dense woodland (Allen 2005; Allen and Davis 2009). This was probably one of the reasons why it was attractive for gatherings and episodes of monument construction in the Neolithic.

At Horslip, woodland was cleared, and grassland maintained before the construction of the long barrow, and at Windmill Hill, mixed woodland is shown by the pre-bank soil molluscan evidence. This tree cover was partly cleared for the construction of the enclosures, at which time some cereal cultivation was occurring nearby (Evans 1972, 242–8; Fishpool 1999). At West Kennet, Beckhampton, South Street and Millbarrow long barrows, the buried soils suggest open grassland, but with mixed woodland nearby (Gillings *et al.* 2008, 184–6). At Easton Down long barrow, outside of the main study area, post-glacial woodland was cleared before the construction of the barrow, with a mixed environment of grassland, wasteland, bracken, and scrub as well as some cereal cultivation in the vicinity (Whittle *et al.* 1993, 227). In the middle Neolithic, at the West Kennet Avenue, oak woodland had been cleared to areas of open woodland (Gillings *et al.* 2019, 8). Evidence previously thought to indicate regeneration of woodland, for example from South Street, Millbarrow and Beckhampton Road long barrow ditches (Gillings *et al.* 2008, 188), now appears to simply reflect localised scrub within shaded ditches.

At Avebury itself the post-glacial open woodland was cleared, and the area used for grazing and possibly cultivation, prior to the building of the henge; tree throws excavated at Rough Leaze show that trees were present in the nearby area until at least the middle Neolithic (Pollard *et al.* 2012, 13). Many of the late Neolithic monuments in the complex, including Longstones enclosure (Gillings *et al.* 2008, 42–44), the West Kennet palisades (Pollard *et al.* 2019, 41) and Silbury Hill (Leary *et al.* 2013), were constructed in established grassland, by which time the Kennet valley must have been largely an open landscape.

The construction of monuments would have had a dramatic impact on the local landscape, particularly in the late Neolithic when many trees were felled for the timber palisades at West Kennet and large areas of turf stripped for the construction of the early stages of Silbury Hill, and hundreds of sarsens were moved to form stone circles and avenues.

2.2 Mesolithic

Isolated finds of flint working or diagnostic tools, often from under later monuments or as minor components within surface collections, suggest that the Avebury area was frequented but not intensely occupied in the Mesolithic period (Gillings and Pollard 2004, 24–6; George 2016, fig 11). However, a dense scatter of late Mesolithic worked flint was found near the winterbourne stream between Avebury and Trusloe, when the area was a dry woodland floor (Evans *et al.* 1993, 151–3; Figure A2-1). Known as Butler’s Field, excavations here in 2018 found both early and later Mesolithic material in some quantities suggesting prolonged occupation (Gillings *et al.* 2018, 32). Some late Mesolithic flint-working has also been identified at Rough Leaze (Pollard *et al.* 2012, 14) and at the foot of Avebury Down (Gillings *et al.* 2020) and at the later West Kennet Avenue occupation site (Josh Pollard pers. comm.). Much more intensive occupation has been identified at Cherhill, 7 km to the west of Avebury, where hunting, toolmaking and occupation took place in the late 7th or earlier 6th millennium BC, adjacent to a stream (Whittle 1990, 106; Allen 2005; Healy 2016, 40). Compared to considerable evidence for activity further downstream in the Kennet valley, particularly between Hungerford and Newbury, the evidence from Avebury suggests less intense occupation, although the river valley may have formed an important corridor of movement between the lower Kennet and the Avon Vale and Cotswolds to the west (Pollard and Reynolds 2002, 25).

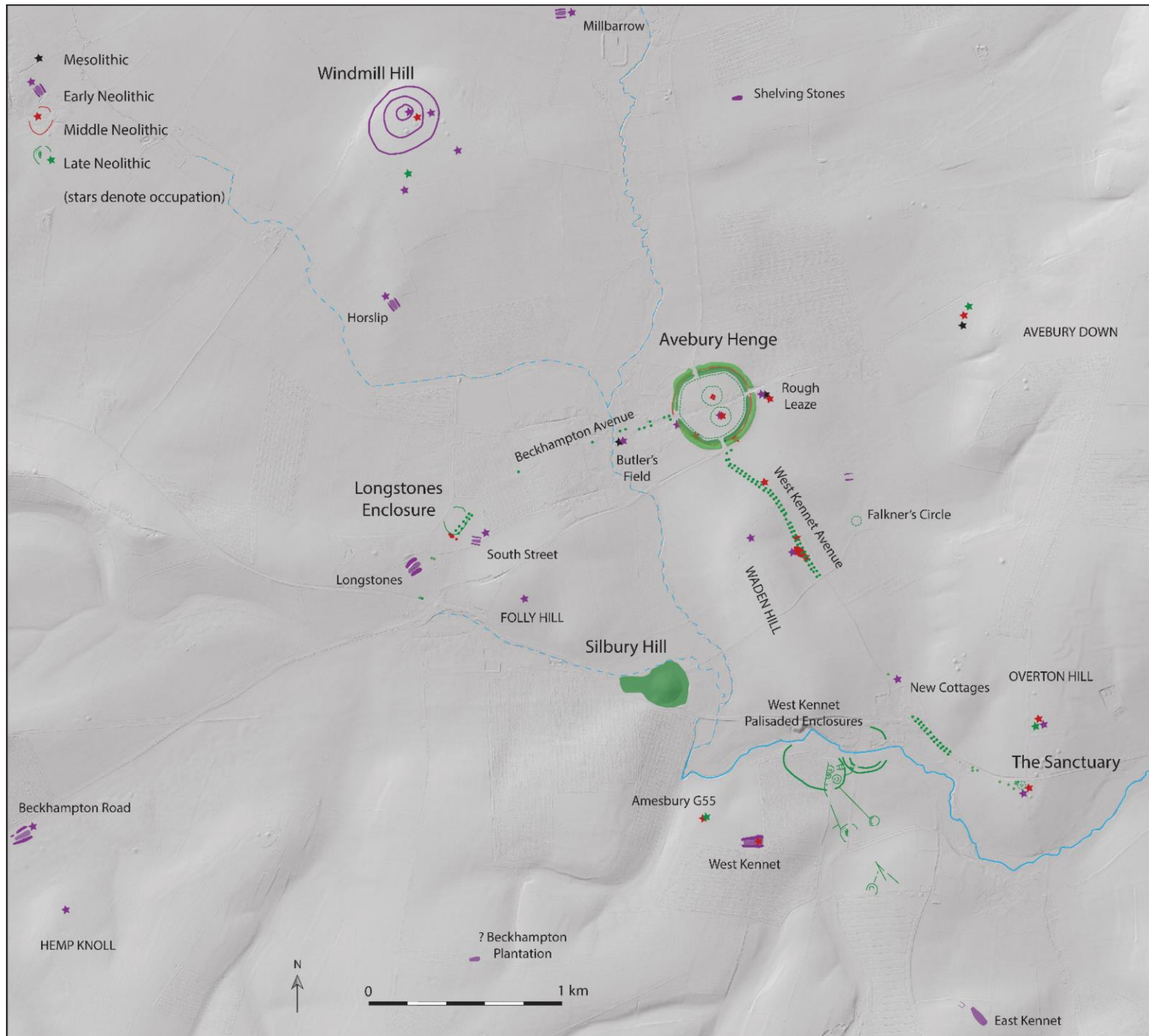


Figure A2-1 Overall map of Avebury complex

2.3 Early Neolithic

2.3.1 Settlement evidence

The transition to Neolithic practices in the Avebury area is estimated to be slightly later than in some adjacent regions, currently estimated within the range 3930–3665 cal BC (95% probability; Bayliss *et al.* 2011, 732). Early Neolithic flintwork is usually a component of artefact scatters (Holgate 1987; 1988, 233–43) and small quantities of early Neolithic pottery have been found at almost every excavation within the Avebury area, including at a number of long barrows (see Table A2-1), at the Sanctuary (Pollard 1992, 219), on Overton Hill (Smith and Simpson 1966, 151–5) and in the plough soil under round barrow Avebury G55, near West Kennet long barrow (Smith 1965a, 32–4). Several long barrows were preceded by pits, stake holes, burnt areas and other signs of occupation but there is difficulty in separating out these types of ‘pre-barrow’ activities and the marking out or initial activities associated with the long barrows themselves (McFadyen 2007, 23). Plain bowl pottery and worked flints of early Neolithic date have been found in two locations under the south-west sector of Avebury henge bank, possibly associated with nearby arable cultivation (Evans 1972, 273–4; Pollard *et al.* 2012, 16–8, fig 11; Figure A2-1). A tree-throw at Rough Leaze, a field just to the east of the henge, contained a fresh sherd of plain bowl pottery and worked flint, as well as an aurochs bone dating to 4220–3970 cal BC (Table A2-2: NZA-37435; Pollard *et al.* 2012, 10). The same area contained a scatter of stake holes, likely to be contemporary.

Early Neolithic flint scatters are found in a variety of locations, including upland, central slopes, and valley floors (Pollard and Reynolds 2002, 33), even though this evidence may often be obscured by later alluvial deposits. For example, at Butler’s Field, to the west of Avebury henge, early Neolithic pottery and worked flint was found beneath deep sediment accumulation (Evans *et al.* 1993, 151–3, 186–7; Gillings *et al.* 2018). At the West Kennet Avenue occupation site (Section A2.4.3), a scatter of early Neolithic flint has been found and a small pit containing worked flint and early Neolithic bowl pottery is associated with a radiocarbon date of 3960–3710 cal BC (Table A2-2: SUERC-59895). Nearby was a substantial oak post, standing perhaps 4–5 m tall, associated with a tree throw and cluster of stake holes (Josh Pollard pers. comm.). A sample of oak charcoal, probably deriving from this post, has returned a date estimate of 3890–3650 cal BC (Table A2-2: SUERC-70789) suggesting that it was erected in the early Neolithic, although as this sample may derive from heartwood it only provides a TPQ for the erection of this post. Another early Neolithic pit was excavated to the west of the avenue at the foot of Waden Hill (Thomas 1955), suggesting that this area saw a concentration of activity.

A further small pit with sherds of an early fine carinated bowl and worked flint has been excavated further south on the line of the West Kennet Avenue to the north of New Cottages (Gillings *et al.* 2008, 137; Figure A2-1). Small numbers of early Neolithic pits have also been excavated on Hemp Knoll (Robertson-Mackay 1980, 125–6). Evidence of more intensive occupation comes from Roughridge Hill, beyond the core study area to the south-west, where several pits containing grey ashy material along

with early Neolithic pottery, flintwork, bone pins, charcoal, hazelnut shells, animal bone and antlers have been found (Proudfoot 1965).

One location that stands out as having seen repeated visitation in the early Neolithic and later is Windmill Hill (Figures A2-1 and A2-2). An extensive flint scatter has been recorded on the southern slopes (Holgate 1987) where excavations have revealed a group of intercutting early Neolithic pits with pottery, animal bone, flint and plant remains, including cereals (Whittle *et al.* 2000). The lack of decorated pottery from these pits may suggest that they are relatively early in the Neolithic, perhaps earlier than, or contemporary with, the nearby causewayed enclosure (Whittle *et al.* 2000, 171; Section 2.3.2). At least 30 pits containing early Neolithic pottery, worked flints and cattle bone, as well as a hearth and some postholes, stratigraphically pre-dated the outer ditch of the enclosure (Smith 1965b, 22–8) and these may represent occupation contemporary with the inner ditch circuit (Whittle *et al.* 2011, 95). Although undated, the square structure to the east may be a contemporary house, shrine, or mortuary structure (Smith 1965b, 30–3; Pollard and Reynolds 2002, 37–8).

2.3.2 Windmill Hill causewayed enclosure

The enclosure on Windmill Hill is one of the largest such monuments in Britain (Figure A2-2). Located on a prominent hill with commanding views in all directions but particularly to the north-west, it consisted of three concentric roughly circular ditches with corresponding inner banks, positioned slightly to the north of the summit and enclosing 8.45 ha (McOmish *et al.* 2005, 16; Whittle *et al.* 2011, 61). The enclosure was principally investigated between 1925 and 1928, during excavations directed by St George Gray and Keiller, but other investigations took place before (Kendall 1923) and after (Smith 1965b; Whittle *et al.* 1999).

Radiocarbon modelling has shown that the inner and outer circuits were probably built before the middle circuit (dates listed in Table A2-2). The inner enclosure was created in 3685–3635 *cal BC* (95% probability, Whittle *et al.* 2011, fig 3.15: *dig WH inner*), probably in 3670–3645 *cal BC* (68% probability). The outer circuit was constructed in 3685–3610 *cal BC* (95% probability, Whittle *et al.* 2011, fig 3.15: *dig WH outer*), probably in 3670–3635 *cal BC* (68% probability). It is possible that the two circuits were constructed at the same time. The middle circuit was built a little later, in 3655–3605 *cal BC* (95% probability; Whittle *et al.* 2011, fig 3.15: *dig WH middle*), probably in 3640–3615 *cal BC* (68% probability). It is possible that all three circuits were built within the time of one or two generations (Figure A2-3). Each irregular ditched circuit had a corresponding bank on the inside, although this only survived as an earthwork on the eastern side of the outer ring. Each had causeways ranging from 0.3 to 7.6 m wide, with a wider gap between in-turned ends of two segments of the inner ditch seeming to mark an entrance into that enclosure, with a similar corresponding gap in the middle enclosure (Smith 1965b, 5; Figure A2-2).

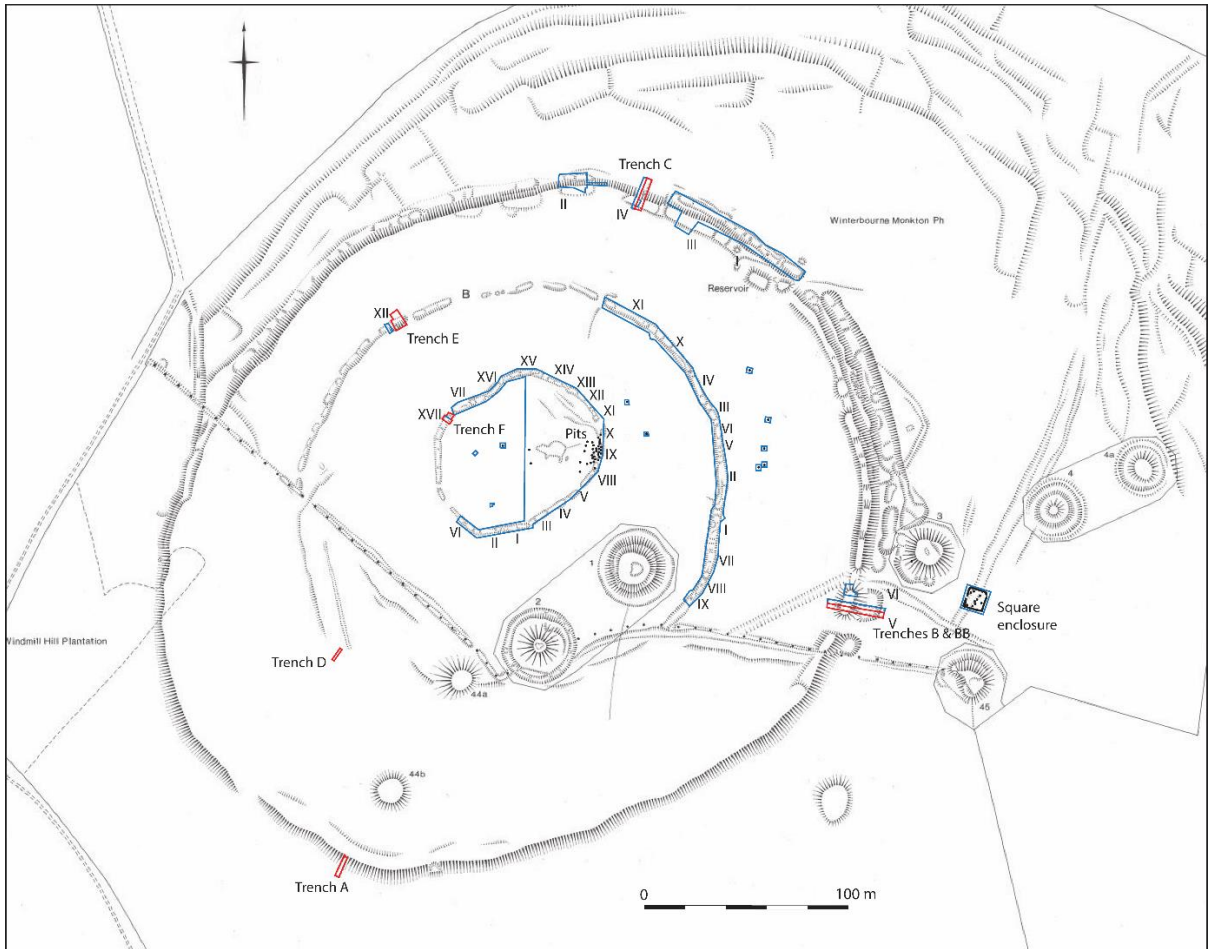


Figure A2-2 Plan of Windmill Hill causewayed enclosure, based on RCHME earthwork survey, with excavation trenches (blue = Keiller, red = Whittle). Base plan © Historic England 932009



Figure A2-3 Reconstruction of Windmill Hill, during the construction of the middle enclosure ditch © English Heritage, drawing by Peter Urmston

The main intensive occupation of the enclosure probably continued for 305–350 years (68% probability, Whittle *et al.* 2011, fig 3.16: use *Windmill Hill*), although sporadic activities at the site continued throughout the Neolithic period (Figure A2-3). Higher up in the ditch fills were middle and later Neolithic pottery forms, including Peterborough Ware, Grooved Ware and Beaker pottery (Smith 1965b, 14–5) attesting to continued activity at the enclosure throughout the Neolithic period. The lower parts of the ditches were filled with large quantities of early Neolithic pottery, animal bones (mostly cattle), patches of decayed organic matter, burnt material, charcoal, worked chalk, flint tools, flint working debris and stone tools, with the inner ditch having the greatest quantity of these midden deposits (Smith 1965b, 7–9). Over 12,000 sherds of pottery have been recovered, representing c.1200 vessels (Whittle *et al.* 1999, 257) and these from relatively small areas of excavation. Analysis of the ceramics has identified mostly dairy fats being cooked within them, with ruminant and porcine fats to a lesser extent (Copley *et al.* 2005). Deposits in the inner ditch often consisted of concentrated bone groups and spreads, which may have been processed or even curated (Whittle *et al.* 2011, 96). Two children and many disarticulated human bones were buried in the ditches, and an adult male was buried in the pre-bank soil under the outer bank (Whittle *et al.* 1999, 79). Clearly this was a place of special significance over a long period, a place where at times large numbers of people gathered, and where transformative social processes of deposition, funerary rites, feasting, and consumption took place (Whittle *et al.* 1999, 385). A distinct sense of ordering structured the deposition in the ditches. The outer, deeper boundary ditch was an appropriate place for human remains, articulated animal bones, axe fragments and decorated pottery, whereas the shallower middle and inner circuits had more worked chalk and bone, with remains of feasting and more ‘domestic’ debris comprising charcoal-rich soils, worked flint and pottery were more frequent in the innermost ditch (Whittle *et al.* 1999, 387). It appears that more ‘socially dangerous’ artefacts and remains were positioned away from the centre of the monument (Pollard and Reynolds 2002, 52–4), perhaps reflecting beliefs about the potential power and animacy of these objects to cause affect.

Other causewayed enclosures are known at Rybury and Knap Hill, about 7 km to the south of Windmill Hill and outside the main study area, on prominent hills overlooking the Vale of Pewsey. Rybury remains undated, but Knap Hill was probably constructed more than a century later than Windmill Hill (Whittle *et al.* 2011, 103).

2.3.3 Long barrows

There is a significant cluster of long barrows in the wider Avebury area (Figure A2-4, Table A2-1). Nine long barrows, and one possible example, lie within the core area of the monument complex as defined by this study, with a further 11 definite, one probable and three possible long barrows in the wider area. Most of these have stone chambers, sharing affinities with the Cotswold-Severn group, although several are unchambered, or had wooden mortuary structures (Kinnes 1992, 78). Chambered examples (only two

of which, West Kennet and Millbarrow, have been excavated to modern standards) are frequently located on upper slopes and false crests of hills, whereas earthen long barrows (five of which have been excavated in recent times) occur more frequently on lower lying valley floor locations. Not all long barrows contained human burials, and where these were present only a small number of individuals were interred (Pollard and Reynolds 2002, 68), similar to the pattern in the Stonehenge area.

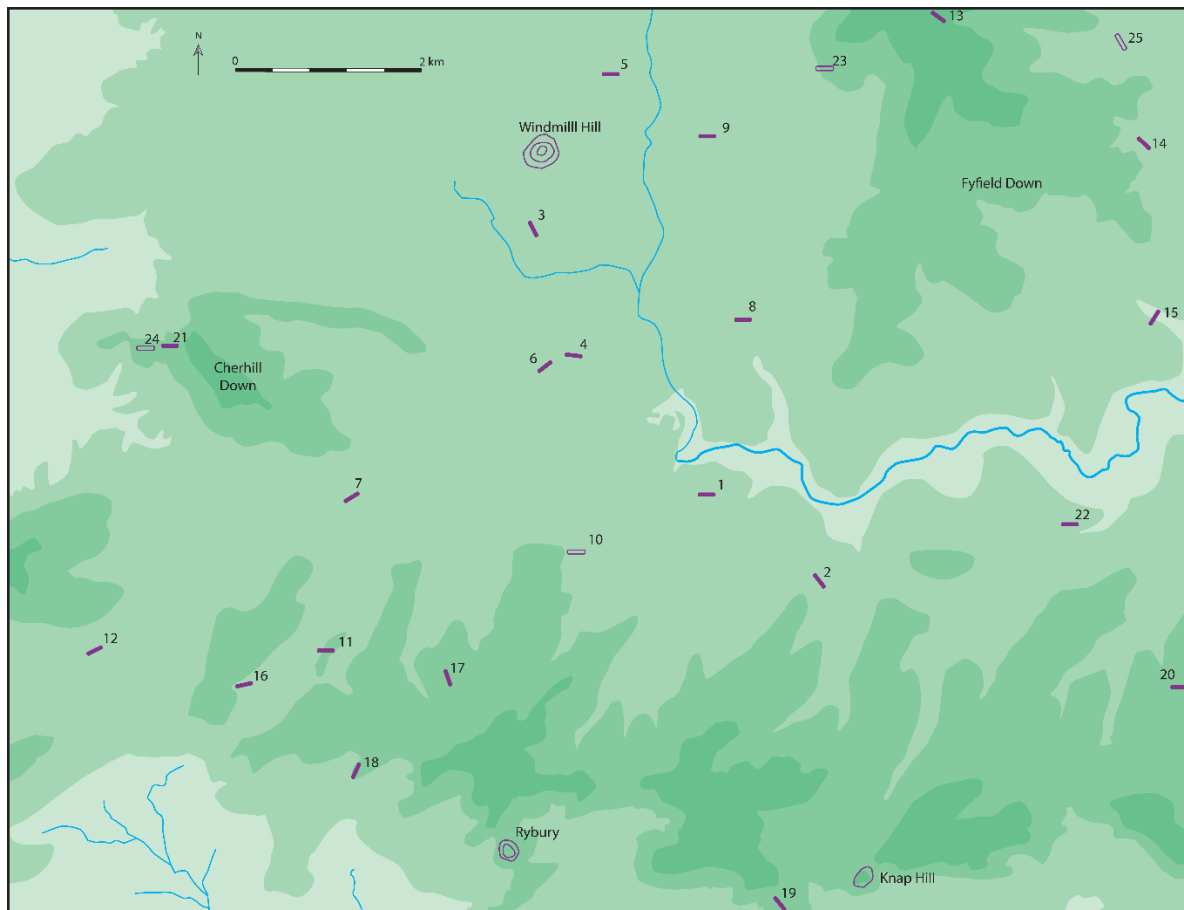


Figure A2-4 Map of all known (solid) and possible (outline) long barrows in the wider Avebury area. Site numbering refers to Table A2-1.

Many of the locations where long barrows were built had existing histories (Table A2-1). Some, like Millbarrow, had structures that appear to be associated with ritual or funerary activities (Whittle 1994), while others seem to have been built at significant locations, such as South Street, where there were patches of charcoal, stake holes, flint-knapping debris, and sarsen boulders (Ashbee *et al.* 1979, 264–5). Several were located at the boundaries between different land-use areas or soil types, such as South Street, Beckhampton Road and Easton Down, whose mounds or ditches have axial differences that may reflect these different zones (Pollard and Reynolds 2002, 62).

Table A2-1 – Table of long barrows known in the wider Avebury region

No (Fig A2-4)	Parish number (Grinsell)	Grid ref	Ori-entation	Mound size (max)	Chamber	Excavation	Description	Pre-barrow activity
1	Avebury 22 'West Kennet'	SU 1046 6774	E-W	104 m x 25 m	Yes	Thurnam 1859 Piggott 1955-6	Five chambers in E end of mound, containing at least 36 individuals buried in primary phase (Bayliss <i>et al.</i> 2007; Figures A2-5 and A2-6). Gradually filled with depositions of midden material and further human remains through Neolithic (Piggott 1962, Thomas and Whittle 1986).	Mesolithic flints and several sherds of Windmill Hill pottery (Piggott 1962, 11)
2	East Kennet 1 'East Kennet'	SU 1163 6685	SE-NW	110 m x 35 m	Yes	Anon c.1840–50	Substantial surviving earthwork, sarsens recorded as protruding from SE end (Westlake 2005). Possible contemporary long enclosure to NW. Three Anglo-Saxon burials (Eagles 2016, 107–8).	-
3	Avebury 47 'Horslip'	SU 0860 7053	SE-NW	58 m x 34 m	No	Ashbee 1959	On southern slope of Windmill Hill. Neolithic and Beaker pottery, antler, bone, flint artefacts and sarsen rubbers found (Ashbee <i>et al.</i> 1979, 207–28).	Mesolithic flints. Seven large inter-cutting pits, laid out on a similar axis (Ashbee <i>et al.</i> 1979, 211).
4	Avebury 68 'South Street'	SU 0900 6927	ESE-WNW	41 m x 15 m	No	Evans 1966–7	Unchambered long barrow with complex bayed mound construction displaying axial symmetry, without mortuary deposits (Figure A2-7). An irregular cairn of stones took the place where a wooden chamber might have been expected (Ashbee <i>et al.</i> 1979, 250–75).	Mesolithic flints. Cultivation (ard marks) succeeded by line of stake holes running diagonally and concentrations of flint knapping debris, areas of fine chalk rubble and two patches of charcoal (Ashbee <i>et al.</i> 1979, 264–5).
5	Winterbourne Monkton 17a 'Millbarrow'	SU 0943 7221	E-W	65 m x 17 m	Yes	Thurnam 1863 Whittle 1989	Largely destroyed. Aubrey recorded a stone chamber and peristalith of 29 stones "six or seven feet high". Merewether noted a few animal and human teeth and a jawbone, in a 'room' of large sarsens. Thurnam found nothing (Thurnam 1869, 201). Human remains from primary mortuary deposit surviving within the disturbed area of the original chambers (Whittle 1994).	Eight or nine postholes and five shallow pits indicate structure under the eastern (chamber) end of the barrow. Two pits contained fragmentary human remains, one of these with plain Neolithic pottery and another a pig jaw (Whittle 1994, 16–18).
6	Avebury 17 'Longstones'	SU 0870 6914	NE-SW	84 m x 35 m	? Yes	Merewether c.1850	Poorly recorded excavation large urn containing burnt bones and a bronze object (Merewether 1851a, 109). Smith recorded seeing two sarsens on top (Smith 1884, 100).	-

7	Bishop's Cannings 76 'Beckhampton Road'	SU 0666 6773	NE-SW	66 m x 50 m	No	Thurnam c.1855-67 Smith 1964	Unchambered long barrow, with complex bayed mound construction displaying axial symmetry, without mortuary deposits (Figure A2-7). Neolithic pottery, animal bones and an antler pick found. BA round barrow over E end (Ashbee <i>et al.</i> 1979, 228–50).	Layer of charcoal found in patches beneath the mound, evidence for a fire which was then smothered beneath a layer of soil or turves. Beneath the charcoal layer was a cluster of stake holes and early Neolithic pottery was found beyond one end of the barrow (Ashbee <i>et al.</i> 1979, 245–50).
8		SU 1078 6952	SE-NW	c. 20 m long	?	None	Discovered on aerial photographs taken in 2010 (Barber 2016, 20).	-
9	Winterbourne Monkton 17b 'Shelving Stones'	SU 1037 7156	?	?	Yes	None	Described and illustrated as stone chambered monument by Aubrey and Stukeley, now destroyed (Barker 1983). Geophysical survey in 2005 (Gunter and Roberts 2005).	-
10	'Beckhampton Plantation'	SU 0901 6713 or SU 0862 6706	?	?	? Yes	None	Possible. Identified as the one described by Stukeley south of Silbury Hill (Barker 1985). The second grid ref is Crawford's observation of a slight mound and sarsens.	-
11	Bishop's Cannings 65 'Easton Down'	SU 0637 6610	E-W	35 m x 18 m	? No	Thurnam 1860s Whittle 1991	Thurnam found two adult and two 'young person' inhumations at east end, and a few frags of sarsen but no chamber (Thurnam 1859–60, 324). Oolitic limestone pieces noted (Barker 1985, 19). Excavation across ditches and mound revealed pre-mound hollows, and outer parallel ditch on northern side (Whittle <i>et al.</i> 1993).	Flint working and two hollows (Whittle <i>et al.</i> 1993)
12	Bishop's Cannings 38 'Shepherd's Shore'	SU 0387 6608	ENE-WSW	55m x 16 m	No	Cunnington 1914	Already disturbed by time of Cunnington's excavations, but she found frags of four skeletons and a cremation in the SE part of the mound. Chalk rubble covering a paved mortuary area of oolite and sarsen blocks (Cunnington 1926). Geophysical survey in 1997 showed mound longer than recorded (Bray 1998; Crutchley 2005).	-
13	Preshute 10c 'Old Chapel'	SU 1290 7290	NW-SE	30 m x 8 ft	Yes	Stukeley 1723	Burial chamber appears to have been at the NW end where a semi-ellipse of five stones was recorded by Stukeley (Stukeley 1743, 47–8).	-

14	Preshute 1 'Manton Down'	SU 1520 7140	E-W?	30 m x 11 m	?	Atkinson 1955	Destroyed. Rescue excavation by Atkinson in 1955 not published (Barker 1985). Hoare referred to it being 'set round with stone' and its plan was drawn in 1946 (Piggott 1946, 60-1). Excavation report currently being written up (Matt Leivers pers. comm.)	?
15	Preshute 3a 'Devil's Den'	SU 1520 6965	SE-NW	70 m x 40 m	Yes	Passmore 1921	Destroyed except for ruined remains of chamber, re-set in 1921. Larger end to SE, chamber about 21 m from E end (Passmore 1922).	-
16	Bishop's Cannings 92 'Roughridge Hill'	SU 0546 6578	E-W	75 m x 32 m	?	None	Eastern tip cut by the Wansdyke (Grinsell 1957, 138). Earthwork extant.	-
17	Bishop's Cannings 91 'Horton Down'	SU 0768 6581	SE-NW	40 m x 15 m	?	Thurnam c.1850	Probably excavated by Thurnam who reported finding skeletons in north end of long mound on Horton Down (Thurnam 1869, 180). Earthwork extant and ditches visible.	-
18	Bishop's Cannings 44 'Kitchen Barrow'	SU 0668 6479	NE-SW	34 m x 18 m	Yes	None	Side ditches are 8m wide. Grinsell referred to sarsen protruding from NE end (Grinsell 1957, 138).	-
19	Alton 14 'Adam's Grave'	SU 1124 6340	SE-NW	65 m x 28 m	Yes	Thurnam 1860	Thurnam found traces of primary burials and a leaf arrowhead (Thurnam 1869). Part of sarsen chamber recorded in 1950s as exposed at SE end, and original retaining wall of alternate sarsens and oolite drystone walling (Grinsell 1957, 137). Flanked by side ditches which are still up to 1.5m deep. Earthwork suggests deep forecourt. Unpublished GPR survey in 1997-8 located internal chambers (Pierce and Shell pers. comm., cited in David 2001, 75).	-
20	West Overton 12 'West Woods'	SU 1567 6563	E-W	38 m x 30 m	Yes	Meux 1880	Meux recorded interior stones, slightly higher at eastern end, side ditches visible (Grinsell 1957, 145).	-
21	Calne/Cherhill 5 'Oldbury Hill'	SU 0468 6931	c.E-W	18 m x 8 m	?	[1864]	Located close to the Cherhill monument, almost destroyed. Chalk digging in 1864 revealed three skeletons in a grave surrounded by sarsens near the east end,	

							with pottery and flints (Grinsell 1957, 139). Further excavations by Cunnington found little more (Cunnington 1872; 1886).	
22	'Lockeridge White Hill'	SU 1436 6744	E-W	35 m long	?	None	Probable long barrow, identified as parch mark on 1995 aerial photograph, showing two 'sausage-shaped' ditches c. 30m long with a trace of a mound between (Historic England 2021, Monument No. 1120481).	-
23	Winterbourne Monkton 8 'Monkton Down'	SU 1163 7230	E-W	30 m x 14 m	? Yes	Merewether 1849	Possible. Oval mound and series of small mounds nearby. Merewether depicted a façade of eight stones at the western end, and his excavation found cattle and deer bones (Merewether 1851b, 103–6).	-
24	Calne Without 1	SU 0445 6933	E-W	70 m x 32 m	?	None	Possible long barrow, much damaged by later chalk and flint digging (Historic England 2021, Monument No. 215906).	-
25	Ogbourne St Andrew 19 'Temple Bottom'	SU 1486 7251	n/a	14 m diam	Yes	Lukis 1861	Chambered round barrow? Sarsens laid flat over low mound with two larger upright stones (Harrod 1863, 208–9). Excavations found pottery, burnt and unburnt human bones, and outside it a human skull with a stone muller or rubber (Lukis 1866, 213–5).	-



Figure A2-5 The reconstructed façade of West Kennet long barrow, built of local sarsen orthostats and drystone walling of oolitic limestone blocks, brought some distance from the Bath–Frome region (author's photograph)



Figure A2-6 Burials in the south-west chamber of West Kennet long barrow, during excavations in 1955. © Wiltshire Museum 2014.7087.117

The 101 m-long West Kennet long barrow (Figure A2-5) has an irregular mound, with a broadening in the middle at a point where there is a slight change in orientation, suggesting that it was built in more than one stage (McOmish *et al.* 2005, 14–5). At the eastern end of the barrow is a semi-circular forecourt with a passage leading to five chambers, within which a minimum of 36 individuals were interred, in varying levels of articulation (Bayliss *et al.* 2007, 36; Figure A2-6).

The barrow was probably constructed in 3670–3635 *cal BC* (81% probability; Bayliss *et al.* 2007, 96). The primary burials were placed in the chambers probably later than the inner and outer circuits of Windmill Hill were dug, but likely by the time the middle circuit was constructed (Whittle *et al.* 2011, 102). There

was deliberate ordering and arrangement of people buried in the various chambers, with the west chamber being male dominated, the south-west and north-west chambers having adults of both sexes, the south-east chamber characterised by younger and the north-east by older individuals (Thomas and Whittle 1986, 133). This patterning extends to the level of disarticulation with the adult males being more likely to be complete and articulated, and to the distribution of pottery placed in the later filling of the barrow. The south-west chamber (Figure A2-6), for example, had no pottery and other chambers were favoured for pottery with certain types of decoration (Thomas and Whittle 1986, 142–3). This distribution may reflect social divisions in the wider society. This initial funerary activity took place over a very short period between the construction date and *3640–3610 cal BC (77% probability; Bayliss et al. 2007, 93; dates listed in Table A2-2) or 3550–3520 cal BC (18% probability)*. This activity therefore only lasted for *1–55 years (94% probability)* and was followed by a period of around 100 years when little activity took place, when at least two of the chambers were sealed by walling, and during which some of the internal dry-stone walling collapsed (Bayliss et al. 2007, 94, 97).

Several other chambered long barrows in the Avebury area may also date to this early stage of the Neolithic but for the majority absolute dating is unavailable. The mound at Horslip, mostly destroyed by the time of excavation, was built of chalk blocks and rubble, and rough sarsen and non-local sandstone boulders were found in the plough soil (Ashbee et al. 1979, 212). A radiocarbon date on an antler pick from the base of the ditch places the construction in the earlier part of the 4th millennium BC (Table A2-2: BM-180). Easton Down, located 5 km to the south-west of Avebury and close to the escarpment overlooking the Vale of Pewsey, appears to date from the second half of the 4th millennium BC. When Thurnam excavated the east end of this barrow he found four internments and stone fragments but no definite evidence of a chamber (Thurnam 1859–60). Excavations in 1991 across both ditches and part of the mound provided environmental and dating evidence (Whittle et al. 1993), with a construction date estimated in *3600–3360 cal BC (95% probability; Whittle et al. 2011, fig 3.31: build Easton Down)*, probably in *3485–3385 cal BC (68% probability)*.

Millbarrow, a largely destroyed tomb, had double ditches and the remains of a possible chamber with disarticulated human remains (Whittle 1994). It was preceded by a square timber structure c.6 m across, possibly some form of mortuary structure, associated with pits with pottery, flint, human and animal bone (Pollard and Reynolds 2002, 61). A series of eight radiocarbon dates from the site (Table A2-2) have been modelled to suggest that the barrow was built in *3500–3135 cal BC (95% probability; Whittle et al. 2011, fig 3.30: build Millbarrow)*, probably in *3390–3200 cal BC (68% probability)*. This is relatively late for a chambered long barrow, comparable perhaps to the date of Wayland's Smithy in Oxfordshire. Also dating to this period are the very similar Beckhampton Road and South Street long barrows, both with axial fence lines and a series of 20 infilled bays (Figure A2-7).

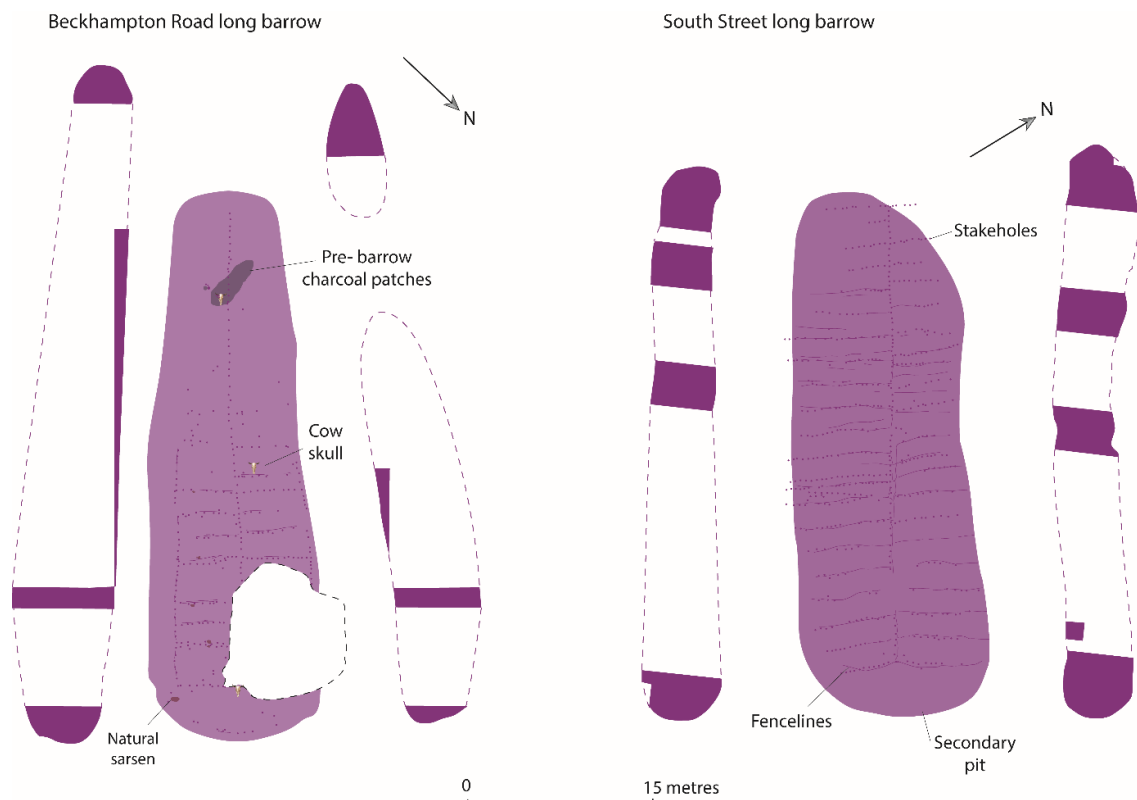


Figure A2-7 Plans of South Street and Beckhampton Road long barrows (after Ashbee *et al.* 1979, figs 11, 14 and 21; 23 and 25)

At South Street, these bays were filled with chalk, turf, coombe rock and chalky soil following a regular pattern, each layer interleaved with brushwood (Ashbee *et al.* 1979, 258–9). The north and south sides of the mound were quite distinct, with the south side have a uniform spacing and regular infilling, with a deep and narrow flanking ditch, whereas the north side was irregular and coombe rock was used to fill the bays, from a shallower and broader ditch. No human remains were found, but five large sarsen boulders were placed at the eastern end before the construction of the bays (Ashbee *et al.* 1979, 262). Radiocarbon modelling (dates listed in Table A2-2) suggests that the barrow was constructed in 3565–3105 *cal BC* (95% probability; Whittle *et al.* 2011, fig 3.31: *build South Street*). This barrow remained an important place, as later the Longstones Enclosure, Longstones cove and the Beckhampton avenue were all built close by (Figure 4-10). In the late Neolithic or early Bronze Age a secondary shallow pit was dug into the front of the long barrow and filled with late Neolithic or early Bronze Age flintwork (Ashbee *et al.* 1979, 257).

Beckhampton Road long barrow was of very similar size, and divided into bays, with the edges defined by fences or planks and filled with turf, small sarsens, coombe rock and chalk. Again, no human remains were found, but three cattle skulls were placed at intervals down the axial centre of the mound, perhaps heads hung on posts (Ashbee *et al.* 1979, 247; Pollard and Reynolds 2002, 43; Figure A2-7). The difference between the two side ditches was again evident, with the northern interrupted and shallow whilst the southern was regular and deep. Two measurements on antler picks found beneath the mound

(Table A2-2: BM-506a and b) suggest a late 4th millennium or even early 3rd millennium date for its construction (Whittle *et al.* 2011, 107).

It is tempting to suggest a development from chambered long barrows to earthen ones, or a development from chambered long barrows to a more diverse group of chambered, earthen, and oval barrows, but this is not a picture borne out in the wider currencies of these monuments in southern England (Bayliss *et al.* 2011, fig 14.45) and the excavation record for long barrows in the Avebury area remains patchy and incomplete.

2.3.4 Long enclosures

A missing component of the Avebury area, when compared to other Neolithic monument complexes in Britain and Ireland, is a cursus monument. A possible example has been identified on a 1935 aerial photograph to the west of Avebury, south of Yatesbury (Major Allen Neg 143), but is by no means certain (Cleal and Pollard 2016, 87). There are at least three smaller rectangular or square enclosures, often called 'mortuary enclosures', that may date from the early Neolithic. Two form part of the barrow cemetery at Folly Hill (Soffe 1993) and a small three-sided rectangular enclosure, visible on an aerial photograph close to the north-west end of East Kennett long barrow, may be some form of early Neolithic long enclosure (Westlake 2005, 13). At Windmill Hill, a square enclosure about 10 m across with two causeways is undated but possibly early Neolithic (Smith 1965b, 30–3) and a gully-defined small sub-triangular enclosure in Longstones Field may be early Neolithic in date (Gillings *et al.* 2008, 21–3).

2.3.5 Summary

The evidence indicates low-level but regular occupation and activity across the whole Avebury area in the early Neolithic period. The dispersed concentration of long barrows around the headwaters of the River Kennet, and further south along the chalk escarpment, appear to have been built at intervals over most of the 4th millennium BC, suggesting a long-lasting tradition. The major focus of periodic settlement, gathering, feasting and deposition was on Windmill Hill, although activity here may have been relatively short-lived, perhaps in the region of 300 years. These gatherings no doubt drew people from a wider area and set the pattern of major monument construction and communal episodes for the next 2000 years.

2.4 Middle Neolithic

2.4.1 Continuity at older sites

Several early Neolithic sites continued to be altered and were the focus for deposition into the middle Neolithic. At Windmill Hill causewayed enclosure, part of the outer circuit of ditches were re-dug, with a recut close to the ditch base in Segment V dated to before 3030–2780 cal BC (Whittle *et al.* 2011, 92; Table A2-2: GrA-25550); it is from this level upwards that Peterborough Ware pottery occurs (Smith 1965b, 11–12, fig 4). This redefinition of the outer enclosure appears to have enlarged the original bank and involved the creation of a new entrance at the northern end of the segment, where a vestigial bank

runs across the present causeway (McOmish 1999, 14, fig 15). This entrance corresponds with concentrations of Peterborough Ware pottery in fills in similar positions of the middle and inner ditches, perhaps representing people passing in or out of the enclosure making deposits in the terminals (Whittle *et al.* 2011, 97). Peterborough Ware occurs frequently in the secondary ditch fills, with an estimated 94 vessels identified (Smith 1965b, 73–8). Various episodes of deposition and activity, including a child burial in the outer ditch dated to 3500–3100 cal BC (Table A2-2: weighted mean, burial WH29 B209a) continued as people returned to the hill on multiple occasions.

Some long barrows, such as Millbarrow, may have been built in the middle Neolithic period, although better dating is needed before this can be claimed with any certainty. At West Kennet long barrow, the chambers continued to be the focus for visits and deposits over a period of about 1000 years, throughout the Neolithic (see discussion in Chapter 6.5). Large quantities of Peterborough Ware pottery, animal bones (including dogs, pig, sheep/goat, and cattle), chalk, earth, burnt material and human remains, including at least five articulated or partially articulated child burials, were placed in the chambers (Thomas and Whittle 1986, 141). This activity continued until at least the end of the Neolithic period, when Beaker pottery was deposited, ending probably in 2475–2225 cal BC (68% probability; Bayliss *et al.* 2007, 94). Similar re-use is indicated by later deposition of artefacts in the ditches of Millbarrow, Horslip and South Street long barrows (Pollard and Reynolds 2002, 78–9), activities that indicate the continued significance of these existing places, despite changing contemporary traditions.

2.4.2 Settlement

Recently it has been suggested that a series of gullies and pits excavated by Keiller at the centre of the southern inner circle at Avebury are the remains of an early or middle Neolithic house, perhaps with a significant history that led to it being monumentalised within later stone settings (Gillings *et al.* 2019, 374). There is a concentration of early and middle Neolithic flintwork and pottery (Neolithic bowl and Peterborough Ware) in this location suggesting occupation, and the gully features and postholes could well be a structure (Figure A2-15). An alternative explanation is that they represent the remains of a central cove or square hearth-like structure at the centre of, and contemporary with, the later southern circle (like that at the centre of Site IV, Mount Pleasant), built at a location with a prior history of use.

Other indications of middle Neolithic settlement include a small assemblage of Fengate style Peterborough Ware from a pit on Overton Down, without any associated flint or bone (Smith and Simpson 1964, 82; Figure A2-1). Middle Neolithic flint implements and pottery have been recovered from a surface scatter from Avebury Down to the east of Avebury henge, where a small pit with Peterborough Ware was excavated (Gillings *et al.* 2020). At Rough Leaze, to the west of the henge, sherds of Peterborough Ware associated with flint debitage and burnt sarsen were retrieved from a tree-throw hollow, perhaps a displaced hearth (Pollard *et al.* 2012, 8). Close to Stone 15b of the later West Kennet Avenue, south of the henge, was a pit containing Mortlake-style pottery sherds probably from a single

vessel, cattle bones, and charred hazelnut shell (Allen and Davis 2009). A radiocarbon date on one of the cattle bones provides an estimate of 3100–2910 cal bc for this pit (Table A2-2: NZA-23742).

Under Avebury henge itself, Peterborough Ware was found on the old land surface below the bank in Cutting X (Smith 1965b, 224; Figure A2-8). A distinct dark patch of charcoal with burnt bone, iron pyrites and Peterborough Ware was found during excavations within the mixed silting of the henge ditch in Cutting VIII (Gray 1935, 138), most likely representing material that had weathered from the adjacent old land surface. A few scattered sherds of Peterborough Ware were found low in the postholes at the Sanctuary (Cunnington 1931, 218), single sherds from a pit in the ‘gap’ of the West Kennet Avenue (Gillings *et al.* 2008, 137–8) and from the West Kennet palisaded enclosures (Whittle 1997, 115) showing that several locations that saw low-scale middle Neolithic activity.

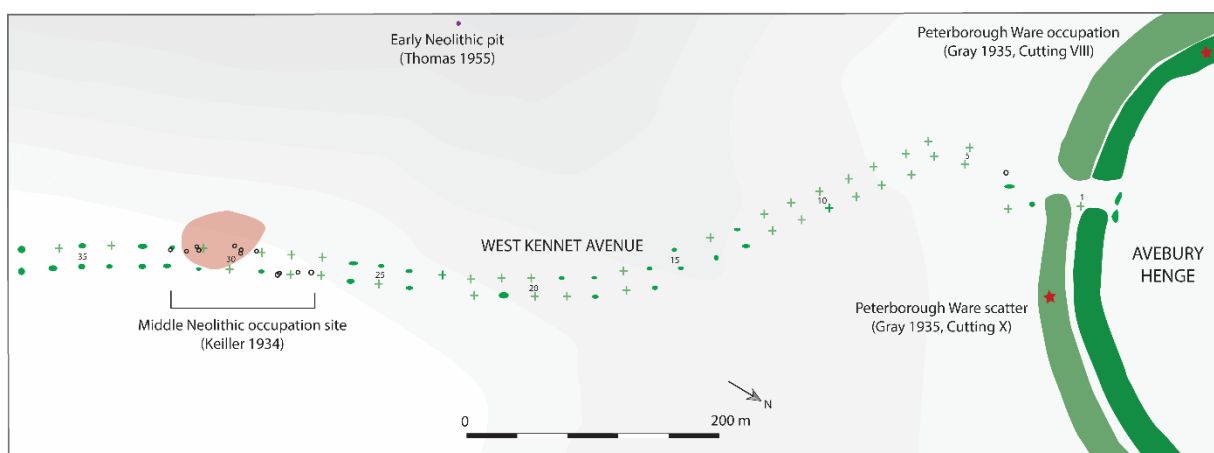


Figure A2-8 West Kennet Avenue, showing location of occupation site (after Smith 1965b, fig 71; Gray 1935, fig 1)

A much larger settlement site was located on the line of the later West Kennet Avenue, in the portion between stone pairs 29 and 32 (Smith 1965b, 210–2; Pollard 2005, 109–11; Gillings *et al.* 2015; Figure A2-8). Here Keiller’s excavations uncovered two substantial pits and 10 smaller pits or postholes associated with an abundant scatter of some 600 sherds of pottery, mostly Peterborough Ware but also Grooved Ware, and more than 1000 flint artefacts, largely middle Neolithic in date with distinctive forms including ‘Levallois-style’ cores, edge-polished pieces, and chisel arrowheads (Smith 1965b, 212, 236). The pits contained charcoal, worked flint, transverse arrowheads, pieces of sarsen and animal bone (cattle and pig), sometimes with the deliberate placement of artefacts (Pollard 2005, 111). Other finds included a bone pin, a stone axe and three further axe fragments, non-local stone fragments and stone tools such as rubbers and pounders (Smith 1965b, 233–4).

Recent excavations have recovered another 300 sherds of prehistoric pottery and thousands more pieces of worked flint, the majority of middle Neolithic date but some earlier and later, as well as a small number of pits and stake holes (Gillings *et al.* 2015; Josh Pollard pers. comm.). Some of these pits have fills indicating their origin from nearby middens or hearths, with burnt flint, burnt antler and charcoal.

From one of these pits (F.6) a piece of Pomoideae roundwood has provided a radiocarbon date of 3320–2910 cal BC (Table A2-2: SUERC-59896). Another pit (recut of F.55) containing a substantial flint assemblage including eight chisel arrowheads is dated by a short-life piece of *Corylus avellana* wood charcoal to 3090–2900 cal BC (Table A2-2: SUERC-70784). This pit was cut into another larger pit or solution hollow, whose primary fill included a piece of Pomoideae wood charcoal with a date of 3090–2900 cal BC (Table A2-2: SUERC-70788). Two radiocarbon dates obtained previously on unidentified charcoal from Hole 4 and an antler from Pit 1 of Keiller’s excavation overlap with this, or are slightly later (Smith 1965b, 215; Table A2-2: HAR-6965 and HAR-10501). This intensively occupied location may have influenced the position and form of the later stone avenue, which was deliberately laid out across the earlier site, and marked by a gap left where Stone 30b should stand (Smith 1965b, 212).

2.4.3 Monuments

In addition to the possible middle Neolithic long barrows, two other major monuments may date to the middle Neolithic: the West Kennet palisaded enclosures, and an early version of Avebury henge. The West Kennet palisaded enclosures consist of two large timber circuits and a series of smaller timber monuments and radial fence lines, located on the valley floor between Silbury Hill and the Sanctuary. When these structures were first excavated, an initial set of radiocarbon dates and the presence of Grooved Ware pottery tentatively placed their construction and associated activity in the period 2500 to 2100 BC (Whittle 1997, 160). Re-analysis of the dating evidence and new dates have placed the construction of the timber palisades much earlier, at the end of the middle Neolithic. The dates on sapwood charcoal from both enclosures are closely comparable and could have been built in a single episode, estimated to have occurred in 3325–3215 cal BC (95% probability; Bayliss *et al.* 2017, fig 17.5: *build_WK_enclosures*), probably in 3315–3270 cal BC (68% probability). In contrast, the animal bones and antlers associated with Grooved Ware occupation of the site appear to from a separate, later phase, starting in 2575–2405 cal BC (95% probability; Bayliss *et al.* 2017, fig 17.6: *start_WK_settlement*), probably in 2520–2440 cal BC (68% probability) and continuing for at least 300 years (Bayliss *et al.* 2017, 263).

The middle Neolithic dates for the construction of the palisaded enclosures are surprising, given that 12 other palisaded enclosures in Britain have been securely dated to the late Neolithic, in the decades around 2500 BC, including the closely comparable site of Mount Pleasant (Greaney *et al.* 2020, fig 14; Appendix 3). The dates do not appear to match the associated cultural material and require a radical re-interpretation of the site formation processes (Pollard *et al.* 2019, 9, 42). It is possible that the posts were old or ‘curated’ by the time that the palisades were constructed but the explanation favoured here is that the dated oak charcoal relates to an earlier woodland clearance event from which charcoal later became incorporated into the post-pipes (Pollard *et al.* 2019, 9). This may suggest a significant change in land-use in this part of the Kennet valley in the middle Neolithic, with oak woodland being removed and burnt,

perhaps opening areas for agriculture or grazing. One of the aims of excavations undertaken in 2019 as part of the Between the Monuments Project is to resolve this conundrum by obtaining new dating samples and clearer stratigraphic information (Pollard *et al.* 2019). For the purposes of this case study, the monument itself and associated occupation activity are both interpreted as late Neolithic in date and are discussed further in Section 2.5.8.

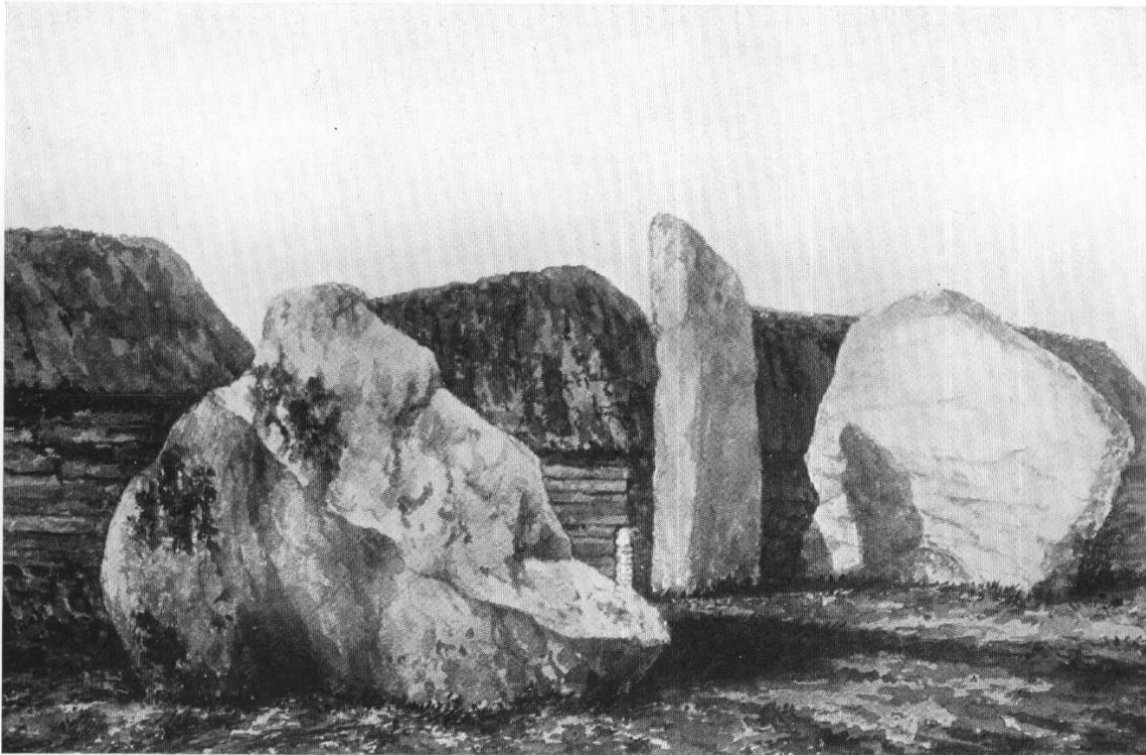


Figure A2-9 A watercolour painting of the Avebury cove from 1825, by J. Browne (reproduced from Gray 1935, fig 2)

More certain is the possibility that some elements of the henge and stone circles at Avebury were constructed in the middle Neolithic. An OSL date obtained on deposits within the stone hole of Stone II of the cove, suggests this enormous stone was erected in the late 4th millennium or early 3rd millennium BC (3120 ± 350 BC; Gillings *et al.* 2008, 165; Figure A2-9). The cove was a setting of four very large stones that stood at the centre of the northern inner circle (Section A2.5.4). Two stones (Stones I and II), each over 4 m tall, remain positioned at right angles to each other, with a third similarly large stone broken up in 1713. Early antiquarian plans hint that a fourth stone may have existed (Gillings *et al.* 2008, 153) and recent geophysical survey has recently confirmed the position of the fourth stone suggesting that they stood in a box-like arrangement. Excavations have shown that Stone II extends at least 3 m below the present ground surface, giving a total length of about 7.5 m and weighing in region of 100 tonnes (Gillings *et al.* 2008, 166). The similarities between the layout and size of the stones at the Avebury Cove and the Longstones Cove (see below) may suggest an early origin for both settings. In a similar way to Durrington Walls (Appendix A1.5.10) there may have been a series of megalithic structures along the ridge at Avebury prior to the construction of the surrounding henge enclosure (Pollard and Reynolds 2002, 91).

It is possible that the henge enclosure at Avebury was preceded by a palisaded enclosure, as suggested by a large posthole within the southern entrance (Pollard and Reynolds 2002, 88). Some of the stone settings or other timber structures within the enclosure (Section 2.5.4) may have pre-dated the henge bank and ditch. The enclosure itself had an earlier phase, as there is a primary bank hidden within the present henge bank. A curving line of 'vegetable mould' with signs of burning within the bank was observed by Thomas Leslie, who supervised the digging of a trench across the bank in 1894 (Smith 1965b, 184; Gray 1935, 104; Pitts 2017). Although Gray did not describe a buried soil within his section across the bank (Cutting X, dug in 1914), Pitts and Whittle (1992, 206) note that such a buried turf line is visible on images from his excavation (Figure A2-10).



Figure A2-10 The buried curving soil line in Gray's Cutting X, seen in this 1914 photograph above the heads of the workmen, which may indicate the top of the primary bank (Gray 1935, plate XLII, 2)

The primary bank at Avebury was recorded by Faith Vatcher, who noted a bank some 3 m wide and 2.5 m high at the school site (Evans 1972, 273). This bank ('Avebury 1') had a distinct turf line, suggesting that it stood for some time before the henge bank and ditch were considerably enlarged in the mid-3rd millennium BC and it is likely to follow the complete circuit (Pollard and Cleal 2004, 124). Unfortunately, there is no direct dating evidence for this first bank; although the henge bank is generally known to seal a scatter of worked flint, early Neolithic pottery and Peterborough Ware, it is not known if this material was under the primary or secondary bank (Healy 2016, 41). Three dates are available on material from the old land surface below the bank (Table A2-2: HAR-10500, HAR-10063 and HAR-10325); one of these is known to be from under the secondary bank; the others could be from under either the primary or secondary bank (Pitts and Whittle 1992, fig 3). These can only act as TPQ for the final earthwork rather than dating the primary bank. If the first version of Avebury henge dates to the middle Neolithic, it would

have been built at a similar time to the circular 'proto-henges' of Stonehenge and Flagstones, although it is far larger in size. These other early henges are associated with cremation burials; although burnt bone was found under the henge bank in Keiller's excavations in the south-west sector, this has not been identified as human or animal (Smith 1965b).

2.4.4 Summary

In the middle Neolithic period, the Avebury landscape appears less busy than in the preceding early Neolithic period, with less dense occupation and fewer monuments constructed. The period saw older monuments such as West Kennet long barrow and Windmill Hill become the focus for deposition and re-working, the continuity of long barrow construction at new locations and probably the inception of entirely new traditions of monument building in the form of square stone coves and the possible circular proto-henge at Avebury. It appears that middle Neolithic activity became more concentrated in certain areas, which would go on to become the location for major late Neolithic monuments (Figure A2-27).

2.5 Late Neolithic

2.5.1 Settlement evidence

Evidence for settlement of late Neolithic date is somewhat elusive in the Avebury area, aside from the intensive and unique occupation at the West Kennet palisaded enclosures which is likely to be related to the construction of nearby Silbury Hill (Section 2.5.9). Small quantities of Grooved Ware pottery have been found during excavations on Overton Hill (Smith and Simpson 1966; Figure A2-1), under the round barrow Avebury G55 (Smith 1965a) and at the West Kennet Avenue occupation site (Smith 1965b, 212). Grooved Ware has also been found in the tops of the ditches at Windmill Hill and a scatter of late Neolithic flints associated with several pits has been found on slopes to the south of the enclosure suggesting an area of settlement outside the older causewayed enclosure (Whittle *et al.* 2000). At the foot of Avebury Down, small quantities of later Neolithic flint tools and Grooved Ware pottery have been found in association with a series of small pits and a posthole (Gillings *et al.* 2020). This sporadic evidence gives a sense of relatively low-frequency occupation, perhaps only temporary settlement sites located at some distance from the main monuments that were being constructed in this period.

2.5.2 Longstones cove and enclosure

To the south-west of Avebury henge stood a megalithic setting of four stones known as Longstones cove. This location is close to the source of the Beckhampton stream, and the cove was roughly aligned with two older long barrows, South Street and Longstones (Figure 4-10; Pollard 2005, 112). Only one large stone of the cove remains, known as 'Adam' and weighing an estimated 62 tons, which was restored from fallen in 1912 (Cunnington 1913; Figure A2-11). At least two others were recorded by Aubrey and Stukeley as standing in the early 18th century (Figure A2-12). Excavations have shown that 'Adam' stood on the north-east side of a square or box-like arrangement formed of four stones aligned north-west to south-east measuring c. 15 x 10 m (Gillings *et al.* 2008, 85). The other three stone holes were large and

deep, supporting stones that perhaps stood 2.5–3.5 m above ground (Gillings *et al.* 2008, 73). The sides of this box arrangement, formed of large diamond-shaped stones, was slightly splayed towards the south-east (Gillings *et al.* 2008, fig 2.86).



Figure A2-11 Photograph of 'Adam', the one remaining stone of Longstones Cove (A in Stukeley's drawing below), and 'Eve', a surviving stone of the Beckhampton Avenue (author's photograph)

To the north-west and south-east, two further stone holes show that the cove originally formed part of a linear arrangement. The two outer stones had been removed in prehistory and their stone holes were filled with pure chalk rubble (Gillings *et al.* 2008, 74). These two stones and the south-east stone of the cove (F11) have been interpreted as a 'pre-cove setting' of three equally spaced megaliths across the end of the Beckhampton Avenue (Section 2.5.5). However, this sequence is not certain: there is no need to assume symmetry with the avenue. As F11 is set perpendicular to the line, it appears to have formed part of the cove from outset. The similarity between Longstones cove and the setting at the centre of the northern inner circle at Avebury suggests that perhaps both were constructed at a similar date. This would place the Longstones cove in the late 4th millennium or early 3rd millennium BC. The two outer stone holes seem likely to have been removed at the time of the construction of the Beckhampton Avenue.

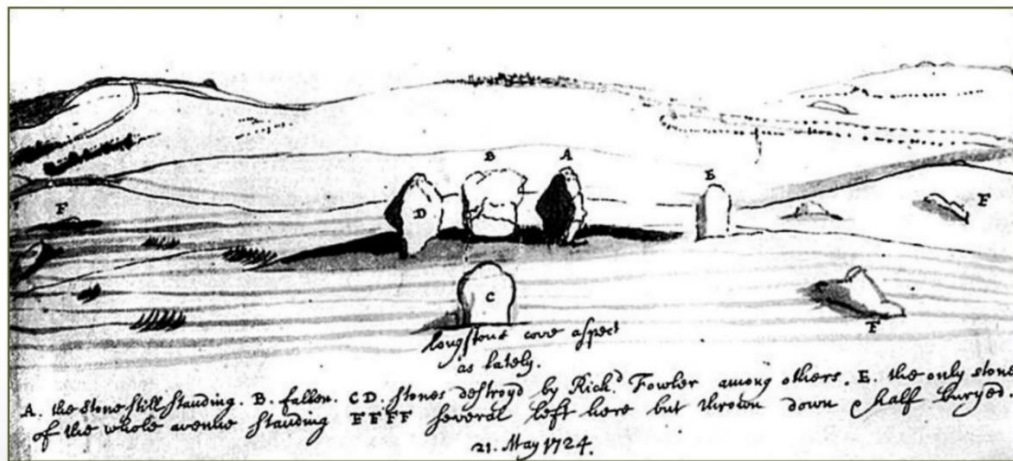


Figure A2-12 Stukeley's 1724 drawing of Longstones. A is 'Adam', standing with two other surviving stones of the four-sided cove. E is 'Eve', the remaining standing stone of the Beckhampton Avenue © Bodleian Library MS. Top gen. b. 53

The Longstones enclosure lies immediately to the north-west of the Longstones cove (Figure 4-10). It was discovered by geophysical survey and aerial photography, with the circuit confirmed by excavation. The oval enclosure measures c.140 by 110 m, with a 45 m wide entrance to the north-east, formed of a discontinuous and irregular ditch between 1.1–2.1 m wide and 0.43–0.96 m deep, with an internal bank (Gillings *et al.* 2008, 12). Very little artefactual or faunal material was associated with enclosure, although animal bones were deposited on the base of the ditch, especially at the terminals on either side of the entrance. These deposits also included sherds of Grooved Ware pottery, and another large portion of an unusual Grooved Ware vessel was found in a shallow scoop within the secondary fills of the ditch (Gillings *et al.* 2008, 15). The enclosure was deliberately backfilled and levelled before a soil profile had developed in the open ditches and therefore shortly after it had been constructed, probably to enable the construction of the Beckhampton Avenue (Gillings *et al.* 2008, 73).

Although the nine available radiocarbon dates from the enclosure have been modelled (Healy 2016, 44, fig 7; Bayliss *et al.* 2017, fig. 17.11) a clear date estimate for construction of the enclosure is hampered by the lack of articulated bone samples, uncertainty as to whether the antler fragments came from picks, and the fact that samples OxA-10945–9 were prepared using the original ultrafiltration protocol which has been shown to produce ages that could be slightly too old (Bronk Ramsey *et al.* 2004). The simplest solution is to take the most robust date, that obtained on an articulated pig foot from the chalk rubble in the base of the ditch, as the date for the construction of the enclosure. This places it in the period 2870–2460 cal BC (95% probability; Table A2-2: Beta-140988). As the enclosure pre-dates the Beckhampton Avenue which probably dates to the late Neolithic, a date earlier in this range seems likely.

2.5.3 Sanctuary

The site known since at least the 18th century as 'The Sanctuary' (Stukeley 1743, 31) is located on Overton Hill. It survived as two concentric stone circles recorded by Aubrey, Pepys and Stukeley before the circles were destroyed in 1724. Identification and excavation of the entire site revealed not only the

positions of these two stone circles but also six concentric timber circles (Cunnington 1931, 300; Figure A2-13).

The outer ring of sarsen stones (Ring A) was 40 m in diameter. Three of the stones on the north-west side were set radially, corresponding with the avenue approach (Cunnington 1931, 305). Another three stones on the north-east side of the circuit were similarly arranged and may indicate another approach on this side, perhaps associated with outlying possible stone holes X1 and X2. This, and the evidence of four small post holes that pre-dated the stone ring, suggest that the outer circle was constructed at the same time as the avenue, probably enclosing a pre-existing arrangement.

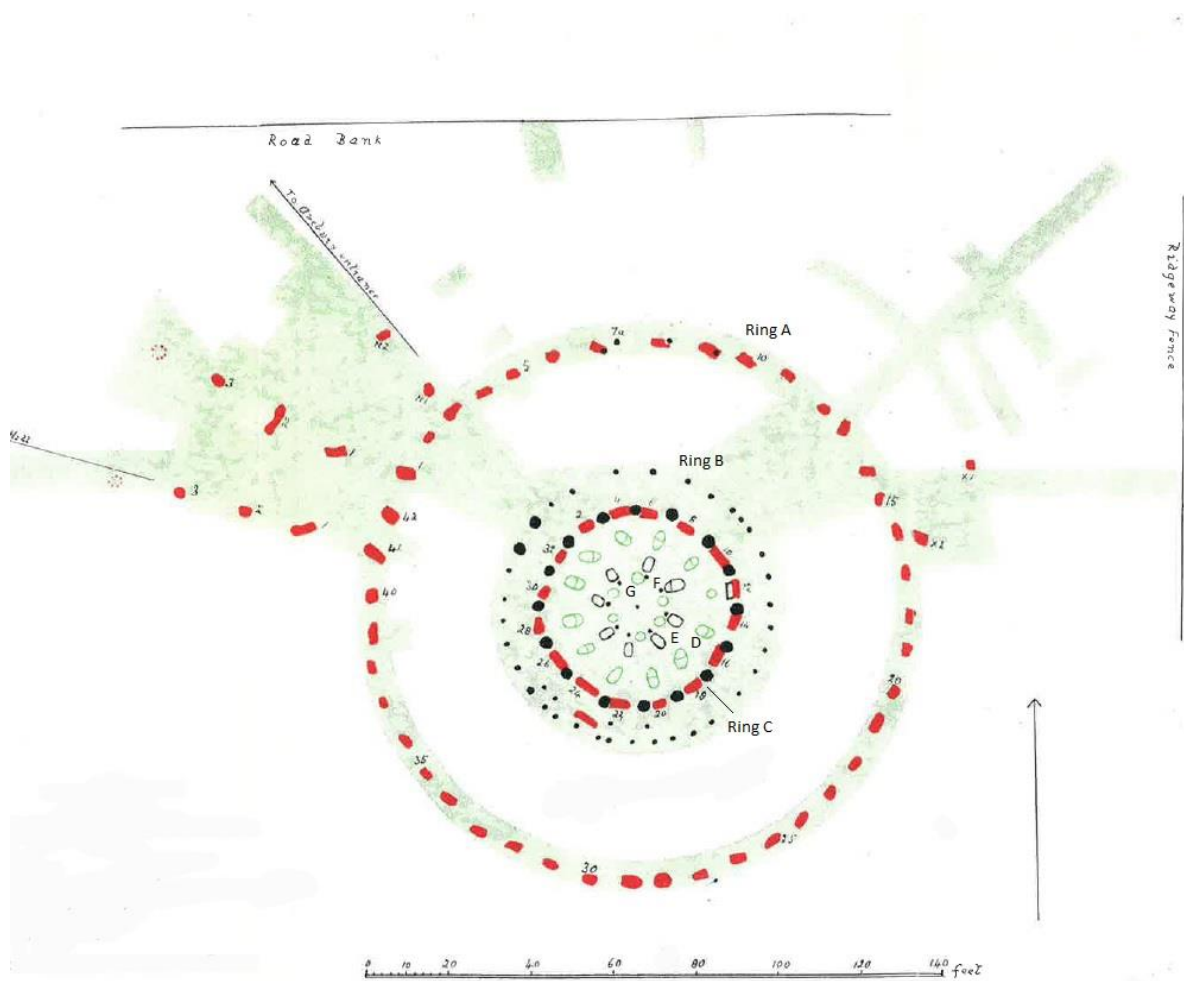


Figure A2-13 Cunnington's plan of the Sanctuary (Cunnington 1931, plate 1)

Moving inwards, Ring B was a circuit of timber posts around 30 cm in diameter, except for B33 and B34 on the north-west side which were larger (60 cm), corresponding with the avenue approach and forming an entrance (Cunnington 1931, 327; Pitts 2001, 6). On the south-west side stood a sarsen stone flanked by two further posts, recalling both the sarsen stones on the south-west side of Woodhenge (Appendix

A1.5.10) and the elaborated double entrances to some square-in-circle monuments (e.g., Knowth, Figure 5.21).

Ring C is made up of 32 alternating stones and posts. Stukeley records these stones as being larger than the outer stone circle (Stukeley 1743, 32) and the posts were set much deeper (Cunnington 1931, 304). These timbers may have stood up to 2.64 m tall (taking a ratio of one third of the post below ground). No stratigraphic relationships were observed between the timber and stones of this circuit; they may have been destroyed by later stone removal but if the stones were erected after the posts, the post positions must still have been visible, as their positions closely matched (Pollard 1992, 216). If they stood together, there must have been an almost continuous wall blocking off both physical and visual access into the interior (Pollard 1992, 223; Barrett 1994, 15).



Figure A2-14 Artist's impression of the Sanctuary in c.2300 BC when a burial accompanied by a Beaker was placed against one of the standing stones. By this date the timber posts had rotted and decayed. In the background can be seen the standing timbers of the West Kennet palisaded enclosures and the white cone of Silbury Hill under construction. © English Heritage, drawing by Peter Urmston

The oval postholes of Rings D and E held posts set an average of 1.55 m into the ground, with posts of 33–35 cm diameter (Cunnington 1931, 307). When originally excavated by Cunnington's team, 11 of the 12 postholes of Ring D were described as 'double', each with two post-pipes. The only single hole, D5, had a post set at a strange angle (Cunnington 1931, plate III.5). The eight postholes of Ring E were also oval, but each preserved only a single core (Cunnington 1931, 307–8). Re-excavation of three of these postholes in 1999 led to the recognition of two or more successive posts set within them (Pitts 2001, fig

11) suggesting piecemeal replacement of posts. This supports the idea that the Sanctuary was a free-standing monument where posts were repeatedly altered and replaced, rather than a roofed structure (Figure A2-14). At the centre of the site stood two further small rings, eight posts in Ring F and six in Ring G. The layout and directionality of the site are further discussed in Chapter 5.6. Although no absolute dating evidence is available for the Sanctuary, the presence of Grooved Ware pottery and chisel arrowheads in the packing material of the postholes suggest a mid-3rd millennium BC date (Pollard 1992, 218).

2.5.4 Avebury henge

The henge monument at Avebury is a complex monument, comprising of a sub-circular bank and ditch 400 m in diameter surrounding a large stone circle, which itself encloses two smaller inner circles with central settings (Figure A2-15). The monument encloses a slightly domed north-south ridge in a relatively low-lying area, above the valley of the Kennet (McOmish *et al.* 2005, 17). It has been noted that the surrounding landscape rises in all directions to create an outer horizon of distant hills (Watson 2001, 306). As discussed in Section A2.4.3, the monument was built in several stages, with early components probably including the primary enclosure and the cove setting within the northern inner circle. In general terms, the monument can be interpreted as a place of ceremonial gathering and ritual events; the lack of Neolithic finds from the enclosure suggest that it was kept clean or reserved (Gillings *et al.* 2008, 166). Major campaigns of excavation at Avebury were conducted by Harold St George Gray in the early 20th century, mostly concentrated on the henge ditch (Gray 1935), and in the late 1930s by Alexander Keiller, whose investigations were aimed at restoring the megalithic components of the monument (Smith 1965b). Length precludes a full catalogue of the standing megaliths or detailed history of investigation of Avebury henge, but these are available elsewhere (Smith 1965b; Papworth 2012, table 1; Cleal and Pollard 2016).

2.5.4.1 Henge enclosure

The massive earthworks of the henge are not perfectly circular but were constructed in several straight sections (McOmish *et al.* 2005, 21). The ditch was dug 8.3 to 10.9 m below the original ground level and where fully excavated, the generally smooth and flat ditch base has varied between 2.9 and 7.9 m wide. However, in Cutting VIII in the south-west of the circuit, where the natural chalk was much softer, the base of the ditch was irregular (Gray 1935, 121) and in Cutting IX at the eastern terminal of the southern entrance, the base of the ditch was stepped and rose significantly from west to east (Gray 1935, 125). At the southern entrance, the terminals were deeper and wider than the rest of the ditch and distinctly squared off. The ditch terminals appear to have been dug with particular care, presumably to impress those viewing the ditch from the adjacent causeway. The inner ditch slope in Cutting III was described by Gray as the 'finest example of cut chalk exposed in any part of the excavations', compared to other sections where projections of chalk bedrock were left along the sides (Gray 1935, 113–26).

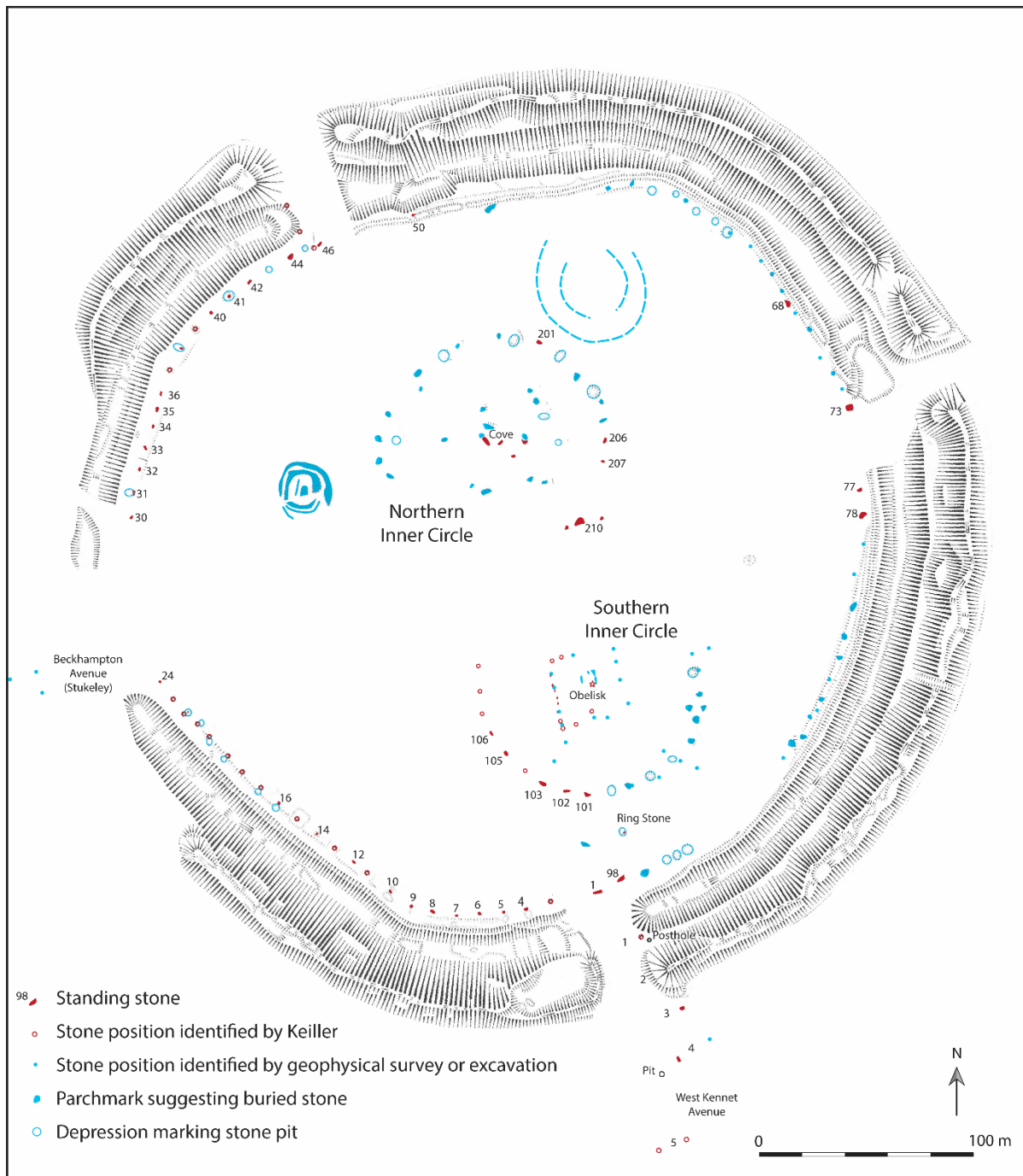


Figure A2-15 Detailed plan of Avebury henge. Basemap earthwork survey from McOmish *et al.* 2005, fig 2.5; other information from Smith 1965, fig 71; Gillings *et al.* 2019, figs 1 and 10

The chalk from the ditch was used to build an immense external bank, which was correspondingly higher near the entrance terminals. This bank today stands about 5.5 m above ground level and was originally higher (Figure A2-16). It was set back from the ditch by a narrow berm of variable width (Gray 1935, 130). Archaeologists have interpreted the irregular shape of bank as resulting from its construction by different work gangs (Malone 1989, 107) or deliberately sculpted to mimic the surrounding downland (Watson 2001, 302). Given the unpredictable way in which the chalk rubble of the bank would have eroded and collapsed over time, this latter explanation seems unlikely. The ditch rapidly infilled with chalk rubble that

slumped from the eroding sides of the ditches and cascaded down the bank (Gray 1935, 120; see discussion in Chapter 6.3), although there are indications that retaining walls of chalk blocks or timber revetment posts helped to retain the bank in places (Smith 1965b, 188, 194). Finds in this primary chalk rubble fill were few, consisting of a few sherds of unidentified prehistoric pottery, a handful of flint tools and worked flakes, animal bones including dog, sheep, pig, and ox, two bone pins and scattered human bones, mostly skull fragments (Gray 1935, 148). The most numerous finds were antler digging tools, with 44 picks and five rakes retrieved from the floor of the ditch or low in the primary chalk rubble fill, as well as several digging or levering tools made of cattle ribs (Gray 1935, 136, 148–9).



Figure A2-16 Photograph of Avebury henge ditch and bank as it appears today, south-west quadrant (author's photograph)

Radiocarbon determinations obtained on bulk charcoal and animal bone samples from under the henge bank (Table A2-2: HAR-10063, HAR-10325 and HAR-10500) provide TPQ for the construction of the main earthwork henge. Samples from two antler picks found on the base of the ditch and one from within the bank (Table A2-2: OxA-12555, OxA-12556 and HAR-10326), likely to have been used to construct the henge, provide good evidence for its date. Modelling of these dates together with that from the charcoal below the burial mentioned above provides an estimate for the construction date of the present henge of *2580–2470 cal BC (95% probability; Healy 2016, fig 9: dig_Avebury_ditch)*, probably *2530–2485 cal BC (68% probability)*. It should be noted that further suitable samples for dating exist within the archive and a more precise chronology could be obtained.

2.5.4.2 Outer circle

Set immediately inside the ditch are the stones of the outer circle, the largest stone circle in Europe, originally consisting of more than 100 megaliths (Figure A2-17). Geophysical survey, parch marks, excavation, probing and the antiquarian records of Stukeley and Aubrey have located most of the stones,

although some questions remain (Ucko *et al.* 1990; Papworth 2012). The stones were originally set at intervals of 10–11 m, although in some parts of the monument they are more closely spaced (e.g., stones 85–87 to the south-east, and stones 49–51 to the north (Papworth 2012, 37)). Larger stones appear to have been placed towards the entrances, with the very largest, estimated to weigh over 60 tonnes, probably standing as pairs on either side of the four causeways (Pollard and Reynolds 2002, 86). Four of these stones still stand today: the diamond-shaped ‘Swindon Stone’ (46, which had a similarly large partner stone, 47, described by Stukeley as being 6.7 m long, destroyed in 1722) at the northern entrance; the ‘Devil’s Chair’ (1) and equally large adjacent Stone 98 at the southern entrance; and the fallen but substantial Stone 73 at the eastern entrance (Figure A12-15). Unfortunately, the partner to this stone and the two stones flanking the western entrance are now lost. Excavations close to Stone 46 at the northern entrance revealed an additional three stone holes (A, B and C), spaced roughly equidistant along the arc of a circle. Keiller thought that these might belong to a stone circle that pre-dated the bank and ditch (Smith 1965b, 190) but further excavations by Piggott in 1960 failed to find further evidence of this circle and these stone holes are more likely to relate to some form of elaboration of the northern entrance.



Figure A2-17 Stones of the outer circle and bank in the north-west quadrant of the henge (author’s photograph)

Dating evidence for the construction of the stone circle is unfortunately sparse, but a bulk charcoal sample and some disarticulated pig bone (Table A2-2: HAR-10062 and HAR-10327) from two of the stone holes provide TPQ for the erection of two of these stones after 2580 cal BC. A date close in time to the main henge bank and ditch is likely, but the stone circle is otherwise not directly dated (Healy 2016, 41–4). A fragment of human skull and sherds of early Bronze Age pottery from the packing of Stonehole 41 might be interpreted as indicating an early Bronze Age date for construction (Table A2-2: OxA-10109) but

this stone appears to have been removed and reset, and the material may date from that activity (Pollard and Cleal 2004, 124).

2.5.4.3 Northern inner circle

Both the northern and southern inner circles are located on a low ridge that extends across the henge interior (McOmish *et al.* 2005, 23). No absolute dating evidence is available from either circle, but they are assumed to be contemporary with the outer stone circle. The northern inner circle is 100 m in diameter and surrounds a cove (Section 2.4.3; Figure A2-9). 27 irregularly spaced stones of the northern part of the stone circle survive as either standing stones or have been recorded as depressions or parch marks; the rest have been destroyed by later buildings and roads (McOmish *et al.* 2005, 21). Within the circle are a variety of other stones, some known from parch marks and one still visible just showing above the surface (McOmish *et al.* 2005, fig 2.5). This latter stone, 9 m to the east of the cove, was excavated by Gray who found a relatively small sarsen (1.8 by 1.4 m) buried in a pit. Immediately to the north and south he found two other similar sized stones, the three comprising a row 5 m in length (Gray 1935, 108, n.8). He interpreted these three as parts of one large stone, although they may have been closely set smaller stones like those within the southern inner circle.

Stukeley's plan shows one remaining stone of a circle within the northern inner circle, together with five depressions or hollows, beyond the stone(s) excavated by Gray. A pipe trench dug across the southern part of the circle confirmed one of these hollows as a typical stone destruction pit (Smith 1965b, 223). It is quite possible therefore that the northern inner circle had an inner circuit, with parch marks suggests that this may have been square, like the southern inner circle (McOmish *et al.* 2005, fig 2.5).

2.5.4.4 Southern inner circle

The southern inner circle, like its counterpart to the north, is only partially preserved, with the northern part having been destroyed by later buildings (Figure A2-18). Five stones of the outer circle remain standing, with other known stone holes marked by Keiller who investigated a portion of the western arc and interior in 1939 (Smith 1965b, 198–201). At 110 m diameter, the circle is slightly larger than the northern inner circle, and is likely to originally have had 29 stones, of which five remain standing today (Smith 1965b, 198; McOmish *et al.* 2005, 23).



Figure A2-18 Keiller's marker for the obelisk stone in the centre of the southern inner circle, smaller markers for his 'Z-feature' and the remaining stones of the inner circle beyond. On the far left can be seen the two large southern entrance stones of the outer circle, Stones 1 and 98 (author's photograph)

Detail of the internal settings is provided by Keiller's excavations and recent geophysical surveys, although earlier accounts supplement this evidence. Stukeley recorded a large fallen central stone which he referred to as an 'obelisk', "of circular form at base, of a vast bulk, 21 ft [6.4 m] long" (Stukeley 1743). Its stone hole and associated burning pit were excavated by Keiller (Smith 1965b, 198).

An additional surviving megalith within the circle led Stukeley to postulate a second inner concentric ring of stones. Keiller's excavations revealed a 30 m line of 12 stone holes to the west of the centre, which he termed the 'Z-feature'. Six stones in the central part of the line were found buried (iii-viii) and evidence of a further six destroyed ones were found to the north and south, although the evidence was confused by later burning pits (Smith 1965b, 199). These small stones, a distinctive orange-red colour, were re-erected where Keiller thought they had stood, although these had to be raised up from 'their' stone hole bases. However, Ucko *et al.* (1990, 215–6) have shown that Stukeley's surviving large stone was in the position where Keiller excavated three small stone holes (ix, x and xi) and it is possible that he was mistaken as to the exact arrangement. Recent re-evaluation of the excavation archive suggests that the excavated stone holes were much larger than the stones that Keiller re-erected in them, similar in size to those of the outer circle (Gillings *et al.* 2019, 362). The implication is that originally this central feature consisted of large standing stones; where the small, red sarsens were obtained and when they were erected remains open to question.

Geophysical survey has shown that the line of stones identified by Keiller was one side of a complete square setting around the central 'obelisk' (Gillings *et al.* 2019, fig 10). Keiller had identified postholes at

the north and south of his 'Z-feature' suggesting that the corners were marked by posts (Smith 1965b, 199). Radiating lines appear to have formed part of this structure, one to the south-west consisting of Stone D and a natural 'fissure' that Keiller identified; and one to the south-east shown in the geophysical survey results (Gillings *et al.* 2019, 373). A rectangular arrangement of gullies at the centre of the centre near the 'obelisk' may be an earlier structure (Section 2.4.3) but may equally be contemporary with the stone settings. It is possible that Stone D and a new stonehole identified in geophysics form part of a free-standing setting of four megaliths between the outer circle and inner square of the southern inner circle, making this feature comparable to square-in-circle monuments.

2.5.4.5 Additional features

Several additional features have been identified within Avebury henge (Figure A2-15). Between the southern entrance and the southern inner circle once stood a pair of stones 15 m apart – one is known by a parchmark (Bewley *et al.* 1996, 640) and the other, called the 'Ring-Stone', was described by Stukeley as having "a hole wrought in it" (Stukeley 1743). Keiller's excavations found a deep hole in this location, partly refilled with blocks of sarsen and chalk and containing the stump of the Ring-Stone which he re-set (Smith 1965b, 202). The double base may have held a larger stone previously (Pollard and Cleal 2004, 126).

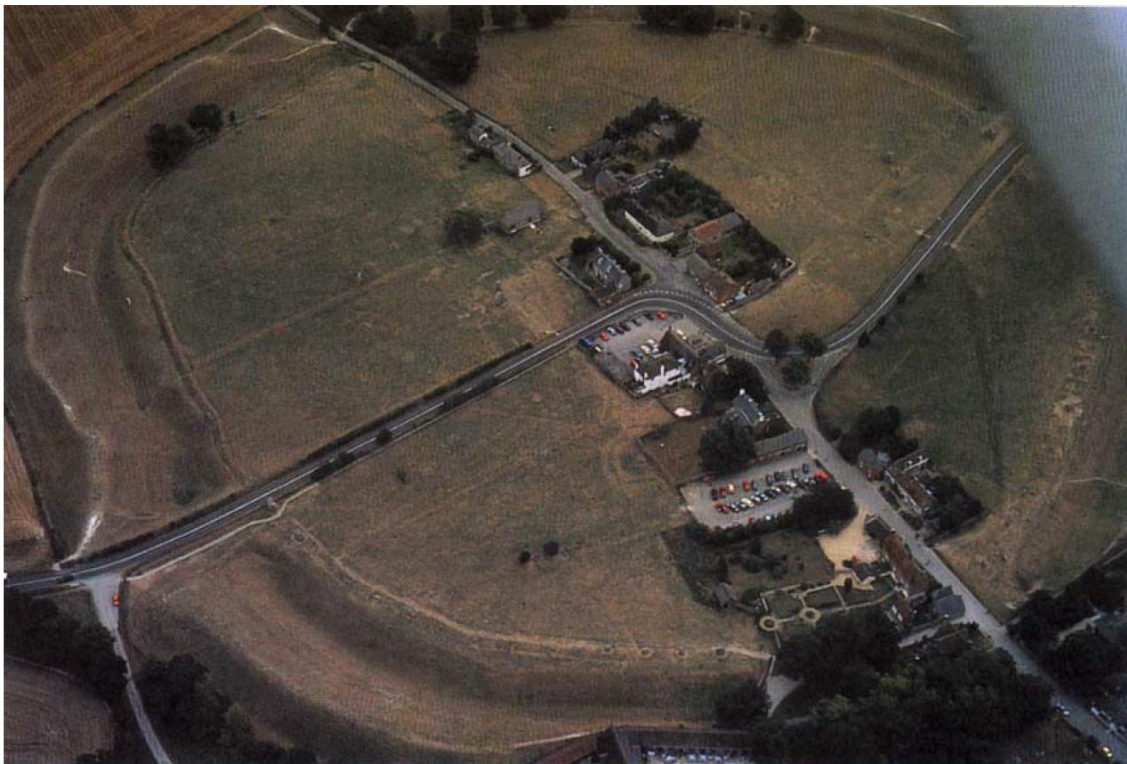


Figure A2-19 Aerial photograph of Avebury henge from the north-west, 1 September 1995. The double-ditched enclosure can clearly be seen between the two car parks © Historic England, NMR 15385/19

To the west of the northern inner circle is a double-ditched circular enclosure, identified from aerial photographs (Figure A2-19) and confirmed by resistivity survey. It is roughly 16 m in diameter, and partly

lies in the garden of The Lodge. Although this has been compared to an oval barrow (Bewley *et al.* 1996, 645), it is more closely comparable to the 'North Barrow' at Stonehenge, perhaps with central pit or stone hole. A further double pit circle or feature has also been identified in the north-west quadrant through geophysical survey (Ucko *et al.* 1991, 219–20). These features suggest considerable complexity to the sequence of construction at Avebury that is as yet little understood.

2.5.5 Beckhampton Avenue

Avebury henge was connected to several other monuments and important sites in the landscape by the construction of at least two avenues at West Kennet and Beckhampton. Evidence is lacking for avenues leading from the other two entrances. Although the Beckhampton Avenue was described and depicted by Stukeley (Smith 1965b, 216), early destruction meant that its status remained ambiguous until its form and position were confirmed by geophysical survey and excavation (Gillings *et al.* 2008, 58–62). It runs for 270 m from the western entrance of the henge to Longstones cove, its route bisecting one side of the Longstones enclosure (Figure 4-10). The stones were set in facing pairs with intervals ranging from 15–17 m, and longitudinal intervals between pairs from 22.5–32 m (Gillings *et al.* 2008, 72). One of the buried stones (L5) had traces of axe polishing and this same surface had been extensively pecked. The excavation of a stonehole near Avebury Trusloe confirms the central portion of the avenue, although its pair was not found (Gillings *et al.* 2008, 108). The avenue must have crossed the Winterbourne stream close to the henge, probably at the northern end of Butler's Field.

Excavations to the south-west of the Longstones cove proved that the regular paired arrangement of stones did not continue beyond (Gillings *et al.* 2008, 71). Stukeley had recorded the avenue as continuing for another c.1.5 km, past Longstones long barrow and onto downland near Fox Culvert (Stukeley 1743, 36). In his drawings of the avenue, he depicts a pair of recumbent stones flanking the avenue immediately to the southwest of the cove and notes another two 'at the Crossing of the two Roads demolished by Rd. Fowler' (Stukeley 1743, pl. XXIV). Although these may be natural sarsens, it is possible that the two pairs did form part of an extended approach or avenue; we should not expect the avenue to have continued with regular spacing for its entire length. In 1969 a stone buried in a pit was found during the excavation of a GPO trench beside the A4 (Vatcher 1969). The grid reference for this stone (SU 0876690) matches Stukeley's drawn depiction (*contra* Gillings *et al.* 2008, fig 2.76) and it is likely to be one of the two buried by Richard Fowler. Vatcher also noted another depression in the section 7 m to the west which could be the position of the westerly of Stukeley's pair. This interval would be very narrow for a continuation of the avenue, but the pair may have formed some form of entrance portal.

The Beckhampton Avenue as it approaches Avebury henge is better documented, with the position of several stones either recorded by Stukeley, recorded during watching briefs or still visible at house frontages along the High Street. All these stone positions conform to the regular spacing seen at Longstones (Gillings *et al.* 2008, 115–8). The avenue is offset from the henge entrance indicating that it

may not have been a routeway (Chapter 4.3). In a field on the north side of Avebury Trusloe, resistivity survey has identified a pair of high resistance anomalies, probably representing a stone pair of the avenue. Nearby were four low-resistance anomalies indicating large pits, arranged symmetrically. Two of these are on the line of the avenue and could represent a second pair, but two are outside, suggesting an elaboration of the avenue at this point.

2.5.6 West Kennet Avenue

The West Kennet Avenue is better preserved, and the stretch closest to the henge restored (Figures A2-8 and A2-20). Keiller, when excavating the West Kennet Avenue, envisaged the monument as a highly regularised arrangement of megaliths, with stones being set on a common axis and carefully paired to present contrasting lozenge and pillar settings (Keiller and Piggott 1936). In fact, such regularity is not present throughout (Gillings *et al.* 2008, 120). It should be noted that Keiller dug 'key-hole' trenches where he expected to find stones, and much information about the setting and context of these stones is missing (Smith 1965b, fig 71). Stone 15b appears to be missing and its location marked by a large pit; another pit exists to the north of Stone 4; and the stone at 30b is missing (see Section A2.4.2). It is quite possible that the avenue did not form regular parallel lines and that stones were missed or erected at right-angles to the main axis of the monument (e.g., Stone 35a) to mark significant places. A low bank about 10m wide, was noted by Keiller running down the centre of the avenue. Its presence has been confirmed by more recent excavations which suggest that it was constructed from turf (Josh Pollard pers. comm.).

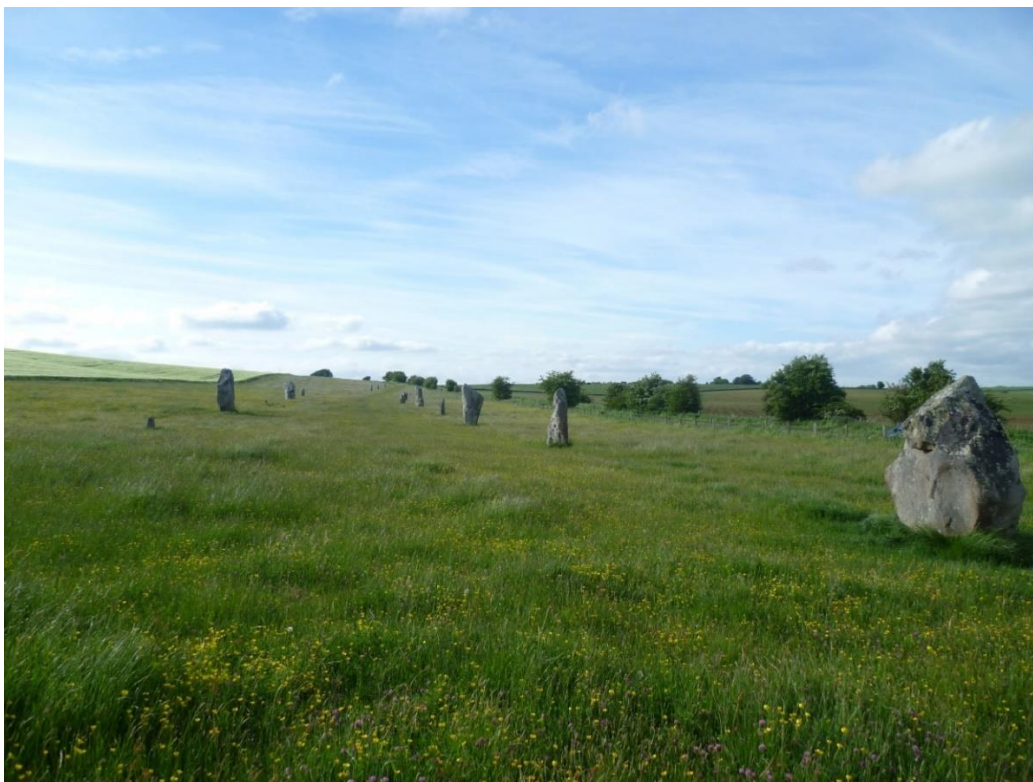


Figure A2-20 West Kennet Avenue, looking north from the end of the reconstructed section (author's photograph)

Stukeley described a cove along the West Kennet Avenue, located about halfway along where it now crosses the modern road (Gillings and Pollard 2004, 20). Aubrey also shows something in this location on his 1663 plan. Stukeley described a three-sided arrangement of stones on the east side of the avenue, opening to the south-west, recording that one of these stones was carried away in 1723, and another had been 'just buried' (Ucko *et al.* 1990, 190–3). Although there are some doubts, Stukeley's descriptions are generally accurate, and other elaborations along the line of the Beckhampton avenue identified through geophysics (Section 2.5.5) make this a plausible account.

Further south, there is a long stretch of the avenue that has not been positively identified, which was not standing at the time of Aubrey's observations in the 17th century (Figure A2-1). An excavation to the north of New Cottages, located where Crawford had reported a stone being buried in the winter of 1921–2, revealed a stone buried in a pit but no clear sign of a corresponding pair to the south (Gillings *et al.* 2008, 133–9). It is possible that the avenue here was only formed of a single line or had wider spacing. However, it is equally plausible that this was a natural sarsen and that the avenue was never continuous. Within this 'gap' lie an early and middle Neolithic occupation site (Gillings *et al.* 2008, 140), the North Kennet spring (Smith 1965b, 207; Marshall 2016, 100) and perhaps also an extensive spread of natural sarsens (Gillings *et al.* 2008, 142). Two hollows from which sarsens of 2.5–3.5 m size had been extracted in the Neolithic were found in the vicinity of the West Kennet Avenue occupation site (Josh Pollard pers. comm.). Connecting the monuments of Avebury henge and the Sanctuary to this powerful location may have been the purpose of the West Kennet Avenue (Chapter 4.3).

For the southern portion of the avenue where it passes the village of West Kennet, the paired arrangement of stones is clearer with several stones surviving and others identified by excavation (Smith 1965b, 187, fig 72). There follows another uncertain gap, before the avenue terminates at the Sanctuary. Geophysical survey of fields to the west of the Sanctuary has identified a high resistance response interpreted as relating to buried Stone 86b, close to a series of five smaller high resistance responses, perhaps also buried stones but not in a regular formation (Sabin and Donaldson 2008, Urmston 2017). There were also a series of pit-like responses near the Sanctuary but again these do not resolve into a clear paired formation. Similar pits were identified in fields to the north of the A4 in this area and may relate to occupation (Sabin and Donaldson 2016, 18–19; Figure A2-1).

Where the avenue approaches the Sanctuary, the final three pairs of stones were found by excavation (Figure A2-13), but a fourth pair were difficult to identify with certainty (Cunnington 1931, 306). The spacing of the avenue pairs is much closer here and another radial line of stones extends from the outer circle (Pollard 1992, 217). This additional line suggests that the 'avenue' here was perhaps made up of three rows of stones. The blocking of the entrance gap in the outer ring of the Sanctuary by a stone, and the offset alignment of the avenue rows, suggests that the middle of these three rows was the significant feature, rather than the avenue itself (see Chapter 4.3). Furthermore, the line appears to be offset from

the roughly east-west course of the avenue further west, perhaps suggesting another 'dog-leg' entrance like that seen at the southern entrance to Avebury henge.

2.5.7 Falkner's circle

This small stone circle, located in the dry valley south-east of Avebury and not far from the West Kennet Avenue, was noted by a Mr Falkner as standing in 1840. He recorded the presence of two recumbent stones and nine hollows, together with the one standing stone making up a stone circle of 12 uprights, with a diameter of 36.5 m (Long 1858). Excavations have confirmed this, revealing five pits on an arc of c.44 m diameter with signs of sarsen breaking and burning from their destruction (Gillings *et al.* 2008, 142–52). The monument had been the location of flint working and a few sherds of Grooved Ware pottery place this activity in the late Neolithic. The stoneholes were not particularly convincing, and the excavators suggested that the stone circle had been constructed of both fortuitously sited sarsens and erected stones, a 'hybrid' monument. The location of the circle at the end of a sarsen trail, perhaps partly used for the construction of the nearby avenue, may support the idea that this was a monumentalisation of an existing sarsen spread.

2.5.8 West Kennet palisaded enclosures

Located on the floor of the Kennet valley, these timber enclosures were once impressive monuments. The complex comprises two substantial circuits, covering an area roughly 500 m by 900 m. Within and nearby are a series of smaller timber monuments and radial lines of palisades. The full layout (Figure A2-21) has been established through a combination of excavation, aerial photography (e.g., Figure A2-22) and geophysical survey (Whittle 1997; Barber 2003; Welham and Steele 2012). Excavations have shown that the palisade trenches were at least 2 m deep, deliberately backfilled and packed with small sarsen boulders to support continuous rows of closely set posts which had decayed in situ (Whittle 1997). These posts are estimated to have stood 6–8 m in height, with an estimated 4400 posts used to create the structures (Whittle 1997, 154). Large quantities of late Neolithic Grooved Ware pottery, animal bone and worked flint suggest intensive occupation.



Figure A2-21 Map of the West Kennet palisaded enclosures based on analysis of aerial photographs. Cropmarks are in green, earthworks in red © Historic England, from Barber 2003

Enclosure 1 is defined by two concentric trenches and straddles the current course of the River Kennet and encloses an important springhead. Between the two circuits lie a post or pit circle (Figure A2-21) and a sub-rectangular negative feature. Recent excavations suggest that this latter feature is prehistoric and was deliberately cut to intersect with the water table, perhaps forming some form of sacred pool (Pollard *et al.* 2019, 37, 42). The enclosure was laid out with reference to a natural palaeo-channel, forming a shallow depression between the inner and outer ditches on the eastern side (Whittle 1997, 90). The single circuit of Enclosure 2 lies to the west, enclosing an area of 5.5 ha. Within the eastern part of this enclosure are a series of three ditched circles and a 'ladder' arrangement of linear trenches or palisades. Excavation of Structure 1 showed that it was a double concentric feature of 40 m diameter, with closely spaced postpipes 30 to 40 cm in diameter set into the outer trench, and an irregular inner ditch. Similarly,

Structure 2 is just under 30 m across, with an outer trench containing postpipes. Structure 3 was similar again, although a large post 1 m in diameter had stood in the centre (Whittle 1997, 83–6).

Contemporary radial palisade lines (Outer radials 1 and 3) run from the southern part of Enclosure 2 to the south-east and south, connecting with further circular enclosures (Pollard *et al.* 2019, 40). A third curving trench (Figure A2-21: outer radial 2) cuts the outer circuit of Enclosure 1, the portion of palisade here being dismantled and the posts removed. Although this suggests some remodelling and a sequence to the complex, this activity was carried out within a short timeframe, as the posts of Enclosure 1 were still standing at the time that the radial trench was dug (Pollard *et al.* 2019, 41).



Figure A2-22 Aerial photograph showing cropmarks of the enclosures in 2000. In the foreground can be seen a pit circle between the two palisades of Enclosure 1, and in the background a 'funnel' arrangement within Enclosure 2 © Historic England NMR 18725/14

Structure 5 is a substantial timber monument enclosed by multiple enclosures. The outer trench is 90–100 m across, holding posts of 18–23 cm in diameter set post width apart against the inner edge (Pollard *et al.* 2019, 14). This outer circuit was built at the same time as Outer Radial 3, much like the avenue and the outer circuit at the Sanctuary (Section A2.5.3). The inner ditch is a c.40 m diameter henge, originally dug as a ditch with an outer bank, but with a palisade later inserted in a slightly staggered row. At least some of these posts had burnt *in situ* (Pollard *et al.* 2019, 17–21). Geophysical survey shows a possible third circuit between the inner and outer rings (Welham and Steele 2012). In the interior were a series of monumental posts, which appear from geophysical survey to have stood in concentric ovals. Two of the postholes have been excavated to a depth of 1.7 m, but they extend much deeper, supporting posts of 0.7–1.1 m diameter and associated with ramps (Pollard *et al.* 2019, 24–5).

A notable feature of the palisades is the large quantity of pig bone, mostly found against the posts and within the post-pipe fills, but sometimes formally deposited in pits. Isotopic analysis of 16 pig bones from the site has shown that the animals were raised on a variety of geologies. Nine pigs from the site have sulphur isotope ratios that indicate residence near the coast, and two have highly radiogenic strontium values only available in small pockets of England and Wales (currently known in isolated areas of southern and north-west Wales, the Malvern Hills, and the Lake District); none appear to have been raised on immediately local chalkland geologies (Madgwick *et al.* 2019). A distinct bias towards remains from the right-hand side of pigs was noted, particularly for remains from Enclosure 1 (of 47 femora from the outer trench, 41 were right and 3 left: Whittle 1997, 120). Teeth from four individual cattle also have strontium isotope ratios suggesting a non-local origin, off the chalk in southern Britain (Evans *et al.* 2019). The impression given is of large-scale feasting, with live animals or meat-bearing parts of animals being brought over long distances, and the remain of feasting deposited with some ceremony. The lack of flint debitage and tools indicate that this was not a permanent settlement (Pollard *et al.* 2019, 10, 42). Instead, the occupation is likely to be related to the construction of nearby Silbury Hill, perhaps as part of a sacred precinct where people were drawn to pay tribute or fulfil obligations (Whittle 1997, 165). An enormous flint core found at the site, thought to be of East Anglian origin (Harding and Lord 2017; Figure A2-23), two ripple-flaked arrowheads made of grey flint probably from north-east Britain, a large block of granodiorite from Structure 5 originally deriving from the Cheviot hills (Josh Pollard pers. comm.) as well as similarities between the Grooved Ware pottery and assemblages from the Rudston area of east Yorkshire suggest further long-distance connections in the late Neolithic, particularly to eastern areas of Britain (Pollard *et al.* 2019, 8).



Figure A2-23 The enormous flint core found in 2009, which has been compared to examples from East Anglia © Wessex Archaeology

When the excavations of the West Kennet palisaded enclosures were published, an initial set of radiocarbon dates and the Grooved Ware pottery placed the construction and associated activity in the period 2500 to 2100 BC (Whittle 1997, 160; see Table A2-2), a period that would coincide with the construction of Silbury Hill (Section A2.5.9). The recent programme of radiocarbon dating places the palisades themselves in the middle Neolithic (Section A2.4.3), and the animal bones and antlers from the site into a later phase of late Neolithic occupation. This is estimated to begin in 2575–2405 cal BC (95% probability; Bayliss *et al.* 2017, 238), probably in 2520–2440 cal BC (68% probability). This occupation is estimated to have ended in 2115–1865 cal BC (95% probability), probably 2015–1905 cal BC (63% probability). The area was occupied for a period of 310–615 years, probably 420–575 years. It may well be that this prolonged activity comprises of two periods of occupation, one in the late Neolithic and another in the early Bronze Age, attested by the presence of Beaker pottery and flints on the site and the deposition of further animal bones dating to this later period.

There are alternative ways to model these dates, setting aside the problematic charcoal dates. Pollard *et al.* (2019, appendix 5) have identified dated samples of animal bone and antlers that derive from secure contexts relating to the construction of the palisades, either from within the packing material or the basal fills of the ditches (rather than from the postholes themselves). If the three secure dates from the ditches of Enclosure 1 are modelled as a single phase, they provide an estimate for construction starting in 2830–2300 cal BC (95% probability), probably 2510–2350 cal BC (68% probability) and ending in 2460–1830 cal BC (95% probability), probably 2430–2210 cal BC (68% probability). These suggests that the enclosure was probably built in the 24th century BC, which fits well with the construction date of Silbury Hill (Section 2.5.9).

2.5.9 Silbury Hill

Perhaps the most dramatic monument of the Avebury complex, Silbury Hill is a conical mound 34 m in height, rising from the base of a natural amphitheatre at the head of the River Kennet (Figure A2-24). The base is 150 m diameter, and the summit 36 m in diameter (McOmish *et al.* 2005, 26). Surveys of the mound have shown that it is not circular but is dictated by a series of radial spokes joined by straight sections. Excavations on the summit and on the side of the mound have revealed curvilinear revetment walls of chalk blocks and occasional sarsen boulders which were used to stabilise the outer slope of the mound and behind which chalk could be dumped (Leary *et al.* 2013, 56–62).

Various terraces and platforms break the slope, the uppermost of which lies 4 m below the summit, forming a spiral ascent, although it is not clear if this was an original feature (McOmish *et al.* 2005, 27). It has been suggested that the flat top was a space for ceremonial performances (Barrett 1994, 31) and it has been noted that sound of human voices or instruments from the top travels some distance (May 2014), although excavations suggest that the flattening is likely the result of medieval truncation (Leary *et al.* 2013, 284–7). The mound is surrounded by a ditch which is between 38 and 53 m in width, broken on

the south side by two causeways (McOmish *et al.* 2005, 28). To the west, the ditch has been enlarged to form a rectilinear basin, some 85 m wide and 165 m long (McOmish *et al.* 2005, 28). Today this basin is often water-filled in winter (Figure A2-24); it may have been deliberately constructed to form a pool although it is also possible that the sheer quantity of chalk required for the construction of the mound required such an extension to obtain enough material.



Figure A2-24 Silbury Hill in winter, with the ditch extension filled with water (author's photograph)

Silbury Hill has been investigated several times, with three separate tunnels being dug into the centre, in 1776, 1849 and 1968–70. An account of the earliest investigation, during which a vertical shaft was sunk from the summit, records that the only 'relic' was 'a thin slip of oak wood', presumably from within a perpendicular cavity or void at the base of the mound, and perhaps representing the remains of a central post (Leary and Field 2010, 29–31). The most recent investigation, undertaken as part of a major conservation project in 2001, revealed that the mound and ditch are the end results of several complex construction phases. The following description is derived from Leary *et al.* 2013 (see also Leary 2010; Leary and Field 2010).

The initial activity on the site involved the clearing of the ground and the piling up of a small gravel mound, less than 1 m high and nearly 10 m in diameter (Figure A2-25). The gravel was derived from a river valley location, perhaps the bed of the nearby River Kennet. Over this a series of layers of topsoil, subsoil and turf were dumped, forming a mound (the Lower Organic Mound) just over a metre high and over 16 m in diameter. A stakehole found on the edge of this mound suggests that it was marked out with posts, and two smaller 'satellite' mounds suggest that this was a group of multiple low mounds. At least two pits were dug into the top of the mound, within which a few pieces of animal bone and worked

flint were deposited. The preferred model of radiocarbon dates from this mound (Table A2-2) suggests that the Lower Organic Mound was constructed in 2460–2395 cal BC (95% probability; Marshall *et al.* 2013, fig 4.5: *Lower Organic Mound_constructed*), probably in 2450–2410 cal BC (68% probability).

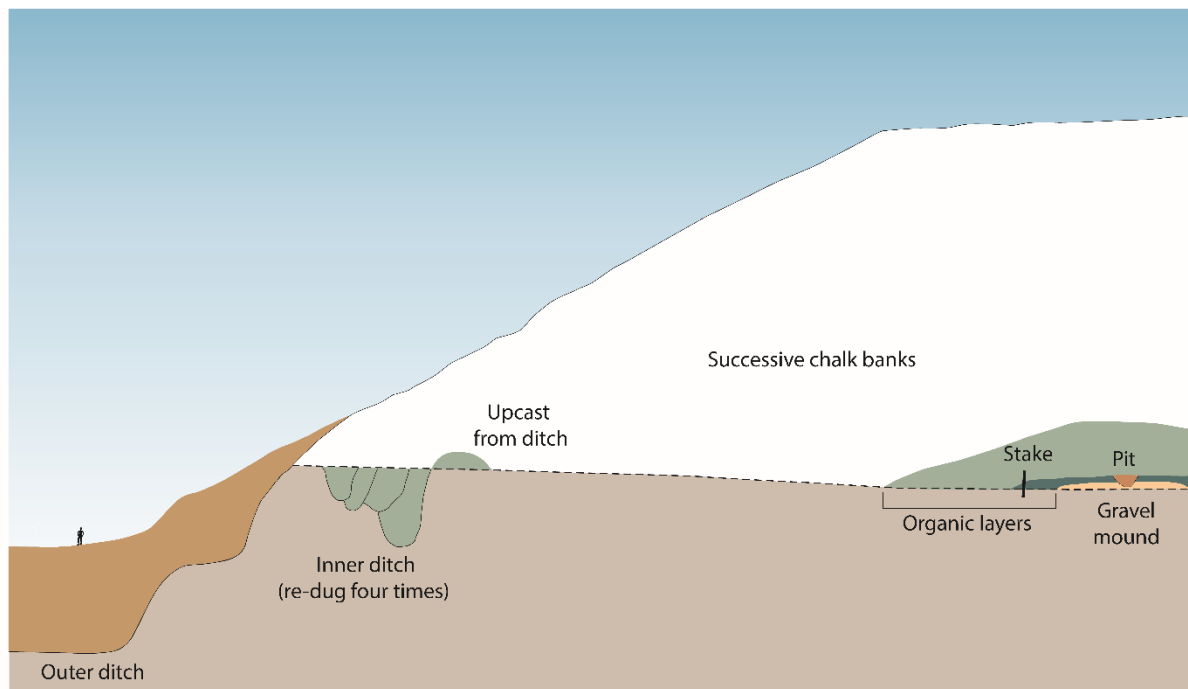


Figure A2-25 Section drawing across Silbury Hill showing phases © English Heritage

During the next phase, the whole mound and satellite mounds were covered by a larger organic mound (Upper Organic Mound) of interleaved dumps of topsoil, subsoil, turves, gravel, chalk, and sarsen stones. This Upper Organic Mound was 5–6 m high with an estimated diameter of 35 m. It was constructed by 2435–2360 cal BC (95% probability; Marshall *et al.* 2013, fig 4.5: *Upper Organic Mound_constructed*) and probably by 2425–2370 cal BC (68% probability). This mound was enlarged in a series of several stages, with banks being piled up against its outer edge before being covered by the growing mound.

Beyond the mound, a large encircling ditch was dug over 6.5m deep and 6 m in width, with a corresponding inner bank, forming an enclosure a little over 100 m diameter. Although this ditch may have provided material for the construction of the mounds within, the ditch was backfilled and recut on at least four occasions suggesting its primary role was enclosure (see discussion in Section 3.3). These banks and ditches were completed by 2410–2330 cal BC (95% probability; Marshall *et al.* 2013, fig 4.5: *Banks_constructed*), or 2375–2335 cal BC (68% probability). The mound was eventually enlarged to the extent that it covered all these earlier ditches, at which point the external ditch visible today was dug, providing the material for the final stages of constructing the chalk mound. Completion of the entire hill is estimated to have taken place in 2335–2270 cal BC (95% probability; Marshall *et al.* 2013, fig 4.4), probably 2335–2285 cal BC (68% probability) and its construction is estimated to have taken 55–155 years

(68% probability). These dates place the construction of the final phase of Silbury Hill into the latest Neolithic or Chalcolithic period.



Figure A2-26 Artist's impression of the construction of Silbury Hill © English Heritage, drawing by Peter Urmston

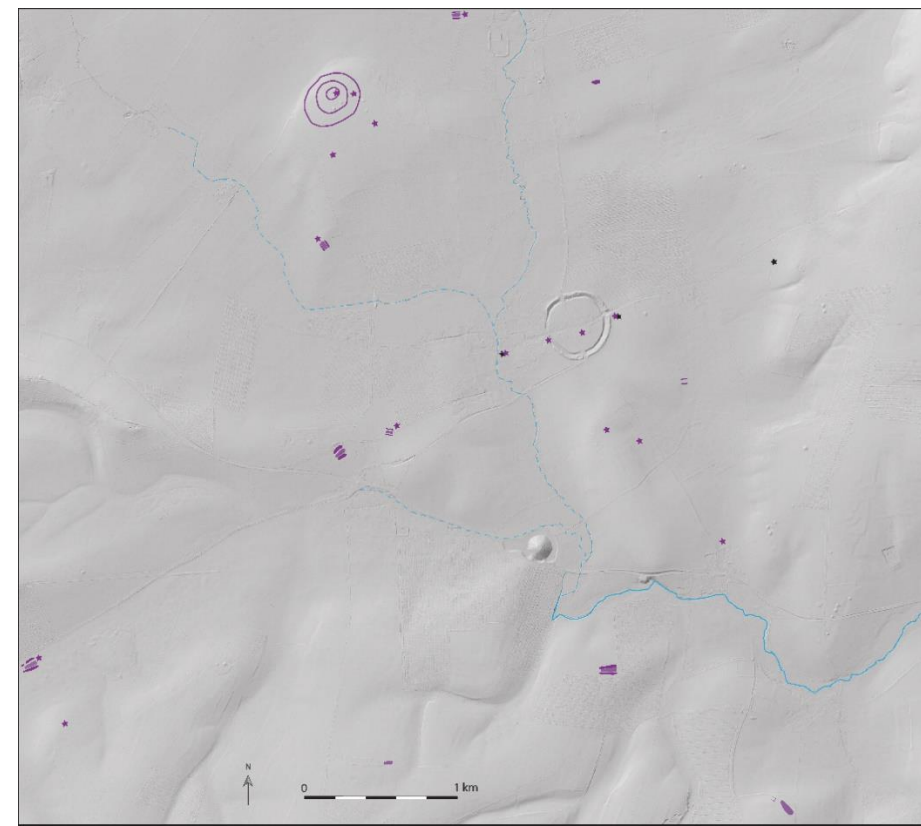
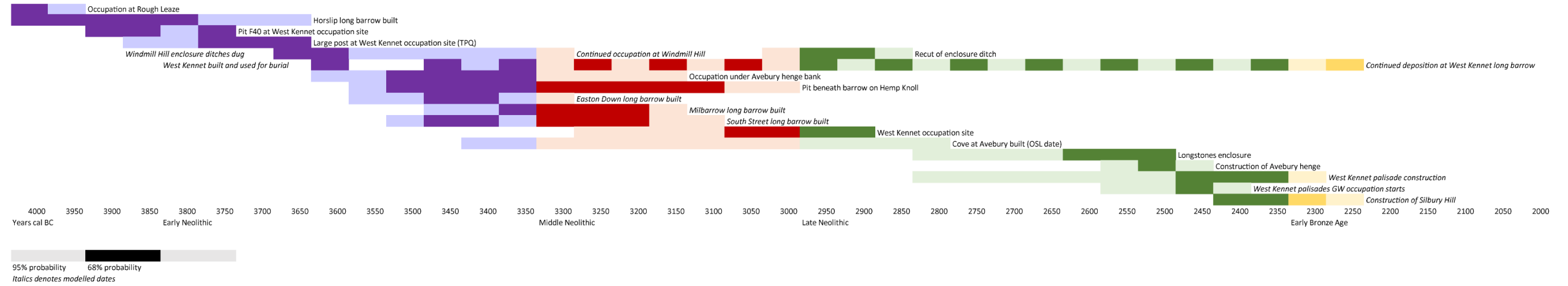
The most recent investigations of Silbury Hill have led to an interpretation of its construction as incremental and piecemeal, without an over-arching plan or design from the beginning (Leary *et al.* 2013, 208), usefully placing focus on the process of construction and the act of building, rather than the 'finished' monument. Whilst this may be true for the early stages of the project, there must have been a conscious decision at some stage to continuously enlarge and build the mound, with the final stage necessitating the excavation of the basin and the construction of chalk block walls suggesting a major engineering and construction feat (Figure A2-26). Silbury Hill was built in a significant location, at a point where several springs converge and combine to form the permanently flowing portion of the River Kennet (see Chapter 4, Case Study 6; Figure A2-1). It was constructed within sight of far earlier monuments, such as the West Kennet long barrow, which still held some significance, and between the recently built henge at Avebury and palisaded enclosures at West Kennet. The mound may have been closely linked with the latter as the construction date estimates are closely comparable with the date of the occupation (and likely construction) of the West Kennet palisaded enclosures (Section A2.5.6).

2.5.10 Summary

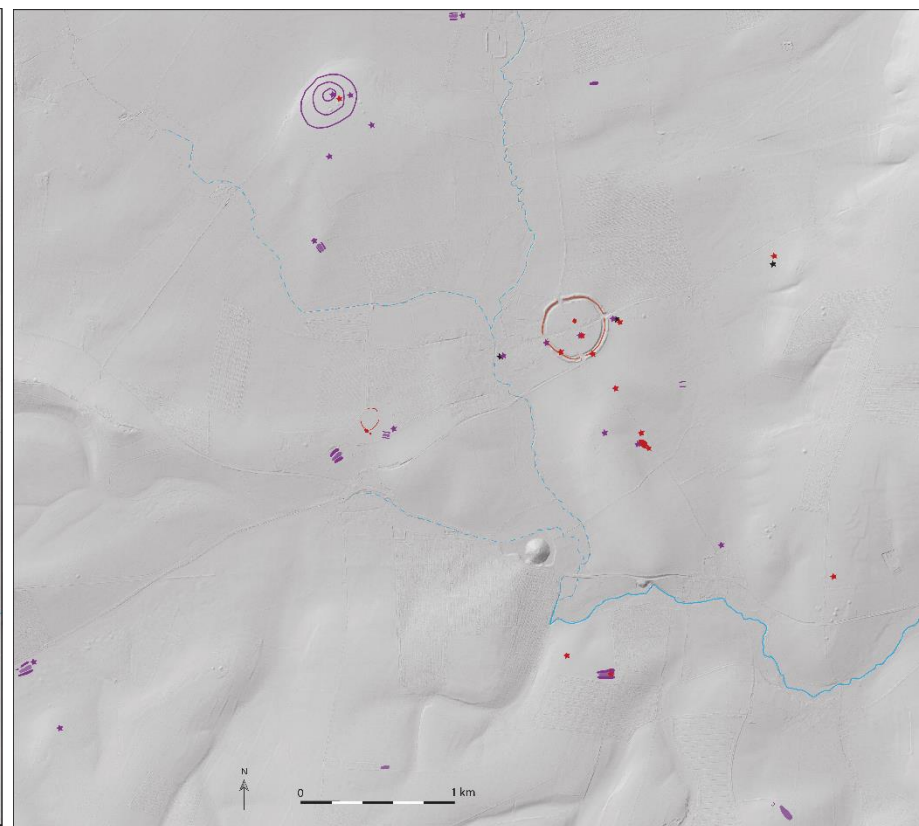
During the late Neolithic period, the construction of monuments took place on the valley floors and Avebury henge area, where activity had been concentrated in the preceding middle Neolithic period (Figure A2-27). A number of these monuments, including Avebury henge and the two coves, may have had their origins in this earlier period. However, in the late Neolithic period a series of enormous monuments were constructed, linked together by their associated avenues. Together these stone, timber

and earth monuments represent a remarkable concentration of human effort and ingenuity. It has been estimated that over 500 large blocks of sarsen were extracted, transported, and erected into positions in this period (Gillings and Pollard 2016, 539), with many settings witnessing several phases of construction, re-working and alteration lasting into the earliest Bronze Age. The latest of these monuments, Silbury Hill and the West Kennet palisaded enclosures, were constructed at a time when the earliest Beakers and metalwork were already present in southern England. Evidently some re-working of standing stones took place in the early Bronze Age (e.g., the Ring-Stone and Stone 44 at Avebury henge; Pollard and Cleal 2004, 126) and Beaker burials were placed against standing sarsens at the Longstones cove, at the West Kennet Avenue and the Sanctuary (Cleal 2005, 118–9), as well as in Avebury henge ditch (Gray 1935, 145–7; Pitts and Whittle 1992, table 1). In this period people continued to visit and deposit material at earlier Neolithic monuments including South Street, West Kennet and Horslip long barrows, and Windmill Hill (Pollard and Cleal 2004, 322–5), suggesting a continuity of place that stretched over nearly two millennia.

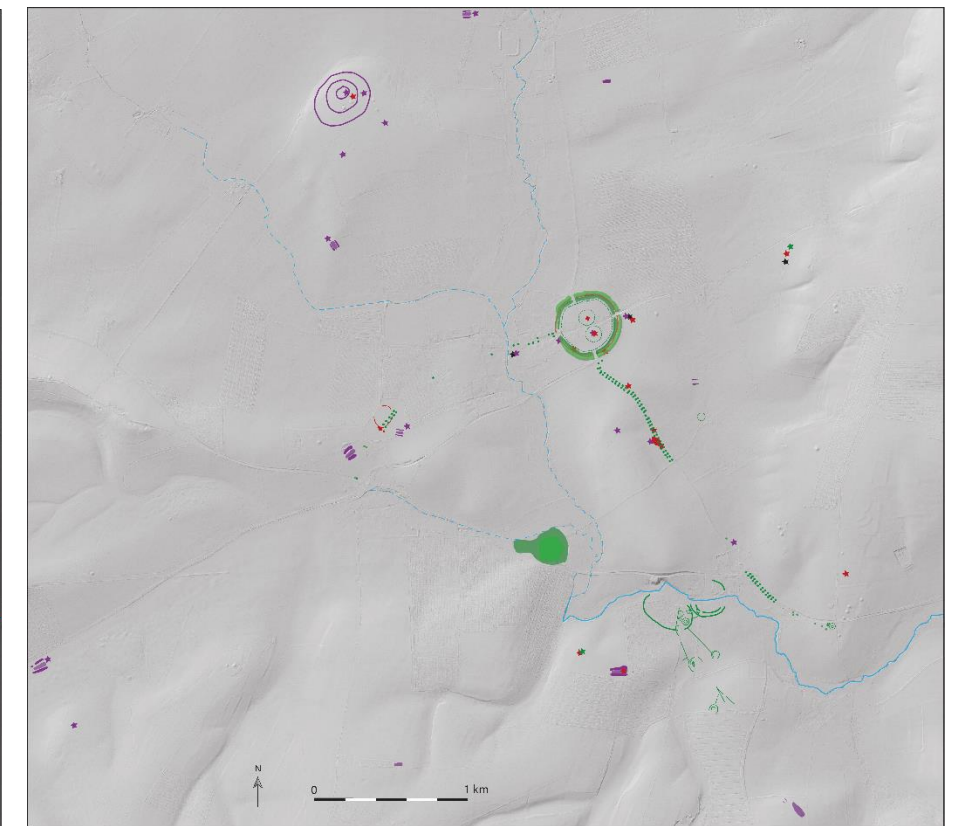
Figure A2-27 Chronology overview for the development of the Avebury monument complex



Early Neolithic



Middle Neolithic



Late Neolithic

Table A2-2 – All radiocarbon dates from Neolithic monuments and occupation in the Avebury complex

Laboratory number	Sample reference	Material	Context	Radiocarbon age (BP)	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	C/N ratio	Calibrated date range (cal BC) (95% confidence)
EARLY NEOLITHIC OCCUPATION								
NZA-37435		Aurochs bone, distal end of right humerus	Set within a posthole in the base of F11 (tree-throw pit) in Trench 5 at Rough Leaze (Pollard <i>et al.</i> 2012, 10)	5227±25				4220–3970
SUERC-59895		Charcoal, <i>Fraxinus excelsior</i>	West Kennet occupation site, pit F.40, small pit with worked flint and early Neolithic bowl pottery, from single fill (089) (Josh Pollard pers. comm.)	5044±30				3960–3710
SUERC-70789		Charcoal, <i>Quercus</i> sp.	West Kennet occupation site, from (612), the postpipe of a large posthole F.58 [609]. Charcoal interpreted as being post (Josh Pollard pers. comm.)	4965±30				3890–3650
HAR-10325		Animal bone	Old land surface beneath bank of Avebury henge in north-west quadrant, in area of interface between first and second banks (Pitts and Whittle 1992, fig 3)	4640±70	-24.8			3640–3100
HAR-2997	HKNEOPT2	Animal bone, disarticulated, bulk (mostly cattle and sheep/goat)	Pit 1, one of five pits beneath an early Bronze Age round barrow at Hemp Knoll (Robertson-Mackay 1980, 162).	4580±80	-22.6			3610–3020
HORSLIP LONG BARROW (Ashbee <i>et al.</i> 1979, 214, fig 4, pl. 30b)								
BM-180		Red deer antler pick	East butt of east ditch, on base, covered by chalk rubble fill	5190±150				4340–3650
WEST KENNET LONG BARROW (Bayliss <i>et al.</i> 2007, table 1)								
GrA-23178	WK 2	Human bone, left femur from child, c.3–4 years	SE chamber primary deposit, strong suggestion that skeleton articulated	4835±45	-21.6	10.7		
OxA-13179	WK 2	Human bone, left femur from child, c.3–4 years	Replicate of GrA-23178	4778±38	-20.8	11.0	3.3	
Weighted mean of GrA-23178 and OxA-13179 ($T'=0.9$; $T'(5\%)=3.8$; $v=1$)				4802±29				3650–3520

GrA-23179	WK 4	Human bone, left femur from child, c.4–5 years	SE chamber primary deposit, strong suggestion that skeleton articulated	4855±45	-21.4	10.1		
OxA-13180	WK 4	Human bone, left femur from child, c.4–5 years	Replicate of GrA-23179	4787±41	-21.1	8.8	3.3	
Weighted mean of GrA-23179 and OxA-13180 (T'=1.2; T'(5%)=3.8; v=1)				4818±30				3650–3520
OxA-13200	WK 14	Human bone, right femur, adult female	SE chamber primary deposit, at least partially articulated Skeleton SE X	4872±38	-20.6	9.4	3.1	3770–3530
OxA-13199	WK 13	Human bone, right femur, adult male	SE chamber primary deposit, at least partially articulated Skeleton SE IX	4880±38	-20.4	10.6	3.1	3770–3530
OxA-13331	WK 23	Human bone, adult left femur	SE chamber primary deposit, disarticulated bone	4747±37	-21.1	10.4	3.1	3640–3370
OxA-12653	WK 16	Human bone, right scapula, adult male	NW chamber primary deposit, partially articulated Skeleton NW I	4803±32	-19.6	11.8	3.3	
GrA-23181	WK 16	Human bone, right scapula, adult male	Replicate of OxA-12653	4950±50	-20.9			
Weighted mean of OxA-12653 and GrA-23181 (T'=6.2; T'(5%)=3.8; v=1)				4847±27				3710–3530
OxA-563	Eu 1.5.142	Human bone, limb bone, adult male	Replicate of OxAo12653 and GrA-23181	4780±90	-19.0 (assumed)			3760–3360
OxA-449	Eu 1.5.143	Human bone, parietal bone, older male	NW chamber primary deposit, disarticulate skull II of older male	4825±90	-19.0 (assumed)			3800–3370
OxA-12283	WK 21	Human bone, right humerus, adult	NW chamber primary deposit, disarticulated bone	4835±33	-19.9	11.0	3.1	3700–3520
OxA-13188	WK 22	Human bone, right humerus, adult	NW chamber primary deposit, disarticulated bone	4767±38	-20.6	9.5	3.1	3640–3380
OxA-451	38	Human bone, left femur, sub-adult c.16–20 years	SW chamber primary deposit, partially articulated skeleton	4780±90	-19.0 (assumed)			3760–3360
OxA-13201	WK 15	Human bone, foot phalange, sub-adult, c.10–14 years	SW chamber primary deposit, at least partially articulated Skeleton SW 1	4827±38	-20.6	9.5	3.1	3660–3520
OxA-12284	WK 24	Human bone, right humerus, adult	SW chamber primary deposit, disarticulated bone	4797±31	-20.5	9.4	3.1	3650–3520
OxA-13332	WK 25	Human bone, right humerus, adult	SW chamber primary deposit, disarticulated bone	4791±37	-21.1	9.8	3.1	3650–3380

OxA-13190	WK 26	Human bone, right humerus, adult	SW chamber primary deposit, disarticulated bone	4680±39	-21.0	11.8	3.3	3620–3360
GrA-23180	WK 12	Human bone, right femur, adult	NE chamber primary deposit, partially articulated Skeleton NE III	4790±50	-22.3	10.5		
OxA-12652	WK 12	Human bone, right femur, adult	Replicate of GrA-23180	4856±31	-20.5	10.4	3.3	
Weighted mean of GrA-23180 and OxA-12652 (T'=1.3; T'(5%)=3.8; v=1)				4838±26				3660–3520
OxA-450	Eu 1.5.140	Human bone, left femur, adult male	NE chamber primary deposit, articulated skeleton NE II	4700±80	-19.0 (assumed)			
OxA-12282	WK 20	Human bone, right femur, adult male	Replicate of OxA-450	4819±30	-20.2	10.6	3.1	
Weighted mean of OxA-450 and OxA-12282 (T'=1.9; T'(5%)=3.8; v=1)				4805±28				3650–3520
OxA-13198	WK 11	Human bone, right femur, adult female	NE chamber primary deposit, partially articulated skeleton NE I	4838±37	-20.5	9.6	3.1	3710–3520
OxA-13182	WK 6	Human bone, tibia, infant 0–6 months old	SE chamber secondary deposits, largely articulated skeleton	4454±34	-19.3	11.0	3.4	3340–2930
OxA-13242	WK 7	Human bone, rib, foetus 5–7 months in utero	SE chamber secondary deposits, partial skeleton	4506±37	-20.1	11.5	3.1	3370–3040
OxA-13184	WK 9	Human bone, tibia, child c.2–3 years	SE chamber secondary deposits, largely complete skeleton	4478±37	-21.2	10.8	3.3	3350–3020
OxA-13183	WK 8	Human bone, humerus, infant 12–18 months	SE chamber secondary deposits, partial skeleton	4103±38	-20.6	11.4	3.4	2870–2500
OxA-13181	WK 5	Human bone, rib, infant, 12–18 months	SE chamber secondary deposits, largely complete skeleton on surface of the undisturbed chalk of secondary filling	4105±35	-20.5	14.0	3.3	2870–2500
OxA-13243	WK 10	Human bone, humerus fragment, infant, c.6–10 months	NE chamber secondary deposits, likely articulated	4583±45	-20.9	13.7	3.1	3520–3100
OxA-13202	WK 17	<i>Cabra</i> sp. bone, tibia, male	NW chamber secondary deposits, partially articulated skeleton	3934±36	-23.3	5.4	3.1	2570–2290
WINDMILL HILL CAUSEWAYED ENCLOSURE (Whittle <i>et al.</i> 2011, table 3.2)								
BM-74	B	Unidentified charcoal (bulk)	Layers 4 and 5 in Outer Ditch V and equivalent layers in Middle Ditch XII	4530±150				3630–2890

Inner ditch								
OxA-13760	ID VII bottom	<i>Corylus avellana</i> charcoal (single fragment)	Segment VII, ditch bottom, beneath Spit 5 (Pollard 1999a, 53–6)	4891±50	-26.1			3800–3530
GrA-25379	ID VII bottom	<i>Corylus avellana</i> charcoal (single fragment)	Same context as OxA-13760	4910±50	-22.6			3900–3530
OxA-13815	WH26 B25	Red deer antler beam	Segment VII, spit 5, at 4.5ft, in chalk rubble at foot of ditch (Pollard 1999a, 53–6, figs 50–52)	4798±34	-22.6			3650–3520
GrA-29708	WH26 B23	Red deer antler with worn tip and charring to beam	Same spit as OxA-13815	4700±35	-22.9			3630–3370
OxA-14975	WH26 ID VII Spit 5 A	<i>Corylus avellana</i> charcoal (single fragment)	Same spit as OxA-13815	4703±36	-24.5			3630–3370
GrA-29746	WH26 ID VII Spit 5 B	<i>Corylus avellana</i> charcoal (single fragment)	Same spit as OxA-13815	4852±40	-25.2			3710–3520
OxA-13732	WH26 sherd 2896	Internal residue from large well-preserved joining Neolithic Bowl sherds	Segment VII, spit 4 (0.7–1 m); primary and secondary fills (Pollard 1999, 53–6)	4672±45	-12.8	6.6		
GrA-25391	WH26 sherd 2896	Internal residue from large well-preserved joining Neolithic Bowl sherds	Same context as OxA-13732	4360±50	-28.3			
Weighted mean of OxA-13732 and GrA-25391 (T'=21.4; T'(5%)=3.8; v=1)				4536±33				3370–3100
GrA-25558	WH26 B22.a	Dog mandible	Segment VII, spit 4 (0.7–1 m)	4690±40	-20.9	9.4		3630–3370
OxA-13715	WH26 B22.b	Sheep/goat left humerus	Segment VII, spit 4 (0.7–1 m). Found with dog mandible; articulated with radius	4710±29	-21.0	5.2		3630–3370
OxA-14968	WH29 B759	Pig metatarsal	Segment XII, spit 2b (0.3–0.6 m) (Smith 1965b, pl. Va; Whittle <i>et al.</i> 1999, 61–3) Associated with Bowl pottery and one sherd of Peterborough Ware (Whittle <i>et al.</i> 1999, table 166)	4747±33	-20.0			3630–3380

GrA-29707	WH29 B322	Cattle right femur	Segment XVI, spit 3a (0.6–0.9 m), close to SW butt. Articulating with right tibia, in group of cattle bones (Smith 1965b, pl. Vb; Whittle <i>et al.</i> 1999, 56). Pottery from this spit was mainly Bowl with five sherds of Peterborough Ware and four of indeterminate Late Neo/EBA (Whittle <i>et al.</i> 1999, table 166)	4725±35	-22.0			3640–3370
OxA-2394	WH88 6464	Cattle vertebra	Segment XVII, Trench F, in silt lens 613, within primary chalk rubble, close to base of ditch (Whittle <i>et al.</i> 1999, fig 95)	4665±70	-22.1			3640–3130
GrA-25560	WH99 6419	Cattle right proximal metatarsal fragment	Segment XVII, Trench F, bone heap 630 on surface of context 610, topmost layer of primary chalk rubble. Articulating with other foot bones (Whittle <i>et al.</i> 1999, figs 95–6)	4500±40	-22.1	5.4		3360–3030
BM-2672	WH88 6389	Cattle vertebra	Segment XVII, Trench F, bone deposit 629 in base of layer 604 at bottom of secondary silts (Whittle <i>et al.</i> 1999, 95–6)	4370±50	-21.4			3320–2890
Middle ditch								
BM-2670	WH88 4374	Cattle tibia	Trench D, bone deposit 418 within layer 416 (Whittle <i>et al.</i> 1999, fig 86)	4670±90	-22.8			3650–3100
UB-6186	WH88 4360 (B1425)	Red deer antler, probable pick	Same context as BM-2670	4699±20	-21.2±0.5			3530–3370
OxA-15075	WH88 4360 (B1425)	Red deer antler, probable pick	Replicate of UB-6186	4717±30	-20.6			
OxA-15076	WH88 4360 (B1425)	Red deer antler, probable pick	Replicate of UB-6186	4673±30	-20.8			
OxA-15088	WH88 4360 (B1425)	Red deer antler, probable pick	Replicate of UB-6186	4770±33	-20.7			
GrA-29706	WH88 4360 (B1425)	Red deer antler, probable pick	Replicate of UB-6186	4700±40	-21.3			
Weighted mean of UB-6186, OxA-15075, OxA-15076, OxA-15088 and GrA-29706 (T'=5.2; T'(5%)=9.5; v=1)				4708±13				3600–3375

OxA-13814	WH88 4328 (B1742)	Cattle bone, right radius	Trench D, context 416, overlying initial silt 417 in angle of ditch base and wall (Whittle <i>et al.</i> 1999, fig 86)	4807±32	-21.9			
OxA-14967	WH88 4329 (B1761)	Cattle bone, right ulna	Articulated with OxA-13814	4729±33	-21.4			
Weighted mean of OxA-13814 and OxA-14967 (T'=2.9; T'(5%)=3.8; v=1)				4769±23				3635–3520
GrA-25706	WH88 4330 (B1743)	Cattle bone, right radius	Same context as OxA-13814	4740±45	-22.5	4.8		3640–3370
OxA-2397	WH88 4232	Cattle bone, scapula	Trench D, bone deposit 414 in layer 411 (Whittle <i>et al.</i> 1999, figs 86–7)	4730±80	-22.5			3650–3360
OxA-13714	WH88 4255 (B1458)	Medium mammal bone, rib	Same context as OxA-2397	4746±32	-22.0	6.4		3640–3380
GrA-25556	WH88 4225 (B1441)	Medium mammal bone, rib	Same context as OxA-2397	4735±40	-23.2	6.1		3640–3370
OxA-2398	WH88 4179	Cattle (?aurochs) bone, calcaneum	Trench D, bone deposit 413 in layer 411 (Whittle <i>et al.</i> 1999, figs 86, 88)	4715±80	-22.6			3650–3350
OxA-13813	WH88 4194 (B1600)	Cattle bone, vertebra	Same context as OxA-2398	4682±34	-21.8			3610–3360
OxA-13680	WH25 B6	Red deer antler crown	Segment I, northern part of segment, 1.2 m deep near the junction of primary chalk rubble and secondary fills (Whittle <i>et al.</i> 1999, fig 42)	4403±33	-21.0	5.2		3320–2910
GrA-25554	WH28 B114	Red deer antler beam, smooth	Segment IB, spit 5A (1.2–1.5 m), within primary fills (Whittle <i>et al.</i> 1999, 47–51, fig 41)	4725±40	-21.8	4.6		3630–3370
GrA-25559	WH28 B374	Cattle bone, right magnum	Segment IB, spit 4 (0.9–1.2 m), upper part of primary fill (Whittle <i>et al.</i> 1999, 47–50, fig 42). Articulated with right scaphoid	4730±40	-22.9	5.3		3630–3370
GrA-25555	WH28 B369	Cattle bone, right magnum	Same spit as GrA-25559. Articulating with complete set of right carpals.	4685±40	-23.8	5.0		3630–3360
OxA-13812	MD IB L4	Toad bones, vertebrae, and long bones	Same spit as GrA-25559. Complete skeleton, near top of primary fills.	4826±33	-20.8			3660–3520

OxA-13679	WH28 B372	Cattle bone, right scaphoid	Segment IB, spit 3 (0.6–0.9 m), mainly in secondary fills (Whittle <i>et al.</i> 1999, 47–50, fig 42).	4839±32	–22.0	5.5		3710–3520
OxA-13505	WH28 B106	Dog bone, right metacarpals	Same spit as OxA-13679. Articulated partial skeleton	4649±30	–20.4	7.3		3520–3360
OxA-15177	WH27 1924	Cattle bone, left humerus	Segment IVB, spits 4 (0.7–1 m) and 5 (1 m–base), skeleton of almost complete ox (Whittle <i>et al.</i> 1999, 42)	4686±33	–21.6			3610–3360
GrA-25368	WH88 12371a	Toad bones, hind limbs	Segment XII, Trench E, from low-density bone spread 527 within context 515 just above base of ditch (Whittle <i>et al.</i> 1999, 100, figs 89–90)	3650±50	–21.1	3.1		
OxA-13730	WH88 12371b	Toad bones, fore limbs	Same context as GrA-25368	3524±30	–20.0	7.6		
Weighted mean of GrA-25368 and OxA-13730 (T'=4.7; T'(5%)=3.8; v=1)				3558±26				2020–1770
OxA-2395	WH88 12361	Pig bone, humerus	Same context as GrA-25368	4730±80	–21.6			3650–3360
OxA-2396	WH88 12369	Pig bone, scapula	Same context as GrA-25368	4690±70	–21.3			3640–3350
OxA-13713	WH88 12301 (B54)	Cattle bone, lunate	Segment XII, Trench E, lower part of bone deposit 525 in lower part of context 508 at top of primary fills. Articulated with other bones in same and nearby contexts (Whittle <i>et al.</i> 1999, 99–101, figs 89, 93)	4695±38	–22.1	5.3		3630–3370
GrA-25707	WH88 12281 (B70)	Cattle bone, vertebra	From same context as OxA-13713. Articulated with other vertebrae and sacrum	4675±40	–23.1	5.3		3620–3360
BM-2671	WH88 12278	Cattle bone, humerus	Segment XII, Trench E, bone deposit 523 in top of 510 (Whittle <i>et al.</i> 1999, figs 89, 91)	4550±50	–21.2			3620–3360
Outer ditch								
OxA-2399	WH88 1710	Human bone, cranium of 3–4-year-old child	Trench A, bone deposit 117, in the top of layer 112, approx. 1m above ditch base (Whittle <i>et al.</i> 1999, fig 81, fig 82: 4)	4750±70	–22.3			3650–3370
OxA-13503	WH88 1712 (B18)	Cattle bone, proximal metatarsal fragment	Same context as OxA-2399, articulating with other bones	4825±32	–22.2	4.8		3650–3520
GrA-25546	WH88 1687 (B5338)	Large mammal bone, rib fragment	Trench A, bone group 115 in top of layer 111. Rib interleaved with other ribs, including OxA-13504 (Whittle <i>et al.</i> 1999, 90)	4765±40	–22.2	4.1		3640–3380

OxA-13504	WH88 1688 (B5330)	Large mammal	Same rib bundle as GrA-25546	4620±31	-21.3	4.7		3520–3340
OxA-13501	WH28 B671	Cattle bone, vertebra with unfused epiphysis	Segment IB, spit 7 (1.8–2.1 m), within primary fills (Whittle <i>et al.</i> 1999, fig 26)	4860±31	-21.3	4.7		3710–3530
GrA-25545	WH28 B370	Cattle bone, right magnum	Same spit as OxA-13501, articulating with other bones from this and spit 6	4780±40	-22.8	4.2		3650–3380
OxA-13502	WH28 B145a	Red deer bone, phalange	Segment IB, spit 3 (0.6–0.9 m), probably within primary fills at inner edge and secondary/tertiary fills at outer (Whittle <i>et al.</i> 1999, fig 26). With another phalange likely to be from same animal.	4164±35	-22.2	5.1		2890–2630
OxA-14966	WH29 B209a	Human bone, left ilium of 2–3-year-old child	Segment IIIB, spit 5 (1.2–1.5 m), central part of segment, articulated skeleton on base of ditch in shallowest part, against the inner side (Smith 1965b, 9; Whittle <i>et al.</i> 1999, 30–4).	4521±35	-21.1	11.9		
GrA-29711	WH29 B209b	Human bone, left ilium of 2–3-year-old child	Replicate of OxA-14966	4615±40	-21.7			
Weighted mean of OxA-14966 and GrA-29711 ($T^*=3.1$; $T^*(5\%)=3.8$; $v=1$)				4562±40				3500–3100
OxA-2401	WH88 10457	Cattle bone, astragalus	Segment V, Trench C, bone deposit 321 within layer 320, compact group of almost all cattle bones, many conjoining or articulating. In secondary silts overlying primary rubble (Whittle <i>et al.</i> 1999, figs 83, 84)	4770±70	-22.3			3660–3370
GrA-29712	WH88 10455 (B74)	Cattle, left metatarsal shaft	Same context as OxA-2401. Bone found with fitting unfused epiphysis, articulated with other bones (Whittle <i>et al.</i> 1999, 12, 18, 19)	4715±35				3630–3370
GrA-29713	WH88 10458 (B248)	Cattle bone, vertebra	Same context as OxA-2401. Bone found with fitting unfused epiphysis and articulating with other vertebrae (Whittle <i>et al.</i> 1999, fig 84: 7)	4675±40	-22.7			3620–3360
OxA-2402	WH88 10452	Cattle bone, humerus	Same context as OxA-2401	4665±80	-23.8			3640–3100
BM-2673	WH88 3915	Cattle bone, scapula	Segment IV, Trench C, bone deposit 317 at base of incipient soil 316 formed over secondary fills. Associated with a Beaker sherd (Whittle <i>et al.</i> 1999, figs 83, 85)	4310±80	-23.0			3330–2660

GrA-29714	WH88 10414	Charcoal, <i>Corylus</i> sp. (single frag)	Segment IV, Trench C, context 305? (Recorded as from 308 but good agreement with OxA-14965 and date later than those of overlying articulated samples in bone deposit 321 suggests transcription error and this is from 305; Whittle <i>et al.</i> 2011, table 3.2)	4120±35	-24.9			2880–2570
OxA-14965	WH88 10343	Charcoal, <i>Corylus</i> sp. (single frag)	Segment IV, Trench C, context 305.	4089±34	-24.4			2870–2490
BM-73	A	Charcoal, unidentified, bulk	Segment V, old land surface under outer bank (Smith 1965b, 28)	4910±150				4050–3360
OxA-2406	WH88 7839	Cattle bone, vertebra	Segment V, Trench BB, surface of soil under 'setting out bank' (Whittle <i>et al.</i> 1999, figs 69–71)	4870±70	-25.5			3910–3380
OxA-2403	WH88 7595/90	Human bone, rib, adult male	Segment V, Trench BB, articulated skeleton in grave cut through pre-bank soil although not necessary covered by bank (Whittle <i>et al.</i> 2011, table 3.2)	4745±70	-22.5			3650–3370
OxA-2404	WH88 7393	Pig bone, scapula	Segment V, Trench BB, layer 733, topmost fill of grave 707 with male burial, overlain by chalk rubble of bank (Whittle <i>et al.</i> 1999, fig 73).	4650±70	-21.9			3640–3100
OxA-2405	WH88 7284	Cattle bone, humerus	Segment V, Trench BB, on surface of soil 705 sealed by tail of outer bank, beyond limits of possible original bank (Whittle <i>et al.</i> 1999, figs 69–71)	4550±80	-23.5			3520–3010
OxA-13499	WH57–58 85	Residue from Neolithic Bowl pottery, unweathered	Segment V, bottom of ditch	4728±32	-27.6	6.1		3640–3370
GrA-25549	WH57–58 86	Residue from Neolithic Bowl pot sherd, unweathered	Same context as OxA-13499	4740±40	-27.6			3640–3370
BM-2669	WH88 23200	Cattle bone, tibia shaft	Segment V, Trench B, bone deposit 229, between layers 228 and 210, within a few cm of ditch base (Whittle <i>et al.</i> 1999, fig 78: 6)	4740±50	-21.9			3640–3370
GrA-25389	WH88 23250b	Residue from Neolithic Bowl pot sherd, large portion	Same context as BM-2669. Alkali fraction from same sample as residue measured by GrA-25821.	4050±150	-29.1			3010–2140
GrA-25821	WH88 2350b	Residue from Neolithic Bowl pot sherd, large portion	Same context as BM-2669.	3980±50	-29.9			2630–2300

GrA-25553	WH88 23207 (B4600)	Cattle bone, proximal phalanx	Same context as BM-2669. Another phalanx c.0.25 m away from same context came from same foot (Whittle <i>et al.</i> 1999, fig 78: 2, 5, 6)	4755±40	-22.5	4.4		3640–3370
GrA-25550	WH88 23059 (B3783)	Pig bone, left ilium from new-born piglet	Segment V, Trench B, bone deposit in context 210, with many bones of same animal (Whittle <i>et al.</i> 1999, 86, 189)	4300±40	-21.5	6.1		3030–2780
OxA-13500	WH88 23113 (B429)	Dog bone, metatarsal	Segment V, Trench B, bone deposit 227 on surface of 210. Articulating with proximal phalanx, and other dog bones from same context likely to be from same animal (Whittle <i>et al.</i> 1999, 82–5, 189, 231, fig 79). Deposit included one sherd of Ebbsfleet Ware and one sherd of Neolithic Bowl (Whittle <i>et al.</i> 1999, 272, table 156)	4021±29	-21.0	9.1		2630–2460
GrA-25367	WH57–58 B198	Human bone, femur from infant skeleton 7–7.5 months old	Segment V, at interface of layers 4 and 3, at junction of lower and upper secondary fills of ditch. Articulated but disturbed skeleton (Whittle <i>et al.</i> 2011, table 3.2)	3640±50	-21.9			
OxA-13759	WH57–58 B198	Human bone, femur from infant skeleton 7–7.5 months old	Replicate of GrA-25367	3716±28	-20.5			
Weighted mean of GrA-25367 and OxA-13759 ($T'=1.8$; $T'(5\%)=3.8$; $v=1$)				3698±24				2200–1980
BM-75	C	Charcoal, unidentified, bulk	Segment V, Layer 2, tertiary fill associated with Peterborough Ware, Grooved Ware, Beaker and Early Bronze Age pottery	3500±150				2280–1450
EASTON DOWN LONG BARROW (Whittle <i>et al.</i> 1993, 200–3, figs 4–5)								
OxA-3759	2531	Cattle bone, humerus	Context 240, surface of buried turfline	4610±60	-21.4			3530–3100
OxA-3760	2450	Red deer antler tine	Trench B, context 249, ditch base, under primary chalk rubble	4730±65	-21.2			3640–3370
OxA-3762	2336	Red deer tooth	Trench B, context 245/249, primary fill of ditch	4535±65	-21.3			3500–3020
OxA-3761	1191	Cattle tooth	Trench A, context 116, upper secondary fill of ditch	3860±60	-21.6			2470–2140
MILLBARROW LONG BARROW (Whittle 1994, table 1)								
OxA-3171	4096	Human bone, mandible, disarticulated	Context 401, pit in area formerly occupied by east end of mound, possibly pre-dating it	4750±120	-21.6			3800–3100

OxA-3172	6005	Human bone, mandible, disarticulated	Context 548, pit in area formerly occupied by east end of mound, pre-dating it	4900±100	-20.9			4000–3380
BM-2730	2047	Red deer antler fragment	Context 234, chalk silt and rubble immediately overlying initial silt of inner northern ditch	4560±70	-22.2			3520–3020
BM-2729	1344	Red deer antler crown	Context 165, earthy material derived from interior, near top of primary silts of inner southern ditch	4450±60	-22.4			3350–2920
BM-2731	1126	Red deer antler crown	Context 119, fine chalky silt near bottom of outer southern ditch	4560±50	-21.9			3500–3090
OxA-3169	4169	Human bone, mandible, disarticulated	Context 431, hollow on north side of supposed chamber area. Associated with plain Neolithic pottery and Peterborough Ware	4620±90	-21.4			3640–3090
OxA-3198	5331	Human bone, mandible, disarticulated	Same context as OxA-3169	4480±80	-21.8			3340–2920
OxA-3170	5716	Red deer antler, fragment of beam with some skull attached	Context 534, pit beyond eastern end of barrow	4630±100	-20.9			3640–3040
SOUTH STREET LONG BARROW (Ashbee <i>et al.</i> 1979)								
BM-356		Charcoal, <i>Quercus</i> sp.	Two charcoal patches on buried soil beneath mound	4760±130				3940–3100
BM-358b		Red deer antler, fragment	In coombe rock forming part of body of mound in Bay II, interpreted as broken and discarded tool	4530±110				3520–2920
BM-357		Cattle bone, vertebrae	Four articulated vertebrae on base of east butt of northern ditch	4700±135				3770–3030
BM-358a		Red deer antler	Same context as BM-357	4620±140				3650–2930
BECKHAMPTON ROAD LONG BARROW (Ashbee <i>et al.</i> 1979)								
NPL-138		Charcoal, <i>Quercus robur</i> , fragments at least 75mm diameter	Charcoal patch burnt in situ or still hot when deposited, forming a continuous layer beneath the buried surface	5200±160				4350–3650
BM-506a		Red deer antler pick	Lower of two antler picks found on buried surface beneath mound	4257±90				3290–2500
BM-506b		Red deer antler pick	Same context as BM-506a	4467±90				3370–2910

WEST KENNET AVENUE OCCUPATION SITE								
NZA-23742		Cattle bone, metacarpal, disarticulated	Pit 408, close to Stone 15b of West Kennet Avenue, containing Mortlake-style pottery, cattle bones, and charred hazelnut shell (Allen and Davis 2009, table 1)	4378±30	-22.8			3100–2910
SUERC-59896		Charcoal, <i>Pomoideae</i> sp. roundwood	Pit F.6, one of a cluster of four pits, from (020), the single dumped fill with frequent charcoal, burnt sarsen, burnt antler, and worked flint, possibly hearth debris (Gillings <i>et al.</i> 2015, 8; Josh Pollard pers. comm.)	4413±30				3320–2910
SUERC-70784		Charcoal, <i>Corylus avellana</i>	From secondary charcoal-rich fill of re-cut pit [418] within top of Pit F.55, with flint assemblage including six chisel arrowheads, burnt sarsen, possibly derived from hearth or midden (Josh Pollard pers. comm.)	4354±30				3090–2900
SUERC-70788		Charcoal, <i>Pomoideae</i> sp.	From primary fill (421) of Pit F.55 [425], an orange-brown clay loam with charcoal flecks (Josh Pollard pers. comm.)	4363±30				3090–2900
HAR-6965		Charcoal, unidentified	Hole 4, Square 3. Small pit or posthole containing weathered Peterborough Ware sherds, two chisel arrowheads, other struck flint, sarsen rubber and fragments (Smith 1965b, 215)	4260±80	-26.7			3100–2580
HAR-10501		Deer antler	Pit 1, containing Grooved Ware sherds, more than 350 pieces struck flint including chisel arrowhead, sarsen fragments, tip of bone pin, cattle, and pig bones (Smith 1965b, 213)	4280±100	-24.3			3330–2570
WEST KENNET PALISADE ENCLOSURES (Bayliss <i>et al.</i> 2017, table 17.1)								
Palisade enclosure 1 – outer ditch								
UBA-31101	A	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Postpipe row [101] seen intermittently through fill [111] of outer ditch [100] in Trench G	4419±37	-27.0±0.22			3330–2910
SUERC-65177	B	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Same context as UBA-31101	4535±28	-26.7±0.2			3370–3100
SUERC-58623	Find 1038, A	Antler tine, probably pick	[111], fill of outer ditch [100] in Trench G	3972±32	-22.8±0.2	4.5±0.3	3.2	
UBA-22618	Find 1038, B	Antler tine, probably pick	Replicate of SUERC-58623	3843±34	-22.8±0.22	4.3±0.22	3.2	
Weighted mean of SUERC-58623 and UBA-22618 (T'=7.6; T'(5%)=3.8; v=1)				3912±24				2470–2300

CAR-1293		Animal bone (bulked pig and cattle)	Edge of postpipe [123], outer ditch [100] in Trench G	3960±70				2840–2200
UBA-31102	A	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Postpipe [207], one of central line visible in outer ditch [200] in Trench H	4511±29	-26.2±0.22			3360–3090
SUERC-65178	B	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Same context as UBA-31102	4559±28	-25.9±0.2			3490–3100
UBA-31103	A	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Postpipe [218], one of central line visible in outer ditch [200] in Trench H	2901±38	-22.7±0.22			1220–940
SUERC-65352	B	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Same context as UBA-31103	4511±29	-24.5±0.2			3360–3090
UBA-31104	A	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Postpipe [219], one of central line visible in outer ditch [200] in Trench H	2958±55	-25.7±0.22			1390–1010
SUERC-65179	B	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Same context as UBA-31104	2966±28	-22.2±0.2			1280–1050
SUERC-58627	Find 2019	Pig bone, right femur with refitting unfused epiphysis	[208], later redefined as [217–218], fill around postpipes [217–218] in outer ditch [200] in Trench H	3820±32	-21.5±0.2	6.6±0.3	3.3	2460–2140
CAR-1289		Pig bone	Around postpipes 217–219 in outer ditch [200] in Trench H	3860±70				2570–2130
CAR-1290		Pig bone	Around postpipes 217–219 in outer ditch [200] in Trench H	3900±70				2580–2150
UBA-22630	Find 2422	Pig bone, right femur with refitting unfused epiphysis	[210], later redefined as [219–220], fill around postpipes 219–220 in outer ditch [200] in Trench H	3842±38	-23.8±0.22	4.2±0.15		2460–2200
BM-2602	Find 262	Red deer antler beam fragment	Fill of postpipe [40], outer ditch [26] in Trench D	3620±50	-20.7			2140–1780
BM-2597	Find 322	Red deer antler crown fragment	Inner edge of Layer 2, deliberate rammed chalk backfill in upper part of outer ditch [26] in Trench D	3810±50	-20.8			2460–2060
UBA-31111	A	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Palisade line [23] visible in the fill of the outer ditch [12] in Trench	4488±35	-26.5±0.22			3360–3030
SUERC-65189	B	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Same feature as UBA-31111	4614±29	-26.8±0.2			3520–3340

Palisade enclosure 1 – inner ditch								
UBA-31112	A	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Postpipe row [31] consisting of three substantial postpipes (34–6) cut into the fill of the inner ditch [21] in Trench F	4512±38	-26.2±0.22			3370–3090
SUERC-65190	B	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Same feature as UBA-31112	4590±28	-22.9±0.2			3500–3120
UBA-31105	A	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Postpipe [310], part of postpipe row [309] in Trench J	4524±38	-24.5±0.22			3520–3100
SUERC-65180	B	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Same context as UBA-31105	4524±30	-25.4±0.2			3370–3100
UBA-31106	A	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Postpipe [313], part of postpipe row [309] in Trench J	4427±50	-25.5±0.22			3340–2910
SUERC-65184	B	Charcoal, <i>Quercus</i> sp. sapwood (single frag)	Same context as UBA-31106	4698±31	-24.4±0.2			3630–3370
CAR-1291		Pig bone	Postpipes [311] and [313–315] in Trench J	3890±70				2570–2140
SUERC-58631	Find 2089, A	Antler tine, probable pick	[325], fill of inner ditch [301] in Trench J	3926±32	-21.1±0.2	4.3±0.3	3.3	
UBA-22622	Find 2089, B	Antler tine, probable pick	Replicate of SUERC-58631	3870±34	-21.1±0.22	5.7±0.15	3.2	
Weighted mean of SUERC-58631 and UBA-22622 (T'=1.4; T'(5%)=3.8; v=1)				3900±24				2470–2295
Midden feature (between inner and outer ditches of Enclosure 1)								
SUERC-58630	Find 2393	Antler tine fragments, probable pick	[222], flat laid chalk layer	3877±32	-22.7±0.2	5.2±0.3	3.3	2470–2200
UBA-22627	Find 2359	Pig bone, lumbar vertebrae with refitting unfused cranial plate	Same context as SUERC-58630	3810±40	-20.8±0.22	5.7±0.15	3.2	2460–2130
SUERC-58628	Find 2322	Pig bone, right femur with refitting unfused distal epiphysis	[215], mass of animal bone, mainly pig, in dark matrix with Grooved Ware pottery, overlying dark flinty layer [223] which in turn overlaid [222], flat chalk layer.	3889±32	-21.0±0.2	6.0±0.3	3.3	2470–2230
SUERC-58629	Find 2325	Pig bone, right femur with refitting unfused distal epiphysis	Same context as SUERC-58628	3902±32	-21.2±0.2	5.6±0.3	3.2	2480–2280
CAR-1296		Cattle bone	Same context as SUERC-58628	3590±70				2140–1740

CAR-1297		Animal bone (bulked pig and red deer)	Same context as SUERC-58628	3550±70				2140–1690
UBA-22629	Find 2301	Pig bone, right femur with refitting unfused distal epiphysis	Same context as SUERC-58628	3581±37	-22.0±0.22	5.4±0.15	3.4	2040–1770
Palisade enclosure 2 ditch								
UBA-22626	Find 6101	Pig bone, left femur with refitting unfused proximal epiphysis	[605], dark layer in uppermost fill of enclosure ditch [630] in Trench M	3948±36	-20.4±0.22	7.6±0.15	3.2	2580–2300
UBA-31107	A	Charcoal, <i>Quercus</i> sp. charcoal sapwood (single frag)	[608], postpipe core of postpipe [625] in row of four substantial postpipes within backfill of enclosure ditch in Trench M. Posts estimated to be no more than 0.5m across	4427±36	-25.6±0.22			3330–2920
SUERC-65185	B	Charcoal, <i>Quercus</i> sp. charcoal sapwood (single frag)	Same context as UBA-31107	4580±36	-24.2±0.2			3500–3100
UBA-31108	A	Charcoal, <i>Quercus</i> sp. charcoal sapwood (single frag)	[609], postpipe core of postpipe [626] in a row of four substantial postpipes within backfill of enclosure ditch in Trench M. Posts estimated to be no more than 0.5m across	4449±36	-25.5±0.22			3340–2930
SUERC-65186	B	Charcoal, <i>Quercus</i> sp. charcoal sapwood (single frag)	Same context as UBA-31108	4771±31	-25.2±0.2			3640–3380
UBA-31109	A	Charcoal, <i>Quercus</i> sp. charcoal sapwood (single frag)	[610], postpipe core of postpipe [627] in a row of four substantial postpipes within backfill of enclosure ditch in Trench M. Posts estimated to be no more than 0.5m across	4514±35	-24.5±0.22			3360–3090
SUERC-65187	B	Charcoal, <i>Quercus</i> sp. charcoal sapwood (single frag)	Same context as UBA-31109	4583±28	-24.9±0.2			3500–3100
SUERC-58632	Find 6195	Pig bone, right femur with refitting unfused distal epiphysis	[610], fill of postpipe [627], cut into fill of enclosure ditch [630] in Trench M	3848±32	-20.4±0.2	6.8±0.3	3.2	2460–2200
UBA-22631	Find 6304	Pig bone, right femur with refitting unfused proximal epiphysis	Same context as SUERC-58632	3891±35	-22.0±0.22	5.7±0.15	3.2	2470–2210

SUERC-58633	Find 6247, A	Pig bone, right femur with refitting unfused proximal epiphysis	[610], fill of postpipe [627], cut into fill of enclosure ditch [630] in Trench M	3679±32	-22.0±0.2	6.3±0.3	3.6	
UBA-22619	Find 6247, B	Pig bone, right femur with refitting unfused proximal epiphysis	Replicate of SUERC-58633	3790±36	-21.6±0.22	6.1±0.15	3.2	
Weighted mean of SUERC-58633 and UBA-22619 (T'=5.3; T'(5%)=3.8; v=1)				3729±24				2205–2035
CAR-1295		Cattle bone	Core of postpipe [626] cut into fill of enclosure ditch [630] in Trench M	4050±70				2880–2410
CAR-1294		Cattle bone	Core of postpipe [627] cut into fill of enclosure ditch [630] in Trench M	3620±70				2200–1770
UBA-31110	A	Charcoal, <i>Quercus</i> sp. charcoal sapwood (single frag)	[611], core of postpipe [628], in a row of four substantial postpipes in backfill of enclosure ditch [630] in Trench M	4455±37	-24.0±0.22			3340–2930
SUERC-65188	B	Charcoal, <i>Quercus</i> sp. charcoal sapwood (single frag)	Same context as UBA-31110	4572±30	-24.1±0.2			3500–3100
SUERC-58637	Find 6146, A	Cattle bone, first phalanx with refitting unfused epiphysis	Around outer visible part of postpipe [625] and in the space between postpipes [626] and [627] cut into fill of enclosure ditch in Trench M	3766±32	-23.2±0.2	6.3±0.3	3.4	
UBA-22620	Find 6146, B	Cattle bone, first phalanx with refitting unfused epiphysis	Replicate of SUERC-58637	3871±38	-23.2±0.22	6.3±0.15	3.2	
Weighted mean of SUERC-58637 and UBA-22620 (T'=4.5; T'(5%)=3.8; v=1)				3810±25				2345–2140
SUERC-58640	Find 70057	Pig bone, sacrum with unfused but articulating first and second sacral vertebrae	Postpipe [7009] set close to inner edge of enclosure ditch [7002] in Trench BB	3770±32	-21.4±0.2	5.8±0.3	3.2	2300–2040
UBA-22624	Find 70061	Medium mammal thoracic vertebra with refitting unfused caudal plate	[7012], a small group of bones in the main fill of the enclosure ditch [7002] on the outside of postpipe [7008] in Trench BB	3858±35	-20.6±0.22	6.3±0.15	3.2	2460–2200

Structure 2								
SUERC-58638	Find 51222	Sheep/goat left femur with refitting unfused proximal epiphysis	[5113], packing from around a row of six postpipes [5046] cut into the fill of ditch [5002], part of the outer ring in Trench Z	3785±28	-23.6±0.2	5.6±0.3	3.3	2340–2060
Structure 3								
SUERC-58639	Find 60026, A	Antler pick	Fill [6006] of inner ring ditch [6005] in Trench AA	3496±32	-22.6±0.2			1920–1690
UBA-22623	Find 60026, B	Antler pick	Replicate of SUERC-58639	3818±40	-22.6±0.22			2460–2140
Weighted mean of SUERC-58638 and UBA-22623 (T'=39.8; T'(5%)=3.8; v=1)				n/a				
UBA-22625	Find 60303	Pig bone	Postpipe [6021] in outer ring [6003] in Trench AA	3861±41	-21.5±0.22			2470–2200
Structure 1								
UBA-22632	Find 41019	Cattle bone, left calcaneum with refitting unfused epiphysis	[4051], a concentration of animal bone on the outer side and across the middle of the Structure 1 inner ditch in Trench Y	3781±37	-24.1±0.22	8.5±0.15	3.2	2350–2040
Outer radial ditch 1								
CAR-1292		Cattle bone	From postpipe packing? In bedding trench [560] of ditch in Trench S	3930±70				2630–2200
CAR-1298		Cattle bone	Same context as CAR-1292	3830±70				2470–2040
LONGSTONES ENCLOSURE (Gillings <i>et al.</i> 2008)								
Beta-140986		Cattle bone	Contact 300, Trench 13, tertiary fill	4060±50				2870–2460
Beta-140987		Cattle bone, vertebra	Context 505, Trench 14, soil above secondary silts	4150±50				2890–2580
Beta-140988		Pig bone, articulated foot	Context 506, Trench 14, chalk rubble on ditch base	4060±50				2870–2460
Beta-140989		Pig bone, scapula	Context 506, Trench 14, chalk rubble on ditch base	3880±50				2480–2200
OxA-10945		Pig bone	Context 710, Trench 23, chalk rubble, primary fill	4190±40				2900–2630
OxA-10946		Antler beam	Context 739, Trench 23, soil lens on ditch base	4193±35				2900–2630

OxA-10947		Sheep/goat bone	Context 709, Trench 23, chalk rubble, primary fill	4320±45				3090–2870
OxA-10948		Antler fragment	Same context as OxA-10947	4216±36				2910–2670
OxA-10949		Antler fragment	Same context as OxA-10947	4233±38				2920–2670
AVEBURY HENGE								
HAR-10063		Charcoal, unidentified (remainder <i>Pomoideae</i> sp. and unknown)	Cutting X, old land surface under henge bank in south-east quadrant, spanning areas under first and second banks (Pitts and Whittle 1992, fig 3)	4380±80	-26.7			3340–2690
HAR-10325	GBA 82+61 to GBA 82+63	Animal bone, bulk	Trench 2, L2, old land surface under bank of henge in north-west quadrant, in area of interface between first and second banks, on site of Great Barn (Healy 2016)	4640±70	-24.8			3640–3100
HAR-10500		Charcoal, unidentified	Cutting X, old land surface under second henge bank (Gray 1935, 130–1; Pitts and Whittle 1992, fig 3)	4190±90	-26.2			3020–2490
HAR-10502	136	Red deer antler pick	Cutting I, base of ditch, south-west sector (Gray 1935, pl. XXXVI, fig 1; Pitts and Whittle 1992, fig 3; Pollard and Cleal 2004)	4300±90	-23.3			3330–2620
OxA-12555	136	Red deer antler pick	Replicate of HAR-10502	4036±34	-22.2			
OxA-12556	136	Red deer antler pick	Replicate of HAR-10502	4043±34	-23.0			
Weighted mean of OxA-12555 and OxA-12556 (not statistically consistent with HAR-10502) ($T'=0.0$; $T'(5\%)=3.8$; $v=1$)				4040±25				2630–2470
OxA-12557		Red deer antler pick	Cutting IX, low in primary chalk rubble fill in east terminal flanking southern entrance (Gray 1935, pl. XLIII, fig 3, pl. XLIV; Pollard and Cleal 2004)	4038±34	-22.2			2840–2470
HAR-10326		Antler pick	In bank, above possible revetment trench (Pitts and Whittle 1992, fig 3)	4160±90	-24.5			2920–2470
HAR-10062		Charcoal, unidentified, bulk	Bottom of Stone hole 41 of main stone circle in north-west quadrant (Pitts and Whittle 1992, fig 3)	4130±90	-27.5			2900–2470

OxA-10109		Human bone, skull fragment	Basal packing of Stone hole 41, probably with small bone or antler tub, and two Beaker sherds (Smith 1965b, 204; Pollard and Cleal 2004)	3525±50	-21.3			2020–1690
HAR-10327		Pig bone	Bottom of Stone hole 44 of main stone circle in north-west quadrant (Pitts and Whittle 1992, fig 3)	3870±90	-21.5			2580–2040
HAR-10064		Charcoal, unidentified	Deposit of burnt material beneath burial in secondary fill of henge ditch (c.2 m below modern surface of ditch, Cutting IX, E terminal of S entrance (Pitts and Whittle 1992, Table 1)	3690±80				2350–1820
BUTLER'S FIELD (Evans <i>et al.</i> 1993, 147, figs 5 and 6)								
OxA-1221		Human bone, femur, disarticulated	Transect I, low if Layer 6, the 'West Overton Formation', a weakly humic calcareous loam formed by alluviation	3800±160				2850–1770
KENNET VALLEY AT WEST OVERTON (Evans <i>et al.</i> 1993, 163, figs 20–4)								
OxA-1222		Aurochs radius	Cutting DN, Layer 7 ('Avebury Soil'), with pottery including Beaker	4040±60				2870–2450
SILBURY HILL (Marshall <i>et al.</i> 2013, tables 4.1 and 4.2)								
Old land surface								
OxA-13333	5	Pig bone, proximal radius	Bone 559, Find 241 from the OLS at Ring 4 of western lateral tunnel, in area of primary mound	3916±28	-20.8			
GrA-27332	5	Pig bone, proximal radius	Replicate of OxA-13333	4015±45	-21.4			
Weighted mean of OxA-13333 and GrA-27332 (T'=3.5; T'(5%)=3.8; v=1)				3944±24				2570–2340
OxA-02080		Hazelnut fragments (same hazelnut)	(4041) <9821>, sub-sample of <9435>, concentration of charcoal comprising charred hazel nutshell fragments and other charred remains as well as two pig or wild boar teeth. Recorded within small defined area of upper part of OLS on north side of the East Lateral in Bay 7, possible hearth	4012±29	-24.6			2620–2460
SUERC-24089		Maloideae branchwood (single entity)	Same context as OxA-02080	4030±35	-27.0			2840–2460
Primary mound (either Lower or Upper Organic Mound)								
I-4136		Small twigs, ?hazel from bark, plant	Surface of turves in core of primary mound	4095±95				2910–2360

		stems and roots, all unburnt					
SI-910AH		Plant material	Turf of primary mound (NaOH soluble portion of SI-910A)	5995±185			5320–4450
SI-910A		Plant material, 2 mm size	Turf of primary mound	4675±110			
SI-910B		Plant material, 1–2 mm size	Turf of primary mound	4315±110			
SI-910C		Plant material, 0.5–1 mm size	Turf of primary mound	4570±120			
SI-910CH		Plant material	Turf of primary mound (NaOH soluble portion of SI-910C)	4465±130			
SI-910D		Plant material, under 0.5 mm size	Turf of primary mound	4530±110			
Weighted mean of SI-910 (excluding SI-910AH) ($T'=11.1$; $T'(5\%)=9.5$; $v=4$)				4515±52			3370–3020
OxA-11663	6A (SILB3)	Plant material	Dried mosses from surface of a turf (acid wash only)	3295±60	-28.1		1740–1440
OxA-11647	6B (SILB5)	Plant material	Dried mosses from surface of a turf (acid wash only)	3746±40	-30.4		2290–2030
OxA-14640	6 (TSI)	Plant material	Dried mosses from surface of a turf (NaOH-soluble fraction)	3735±50	-28.9		
GrA-28555	6 (TSIa)	Plant material	Replicate of OxA-14640 (NaOH-soluble fraction)	3710±80	-29.9		
OxA-14642	7 (TS2b)	Plant material	Dried mosses from surface of a turf (NaOH-soluble fraction)	3612±31	-28.8		
GrA-28467	7 (TS2a)	Plant material	Replicate of OxA-14642 (NaOH-soluble fraction)	3585±40	-29.9		
Weighted mean of OxA-14640, GrA-28555, OxA-14642 and GrA-28467 ($T'=6.9$, $T'(5\%) = 7.8$; $v=3$)				3634±21			2130–1930
OxA-14641	6 (TSIb)	Plant material	Dried mosses from surface of a turf, NaOH and HCl-insoluble fraction	3898±31			
GrA-28465	6 (TSIa)	Plant material	Replicate of OxA-14641	3770±40			
OxA-14643	7 (TSIb)	Plant material	Dried mosses from surface of a turf, NaOH and HCl-insoluble fraction	3848±31			
GrA-28466	7 (TSIa)	Plant material	Replicate of OxA-14643	3840±40			
Weighted mean of OxA-14641, GrA-28465, OxA-14643 and GrA-28466 ($T'=6.4$; $T'(5\%)=7.8$; $v=3$)				3848±17			2460–2200
Lower Organic Mound							

OxA-X-2353-53		<i>Ranunculus acris/bublosus</i> (1) and <i>Stellaria gramineae</i> (3)	(3046b) <9824>, one of organic layers that formed part of coherent mound enlarging the height of earlier Gravel Mound to at least 1.1 m	3950±100	-26.9			2860–2140
OxA-22082		<i>Monocotyledonous</i> stem (4 frags)	(4156a) <9200>, one of organic layers of mound	3902±33	-27.3			2480–2230
SUERC-24090		<i>Ranunculus acris</i> (3), <i>Ranunculus bulbosus</i> (1) <i>Ranunculus acris/repens/bulbosus</i> (1)	Same context as OxA-22082	3935±30	-25.9			2570–2300
SUERC-24088		Yew berry	(4181) <9808>, sub sample of <9425>, from mini-mound part of Lower Organic Mound	3925±35	-21.7			2560–2290
SUERC-27239		<i>Crataegus</i> sp. twig (4 years old)	(4181) <9827>, from mini-mound part of Lower Organic Mound	3885±30	-28.1			2470–2230
Pit cutting Lower Organic Mound								
OxA-20807		Large animal bone, described as 'fresh'	SF 8038, from (3066), secondary fill of pit (3067), cut through top of Lower Organic Mound. Recorded in Western Section of the Main Tunnel in Bays 75 and 76, 1 m in diameter, 0.6 m deep	3946±28	-22.8			2570–2340
SUERC-24828		<i>Ranunculus acris</i> (2), <i>Ranunculus bulbosus</i> (2.5)	Same context as OxA-20807	3960±45				2580–2300
Upper Organic Mound								
OxA-X-2352-55		<i>Monocotyledonous</i> stem (4 frags)	(3061a) <9375>, one of a series of contexts on the western side of the main tunnel that formed part of the Upper Organic Mound. Basket-loads of material represented	3878±45	-28.6			2470–2200
SUERC-24829		<i>Ranunculus acris/bulbosus</i> (3)	Same context as OxA-X-2352-55	3950±50				2580–2290
OxA-22083		<i>Ranunculus acris/repens/bulbosus</i> (1), <i>Ranunculus bulbosus</i> (1)	(3078b) <9335>, one of a series of contexts on the western side of the tunnel that formed part of the Upper Organic Mound	3848±39	-29.4			2460–2200

SUERC-27238		Twig, unidentified	Same context as OxA-22083	3875±30	-27.9			2470–2200
Chalk mound								
OxA-13210	1	Antler tine, probably red deer	Not precisely located, from early part of tunnel excavation in April 1968, 'east side of chalk block wall' (Rings 11–13/14, above 14-18 m into the mound)	3401±36				
OxA-27336	1	Antler	Replicate of OxA-13210	3390±40				
Weighted mean of OxA-13210 and OxA-27336 ($T'=0.0$; $T'(5\%)=3.8$; $v=1$)				3396±27				1870–1610
OxA-11970	2	Antler, red deer	Clean chalk material above floor of tunnel at Ring 12 on west side of tunnel in outer part of mound (Whittle 1997, figs 10–11)	3634±30	-23.3			
GrA-27335	2	Antler	Replicate of OxA-11970	3630±45	-23.7			
Weighted mean of OxA-11970 and GrA-27335 ($T'=0.0$; $T'(5\%)=3.8$; $v=1$)				3633±25				2130–1900
GrA-27331	661-200100864	Antler	Context 30, large chalk blocks approx. 2 m below summit in shaft	3655±45	-23.2			2200–1900
Tunnel collapse material								
OxA-17470		Antler, red deer	SF 28048, context 3843, collapsed material over Bay S:41, derived from Bank (4073) (NB – error in published SF number as same as OxA-17474)	3902±29	-21.9			2470–2290
OxA-17471		Antler, red deer	SF 28076, context 3844, collapsed material over Bay S: 50	3902±29	-21.9			2470–2290
OxA-17472		Antler, red deer	SF 28019, context 3829, collapsed material over Bays S:34, 35 and 36, derived from Bank (4073)	3896±28	-23.0			2470–2290
OxA-17473		Antler, red deer	SF 28022, context 3817, collapse of cobbly chalk deposit over Bay S:32	3907±28	-21.2			2470–2290
OxA-17474		Antler, red deer	SF 28048, context 3845, collapsed deposit above Bay S:58 (NB – error in published SF number as same as OxA-17470)	3907±27	-21.0			2470–2290
Summit and side								
OxA-13328	661-851	Antler, red deer	Context 7, the outer face of very substantial chalk wall, approx. 0.7 m below summit, Trench B	3856±39	-22.6			
OxA-14118	661-851	Antler, red deer	Replicate of OxA-13328	3878±31	-22.5			
Weighted mean of OxA-13328 and OxA-14118 ($T'=0.2$; $T'(5\%)=3.8$; $v=1$)				3870±25				2470–2210

OxA-20806		Antler pick	SF 8751 from (4904), the earliest deposit recorded on the side of the monument, a layer of loose chalk containing several antler fragments.	3892±27	-22.3			
SUERC-24086		Antler pick	Replicate of OxA-20806	3890±30	-23.0			
Weighted mean of OxA-20806 and SUERC-24086 ($T'=0.0$; $T'(5\%)=3.8$; $v=1$)				3891±21				2470–2290
OxA-20805		Antler	Context (4835), one of a series of layers laid on the northern side of Wall 3 (4808) on summit	3883±27	-22.1			2470–2230
SUERC-24081		Antler fragment	SF 8525 from (4845), one of a series of layers of chalk dumped to the north side of Wall 2 (4809) on summit	3855±30	-23.1			2460–2200
SUERC-24082		Antler tine	SF 8523 from (4814), lower of a series of five layers dumped to the north of Wall 1 (4812) on summit	3840±30	-23.4			2460–2200
SUERC-27241		Antler fragment	Context (4848) one of upper layers to north of Wall 2 (4809) on summit	3915±30	-23.2			2480–2290
OxA-22150		Antler, naturally shed burr	Context (4813), one of five layers of chalk dumped to north of Chalk Wall 1 (4812) on summit	3888±32	-21.6			2470–2230
Ditches								
BM-841		Antler	Near excavated base of the south ditch cutting 1969, which reach to within 1 m of base of ditch (Whittle 1997, fig 23)	3752±50				2350–1980
BM-842		Antler	Same context as BM-841	3849±43				2470–2200
SUERC-27240		Antler, small fragment of worn tine	SF 9036 from (3926), primary fill of Ditch 1	3965±30	-22.1			2580–2340
OxA-22151		Antler	Fill of fourth and final re-cutting of Ditch 4 (date not listed in table 4.2)					

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3 Dorchester, Dorset

Between the confluence of the rivers Frome and South Winterborne in Dorset, around the Roman and modern town of Dorchester, lies a cluster of Neolithic monuments that form the southernmost ceremonial complex selected for detailed analysis in this study (Figure A3-1). Both rivers drain to the east, meeting some 3 km away and forming a natural route way towards Poole Harbour. To the south is the South Dorset Ridgeway forming the southern extremity of the Wessex chalk and separating the area from the coast. The geology is largely chalk but the landscape to the north of the River Frome has contrasting clayey alluvial soils and brown earths (Smith *et al.* 1997, 277) and sections of the Ridgeway, specifically Black Down and Bronkham Hills, are capped by a variety of smooth cobbles. To the east are more unusual geological features due to overlying tertiary Bagshot beds. In this direction is the Valley of Stones, strewn with sarsen stones, which were used to build monuments beyond the main complex, including Kingston Russell stone circle and two chambered long barrows, the Hell Stone and the Grey Mare and her Colts.

3.1 Landscape history

The route of the South Winterborne was stable throughout prehistory, whereas the Frome had a shifting course, creating a floodplain, valuable for pasture but also supplying resources such as supplying reeds and willow (Evans and Rouse 1991a, 16–7). In contrast, areas of higher ground such as the ridge on which Maiden Castle causewayed enclosure was built, were covered in primary woodland, which was at least partly cleared for its construction (Evans and Rouse 1991b, 123–4). In the early Neolithic period, the floodplain valley area was probably used for cereal cultivation, attested by a pit with grains at Poundbury Farm (Section A3.3). Molluscan evidence shows that by the time that early Neolithic pits were dug at Flagstones, the area had seen clearance and secondary woodland regeneration, or had open canopy woodland (Healy 1997, 44; Allen and Gardiner 2009, 58). Slightly later, this area was being used for intensive grazing, with Alington Avenue and Flagstones constructed in the middle Neolithic within long-established open grassland (Woodward 1991, 129; Smith *et al.* 1997, 184; Allen 2002, 185). Soon after the construction of the bank barrow at Maiden Castle, woodland began to regenerate in this upland area which was not cleared until the early Bronze Age (Evans and Rouse 1991b, 124). The land nearer the river seems to have remained open, with Mount Pleasant henge also built on established grassland (Wainwright 1979, 7), although the palisaded enclosure at Greyhound Yard was constructed in a slightly scrubrier environment, cleared for its construction and with open pasture conditions prevailing afterwards (Woodward *et al.* 1993, 344). This suggests that that grazing areas in the lower lying areas changed over time, with some patches of scrub regenerating in the late Neolithic period.

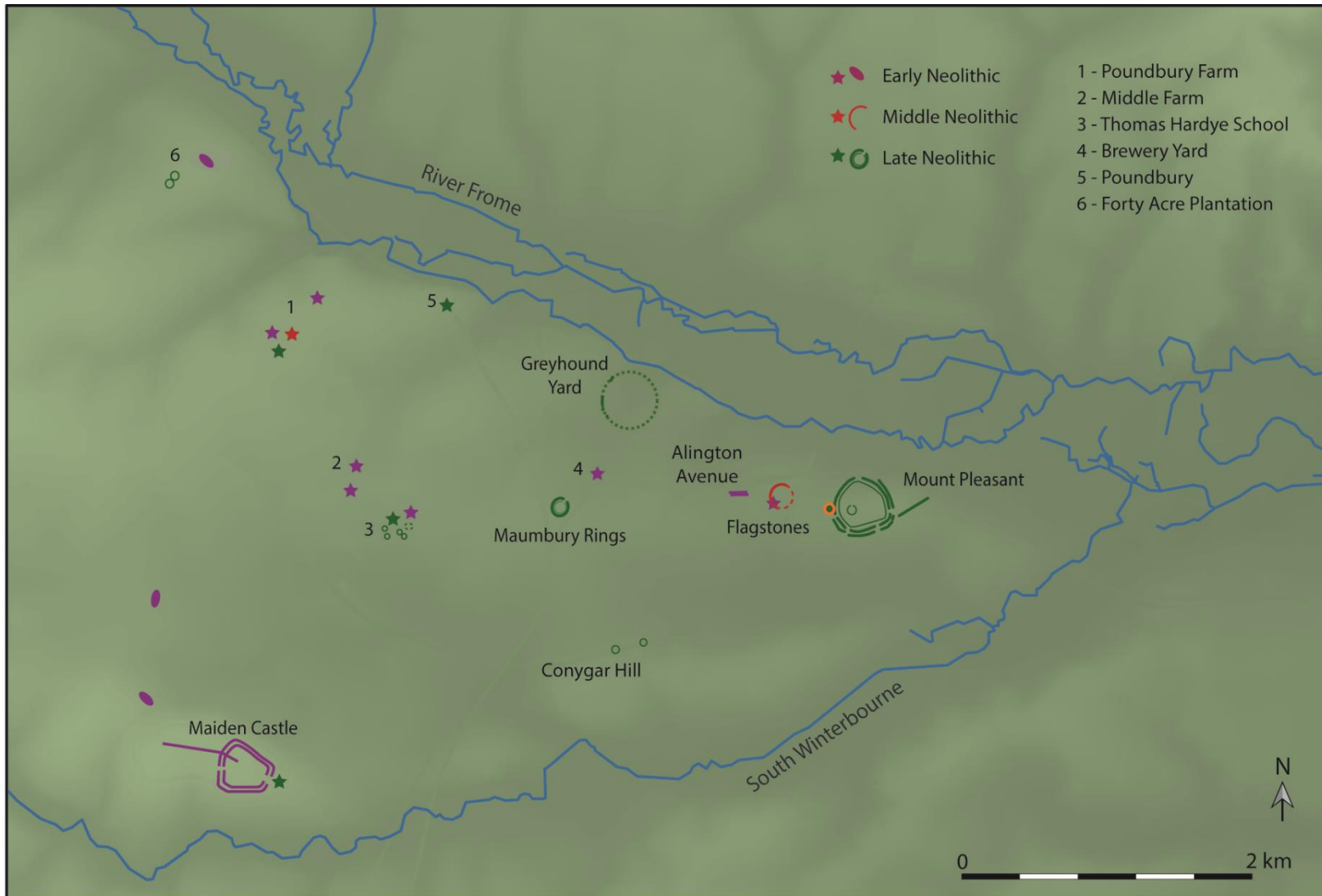


Figure A3-1 Overall map of the Dorchester complex. Stars denote occupation evidence (Lidar imagery from the Environment Agency via Digimap. Contains public sector information licensed under the Open Government Licence v3.0)

3.2 Mesolithic

Evidence for Mesolithic activity in the Dorchester area is limited, although slight evidence for occupation was found during excavations at Charles Street, Dorchester (Davies *et al.* 2002, 186). Some possible Mesolithic flints were found at Middle Farm (Butterworth and Gibson 2004, 15) and a small assemblage of bladelets, core-trimming flakes and a possible of burin of late Mesolithic date came from an evaluation trench at Poundbury Farm (Egging Dinwiddy and Bradley 2011, 9). The only occurrence of microliths is to the north of the Frome on the river gravel terrace (Woodward 1991, 35).

3.3 Early Neolithic

There is clear evidence that people occupied the Dorchester area in the early Neolithic period. At Poundbury Farm, a pit contained a substantial quantity of charred emmer wheat and naked barley grains, together with a few weeds harvested with these crops (Pelling 2011, 148; Figure A3-1: 1). Three radiocarbon dates (Table A3-1) suggest that these grains were harvested between 3770–3640 *cal BC* and 3680–3630 *cal BC* (Barclay 2011, 8), probably representing the earliest radiocarbon dated activity in the area, earlier than or contemporary with the first enclosure at Maiden Castle (Section A3.3.1 and Figure A3-18). This pit was one of 13 early Neolithic pits found at Poundbury Farm, the others containing carinated plain bowl pottery, worked flint, charcoal, hazelnut shells and animal bones, indicating domestic occupation (Egging Dinwiddy and Bradley 2011, 9–13). One of these pits contained a deliberate cache of 11 roughouts and one near complete flint axe. This deposit, along with other roughouts from pits nearby, suggests that it was an important site for axe production, made from locally available flint nodules (Harding 2010). These may have been finished and polished at Maiden Castle causewayed enclosure, where several broken or incomplete axes were found in pits at the eastern side of the enclosure (Edmonds and Bellamy 1991, 227).

Further Early Neolithic pits with carinated plain bowl pottery and early Neolithic flintwork have been found at Middle Farm (Butterworth and Gibson 2004, 15) and Thomas Hardy School (Gardiner *et al.* 2007, 26) (Figure A3-1: 2 and 3). Scatters of early Neolithic pottery have been uncovered at Mount Pleasant and Greyhound Yard (Wainwright 1979, 7; Woodward *et al.* 1993, 25). At Flagstones, two small pits containing charcoal, early Neolithic pottery and flints were associated with charcoal dating to 3960–3630 *cal BC* (Table A3-1: HAR-9161). A pit at Brewery Square (Figure A3-1:4; Smith 2018) has been dated by a charred hazelnut shell to slightly later, 3640–3380 *cal BC* (Table A3-1: UBA-36902). Dense flint scatters along the sides of the South Winterborne valley and around dry coombes leading to the Frome and at the eastern and western ends of the South Dorset Ridgeway suggest further areas of early Neolithic occupation (Sharples 1991, 253). Together this evidence suggests relatively intensive occupation and agriculture in the Dorchester area, both prior to and contemporary with the causewayed enclosure at Maiden Castle. Although most of the long barrows in the area are unexcavated, these are

also likely to date from the early Neolithic, together with associated short cursus and long enclosure monuments outside the core study area (Riley 2008).

3.3.1 Maiden Castle causewayed enclosure

The earliest monument known to be built in the Dorchester area was the causewayed enclosure at Maiden Castle (Figure 6-9). Excavations in the 1930s (Wheeler 1943) and in 1985–6 (Sharples 1991), as well as a reassessment of the radiocarbon dates from the site (Whittle *et al.* 2011, 164–92) provide a good chronology for its construction and occupation, although only limited parts of the monument have been excavated. About 8 ha of hilltop was surrounded by two segmented ditches, with a few potentially contemporary pits, sections of additional ditch and possible bank (Sharples 1991, 49–53). Although the entire circuit is not known, there is good reason to believe that the earliest Iron Age hillfort was laid out on the same circuit (Sharples 1991, 49). The two enclosure ditches lie 14–5 m apart, the inner ditch being somewhat wider than the outer (3–4 m wide, compared to 1.7–2.4 m wide). Both appear to have been constructed as segmented ditches, with breaks or causeways identified across the outer ditch in two places (Sharples 1991, 50).

The inner ditch contained charcoal and artefact-rich midden layers, with animal bones dominated by cattle (but also sheep and pig), as well as cereal grains, edible weeds, and hazelnuts, suggesting lengthy or intense periods of occupation (Sharples 1991, 253–5). The outer ditch was much cleaner and appeared to have been deliberately backfilled with chalk rubble. In part of the western circuit this took place after the deposition of a disarticulated adult burial and the skulls of two children, together with animal bones, flint tools and a stone axe (Sharples 1991, 52). The enclosure appears to have been the location of flint tool production, including polished axes, but also blades and tertiary flakes (Edmonds and Bellamy 1991, 227–9). Connections with the south-west are demonstrated by the presence of Gabbroic pottery and plain bowl pottery of south-western type (Cleal 1991, 184), as well as two or three stone axes of Cornish origin (Laws 1991, 230). The Neolithic pits excavated by Wheeler outside the eastern entrance to the hillfort (Wheeler 1943, plate CXIX; Figure 6-9) are of uncertain date but contained early and late Neolithic pottery.

As part of the current research, a re-assessment of radiocarbon dates from Maiden Castle was undertaken, with input from Professor Sharples. This has resulted in a refinement to the previously published date for the digging of the inner circuit of ditches. The inner circuit is now estimated to have been dug in 3695–3640 *cal BC* (95% probability; Greaney *et al.* 2020, fig. SI1.b: *dig Maiden inner*), probably 3670–3640 *cal BC* (68% probability). The date for the outer circuit of ditches remains relatively unchanged and is estimated to have been dug in 3585–3485 *cal BC* (95% probability; Greaney *et al.* 2020, fig SI1.b: *dig Maiden outer*,) probably 3560–3525 *cal BC* (68% probability). The two enclosures were therefore constructed 75–185 years (95% probability) apart. The clean fill of the outer ditch suggests that

it was dug towards the end of occupation of the enclosure and was soon filled as part of a decommissioning or closure event.

3.3.2 Alington Avenue

The Alington Avenue monument comprises two east–west broadly parallel ditches 14–16 m apart, found during excavations in 1984–7 on the valley floodplain (Figures A3-1 and 6-15). The ditches were dug as a series of overlapping pits, with a total length of 75 m (Davies *et al.* 2002, 13). These were interpreted as the remains of a long barrow, but there was no trace of an internal mound and the uniform ditch fills did not indicate the presence of one, nor were any contemporary features or funerary activities discovered. As noted by the excavators, although the length of the surviving monument falls within the size range of long barrows in south Dorset, the width is narrow and the lack of central mound may indicate closer parallels with bank barrows, or alternatively with short cursus monuments (Davies *et al.* 2002, 20). It is referred to here as a long enclosure. As part of this research project, two new radiocarbon dates have been obtained on a partially articulated cattle skull deliberately placed in the base of one of the ditches (Figure 6-16), providing an estimated date of 3630–3370 cal BC (Table A3-1: weighted mean, 2102). An existing radiocarbon determination of 3370–2900 cal BC (Table A3-1: HAR-8579; Davies *et al.* 2002, 17) would seem to be anomalously young. The Alington Avenue monument is therefore potentially contemporary with the construction of the outer ditch at the causewayed enclosure.

Alington Avenue has similarities to a range of early and middle Neolithic long enclosures and short cursus monuments but perhaps the closest parallel is the slightly smaller ‘avenue’ found at Raunds, Northamptonshire. This monument was 60 m long and had ditches 7–9 m apart, with one terminal ditch and central in-turned entrance (Harding and Healy 2008, 64–5). Unfortunately, this site is not well dated, although it was earlier than an early Bronze Age segmented ring ditch that was cut across the southern end, in a similar position to the ring ditch at Alington Avenue. Four dates from the ‘avenue’ ditch fills were obtained on material that could be residual (a charred hazelnut shell and charred tubers) and on oak charcoal from areas of burning in the top of the ditch fills (Harding and Healy 2008, table 3.1) but broadly indicate a comparable early or middle Neolithic date for its construction.

3.3.3 Maiden Castle bank barrow

After a gap of unknown duration, but certainly less than 160 years after the construction of the enclosure ditches (Whittle *et al.* 2011, 188), a 500 m long mound or bank barrow was constructed at Maiden Castle (Figures A3-2 and 6-9). It was built along a false crest of the hill summit, apparently designed to be most visible from the north, and had three separate sections (Sharples 1991, 54). The eastern end of the barrow was constructed over the inner ditch of the causewayed enclosure, soon after it had been filled. This eastern part of the long mound was built in 3550–3500 cal BC (40% probability; Whittle *et al.* 2011, 188) or 3480–3385 cal BC (55% probability). After this, woodland began to regenerate and it seems that construction activities on the hilltop ceased, with the focus of activity shifting north to the Dorchester

basin. The Maiden Castle bank barrow is one of several in the wider area. At the western end of the South Dorset Ridgeway is the bank barrow at Long Bredy on Martin's Down, which is associated with a cluster of early Neolithic monuments: two long barrows and a shorter, partial cursus. Analysis of aerial photographs during the South Dorset Ridgeway Mapping Project revealed a further short cursus or large 'mortuary enclosure' immediately to the east of the Long Bredy bank barrow, and another long barrow spanning the gap between Long Bredy bank barrow and the two bank barrows on Black Down (Royall 2011, 30–1). At the south-eastern end of the Ridgeway is the bank barrow at Broadmayne (Woodward 1991, 131; Figure 3-14). Together these form a significant cluster of early Neolithic monuments that appears to frame or bracket subsequent activity, as discussed in Case Study 2.



Figure A3-2 Reconstruction of Maiden Castle after the construction of the bank barrow in about 3500 bc © English Heritage, drawing by Peter Dunn

3.3.4 Summary

After the construction and use of the causewayed enclosure at Maiden Castle, Alington Avenue was the first monument built in the river valley, representing a shift in focus that would be maintained for a millennium. Statistical comparison of the dating available indicates that Alington Avenue was probably built earlier than the Maiden Castle bank barrow (75% probable). It is likely that the bank barrows and cursus monuments at Long Bredy and Broadmayne were built at a similar time. These linear monuments appear to be a decisive break with the activities at the earlier causewayed enclosure. In this respect, it is interesting that the Maiden Castle bank barrow appears to have been built to be visible from the valley and floodplain to the north.

3.4 Middle Neolithic

Middle Neolithic occupation evidence is scarce in the Dorchester area, although two pits of this date were found at Poundbury Farm containing Mortlake style pottery, charred hazelnut shells and a flint scraper (Egging Dinwiddy and Bradley 2011, 13). Residual sherds of Peterborough Ware were found at the later pit circles on Conygar Hill (Smith *et al.* 1997, 53), in the decay hollows of the Greyhound Yard post pits (Davies *et al.* 2002, 25) and in the tops of early Neolithic ditches and pits at Maiden Castle, where it may be associated with a redefinition of the enclosure (Sharples 1991, 57). These finds suggest some occupation of the area, but not as intense as in the preceding early Neolithic period.

3.4.1 Flagstones

To the east of the Alington avenue long enclosure is Flagstones, a 100 m diameter circular enclosure of unevenly spaced pits, with a 7 m wide entrance gap to the north-west and a 3 m wide gap to the north (Healy 1997, 33). Roughly half of the circuit was investigated during excavations in advance of the construction of Dorchester bypass in 1986–7 (Figure 6-17). The ditch spoil was presumably used to create a bank, although no evidence of one remained at the time of excavation (Healy 1997, 44). Finds from the ditch were few but included struck flints, a chalk ball, an adult femur, and animal bone including red deer antler, cattle and dog or wolf (Healy 1997, 38). Curvilinear engravings on the vertical chalk faces of the ditch segments were found in four instances, the motifs paralleled in Irish megalithic art (Woodward 1988; Figure A3-3). Three burials were placed on the base of the ditch: the cremated remains of an adult in segment 16 below a large sarsen slab (accompanied by a small bone bead); a 2–3-year-old child inhumation in segment 19 below a slab of sandstone; and a 6–12-month-old child, with additional femur of a 3–5-year-old, was found in segment 30 with a sarsen fragment 1 m away (Healy 1997, 37). A further burial of a 10–12-year-old child was placed into segment 14 after the accumulation of the primary silts.

Within the south-west of the enclosure, three pits within a penannular gully each contained the partial cremated remains of an adult. One of these cremations was accompanied by a flint implement (Figure A3-4). Another likely grave good is a small, fine, black ceramic dish decorated with motifs more usually seen early Grooved Ware pottery (Figure A3-5). It was found at 'Wareham House' in Dorchester (Piggott 1938, 75–6), which once stood on Alington Avenue road, a short distance to the north-west of Flagstones. A very similar object was found accompanying a cremation at Stonehenge, interpreted as being suspended for the burning of some material (Cleal *et al.* 1995, 360–1).



Figure A3-3 Two of the engravings found on the ditch walls at Flagstones enclosure (top – A, and bottom – D), which have parallels with decoration found on Grooved Ware pottery and late Neolithic carved chalk objects, as well as motifs found on megalithic art in Ireland
© Dorset County Museum, image numbers 199630321503 and 199630321809



Figure A3-4 Adult cremation found on the base of the ditch under a large sarsen slab, accompanied by the small bone bead (far right). The flint implement, probably an awl, was found with one of the cremations within the small penannular enclosure. Cremation photograph (c) Dorset County Museum, image number 199630321404; author's photographs

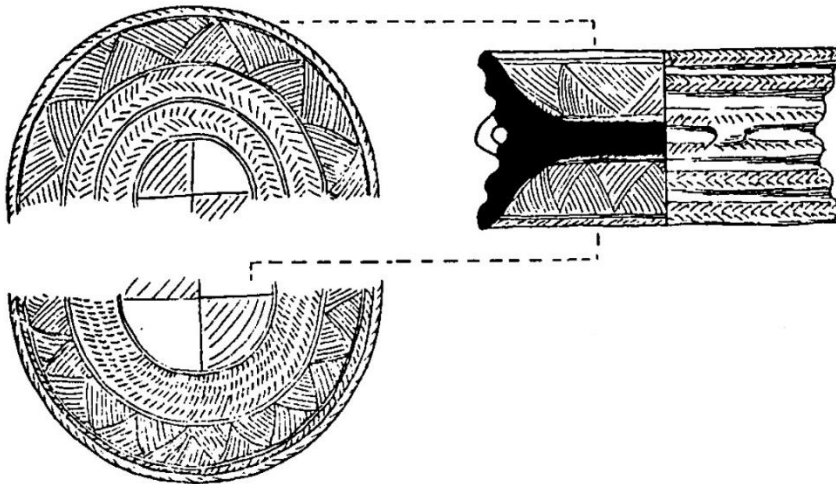


Figure A3-5 The ceramic object probably from Flagstones. The dish is 7.6 cm in diameter (Piggott 1938, fig 15)

Several fragments of sarsen, limestone and sandstone were found during the excavations, in addition to the large sarsens found covering the cremation in the ditch and the later central burial. To the south-east, a sarsen slab was found in 1891 during the construction of Thomas Hardy's house (known as Max Gate), overlying ashes and half-charred bones (Hardy 1890). This is likely to have covered a burial in another enclosure segment. This concentration of large stones is unusual for Dorchester and some stone fragments excavated from the ditch fills had fresh breaks and signs of burning. It has been suggested that Flagstones had a primary stone phase (Healy 1997, 46) but there is little direct evidence for this as no stoneholes were found, and the stones may simply have been used to cover cremations and inhumations within the enclosure ditch.

A series of 16 new radiocarbon dates were obtained on archive material from the Flagstones excavations, and were analysed together with four existing dates, within the framework of Bayesian chronological modelling, as part of this research project (Table A3-1; Figure A3-6; Greaney *et al.* forthcoming). The new dates were obtained on antler picks likely to have been used to dig the enclosure ditch, on the burials and

cremation placed into the ditch, and on the cremations from within the enclosure. The antler picks and ditch burials provide an estimate for the construction of Flagstones enclosure in 3265–3105 cal BC (95% probability, Figure A3-7: *build_flagstones*), probably in 3205–3120 cal BC (64% probability). This construction event took place 205–415 years (95% probability), probably 250–375 years (68% probability) after the outer ditch at Maiden Castle causewayed enclosure was dug.

The radiocarbon dates obtained on burials from the site (both from the enclosure ditch and the cremations within) suggest that Flagstones was used for burial from 3270–3120 cal BC (95% probability), probably 3195–3135 cal BC (68% probability), until 3175–3055 cal BC (95% probability), probably 3155–3110 cal BC (68% probability). This provides an estimate of the duration of funerary activity at the site of 1–105 years (98% probability), probably 1–45 years (68% probability). The period of funerary use of Flagstones appears to be short-lived and may only have been related to the initial construction of the monuments (discussed further in Case Study 10C).

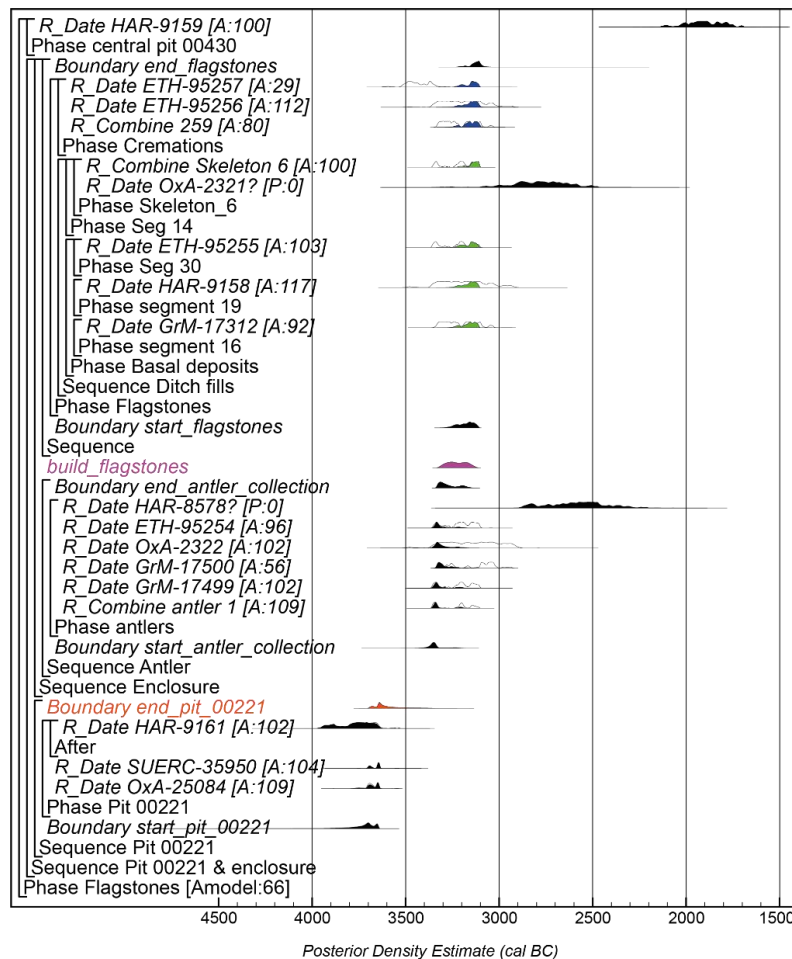


Figure A3-6 Probability distributions of dates from Flagstones. Each distribution represents the relative probability that an event occurred at a particular time. For each of the dates two distributions have been plotted, one in online which is the result produced by the independent calibration of the radiocarbon measurement and a solid one which is based on the chronological information provided by the model. With thanks to Dr Peter Marshall

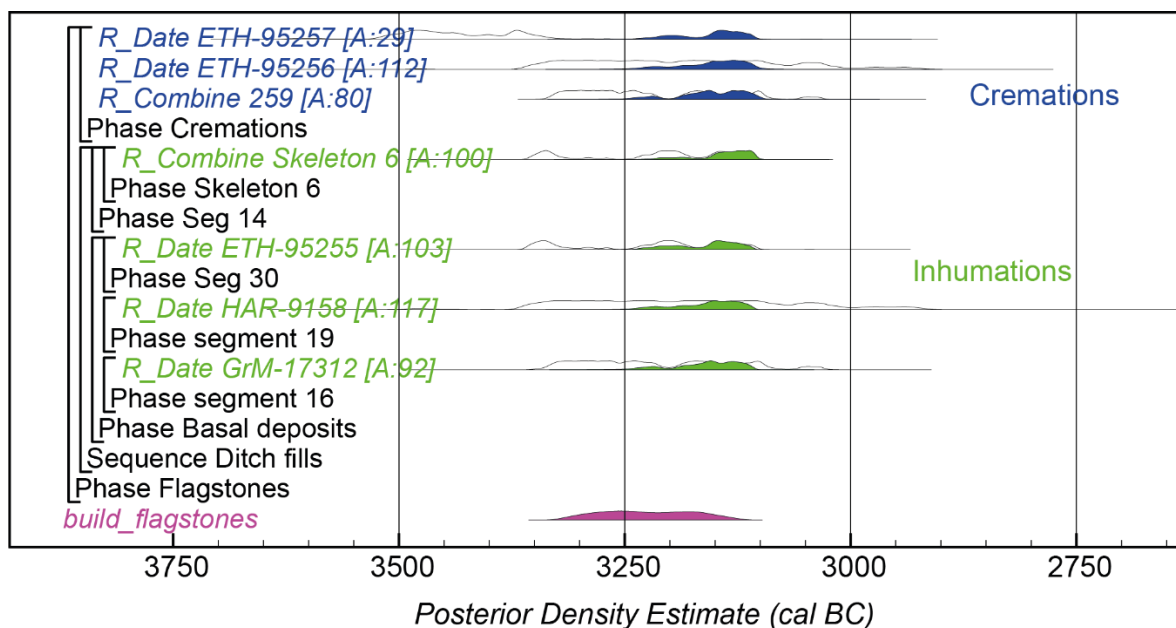


Figure A3-7 Probability distribution summarising the key date estimates for digging the Flagstones enclosure ditch, as well as the inhumation and cremation burials. The distributions are taken from the model in Figure A3-6. With thanks to Dr Peter Marshall

Flagstones is often compared to other 'proto-henges' (Cleal *et al.* 1995, 31) or 'formative henges' (Harding 2003, 130) of middle Neolithic date, particularly Stonehenge and Llandygai Henge A. As Burrow (2010, 184) highlights, these three sites were constructed at the end of the 4th millennium BC, have a markedly circular form of 80–107 m diameter, a bank set within the ditch or sometimes a bank on either side of the ditch, and typically narrow entrances. To this set of characteristics can be added funerary practices – the internment of cremations and, in some cases, inhumations. At Stonehenge in Wiltshire, a minimum number of 60 people were buried as cremations in the Aubrey Holes and in the ditch (Willis *et al.* 2016; Willis 2019), and probably many more; like Flagstones, only half of the circuit has been excavated. At Llandygai Henge A in Gwynedd, one cremation of an adult female was found in a pit within the henge, and 22 further cremation deposits were placed in a small, segmented circle outside the entrance (Lynch and Musson 2004). In comparison with these sites, the number of cremations known from Flagstones appears relatively low, although the child inhumations and disarticulated bones from the ditch increases the minimum number of individuals buried at the site to ten. The circular ditch surrounding the three cremation deposits within the Flagstones enclosure can be compared to other small ring ditches or penannular enclosures associated with middle Neolithic cremations found across Britain, some associated with larger circular monuments and others isolated (Greaney *et al.* forthcoming). It may be appropriate to term both the larger 'proto-henge' monuments and these smaller ditched enclosures as middle Neolithic 'mortuary circles'.

3.4.2 Summary

The construction of a circular monument at Flagstones was a radical change from the linear monuments of the previous few centuries and represented a shift in both style of monument construction and

funerary practices. The carvings on the chalk walls of the enclosure and the different treatment of adults and children after death suggests potential links to contemporary practices at passage tombs in Ireland. The ceramic object with its close affinities to Grooved Ware pottery links to another important cremation cemetery at Stonehenge, and to a wider network of Grooved Ware using communities across Britain and Ireland.

3.5 Late Neolithic

After a gap of construction activity of at least 600 years, the late Neolithic period saw the construction of several major monuments in the low-lying floodplain adjacent to the River Frome at Dorchester. There are sporadic signs of late Neolithic occupation beyond these monuments, identified by concentrations of chisel and oblique transverse arrowheads from surface collections located to the south and north-east of Maiden Castle, in the Mount Pleasant area and to the north of the River Frome (Woodward 1991, 35, fig 28). An isolated pit with Grooved Ware pottery, hazelnut shells and a small assemblage of worked flint was found at Poundbury Farm (Egging Dinwiddy and Bradley 2011, 13; Figure A3-1: 1) and a small cluster of similar pits, some containing Grooved Ware, were found just to the north near the Poundbury Iron Age enclosure (Sparey-Green 1987, 22; Figure A3-1: 5). Eight pits that contained placed deposits of Grooved Ware pottery, worked flint, worked chert and animal bones were found during excavations at Thomas Hardye School (Gardiner *et al.* 2007, 26, table 1; Figure A3-1: 3). These all suggest occupation to the west of the main monument complex. The enclosure at Maiden Castle appears to have retained some significance in this period, with some pits at the eastern end of the hilltop containing Grooved Ware (Sharpley 1991, 256), as well as a probable late Neolithic chalk figurine (Figure 6-9: Pit T1).

Small monuments, including two hengiform monuments built on Conygar Hill to the south of the main complex, were also built in this period. These segmented ditch monuments were associated with Grooved Ware, and one contained a post-setting 8 m in diameter (Smith *et al.* 1997, 52). A similar but smaller oval segmented enclosure of five elongated pits was found at Thomas Hardye School, just to the north of four penannular or hengiform ditched enclosures of probable late Neolithic date, ranging between 8 m and 16 m in diameter (Gardiner *et al.* 2007, 29–31). Two similar hengiforms of late Neolithic or early Bronze Age date have been identified at Forty Acre Plantation, to the east of Dorchester, overlooking the River Frome (Royall 2011, 34; Figure A3-1: 6). These smaller monuments appear to have been located at some remove from the larger, more imposing monuments on the floodplain.

3.5.1 Mount Pleasant and Conquer Barrow

Situated on a low-lying ridge, the Mount Pleasant henge enclosure is an irregular oval enclosing an area around 370 m east–west and 320 m north–south (Figures 6-12 and A3-8). For a long period, the site has been (and remains) under the plough, prompting excavations in 1970–1 to characterise the site and compare it to the similar henges at Durrington Walls and Marden (Wainwright and Longworth 1971;

Wainwright 1989). Mount Pleasant is a monument with multiple components: henge enclosure, concentric timber and stone structure, palisaded enclosure, and large round mound.

The henge enclosure is defined by a poorly preserved bank represented by a layer of chalk lumps 10 m wide, and corresponding irregular ditch (Wainwright 1979, 35, 38; plates XIXa and b; Linford *et al.* 2019). Excavations across the ditches at the western and northern entrance terminals led to the recovery of flint tools, chalk artefacts including scraped blocks and two phallic fragments, antler picks, animal remains and Grooved Ware pottery from the primary fills (Wainwright 1979, 40). Four entrances were initially identified, but a fifth to the south-west is now known, the causeway occupied by a series of large irregular pits (Barber 2014, 25; Linford *et al.* 2019, 11). These may indicate the presence of an earlier circuit or could represent a later blocking of this entrance. To the east of Mount Pleasant lies a sunken, straight 'approach' feature which may form an avenue or roadway leading towards a fording point of the river (Barber 2014, 35).

As part of this PhD project, new radiocarbon dates were obtained on archive material from Mount Pleasant. Modelling of these has provided a revised sequence for the henge enclosure and its various constituent parts (see Greaney *et al.* 2020 for full model and alternatives). The model provides an estimate for the digging of the henge ditch of 2610–2495 *cal BC* (95% probability; Greaney *et al.* 2020, fig 12: *build_henge*), probably 2580–2530 *cal BC* (62% probability), assuming a unitary construction.



Figure A3-8 Aerial view of Mount Pleasant henge from the south. FR 198-309, 5th August 1996 © Francesca Radcliffe, with permission of Dorset County Museum

Within the henge enclosure stood a concentric timber and stone monument, Site IV, consisting of five rings of postholes, a central square setting of stones and posts, and several outlying standing stones

(Figure 6-13). The five rings of postholes are laid out around four ‘corridors’ in quadrants, an arrangement that can be compared to the Sanctuary at Avebury (Pollard 1992) and the timber circles at Stanton Drew (Linford *et al.* 2017) This structure was surrounded by a circular ditch 43 m in diameter with a single causeway to the north and, from the evidence of chalk rubble filling within the ditch, probably an external bank (Wainwright 1979, 10). It has been suggested that the ditch was preceded by a series of pits or an earlier ditch although this is not certain (Barrett 1994, 101; Needham 2006, 18). The ditch surrounding Site IV is estimated to have been completed in 2555–2400 cal BC (95% probability; Greaney *et al.* 2020, fig 12: *dig_site_IV_ditch*), probably 2515–2440 cal BC (68% probability). The lack of any suitable dating material directly relating to the construction of Site IV timber structure means that this remains undated. Within the Site IV ditch fills at various places around the circuit were many large and fresh flakes of sarsen stone, as well as three hammerstones, associated with Beaker pottery, probably relating to the breaking and removal of stone settings in the interior (Pollard 1992, 22).

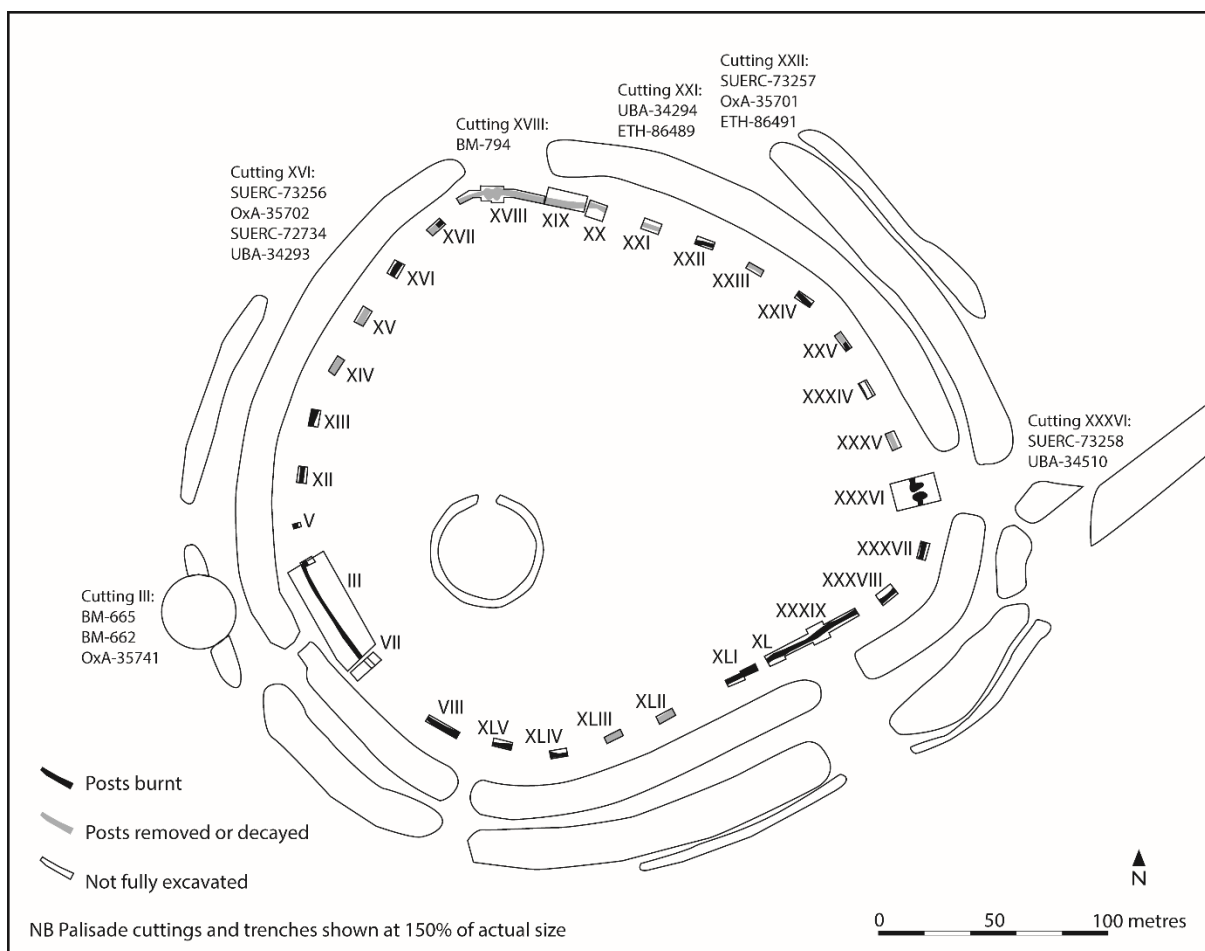


Figure A3-9 Plan of the palisaded enclosure at Mount Pleasant showing patterns of burning, removal or decay of posts, and the location of samples used for radiocarbon dating. Based on Wainwright (1979, fig. 99)

Situated roughly concentrically within the henge enclosure was a timber palisade consisting of an estimated 1600 posts set into a trench 1–2 m wide and between 2.5–3 m deep (Wainwright 1979, 45). In addition, within the north-west quadrant of the enclosure aerial photographs and geophysical survey

show the presence of a partial inner palisade (Barber 2014, 29; Linford *et al.* 2019, 12). The posts of the main palisade perhaps stood 6 m high, and were probably oak (Wainwright 1979, 50, 253). Two narrow entrances into this enclosure were discovered on the northern and eastern sides (others may exist); each was flanked by enormous posts 1.8 m in diameter. Some sections of the palisade had been destroyed by fire, in other places the posts decayed *in situ* and elsewhere they were deliberately removed (Figure A3-9). Finds from this palisade trench included carved chalk objects and Grooved Ware pottery (Wainwright 1979, 79–82, 167). The palisade is estimated to have been built in 2560–2440 cal BC (95% probability; Greaney *et al.* 2020, fig 12: *build_palisade*), probably 2530–2465 cal BC (68% probability), assuming a unitary construction.

Close to the western entrance of the henge enclosure is a large round mound known as the Conquer Barrow, standing 7 m high and 30 m in diameter. Several investigators have noted that the mound appears to lie on top of the henge bank (Crawford in Piggott & Piggott 1939, 158; RCHME 1970, 591; OS card record, Historic England Archive). Excavations have revealed that the mound was once surrounded by a ditch which stopped short of the henge enclosure ditch to the south. Following the evidence of the earthworks, our preferred interpretation is that the Conquer Barrow was built on top of the henge bank, the single dated antler from its ditch, BM-795, providing an estimate for its building of 2580–2460 cal BC (95% probability; Greaney *et al.* 2020, fig 12), probably 2525–2475 cal BC (68% probability). This suggests that Conquer Barrow can be placed in a category of late Neolithic round mounds alongside Silbury Hill, Hatfield Barrow at Marden, Great Barrow at Knowlton (Barber *et al.* 2010) and Marlborough Mound (Leary *et al.* 2013).

All the major components of Mount Pleasant were built in the late Neolithic over a relatively short time span, probably lasting 35–125 years (Figure A3-10). Further discussion of this sequence can be found in Chapter 6, comparison with other similar sites in the published paper (Greaney *et al.* 2020) and the radiocarbon dates are listed in Table A3-1.

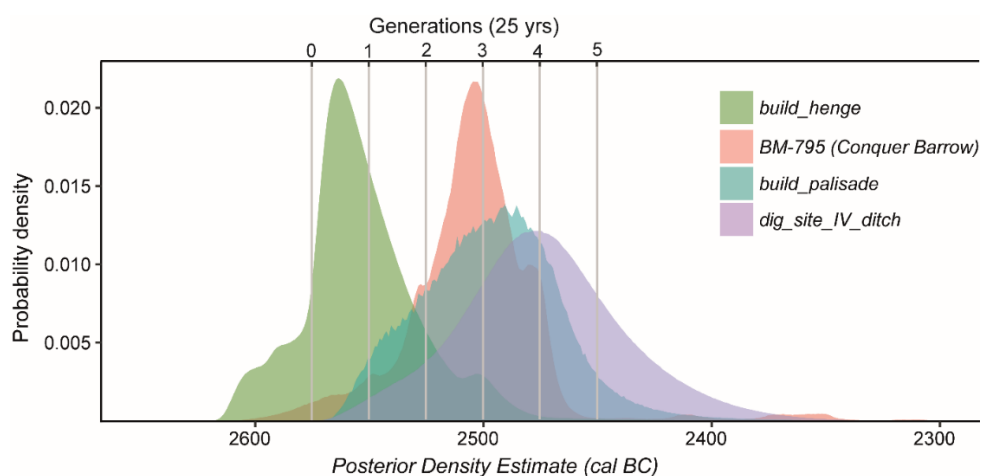


Figure A3-10 Probability distributions of the dates of major constructional events at Mount Pleasant henge. Note some of the tails of these distributions have been truncated to enable detailed examination of the highest area of probability. For full description of dates and modelling, see Greaney *et al.* 2020. With thanks to Dr Peter Marshall

3.5.2 Greyhound Yard palisade

During excavations in 1984 in the centre of Dorchester, 21 substantial post-pits in a 40 m arc were uncovered (Figures 6-3 and A3-11). The pits had been dug 2.8 m into the chalk, each with a ramp, and could have held posts standing an estimated 6–11 m above ground (Woodward *et al.* 1993, 30). A shallow gully was dug just outside the arc of posts, and the palisade appears to have been destroyed by fire. Finds from the post-holes included Grooved Ware and Peterborough Ware pottery, as well as large numbers of pig bones and a flint assemblage comparable to that from Mount Pleasant (Woodward *et al.* 1993, 315).

These pits appeared to be laid out as part of a huge circle, which if projected to its full extent, would form an enclosure around 290 m in diameter, surrounding a small coombe which runs north to the Frome. However, nine further post-pits uncovered to the north, to the east of Church Street (Batchelor n.d.), were on a different alignment, suggesting that the palisade was not a perfect circle and instead a more irregular sub-circular enclosure around 380m in diameter (Woodward *et al.* 1993, 30). This irregular shape was confirmed when a further eight post-pits were excavated between Charles Street and Acland Road in 1989 (Adam *et al.* 1992; Adam and Butterworth 1993; Figure 6-3).



Figure A3-11 Photograph of five post-pits prior to full excavation at Greyhound Yard, with the ramps clearly visible © Dorset County Museum, 198531322363

As part of this PhD research, 12 new radiocarbon dates were obtained on antler picks and charcoal from the burnt post-pipes of the Greyhound Yard enclosure. These were analysed alongside the seven existing radiocarbon dates in a Bayesian framework. The estimated diameter of the mature oak posts of 0.8–1.2 m (Woodward *et al.* 1993, 349) would suggest that the trees were between 100 and 180 years old when felled and therefore the charcoal could have a significant age-offset. For this reason, pieces of sapwood were selected from the substantial quantities of charcoal preserved in the archive for sampling, to

provide a date as close as possible to the actual construction of the monument (Figure 6-4). The dates show that Greyhound Yard palisaded enclosure was built in 2485–2420 cal BC (95% probability; Figure 6-5: *combine_build_dorchester*), probably 2470–2445 cal BC (68% probability). The combination of dates from antler and charcoal and the use of Bayesian statistics, means that this is the most precisely dated timber enclosure in prehistoric Britain. The full results will be published shortly, and the dates are listed in Table A3-1.

The Greyhound Yard monument has parallels with other Neolithic palisaded enclosures, including the one nearby at Mount Pleasant, albeit built using a different construction technique of individual post-holes, rather than the palisade trench at that site. It is probable that the one at Mount Pleasant was built first, but it is likely that the two timber monuments stood at the same time. The relationship between the pair, positioned along the same river, is paralleled by the enclosures of Forteviot and Leadketty located only 4 km apart on the River Earn (Brophy and Noble 2012; 2021). Each of these sites had contrasting patterns of deposition and different styles of timber construction, and the same may be true of the Dorchester pairing.

3.5.3 Maumbury Rings

The henge at Maumbury Rings survives as a substantial earthwork, largely due to its later use as a Roman amphitheatre (Figure A3-12). It has an internal diameter of 47 m and an external diameter of 101 m, with the banks standing up to 5.6 m high. It was excavated between 1908–13 by Harold St George Gray, who confirmed that northern entrance causeway was 15 m wide. He also found an unusual circuit of deep shafts, some 52 m in diameter and probably comprising 45 shafts in total, with depths ranging from 9 to 11.7 m (Bradley 1975; Figures A3-13 and 3-16). Although these shafts appear to have been cut down from the base of a pre-existing ditch, a date on an antler pick from within the make-up of the henge bank appears contemporary with the material deposited within the shafts. This material included Grooved Ware pottery, carved chalk objects, worked flint, fossils and antler fragments. Some objects were deliberately placed, such as a red deer skull with its antlers found close to chalk phallus. It seems that the shafts were deliberately backfilled with chalk rubble, perhaps after each episode of deposition (Bradley 1975, 33). A possible portal standing stone had been noted in the entrance prior to 1846 (Gray 1908) and the circuit was surrounded by an external bank.



Figure A3-12 Maumbury Rings, looking towards the southern breach in the henge bank. The appearance of the monument was altered by the construction of a Roman amphitheatre and Civil War fortification, but the scale of the henge is clear (author's photograph)

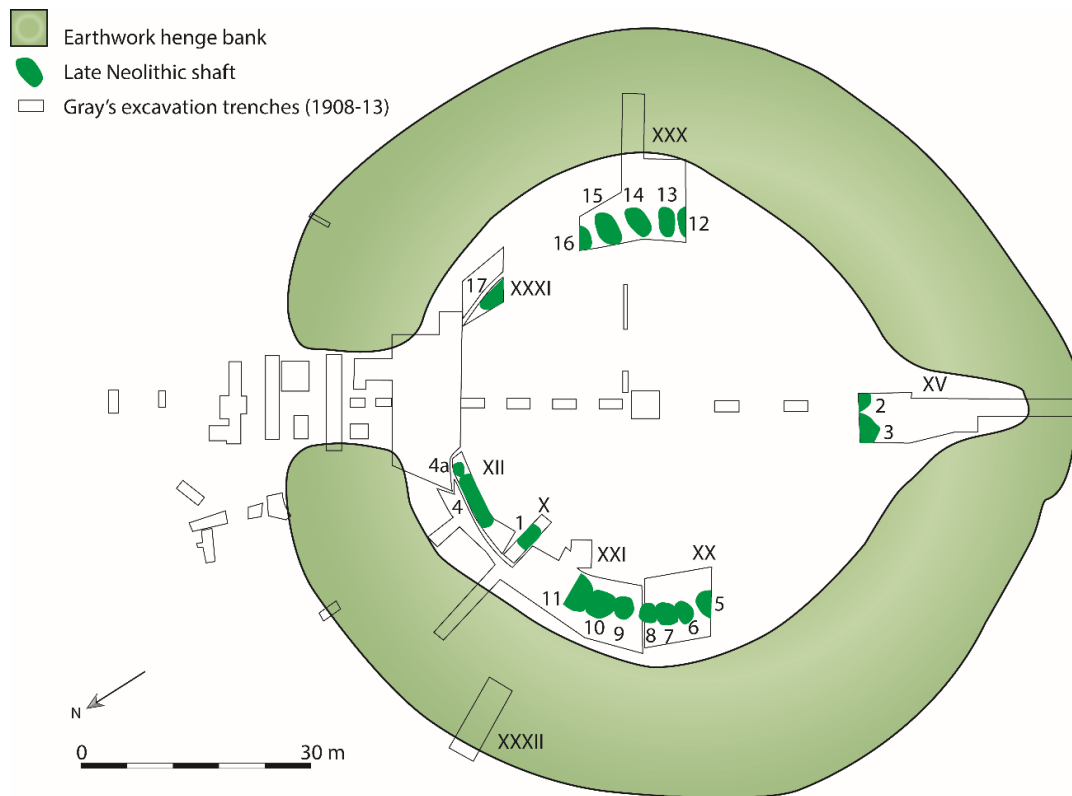


Figure A3-13 Plan of Maumbury Rings. Cutting numbers are given in Roman numerals (based on Gray 1914, Plate 1 and Bradley 1975, fig 3)

As part of this PhD research, eleven antlers from the deep shafts at Maumbury Rings were radiocarbon dated (Figure A3-14). Along with two existing radiocarbon dates (Bradley 1988, 160; Table A3-1), these were modelled to provide an estimate for the construction of the henge monument of *2460–2330 cal BC* (95% probability; Figure A3-15: *build_maumbury_rings*), probably *2455–2400 cal BC* (68% probability). The full dating model will be published in a forthcoming paper; please note that these are preliminary results.

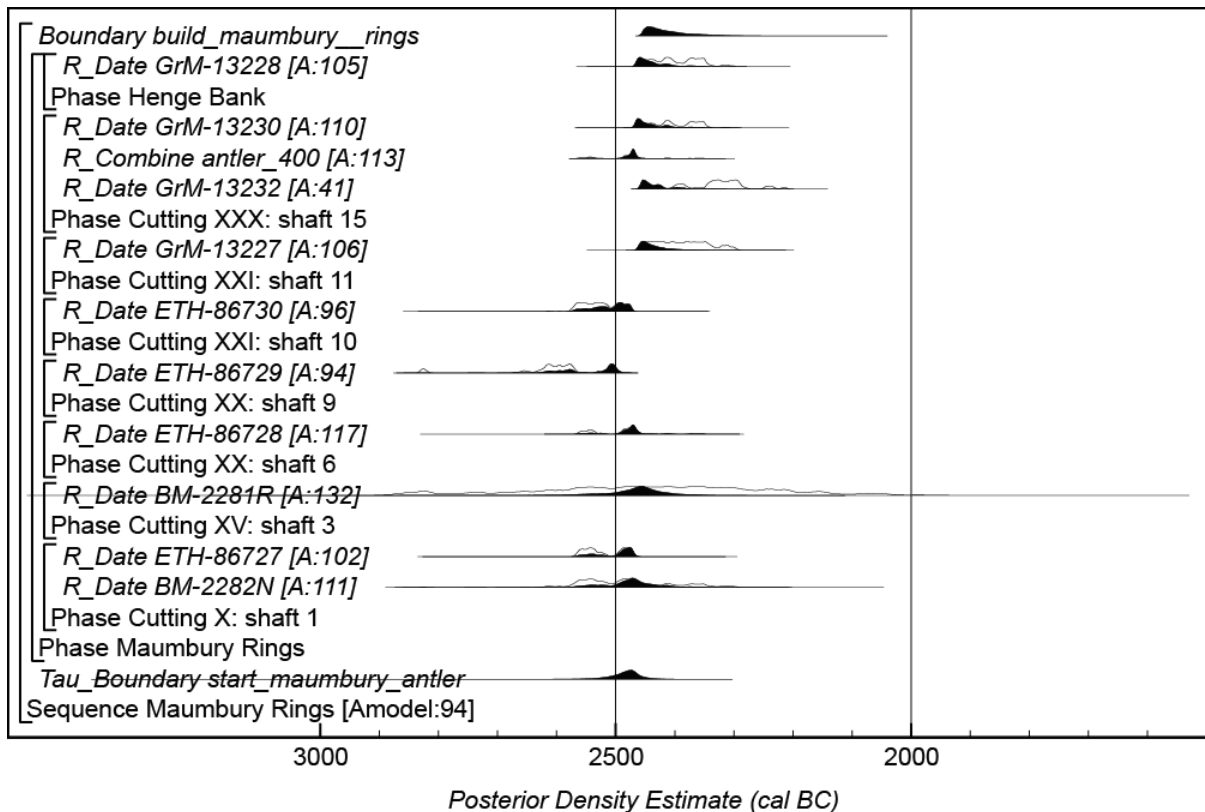


Figure A3-14 Probability distributions of dates from Maumbury Rings. Explanation is the same as for Figure A3-6

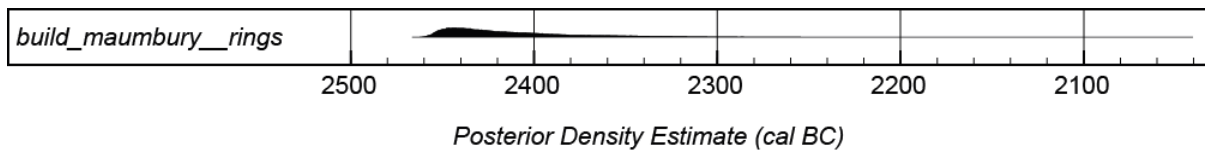


Figure A3-15 Probability distribution for the estimated date of construction of Maumbury Rings (the distribution is derived from the model shown in Figure A3-14). With thanks to Dr Peter Marshall

3.5.4 Summary

Mount Pleasant henge was built an estimated 560–775 years (98% probability), probably 605–725 years (68% probability), after the construction of Flagstones enclosure. Together with Alington Avenue, the middle Neolithic monuments of Flagstones and Alington Avenue share a principal alignment along the Alington ridge, with the long enclosure the first to mark this axis. However, by the time that Mount Pleasant henge was constructed, both Alington Avenue and Flagstones would have been weathered and eroded earthworks. The location of Greyhound Yard, built at the same time or shortly after the palisaded enclosure at Mount Pleasant, and the pit-henge monument of Maumbury Rings built shortly afterwards, are both to the west of this initial area of construction focus, but their locations continued to enclose the earlier monuments at Alington Avenue and Flagstones. Late Neolithic people frequenting the Dorchester area may have regarded the older monuments as vestiges of the distant past; whether they were regarded as the works of ancestors, whether direct, real, or supernatural, cannot be known. Any movement between the later monuments would have necessitated the circumnavigation of these older features. The lack of later Neolithic material from the ditches of Flagstones (Healy 1997, 38) suggests that

not only was the site left unmodified, but it may have been avoided entirely, perhaps deliberately forgotten or taboo. The ditches of the Alington Avenue long barrow did contain a small quantity of later Neolithic sherds, animal bones and flint (Davies *et al.* 2002, 17) suggesting that such avoidance did not extend equally to both monuments.

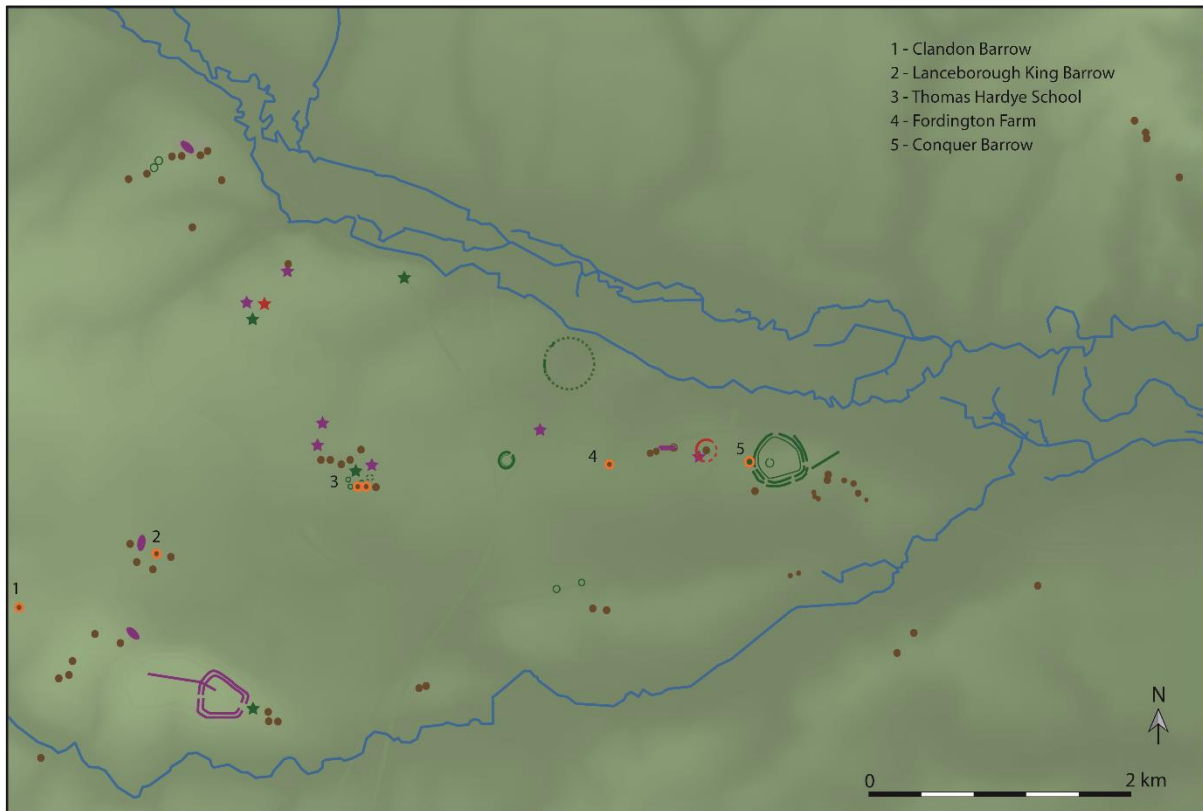


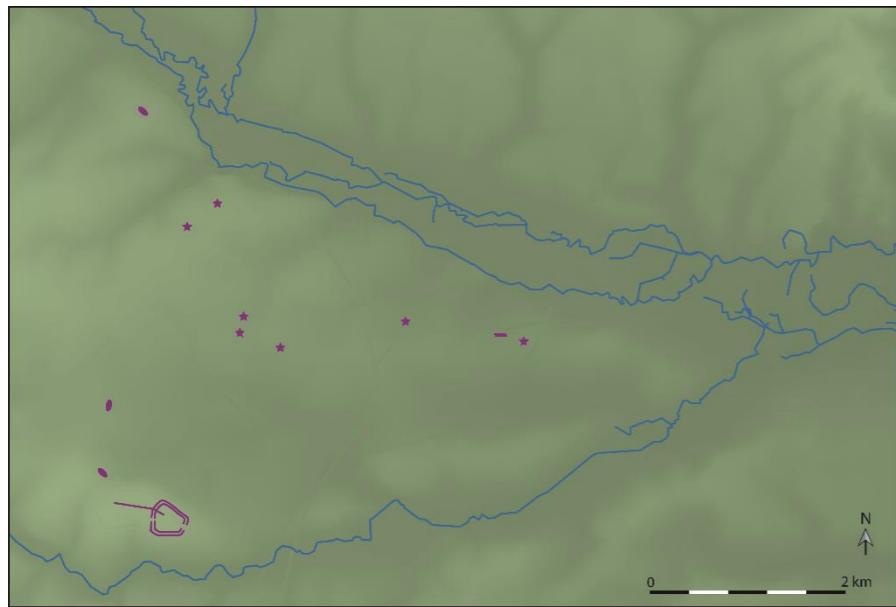
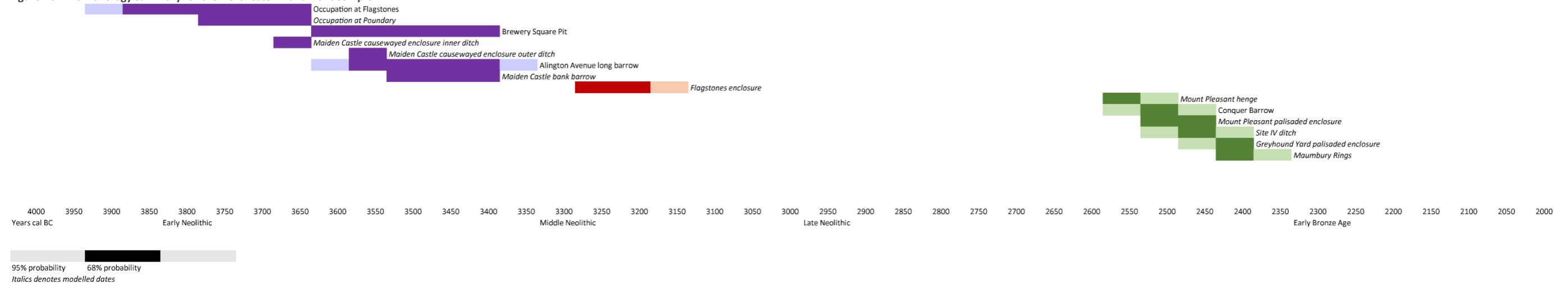
Figure A3-16 Map of Dorchester monument complex showing early Bronze Age round barrows, with those described as ‘aggrandised’ barrows with known or possible late Neolithic origins highlighted and numbered (Lidar imagery from the Environment Agency via Digimap. Contains public sector information licensed under the Open Government Licence v3.0)

After the construction of the last major late Neolithic monument at Maumbury Rings, several of the monuments in the Dorchester complex saw significant Chalcolithic and early Bronze Age activity, and many round barrows were constructed in the area (Figure A3-16). The broken sarsen layer associated with burning within the ditch of Site IV at Mount Pleasant was deposited in 2360–2200 *cal BC* (95% probability; Greaney *et al.* 2020, fig 9: *seg_XIII_layer_5*). The Beaker pottery from this layer is early and has direct parallels with mainland Europe, perhaps reflecting the location of Mount Pleasant on a river network that leads to Poole Harbour, a position within emerging cross-channel networks. The destruction of the sarsen stones at Site IV, a physical eradication of an important megalithic structure in the deepest and most sacred space of the monument, appears to be associated with the earliest activities of Beaker-using people in Wessex. Here we might be witnessing the impact of new religious and ideological concepts antithetical to those represented by earthwork, timber, and stone monuments. There are comparable earliest Bronze Age date estimates (Table A3-1) from two of the three Beaker-accompanied burials in flat graves at Thomas Hardye School, 2.8 km to the west (Gardiner *et al.* 2007, 38). Another

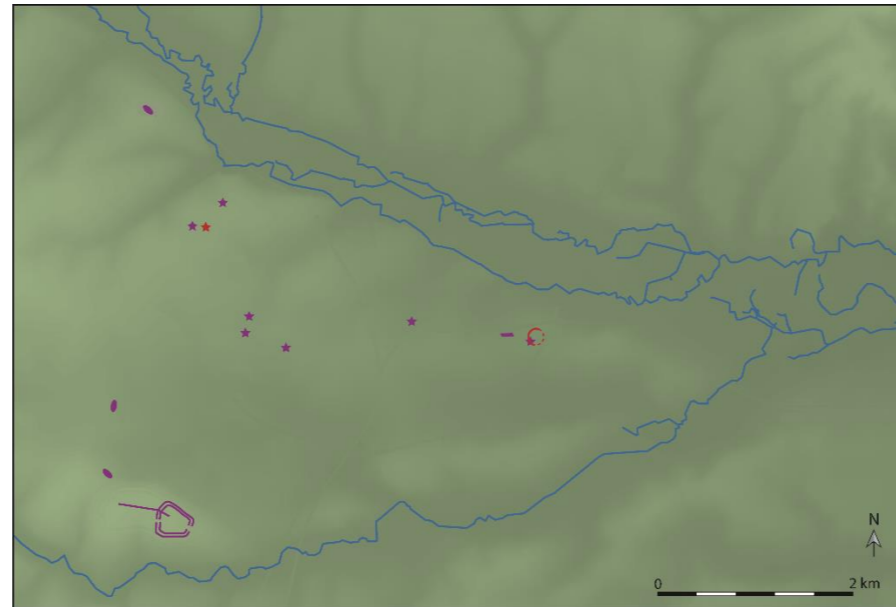
burial from this site, associated with Beaker pottery sherds, has bone stable isotope results which suggests long-distance movement, perhaps from the French chalk (Parker Pearson *et al.* 2019, 337–8) but unfortunately this skeleton has not been dated. Two groups of disarticulated burials under the large round barrow at Fordington Farm also have similar Chalcolithic or earliest Bronze Age dates (Bellamy 1991; Bayliss *et al.* 2013, 72–3; Table A3-1). This barrow is one of several ‘aggrandised’ early Bronze Age barrows in the Dorchester area that were built following a rough east-west alignment, including the Lanceborough King Barrow, those built at Thomas Hardy School associated with the Beaker flat graves described above, and Clandon Barrow, with its spectacular collection of early Bronze Age artefacts (Needham and Woodward 2008, 5; Figure A3-16). In addition, there is a dense concentration of at least 883 round barrows constructed along the South Dorset Ridgeway and scattered across the valley (Royall 2011, 35).

Slightly later, the middle Neolithic monuments of Flagstones and Alington Avenue were modified and re-used. At the centre of the Flagstones enclosure a young adult male was buried in a grave covered by a large sarsen stone under a mound of chalk quarried from a surrounding ditch. An early Bronze Age copper alloy rivet was found in the layer over the skeleton, and a radiocarbon date of 2140–1690 (95% probability; Table A3-1: HAR-9159, 3560±70; Healy 1997, 39) confirms its early Bronze Age date. At Alington Avenue, a sub-circular enclosure was constructed over the eastern end of the long enclosure, with cremation burials associated with a sherd of Collared Urn. Close to the western end, a larger pair of contiguous penannular ditches were dug, with three tightly crouched inhumation burials placed in the ditch after the formation of secondary fills. One of these burials has been radiocarbon dated to 2580–1910 cal BC (Davies *et al.* 2002, 30). Within the larger of these two ditches a 10.5 m diameter timber structure was built, formed by a series of stakeholes linked together in a shallow trench. Clearly the Dorchester complex retained its significance as a funerary and monumental complex well into the Bronze Age. This later use of much older monuments is discussed further in Case Study 10C.

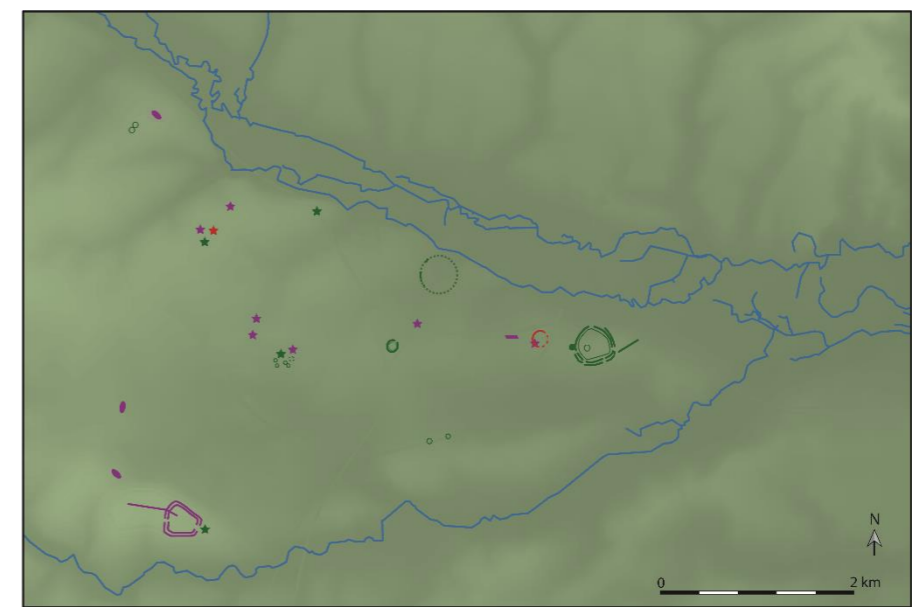
Figure A3-17 Chronology summary for the Dorchester monument complex



Early Neolithic



Middle Neolithic



Late Neolithic

Table A3-1 – All radiocarbon dates from Neolithic monuments and occupation in the Dorchester complex

Laboratory number	Sample reference	Material	Context	Radiocarbon age (BP)	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	C/N ratio	Calibrated date range (cal BC) (95% confidence)
BREWERY SQUARE PIT (Smith 2018, 6, table 3)								
UBA-36902	57158_[9]_(11) <1> I	Charred hazelnut shell	Pit 9, Context 11. Secondary fill, associated with Neolithic pottery	4721±67				3640–3380
POUNDBURY (Egging Dinwiddy and Bradley 2011, table 1.3)								
NZA-16020	2905	Single charred barley grain	Context 11	4902±40	-25.3			
UBA-16020	2905	Single charred emmer grain	Context 11	4869±26	-21.4			
UBA-16021	2905	Single charred barley grain	Context 11	4855±25	-22.3			
MAIDEN CASTLE CAUSEWAYED ENCLOSURE (Whittle <i>et al.</i> 2011, table 4.9)								
Inner ditch								
GrA-29112	401 299/A	Animal bone, cattle-sized rib fragment	Trench I, Context 299. From one of the fills of feature 2233, cut by inner ditch 2235, above 2183 (Sharples 1991, fig 49)	4785±40	-21.8			3650–3380
OxA-14834	401 299/B	Animal bone, sheep/goat mandible fragment	Same as GrA-29112	4734±35	-21.7			3640–3370
GrA-29744	401 141 A	Charcoal, single fragment Pomoideae	Trench I, Context 141 (subdivision of 140). Layer immediately above initial silt (Sharples 1991, fig 51)	4825±40	-24.5			3565–3535

OxA-15096	401 141 B	Charcoal, single frag <i>Corylus</i> sp.	Same as GrA-29744	4303±30	-24.5			3010–2880
GrA-29743	401 215 A	Charcoal, single fragment <i>Quercus</i> sp. roundwood	Trench I, Context 215 (subdivision of 140). Layer immediately above initial silt (Sharples 1991, fig 51)	4825±40	-26.3			3700–3520
OxA-15097	401 215 B	Charcoal, single fragment of <i>Quercus</i> sp. sapwood	Same as GrA-29743	4868±33	-26.0			3710–3540
OxA-1148	401 14577	Human bone, articular burial of 3–4-year-old child	Trench I, Context 215 (subdivision of 140). In top of rubble layer 140 immediately overlaying fine silts (Sharples 1991, fig 51)	4810±80				
OxA-14832	401 14577/A	Human bone, articular burial of 3–4-year-old child	Replicate of OxA-1148	4886±35	-20.2	10.9		
Weighted mean of OxA-1148 and OxA-14832 (T'=0.8; T'(5%)=3.8; v=1)				4874±32				3710–3630
BM-2449	401 14565	Charcoal, <i>Quercus</i> sp. mature	Trench I, Context 2169. Chalk rubble layer approx. 0.30 m above base of ditch, below 2164, in upper part of chalk rubble fills (Sharples 1991, fig 49)	5040±60	-25.4			3970–3670
BM-2450	401 14565	Charcoal, <i>Quercus</i> sp. mature	Same as BM-2449	5020±50	-23.5			
BM-2450A	401 14565	Charcoal, <i>Quercus</i> sp. mature	Replicate of BM-2450	5050±60	-23.5			
Weighted mean of BM-2450 and BM-2450A (T'=0.1; T'(5%)=3.8; v=1)				5032±38				3960–3700

OxA-14835	401 2180	Animal bone, sheep/goat vertebrae	Trench I, context 2180 (subdivision of 2206). Chalk rubble layer at equivalent level to 2169 (Sharples 1991, fig 49)	4796±36	-22.2			3650–3510
GrA-29109	401 2180	Internal residue from vessel 4040, Neolithic bowl (few sherds found together)	Same as OxA-14835	4920±45	-28.8			3790–3630
GrA-29109	401 136	Animal bone, cattle unfused distal metacarpal shaft end and fitting epiphyses	Trench I, Context 136 (subdivision of 130). Layer overlying 140 (Sharples 1991, 51)	4860±40	-22.4			3710–3530
BM-2448	401 14558	Animal bone, cattle tibia	Trench I, Context 298. Midden layer above 2206 and below 280	4710±70	-20.3			3650–3350
BM-2447	401 14555	Animal bone, articulated vertebrae of large ungulate	Trench 1, Context 283 (subdivision of layer 280). Midden layer above 281 and below 2157 (Sharples 1991, fig 49)	4800±45	-20.4			3660–3380
GrA-29209	401 284/A	Residue from pottery sherd (1 of 3 found together)	Trench I, Context 284 (subdivision of layer 280). Midden layer above 281 and below 2157 (Sharples 1991, fig 49)	4910±45	-29.1			
OxA-14733	401 284/B	Residue from pottery sherd (1 of 3 found together)	Same as GrA-29209	4980±32	-26.2			
Weighted mean of GrA-29209 and OxA-14733 (T'=1.65; T'(5%)=3.8; v=1)				4957±26				3800–3650

GrA-29210	401 2283	Residue from Neolithic Bowl pottery sherd	Same as GrA-29209	4975±40	-28.4			3940–3650
GrA-29211	401 2284	Residue from 1 of 5 conjoining sherds of Neolithic Bowl	Same as GrA-29209	4885±40	-28.3			3750–3630
GrA-29107	401 2205	Animal bone, cattle tibia	Trench I, Context 2205 (subdivision of 280). Midden layer above 281 and below 2157 (Sharples 1991, fig 49)	4755±40	-22.1			3640–3370
OxA-X-2135-46	401 2336	Residue from gabbroic vessel	Trench I, Context 291. Loam intercalated with midden layers, above 296 and below 293 (Cleal 1991, fig 141:4)	4880±65	-27.5			3790–3520
OxA-14833	401 291	Animal bone, pig lumbar vertebra with fitting unfused epiphysis	Same as OxA-X-2135-46	4804±37	-20.6			3660–3520
OxA-14792	401 109	Residue from Neolithic Bowl sherd	Trench I, Context 109 (subdivision of 98). Lower horizon of pre-long mound soil in ditch top (Sharples 1991, fig 51)	4922±39	-28.0			3790–3640
OxA-1147	401 14575	Animal bone, cattle femur	Same context as OxA-14792	4690±80				3650–3190
OxA-1337	401 14557	Animal bone, pig humerus	Trench II/A, Context 560. Primary silt, on ditch bottom (Sharples 1991, fig 59)	5030±80				3980–3640
OxA-1144	401 14563	Animal bone, vertebra from probable red deer	Trench II/A, Context 554. Rubble fill overlying primary silt 570 (Sharples 1991, fig 59)	4550±80				

GrA-29108	401 14563/A	Animal bone, vertebra from probable red deer	Replicate of OxA-1144	4915±40	-21.8			
Weighted mean of OxA-1144 and GrA-29108 (T'=16.2; T'(5%)=3.8; v=1)				4846±36				3780–3630
GrA-29207	401 553/A	Residue from Neolithic Bowl pottery, 1 of 2 sherds	Trench II/A, Context 553. Lowest charcoal-rich midden layer over 568 and under 550 (Sharples 1991, fig 59)	4935±45	-28.8			
OxA-14734	401 553/N	Residue from Neolithic Bowl pottery, 1 of 2 sherds	Replicate of GrA-29207	4830±33	-26.2			
Weighted mean of GrA-29207 and OxA-14734 (T'=3.6; T'(5%)=3.8; v=1)				4867±27				3710–3630
GrA-29111	401 567	Animal bone, cattle femur, and unfused epiphysis, probably fitting	Trench II/A, Context 567. Midden layer over 553 and under 550 (Sharples 1991, fig 59)	4815±40	-21.8			3660–3520
BM-2454	401 14562	Animal bone, cattle metatarsal and ilium and acetabulum	Same as GrA-29111	4830±60	-20.8			3660–3520
OxA-1143	401 14579	Animal bone, cattle radius	Trench II/A, Context 568. Clay silt between midden deposits 552 and 551 (Sharples 1991, fig 59)	4730±80				3660–3350
OxA-1142	401 14553	Animal bone, cattle metacarpal	Trench II/A, Context 541. One of topmost fills of ditch, above 557, below 529 (Sharples 1991, fig 59)	4750±80				3700–3360
OxA-1141	401 14582	Animal bone, cattle	Trench II/A, Context 530 (subdivision of 529). One of the topmost fills of the ditch,	4360±80				3340–2870

		metacarpal (?Aurochs)	above 537, below 523 (Sharples 1991, fig 59). LN/EBA sherds present (Cleal 1991, table 143)					
Outer ditch								
GrA-29113	401 2030	Animal bone, sheep horncore and skull	Trench II/A, Context 324. Basal fill of ditch (Sharples 1991, figs 50, 54)	4775±40	-21.6			3650–3380
BM-2452	401 2012	Animal bone, cattle tibia	Same as GrA-29113	4640±50	-21.5			3630–3340
BM-2451	401 2010	Human bone, disarticulated femur	Same as GrA-29113	4860±70	-20.4			3790–3510
OxA-14794	401 1580	Internal residue of small Neolithic Bowl body sherd	Same as GrA-29113	4806±36	-25.5			3660–3520
OxA-1338	401 2011	Human bone, disarticulated femur	Same as GrA-29113	4930±90				3960–3520
OxA-14837	401 2026	Human bone, mandible from 3–5-year-old	Same as GrA-29113	4794±38	-20.6	9.2		3650–3390
OxA-1339	401 13510	Animal bone, large ungulate rib	Trench V/F, Context 7014. Silt overlying ditch floor (Sharples 1991, fig 53)	4740±80				3660–3350
OxA-1340	401 13511	Animal bone, cattle mandible	Same as OxA-1339	4650±70				3640–3120

GrA-29120	401 7014 18/19	Animal bone, cattle mandible	Same as OxA-1339	4795±40	-22.0			3660–3380
GrA-29213	401 7850/A	Residue from large sherd of Neolithic Bowl pottery	Trench V/F, Context 7013. Large chalk blocks overlying 7014 (Sharples 1991, fig 53)	4605±40	-29.5			
OxA- 14793	401 7850/B	Residue from large sherd of Neolithic Bowl pottery	Replicate of GrA-29213	4870±50	-28.6			
Weighted mean of GrA-29213 and OxA-14793 (T'=17.2; T'(5%)=3.8; v=1)				4712±31				3630–3370
OxA- 14836	401 7012 2/30	Animal bone, cattle vertebrae, with cut- marks	Trench V/F, Context 7012. Apparent backfill of unweathered ditch, overlying 7013	4819±34	-22.0			3660–3520
GrA-29145	401 7012 1/30	Animal bone, cattle rib frags x2 with cut-marks	Same as OxA-14836	4905±45	-22.0			3780–3630
Inter-ditch bank								
OxA-1336	401 14508	Animal bone, cattle innominate	Trench II/A, Context 511 (subdivision of 509), from bank (Sharples 1991, 59–60)	4570±80				3630–3020
Bank barrow								
GrA-29146	401 1102	Red deer antler pick	Trench III, Context 810. Initial fill, on base of ditch (Sharples 1991, fig 57)	4710±45	-23.2			3640–3360
OxA- 14838	401 1133	Red deer antler pick	Trench III, Context 991. Lowest fill of Pit 2276, cut into primary fills of north long mound ditch, west of causewayed, cutting clay layer 2262 which overlay the ditch bottom (Sharples 1991, figs 56–7)	4674±35	-20.8			3630–3360

GrA-29147	401 1131	Red deer antler pick	Same as OxA-14838	4740±45	-22.7			3640–3370
OxA-1145	401 14591	Red deer antler pick	Same as OxA-14838	4660±80				3640–3120
OxA-1349	401 14507	Red deer antler pick	Trench III, Context 851. Fill of tentatively identified Pit 849, apparently cut into primary fill of ditch	4660±80				3640–3120
GrA-29336	ARC 1970 3054/B	Red deer antler pick	Wheeler's Site Q, trench p 49 extension. Layer 6, dark occupation deposit immediately over rapid silt (Wheeler 1943, 88)	4755±45	-21.2			3650–3370
OxA-14831	ARC 1970 3054/A	Red deer antler pick	Same as GrA-29336	4783±35	-20.8			3650–3380
OxA-1146	401 14571	Animal bone, red deer atlas	Trench I, Context 2209. Overlying primary silts (Sharples 1991, fig 46)	4650±80				3640–3100
BM-2456	401 14543	Animal bone, red deer tibia	Trench III, Context 2263. Central section of long mound, N side of N ditch, above 2267 (Sharples 1991, fig 57)	4720±100	-20.9			3700–3130
OxA-1576	401 14589	Animal bone, cattle lumbar vertebra	Trench III, Context 2268. Central section of long mound, layer immediately overlying primary fill of N ditch (Sharples 1991, fig 57)	4460±80				3370–2900
ALINGTON AVENUE (Davies <i>et al.</i> 2002, 17, 30–1, 53, table 1)								
HAR-8597		Animal bone, Bos (domestic) skull fragment (M Maltby)	Skull inverted in primary fill (2102) of ditch, towards eastern end of northern ditch [1999]. An atlas and another cervical vertebra were recovered from adjacent context (2103) which probably belonged to the same animal	4450±80	-23.6			3360–2920
ETH-95265	2102a	Replicate of HAR-8597	Same as HAR-8597	4736±33	-22.2±0.1	4.7±0.1	3.4	
GrM-17422	2102b	Replicate of HAR-8597	Same as HAR-8597	4730±25	-22.1±0.15	4.6±0.3	3.2	
Weighted mean of ETH-95265 and GrM-17422 (T'=0.0; T'(5%)=3.8, v=1)				4732±20				3630–3375

HAR-9662		Human bone, femur	Tightly crouched burial of adult male, burial 126 in Grave 127, in ditch of double ring-ditch 1600	3810±120				2580–1900
FLAGSTONES								
Pre-enclosure ditch								
HAR-9161		Charcoal, <i>Quercus</i> sp.	Basal fill (Context 259) of pre-enclosure Pit 00221. Associated with Neolithic bowl pottery. Sample W183.259.89 (Bayliss <i>et al.</i> 2012, 78; Healy 1997, 30)	4960±80	-26.0			3960–3630
Enclosure ditch								
ETH-95253	1a	Red deer antler pick	From enclosure ditch bottom. Left antler, incomplete, shed. Bow and trez tines removed in antiquity. SF829, Context 50160, unknown segment (Healy n.d.)	4551±22	-22.6±0.1	5.4±0.1	3.4	
GrM-17498	1b	Red deer antler pick	Replicate of ETH-95253	4525±25	-22.3±0.15	5.1±0.3	3.2	
Weighted mean of ETH-95253 and GrM-17498 (T'=0.6; δ13C: -22.5±0.1‰, T'=2.8; δ15N: 5.4±0.1‰, T'=0.9)				4530±25				3365–3100
GrM-17499	3	Red deer antler pick	From base of enclosure ditch. Incomplete. Chipped and worn tine tip. SF91, Context 244, unknown segment (Healy n.d.; Smith <i>et al.</i> 1997, 157)	4530±25	-22.7±0.15	5.1±0.3	3.2	3365–3100
GrM-17500	5	Red deer antler pick	From bottom of enclosure ditch. Bez and trez tines removed in antiquity, traces of burning on posterior edge of burr. SF54, Context 541, Segment 33/34 (Healy n.d.). From slain deer (Smith <i>et al.</i> 1997, 157)	4440±25	-22.0±0.15	6.7±0.3	3.2	3330–2930
ETH-95254	6	Red deer antler pick	From enclosure ditch bottom. Left antler, eroded, bez and trez tines removed in antiquity, bez tine chipped and worn at tip, traces of burning on underside of stump of brow tine. SF46, Context 255, unknown segment (Healy n.d.)	4516±22	-21.5±0.1	4.1±0.1	3.4	3360–3100

OxA-2322	4	Red deer antler pick	Primary fill of Segment 27 of enclosure ditch. Sample W183.581.92 (Hedges <i>et al.</i> 1991, 288). Lower half of shed antler with single brown tine, too eroded to show signs of use (Healy n.d.)	4450±90	-24.1			3370–2910
HAR-8578	2	Red deer antler pick	From base (sealed by immediate collapse of adjacent bank) of Segment 13 of enclosure ditch. Sample W183.382.44 (Bayliss <i>et al.</i> 2012, 77). Beam fragment with stump of one tine, with cutmarks (Healy n.d.)	4030±100	-23.6			2880–2290
OxA-2321	W183.364.7	Human bone	Right femur of 10–12-year-old child in base of Pit 00363, cut into the bottom c.700mm fill of enclosure ditch, Segment 14. Sample 6 (Hedges <i>et al.</i> 1991, 288; Healy 1997, 38)	4210±110	-23.0			
ETH-95258	Skeleton 6a.	Human bone	Replicate of OxA-2321	4571±23	-21.9±0.1	10.5±0.1	3.5	
GrM-17502	Skeleton 6b.	Human bone	Replicate of OxA-2321	4465±25	-21.7±0.15	10.3±0.3	3.2	
Weighted mean of OxA-2321, ETH-95258 and GrM-17502 (T'=17.3; T'(5%)=6.0, v=2; δ13C: -21.8±0.1‰, T'=1.2; δ15N: 10.4±0.1‰, T'=1.2)				4516±17				3305–3100
ETH-95255	SF78 (516)	Human bone.	Partial (>50%) skeleton of a 6-12-month-old infant. From against the junction of ditch base and side in Segment 30, west terminal (Healy 1997, 37)	4529±23	-21.4±0.1	10.7±0.1		3365–3100
GrM-17312	351 SF35	Cremated human bone, skull fragment.	Unsexed young adult (c.20–40 years old), heaped on base of ditch below sarsen slab. Associated with small bone bead. SF35, Segment 16 (Healy 1997, 37).	4480±25				3340–3030
HAR-9158	W183.417.31	Human bone.	Burial of a child 2-3 years old, beneath stone slab at base of Segment 19 of enclosure ditch (Bayliss <i>et al.</i> 2012, 77; Healy 1997, 37)	4490±70	-23.0			3370–2930
Cremations within small penannular enclosure								

ETH-95256	257	Cremated human bone, skull fragment	Unsex adult, found as discrete deposit in Pit 50256 (Healy 1997, 41)	4485±58	-20.5±1.0		3370–2930
GrM-17311	259	Cremated human bone, skull fragment	Probable adult male (over 40), found as discrete deposit in Pit 5025 (Healy 1997, 41). Associated with flint awl.	5320±25			4245–4050
GrM-19836	259.1	Cremated human bone	Replicate of GrM-17311	4385±70			
ETH-102658	259.2	Cremated human bone	Replicate of GrM-17311	4483±19			
Weighted mean of GrM-19836 and ETH-102658 (T'=1.8; T'(5%)=3.8, v=1)				4476±19			3340–3090
ETH-95257		Cremated human bone, skull fragment, probably adult male	Discrete deposit within Pit 50260 (Healy 1997, 41).	4529±23	-22.7±1.0		3365–3100
Central burial							
HAR-9159		Human bone	Burial beneath stone slab in central pit, Burial 80, Pit 430, Sample W183.430.80 (Bayliss <i>et al.</i> 2012, 77–8)	3560±70	-21.7		2140–1690
MOUNT PLEASANT							
Pre-henge activity (western side of enclosure)							
BM-644		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Cutting I. From Layer 9, from below surface of thin fossil soil (OLS) under henge. Associated with 29 sherds of plain Neolithic bowl pottery and two sherds of Grooved Ware (Wainwright 1979, 7, 77, fig 3 (plan) & fig 22 (section)).	4072±73			2875–2467
OxA-35703	XXXII.A.	Charcoal, <i>Rhamnus</i> sp., 9 growth	Cutting XXXII. From Layer 3, top of old land surface beneath henge bank. The bank was well preserved at this point and overlay a 2–	4421±29	-26.0±0.2		3330–2920

		rings, strong ring curvature (single fragment; Z Hazell)	5cm thick dark brown humic loam. This context contained 326 sherds of plain Neolithic pottery and two transverse arrowheads (Wainwright 1979, 7, 81, 141, fig 3 (plan) & fig 4 (section)).					
UBA-34511	XXXIII.A.	Charcoal, <i>Corylus</i> sp., 7 growth rings, weak/no curvature (single fragment; Z Hazell)	Cutting XXXIII. From Layer 3, top of old land surface beneath henge bank. The bank was well preserved at this point and overlay a 2–5cm thick dark brown humic loam (Wainwright 1979, 8, fig 3 (plan) & fig 4 (section)).	4137±36	-24.3±0.22			2880–2580
ETH-86490	XXXIII.C.	<i>Corylus avellana</i> shell fragment (Z Hazell)	Cutting XXXIII. From Layer 3, top of the old land surface beneath henge bank. The bank was well preserved at this point and overlay a 2–5cm thick dark brown humic loam (Wainwright 1979, 8, fig 3 (plan) & fig 4 (section)).	4070±25	-24.2			2850–2495
Henge ditch – western entrance								
BM-664		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Cutting II, north terminal pit. From the base of Layer 3, a thick deposit of pale-brown loam interpreted as aeolian material, associated with a single Beaker sherd and a flaked axe (Wainwright 1979, 38, 77, 156, fig 21 (plan) & fig 23 (section)).	3410±130				2120–1420
SUERC-73732	II: layer 8. AA.	Red deer antler, probable pick	Cutting II. From Layer 8, a fine dirty silt in the bottom of the ditch which lay under a coarse angular chalk rubble (Layer 7) i.e. very earliest silting (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (sections)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). This large antler	4108±32	-22.1±0.2	3.1±0.3	3.3	2870–2500

			pick has wear on the tine, making it likely to be functionally related to the digging of the ditch. It is labelled as being found c. 5cm from ditch bottom, but it is not certain whether it was obtained from the north or south terminal.					
OxA-35737	II: layer 8.A.	Red deer antler, probable pick	Cutting II. From Layer 8, a fine dirty silt in the bottom of the ditch which lay under a coarse angular chalk rubble i.e. very earliest silting (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (section)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). This large antler pick has a tine that shows considerable wear and polish from use, making it likely to be functionally related to the digging of the ditch. Not known whether north or south terminal. A different antler to SUERC-73732.	4055±31	-21.8±0.2	3.4±0.3	3.2	
UBA-34291	II: layer 8.B.	Red deer antler, probable pick	Replicate of OxA-35737	4056±35	-21.4±0.22	3.7±0.15	3.2	
SUERC-72733	II: layer 8.C.	Red deer antler, probable pick	Replicate of OxA-35737	4057±32	-21.4±0.2	3.9±0.3	3.3	
ETH-86493	II: layer 8.D.	Red deer antler, probable pick	Replicate of OxA-35737	4061±31	-21.4±0.08	3.9±0.08	3.3	
Weighted mean Cutting II: layer 8: OxA-35737+UBA-34291+ SUERC-72733+ ETH-86493 T'=0.0; T'(5%)=7.8, v=3; δ13C: -21.5±0.7‰, T'=3.6; T'(5%)=7.8, v=3; δ15N: 3.8±0.7‰, T'=3.6; T'(5%)=7.8, v=3				4057±17				2665–2490
BM-645		Red deer antler, pick (R A Harcourt)	Cutting II, south terminal. From Layer 8, fine dirty silt in the bottom of the ditch which lay under a coarse angular chalk rubble i.e. very earliest silting (Wainwright 1979, 38, fig 21	3734±41				2290–1980

			(plan), figs 23 & 24 (sections)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). Pick described as resting on the floor of the ditch (Wainwright 1979, 38; Burleigh <i>et al.</i> 1976, 23).					
BM-646		Red deer antler, pick (R A Harcourt)	Cutting II, north terminal. From Layer 8, fine dirty silt in the bottom of the ditch which underlay coarse angular chalk rubble i.e. very earliest silting (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (sections)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). Pick described as resting on the floor of the ditch (Wainwright 1979, 38; Burleigh <i>et al.</i> 1976, 23).	3728±59				2340–1940
OxA-35738	II (DTN): layer 8: floor of ditch terminal north.	Red deer antler, probable pick	Cutting II, north terminal. From Layer 8, fine dirty silt in the bottom of the ditch which lay under a coarse angular chalk rubble i.e. very earliest silting. (Wainwright 1979, 38, fig 21 (plan), figs 23 & 24 (sections)). Associated with 1 transverse arrowhead (Wainwright 1979, 156). Tine shows considerable wear and polish from use, making it likely to be functionally related to the digging of the ditch.	4016±30	-23.1±0.2	4.6±0.3	3.2	
ETH-86492	II (DTN): layer 8: floor of ditch terminal north.	Red deer antler, probable pick	Replicate of OxA-35738	4049±31	-22.9±0.09	4.9±0.02	3.3	
Weighted mean: Cutting II, (DTN): layer 8: ditch floor: OxA-35738+ ETH-86492				4032±22				2625–2470
T'=0.6; δ13C: -22.9±0.08‰, T'=0.8; δ15N:4.9±0.01‰, T'=1.0								
Henge ditch – northern entrance								

BM-788		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Cutting XXIX, east terminal. From Layer 7, a thick deposit of ashy grey soil (Wainwright 1979, 45, fig 26 (plan), figs 27 & 28 (sections)) and forming the middle part of slower silts (Burleigh <i>et al.</i> 1976, 24). Associated with 3 sherds of Grooved Ware, 2 Beaker sherds and 11 Bronze Age sherds, 1 transverse arrowhead and 1 oblique arrowhead (Wainwright 1979, 81 & 156).	3506±55			2020–1680
BM-789		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Cutting XXIX, east terminal. From Layer 7, a thick deposit of ashy grey soil (Wainwright 1979, 45, fig 26 (plan), figs 27 & 28 (sections)) and forming the middle part of slower silts (Burleigh <i>et al.</i> 1976, 24). Associated with 3 sherds of Grooved Ware, 2 Beaker sherds and 11 Bronze Age sherds, 1 transverse arrowhead and 1 oblique arrowhead (Wainwright 1979, 81 & 156).	3459±53			1920–1620
BM-790		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Cutting XXVIII/XXIX, east terminal. From Layer 8, a friable ashy grey soil which sealed two infant burials and stake-holes (Wainwright 1979, 44, fig 26 (plan), figs 27 & 28 (sections), forming the lower part of slower silts (Burleigh <i>et al.</i> 1976, 24). Associated with 7 sherds of Grooved Ware and 13 Beaker sherds (Wainwright 1979, 81).	3619±55			2190–1770
OxA-35740	XXX: burial	Human bone, infant ?left femur (S Mays)	Cutting XXX, east terminal. Burial cut from the base of Layer 8 into Layer 9 (Wainwright 1979, 45, fig 26 (plan)). Infant burial (under 1 year old), extremely fragmentary but fully articulated.	2411±28			740–400

BM-791		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Cutting XXIX, east terminal. From Layer 10, a fine brown soil interspersed with spills of small chalk rubble and sealing stake-holes (Wainwright 1979, 44, fig 26 (plan), figs 27 & 28 (sections), between rapid and slower silts (Burleigh <i>et al.</i> 1976, 24). Associated with sherds of 1 Neolithic plain bowl, 257 Grooved Ware, 91 Beaker and 1 Bronze Age pot, as well as 2 transverse arrowheads and a polished axe (Wainwright 1979, 81 & 156).	3891±55	-21.4±0.2	11.1±0.3	3.4	2570–2200
BM-792		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Cutting XXVIII/XXIX, east terminal. From Layer 11, small to coarse angular chalk rubble layer representing the earliest silting of the ditch (Wainwright 1979, 44, fig 26 (plan), figs 27 & 28 (sections)), forming rapid silts (Burleigh <i>et al.</i> 1976, 24).	4058±71				2880–2460
OxA-35739	XXIX: layer 11.AA	Red deer antler, probable pick	Cutting XXIX, east terminal. From Layer 11, small to coarse angular chalk rubble representing the earliest silting of the ditch (Wainwright 1979, 44, fig 26 (plan), figs 27 & 28 (sections)). Associated with sherd of 1 Neolithic plain bowl and 16 sherds of Grooved Ware (Wainwright 1979, 81). This large antler pick has wear on the tines, making it likely to be functionally connected with the digging of the ditch. It is labelled 'Base of Layer 11, north side.'	4063±30	-24.0±0.2	3.8±0.3	3.3	
UBA-34292	XXIX: Layer 11.AB	Red deer antler, probable pick	Replicate of OxA-35739	4010±35	-23.0±0.22	3.6±0.15	3.2	
ETH-86494	XXIX: layer 11.AC	Red deer antler, probable pick	Replicate of OxA-35739	4054±31	-23.1±0.02	3.7±0.05	3.2	
Weighted mean: Cutting XXIX: layer 11: OxA-35739+ UBA-34292+ ETH-86494				4045±19				2630–2475

T'=1.4, T'(5%)=6.0, v=2; δ13C: -23.1±0.02‰, T'=20.3; δ15N: 3.7±0.05‰, T'=0.5								
SUERC-72738	XXIX: layer 11B	Red deer antler, probable pick	Cutting XXIX, eastern terminal. From Layer 11, small to coarse angular chalk rubble representing the earliest silting of the ditch (Wainwright 1979, 44, fig 26 (plan); figs 27–28 (sections)). Associated with sherd of 1 Neolithic plain bowl and 16 sherds of Grooved Ware (Wainwright 1979, 81). This large antler pick has wear on the tines, making it likely to be functionally related with the digging of the ditch.	4076±30	-23.1±0.2	5.8±0.3	3.3	2860–2490
BM-793		Charcoal, Quercus sp. (G C Morgan)	Cutting XXIX, east terminal. From Layer 12, the lowest ditch layer, a localised deposit of ash and dirty rubble (Wainwright 1979, 44, fig 26 (plan) & fig 28 (section)). Associated with 34 sherds of Grooved Ware (Wainwright 1979, 81).	4048±54				2870–2460
Conquer Barrow ditch								
BM-795		Red deer antler, pick (R A Harcourt)	Cutting XLVI. From Layer 9, the lowest primary chalk rubble in the ditch (Wainwright 1979, 67, fig 37 (plan) & fig 38 (section)).	4077±52				2870–2470
Site IV ditch								
OxA-35736	IV: layer 8	Red deer antler, probable pick	Segment IV. From Layer 8, a lens of finer silt in the primary chalk rubble in base of ditch (Wainwright 1979, 15, fig 6 (plan) & fig 8 (section, although Layer 8 not depicted)). This antler tine displays wear, making it likely to be functionally related with the digging of the ditch.	4010±30	-23.6±0.2	6.6±0.3	3.3	2620–2460

SUERC-72730	VI: layer 7	Red deer antler, probable pick	Segment VI. From Layer 7, primary chalk rubble in base of ditch (Wainwright 1979, 15, fig 6 (plan) & fig 9 (section)). This large antler pick displays signs of smoothing by use on the handle, making it likely to be functionally related with the digging of the ditch	4090±30	-22.7±0.2	6.1±0.3	3.3	2860–2490
OxA-35735	VIα: layer 7	Red deer antler, probable pick	Segment VIα. From Layer 7, buried soil immediately on top of primary chalk rubble in base of ditch (Wainwright 1979, fig 6 (plan); fig 10 (section)). This antler tine displays wear, making it likely to be functionally related with the digging of the ditch.	4035±30	-23.3±0.2	6.6±0.3	3.2	2660–2460
UBA-34289	VII: layer 8	Red deer antler, probable pick	Segment VII. From Layer 8, primary chalk rubble in base of ditch (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)). This antler tine displays extreme wear, making it likely to be functionally connected with the digging of the ditch.	3857±38	-23.4±0.22	5.1±0.15	3.2	
ETH-86488	VII: layer 8.b	Red deer antler, probable pick	Replicate of UBA-34289	3906±30	-20.3			
Weighted mean: Segment VII: layer 8: UBA-34289+ ETH-86488 (T'=1.0)				3887±24				2465–2290
UBA-34290	VII: layer 10.A	Red deer antler, probable pick	Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)). This antler displays wear, making it likely to be functionally related with the digging of this pit.	3963±39	-21.2±0.22	3.5±0.15	3.2	2580–2310
SUERC-72731	VII: Layer 10.B	Red deer antler, pick	Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary	4057±32	-23.1±0.2	5.6±0.3	3.2	2850–2470

		(R A Harcourt)	chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)). This antler displays wear, making it likely to be functionally related with the digging of this pit.				
BM-663		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)).	3911±89			2670–2060
BM-666		Red deer antler pick (R A Harcourt)	Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)).	3941±72			2630–2200
BM-667		Animal bone <i>Bos primigenius</i> (aurochs) limb bone (R A Harcourt)	Segment VII. From Layer 10, a thick lens of ash and charcoal overlying the primary chalk rubble within an irregular pit (Feature 195) 35cm deep within the ditch segment (Wainwright 1979, 18, fig 6 (plan) & fig 10 (section)).	3988±84			2870–2200
BM-669		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Segment VIIIα. From hearth on the surface of Layer 5 (Wainwright 1979, 12, 18 & fig 6 (plan)) within upper silts of ditch (Burleigh <i>et al.</i> 1976, 24).	3274±51			1680–1430
BM-668		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Segment X of outer ditch, from area of hearth or area of burning and sarsen flakes at the base of Layer 5 (Wainwright 1979, 12, 18, fig 6 (plan) & fig 12 (section)) from secondary silts of ditch (Burleigh <i>et al.</i> 1976, 23).	3630±60			2200–1770

CAR-5		Charcoal (unidentified)	From secondary silts of outer ditch, unknown segment. Provided as a check sample for BM-668 so likely same context (Dresser 1985, 340).	3890±60	-24.7			2570–2150
ETH-92535	XIII, layer 5.1	Charcoal, <i>Quercus</i> sp. sapwood (D Challinor)	Segment XIII. From Layer 5, secondary infilling including a burnt deposit containing quantities of sarsen (Wainwright 1979, 21, fig 6 (plan) & fig 13 (section)).	3889±29	-23.1			2470–2240
ETH-92536	XIII, layer 5.2	Charcoal, Maloideae roundwood, moderate–strong curvature (D Challinor)	Same as ETH-92535	3871±28	-27.0			2470–2200
ETH-92537	XIII, layer 5.3	Charcoal, <i>Corylus</i> sp. roundwood, moderate–strong curvature (D Challinor)	Same as ETH-92535	3856±29	-25.1			2460–2200
ETH-86487	XIII, Layer 7	Red deer antler, probable pick	Segment XIII. From Layer 7, the primary chalk rubble (Wainwright 1979, 21, fig 6 (plan) & fig 13 (section)).	4010±30	-19.6±0.34	7.1±0.02	3.2	2620–2460
Palisade enclosure								
BM-665		Charcoal, <i>Quercus</i> sp. (G C Morgan)	Cutting III, west side of enclosure. From Layer 3, a thick layer of ash and charcoal sealing the top of the palisade trench (Wainwright 1979, 58–59, fig 5 (plan) & fig 34 (section)). Associated with 1 sherd of Beaker pottery (Wainwright 1979, 77).	3645±43				2140–1890

OxA-35741	III: Ditch I: layer 5	Red deer antler, probable pick	Cutting III, west side of the enclosure. From Layer 5, packing material around the posts consisting of a hard, rammed puddled chalk layer which extends almost up to ground level (Wainwright 1979, 58–9, fig 5 (plan) & fig 34 (section)). Antler pick shows wear from use, making it likely to be functionally connected with the digging of the palisade ditch.	4010±30	-23.8±0.2	5.6±0.3	3.3	2620–2460
BM-662		Red deer antler, pick (R A Harcourt)	Cutting III, west side of enclosure. From Layer 5, packing material in base of palisade ditch (Wainwright 1979, 58–59, fig 5 (plan) & fig 34 (section)).	3637±63				2200–1770
SUERC-73256	XVI: Post 2: 80–100cm.A	Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 5 growth rings, weak curvature (single fragment; Z Hazell)	Cutting XVI, north-west side of enclosure (Wainwright 1979, 60, fig 33 (plan) & fig 35 (section)). From Post 2, sample collected from 80–100cm below ground level (label on bag).	4063±29	-24.8±0.2			2850–2470
OxA-35702	XVI: Post 2: 80–100cm.B	Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 5 growth rings, weak curvature (single fragment; Z Hazell)	Cutting XVI, north-west side of enclosure (Wainwright 1979, 60, fig 33 (plan) & fig 35 (section)). From Post 2, sample collected from 80–100cm below ground level (label on bag).	4087±31	-26.1±0.2			2860–2490

SUERC-72734	XVI: layer 4: 100–150cm	Red deer antler, probable pick	Cutting XVI, north-west side of enclosure (Wainwright 1979, 60, fig 33 (plan) & fig 35 (section)). From Layer 4, packing material around the posts, at a depth of 100–150cm below ground level (label attached to antler). Antler pick shows wear from use, making it likely to be functionally related with the digging of the palisade trench.	4048±33	-23.2±0.2	5.3±0.3	3.3	2840–2470
UBA-34293	XVI: layer 4: 160–170cm	Red deer antler, probable pick	Cutting XVI, north-west side of enclosure (Wainwright 1979, 60, fig 33 (plan) & fig 35 (section)). From Layer 4, packing material around the posts, at a depth of 160–170cm below ground level (label attached to antler). Antler pick shows wear from use, making it likely to be functionally related with the digging of the palisade trench.	4042±35	-23.8±0.22	5.4±0.15	3.2	2840–2460
BM-794		Animal bone (domestic Bos sp.) (R A Harcourt)	Cutting XVIII, northern side of enclosure including northern entrance (Wainwright 1979, 61, fig 33 (plan) & fig 35 (section)). From Layers 3–6. Described as a 'selection of the latter [animal bones]' (Wainwright 1979, 61) so likely a bulk sample.	3956±45				2580–2290
UBA-34294	XXI: layer 6	Red deer antler, probable pick	Cutting XXI, north-west side of enclosure. From Layer 6, the lowest layer within palisade ditch, described as puddled chalk (Wainwright 1979, 50, 62, fig 33 (plan) & fig 36 (section)). Although tines are broken from antler pick, it is a suitable shape and it is likely to be functionally related with the digging of the palisade trench.	3937±50	-23.3±0.22	4.1±0.15	3.2	
ETH-86489	XXI: layer 6b	Red deer antler, probable pick	Replicate of UBA-34294	3977±31	-23.5±0.08	4.2±0.12	3.2	
Weighted mean: Cutting XXI: layer 6: UBA-34294+ ETH-86489				3966±27				2580–2350

T'=0.5; $\delta^{13}C$: $-23.5 \pm 0.08\%$, T'=0.7; $\delta^{15}N$: $4.2 \pm 0.09\%$, T'=0.3								
SUERC-73257	XXII: post 3: 70–90cm.A	Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 6 growth rings, weak/no curvature (single fragment; Z Hazell)	Cutting XXII, north-west side of enclosure (Wainwright 1979, 62, fig 3 (plan) & fig 36 (section)). From Post 3, sample collected from 70–90cm below the ground level (label on bag).	4010±29	-26.2±0.2			2620–2460
OxA-35701	XXII: post 3: 70–90cm.B	Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 3 growth rings, weak curvature (single fragment; Z Hazell)	Same as SUERC-73257	4137±29	-24.8±0.2			2880–2580
ETH-86491	XXII: post 3: 70–90cm.C	Charcoal, <i>Quercus</i> sp. sapwood (no tyloses), 6 growth rings, weak/no curvature (single fragment; Z Hazell)	Cutting XXII, north-west side of enclosure (Wainwright 1979, 62, fig 3 (plan) & fig 36 (section)). From Post 3, sample collected from 70–90cm below the ground level (label on bag).	3995±25	-26.4			2580–2460
SUERC-72739	XXIV: layer 6	Red deer antler, probable pick	Cutting XXIV, east side of the enclosure. From Layer 6, the lowest layer of chalk within trench (Wainwright 1979, 63, fig 5	4078±29	-21.7±0.2	2.3±0.3	3.3	2860–2490

			(plan) & fig 36 (section)). Some wear on antler tine suggests it is likely to be functionally related with the digging of the palisade trench.					
SUERC-73258	XXXVI: south pipe 11.A	Charcoal, <i>Quercus</i> sp., sapwood (no tyloses), 6 growth rings, no curvature (single fragment; Z Hazell)	Cutting XXXVI, east entrance of enclosure (Wainwright 1979, 63, fig 30 (plan) & fig 31 (section)). From Pipe 11 south (label on bag), collected from unspecified depth below ground level.	4108±29	-25.0±0.2			2870–2570
UBA-34510	XXXVI: south pipe 11.B	Charcoal, <i>Quercus</i> sp., sapwood (no tyloses) 3 growth rings, weak curvature (single fragment; Z Hazell)	Cutting XXXVI, east entrance of enclosure (Wainwright 1979, 63, fig 30 (plan) & fig 31 (section)). From Pipe 11 south (label on bag). Collected from unspecified depth below ground level.	4141±29	-26.1±0.22			2880–2580
GREYHOUND YARD								
HAR-6663	W67.4947	Red deer antler pick	Pit 4885. From Context 4947, backfill of ramp against post. Section drawing Woodward <i>et al.</i> 1993, fig 8. This large antler pick has frontal bone and skull attached (slain deer). A small patch of burning suggests human modification, making it likely to be functionally related to the digging of the post-pipe.	4020±80	-23.8			
GrM-17425		Red deer antler pick	Replicate of HAR-6663	4030±30	-21.6±0.15	7.9±0.3	3.2	

Weighted mean of HAR-663+GrM-17425, T'=0.0				4029±29				2625–2470
HAR-6664	W67.4166	Red deer antler pick	Pit 4163. From Context 4166, packing around post-pipe. This is a large, shed antler. Section drawing Woodward <i>et al.</i> 1993, microfiche 1, DWG 2162	4070±70	-23.8			
ETH-95259		Red deer antler pick	Replicate of HAR-6664.	3957±22	-23.2±0.1	4.9±0.1	3.5	
Weighted mean of HAR-6664+ETH-95259, T'=2.4				3967±20				2575–2355
ETH-95260	A	Red deer antler pick	Pit 4355. From Context 4577, lowest fill of ramp. Section drawing Woodward <i>et al.</i> 1993, microfiche 1, DWG 2254	3986±22	-23.5±0.1	4.3±0.1	3.4	
GrM-17424	B	Red deer antler pick	Replicate of ETH-95260	3995±30	-23.4±0.15	4.2±0.3	3.2	
Weighted mean ETH_95260+GrM-17424, T'=0.1; δ13C: -23.5±0.1‰, T'=0.3; δ15N: 4.3±0.1‰, T'=0.1				3989±18				2575–2465
ETH-95262		Red deer antler tine	Pit 4843. From Context 4853, middle layer of ramp. This tine is worn, making it likely to be functionally related to the digging of the post-pipe. Woodward <i>et al.</i> 1993, microfiche 1, DWG 2320	4068±30	-21.6			2850–2380
ETH-95261		Red deer antler rake	Pit 4540. From context 4562, middle layer of ramp. This rake is worn, making it likely to be functionally related to the digging of the post-pipe. Woodward <i>et al.</i> 1993, microfiche 1, DWG 2262	3911±22	-22.5±0.1	4.2±0.1	3.5	2470–2300
HAR-6686	W67.1648	Charcoal, <i>Quercus</i> sp.	Pit 1635. From context 1648, infill/packing on outer edge of post-pipe, relatively high in section. Section drawing Woodward <i>et al.</i> 1993, fig. 169.	4020±80	-27.0			2780–2300
HAR-6687	W67.1649	Charcoal, <i>Quercus</i> sp.	Pit 1635. From context 1649, festoons of charcoal along the edge of the inner post-pipe. Section drawing Woodward <i>et al.</i> 1993, fig. 169.	4090±70	-25.9			2880–2470

HAR-6688	W67.1653	Charcoal, <i>Quercus</i> sp.	Pit 1631. From context 1653, festoons of charcoal in the lower post-pipe fill. Section drawing Woodward <i>et al.</i> 1993, fig. 169.	4080±70	-26.5			2880–2470
HAR-6689	W67.1642	Charcoal, <i>Quercus</i> sp.	Pit 1631. From context 1642, fill of upper post-pipe. Section drawing Woodward <i>et al.</i> 1993, fig. 169.	4140±90	-26.3			2910–2470
GrM-17426	B	Charcoal, <i>Quercus</i> sp., sapwood	Pit 1631. From context 1642, the central charcoal festoon within the post-pipe. Section drawing Woodward <i>et al.</i> 1993, fig. 169.	3975±25	-25.1±0.15			2575–2410
GrM-17496	B	Charcoal, <i>Quercus</i> sp., heartwood/ sapwood transition	Pit 4163. From context 4164, the outer circumference of the post-pipe that extends from the truncation to the base of the post pit. Section drawing Woodward <i>et al.</i> 1993, microfiche 1, DWG 2162	4000±25	-24.0±0.15			2575–2465
GrM-17497		Charcoal, <i>Quercus</i> sp., heartwood.	Pit 4503. From context 4556, the outer circumference of the post-pipe that extends from the truncation to the base of the post pit. Section drawing Woodward <i>et al.</i> 1993, microfiche 1, DWG 2231	4185±25	-23.9±0.15			2890–2670
ETH-95263	A	Charcoal, <i>Quercus</i> sp., sapwood.	Pit 1631. From context 1642, the central charcoal festoon within the post-pipe. Section drawing Woodward <i>et al.</i> 1993, fig. 169.	4010±22	-24.8±0.1			2575–2470
ETH-95264	A	Charcoal, <i>Quercus</i> sp., heartwood/ sapwood transition	Pit 4163. From context 4164, the outer circumference of the post-pipe that extends from the truncation to the base of the post pit. Section drawing Woodward <i>et al.</i> 1993, microfiche 1, DWG 2162	4080±22	-24.9±0.1			2850–2495
GrM-17423		Red deer antler tine (find no.1130)	Pit 828. From context 843, primary chalk fill (likely to be ramp). Section drawing unknown. Tine from pre-Roman post-pipe/ditch at Church St excavations (Batchelor n.d., 3). The tine is	3970±25	-22.7±0.15	4.1±0.3		2575–2350

			worn, making it likely to be functionally related to the digging of the post-pipe.					
HAR-5508	45-1129	Charcoal, <i>Quercus</i> sp.	Pit 828. From context 843, primary chalk fill (likely to be ramp). Section drawing unknown. Sample (Batchelor n.d., 4)	4060±90	-26.5			2890–2340
MAUMBURY RINGS								
BM-2282N	1	Red deer antler pick (H St George Gray)	Cutting X, from bottom of Shaft 1 (depth of 36ft below modern ground surface; Bradley 1975, 16), Antler 60 (Ambers <i>et al.</i> 1987, 64; Bowman <i>et al.</i> 1990, 65; Bradley and Thomas 1984, 133)	3970±50	-22.3			2670–2290
ETH-86727	Antler 59	Red deer antler pick	Cutting X, from depth of 24.8ft below modern ground surface within Shaft 1 (Gray excavation diary; Bradley 1975, 16). This antler pick has a tine that is smoothed and polished from use, making it likely to be functionally related to the digging of the shaft.	3985±22	-22±0.1		3.4	2575–2460
BM-2281R	4	Red deer antler pick (H St George Gray)	Cutting XV, from uppermost Neolithic fill of Shaft 3, Antler 160 (Ambers <i>et al.</i> 1987, 64; Bowman <i>et al.</i> 1990, 71; Bradley and Thomas 1984, 133)	3940±130	-23.3			2880–2040
ETH-86728	Antler 245	Red deer antler pick	Cutting XX, from bottom of Shaft 6 at a depth of 20.7ft below modern ground surface (Gray 1910, 262; Gray excavation diary; Bradley 1975, 16). This antler pick has a polished and partly burnt tine, making it likely to be functionally related to the digging of the shaft.	3961±23	-23.7±0.1		3.3	2575–2345
ETH-86729	Antler 293	Red deer antler pick	Cutting XX, from depth of 27ft below modern ground surface within Shaft 9 (Gray 1910, 261; Gray excavation diary; Bradley 1975, 16). This antler pick has a tine that is smoothed and polished from use, making it	4064±22	-17.2±0.1		3.4	2845–2490

			likely to be functionally related to the digging of the shaft.					
ETH-86730	Antler 311	Red deer antler pick	Cutting XXI, from depth of 22ft below modern ground surface within Shaft 10 (Gray excavation diary; Bradley 1975, 16). This antler pick has a tine that is smoothed and polished from use, making it likely to be functionally related to the digging of the shaft.	4011±23	-22.4±0.1		3.4	2575–2470
GrM-13227	Antler 332	Red deer antler pick	Cutting XXI, from the bottom of Shaft 11 at a depth of 28ft below modern ground level (Gray excavation diary; Bradley 1975, 16). This antler pick has a highly polished shaft from use, making it likely to be functionally related to the digging of the shaft.	3889±16	-22.6±0.05	3.24±0.1	3.23	2465–2295
GrM-13230	Antler 399	Red deer antler pick	Cutting XXX, from depth of 22ft below modern ground level in Shaft 15 (Gray excavation diary; Bradley 1975, 17).	3917±16	-22.9±0.05	4.62±0.1	3.2	2470–2340
ETH-86731	Antler 400A	Red deer antler pick	Cutting XXX, from depth of 25.5ft below modern ground level in Shaft 15 (Gray 1914, 111). This antler pick has a tine that is smoothed and polished from use, making it likely to be functionally related to the digging of the shaft.	3973±23	-22.6±0.1		3.3	
GrM-13231	Antler 400B	Red deer antler pick	Cutting XXX, from depth of 25.5ft below modern ground level in Shaft 15 (Gray 1914, 111; Bradley 1975, 17). This antler pick has a tine that is smoothed and polished from use, making it likely to be functionally related to the digging of the shaft.	3951±16	-22.4±0.05	5.94±0.1	3.2	
Weighted mean: ETH-86731+GrM-13231, T'=0.6; δ13C: -22.4±0.05‰, T'=3.2				3958±14				2570–2355
GrM-13232	Antler 401	Red deer antler crown	Cutting XXX, from bottom of Shaft 15 (depth of 26.5ft below modern ground level) (Gray 1914, 111; Bradley 1975, 17). This antler	3856±16	-23.8±0.05	4.13±0.1	3.2	2455–2205

			pick has a tine that is highly smoothed and polished from use, making it likely to be functionally related to the digging of the shaft.					
GrM-13228	Antler 398	Red deer antler tine	Cutting XXXII, found 'just below the brown mould rise in the body of the henge bank', 4.75ft down from the surface, i.e. within the secondary henge bank (Gray excavation diary; Gray 1914, 116). This broken antler tine is highly polished, making it likely to be functionally related to the digging of the shafts or henge ditch.	3908±16	-21.8±0.05	6.19±0.1	3.2	2470–2305
THOMAS HARDYE SCHOOL (Gardiner <i>et al.</i> 2007, table 7)								
NZA-23745	R-29080/4	Human bone, left femur	Grave 1643, in south-west quadrant of enclosure 1004, young adult male with Beaker, wrist guard and copper alloy dagger – SK 187	3856±30	-20.9			2460–2200
NZA-23746	R-29080/5	Human bone, left femur	Grave 1605, older male buried at centre of Barrow 1005 and small internal hengiform, with Beaker and copper alloy dagger	3789±30	-21.0			2340–2060
NZA-23747	R-29080/6	Human bone, right femur	Grave 1444, female adult burial outside ditch of Barrow 1006, with no grave goods	3689±35	-20.9			2200–1960
FORDINGTON FARM (Bellamy 1991; Bayliss <i>et al.</i> 2013, 72–3)								
UB-3304		Human bone, L&R femora	Burial 70 – disarticulated but separate bones of adult male, adult female and a foetal or neonatal child, unaccompanied by artefacts, one of two grave pits surrounded by a segmented ditch under later barrow	3715±54	-23.9 ±0.2			2290–1950
UB-3305		Human bone, L&R femora	Burial 59 – disarticulated but separate bones of adult male and child, one of two grave pits surrounded by a segmented ditch under later barrow	3767±47	-21.6 ±0.2			2350–2030
UB-3306		Human bone, L&R femora	Burial 61, articulated skeleton of young adult male with cattle bones and barbed	3844±30	-22.5 ±0.2			2460–2200

			and tanged arrowhead in a grave cut through the primary mound into the pre- barrow land surface					
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4 Brú na Bóinne, Co. Meath

Eight miles inland from the estuary at Drogheda on the east coast of Ireland, the River Boyne makes a distinctive bend to the south, curving around a low-lying shale ridge before continuing west towards Navan. This geomorphological island (Mitchell 1984) within the ‘bend of the Boyne’ has been famous for its prehistoric monuments since Edward Llywd first recorded the tomb of Newgrange in 1699 (Eogan 1991, 102). On the ridge above the river, on top of elevated elongated knolls (at about 150 m above sea level), are the three great passage tombs of Knowth, Newgrange and Dowth (Figures A4-1 and 4-2). Medieval texts use the name Brug na Boinde to refer to this area, a term which may originally have been applied just to Newgrange. This name, with its modern spelling, was revived in the 19th century and has been adopted for the area and its World Heritage Site today (Smyth 2009, 4).

The bedrock geology of the Brú na Bóinne area is predominantly sandstone with shale corridors, although this is largely buried by thick glacial deposits (Lynch 2014, 18). Geological events during the last Ice Age have moulded the landscape, leaving a dominant north-east to south-west axis reflected in the local topography (Stout 2002, 3). The Boyne is now tidal upstream as far as Oldbridge but it may previously have been tidal right into the Brú na Bóinne area (Mitchell 1995). This makes it a significant place where the river once met the sea, but also where the migration of thousands of salmon would have been an observable phenomenon in prehistory, as it is on a smaller scale today (Hensey 2015, 79–84). Recent surveys of the river have uncovered the remains of 11 log boats (Brady 2018), one of which has been dated to 3300–2910 cal BC (Table A4-3: UBA-27787), making it potentially contemporary with the construction of the passage tombs and perhaps indicative of the type of transport used for moving materials, people, and animals to the area.

Brú na Bóinne is often described as a passage tomb cemetery (e.g., Newman 1995; Fraser 1998; Eogan 1999) but this is not an appropriate term for this or any of the other Irish monument complexes. As critiqued by Cooney (2000, 147), the term wrongly implies that the area had the primary purpose of human burial; there is, of course, evidence for a full range of activities, even without considering a recently made argument that the function of the largest passage tombs was not primarily one of human burial (Hensey 2015). More importantly, the term ‘cemetery’ unduly focuses attention on the passage tombs, at the expense of the other now less visible and dramatic forms of monument present at this and other complexes, which would have been equally dominating and important as the tombs at certain times of prehistory. Rather than ‘cemetery’, the term ‘monument complex’ will be used here, with all the geographical and chronological complexity that that implies.

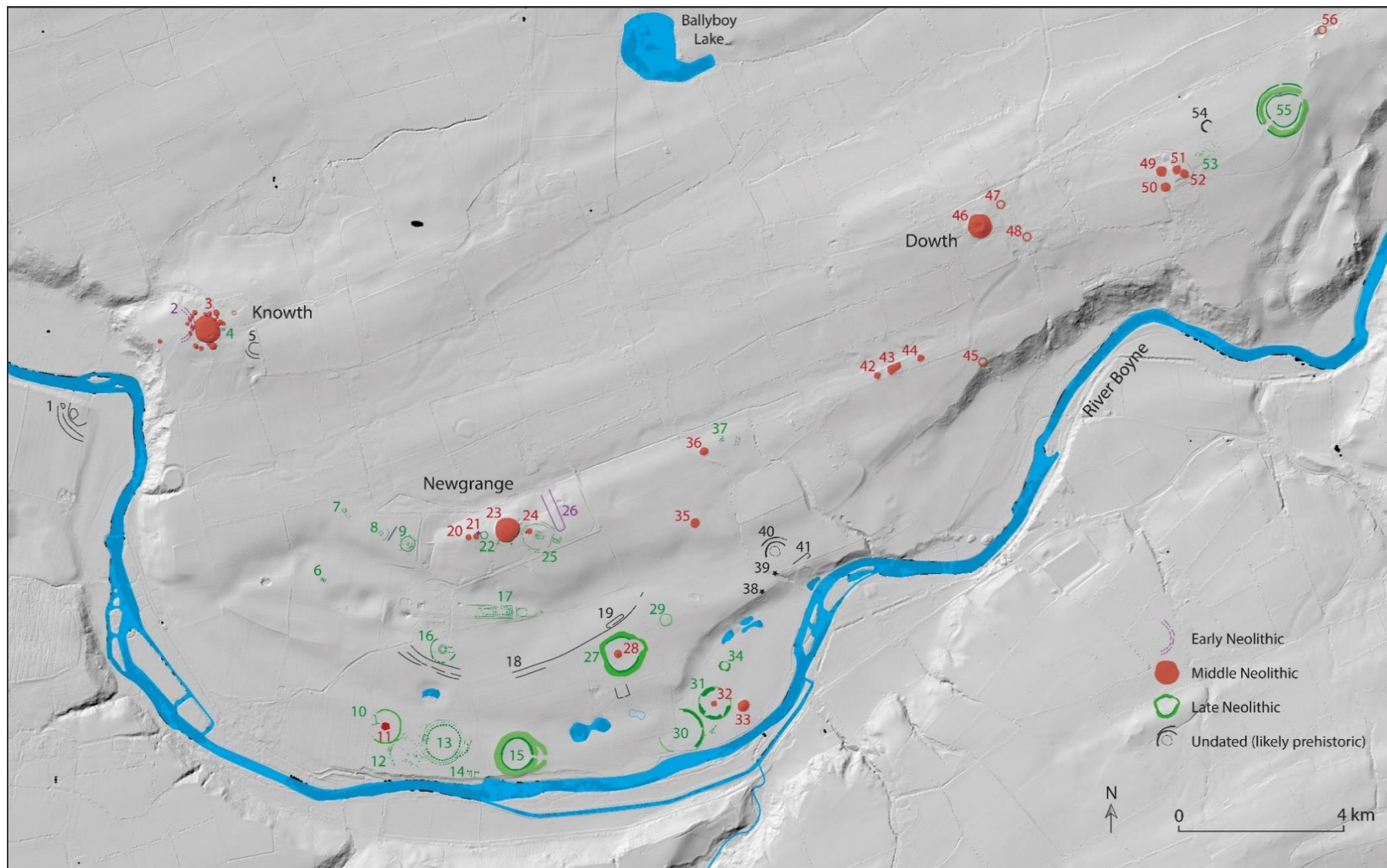


Figure A4-1 Overall map of monuments that comprise the Brú na Bóinne complex; see Table A4-1 for site number concordance

Table A4-1 List of sites within the Brú na Bóinne complex, providing a concordance of site names and inventory numbers

Site number (Figure A4-1)	Name	Alternative names	National Monument Inventory Ireland ID	Site type	Known or estimated date
1	Rosnaree enclosure		ME019-080	Enclosure	Undated
2	Knowth palisaded enclosure		ME019-030021 (enclosure) and ME019-030022 (house)	Palisaded enclosure	Early Neolithic
3	Knowth passage tomb and satellites	[Individual site numbers given to satellite passage tombs]	ME019-030001	Passage tombs	Middle Neolithic
4	Knowth square-in-circle		ME019-030033	Square-in-circle	Late Neolithic
5	Area 11 enclosure		ME019-015	Enclosure	Undated
6	NG39		ME019-119	Square-in-circle	Late Neolithic
7	NG10		n/a	Square-in-circle with avenue	Late Neolithic
8			n/a	Possible square in circle set in enclosure	Late Neolithic
9	NG16		n/a	Square-in-circle set in enclosure and possible stone circle	Late Neolithic
10	Univallate Henge		ME019-094	Enclosure	Late Neolithic
11	Site LP2		ME019-094	Passage tomb	Middle Neolithic
12	Hidden Henge		n/a	Enclosure	Late Neolithic
13	Geometric Henge	Drone Henge	ME026-033	Enclosure	Late Neolithic
14	Dumbbell Feature		n/a	Timber linear feature	Late Neolithic
15	Site P		ME026-006	Henge	Late Neolithic
16			ME019-067002	Square-in-circle set in enclosure with avenue	Late Neolithic
17	Newgrange Farm linear	Great Rectangular Palisade	ME019-129	Timber linear feature	Late Neolithic
18	Great Palisade		ME019-067005	Palisaded enclosure	Undated
19	Capsule-shaped enclosure		n/a	Unknown	Undated
20	Site K		ME019-046001	Passage tomb	Middle Neolithic

21	Site L		ME019-046003	Passage tomb	Middle Neolithic
22	Double timber circle		ME019-046005	Timber circle	Late Neolithic
23	Newgrange passage tomb		ME019-044045	Passage tomb	Middle Neolithic
24	Site Z		ME019-044004	Passage tomb	Middle Neolithic
25	Pit-and-post circle		ME019-044002	Elaborate square-in-circle with avenue and pit enclosure	Late Neolithic
26	Newgrange cursus		ME019-044001	Cursus	Early Neolithic?
27	Site A		ME019-049002	Henge	Late Neolithic
28	Within Site A		ME019-049001	Passage tomb	Middle Neolithic
29	Site A1		ME019-050	Small enclosure	Late Neolithic/ Early Bronze Age?
30	Riverside Enclosure	Riverside Henge	n/a	Enclosure	Late Neolithic
31	Site B1 enclosure		n/a	Enclosure	Late Neolithic
32	Site B1		ME019-058002	Passage tomb	Middle Neolithic
33	Site B		ME019-058001	Passage tomb	Middle Neolithic
34			n/a	Small enclosure	Late Neolithic/ Early Bronze Age?
35	Site U		ME019-051	Passage tomb	Middle Neolithic
36	Site E		ME019-043	Passage tomb	Middle Neolithic
37			n/a	Square-in-circle with façade	Late Neolithic
38	Standing Stone C		ME019-055	Standing stone	Undated
39	Standing Stone D		ME019-053	Standing stone	Undated
40	Site LP1		ME019-103	Triple-ditched enclosure	Undated
41			n/a	Timber linear feature	Undated
42	Site F		ME019-040	Passage tomb	Middle Neolithic
43	Site G		ME019-041	Passage tomb	Middle Neolithic
44	Site H		ME019-042	Passage tomb	Middle Neolithic

45			n/a	Site of passage tomb	Middle Neolithic
46	Dowth		ME020-017	Passage tomb	Middle Neolithic
47			ME020-016002	Site of passage tomb	Middle Neolithic
48			n/a	Site of passage tomb	Middle Neolithic
49	Site I		ME020-012	Passage tomb	Middle Neolithic
50	Site J		ME020-013	Passage tomb	Middle Neolithic
51			n/a	Passage tomb	Middle Neolithic
52			n/a	Passage tomb	Middle Neolithic
53	DOW19	Dowth 'box' structure	n/a	Timber feature, possibly henge	Late Neolithic
54			n/a	Small enclosure	Undated
55	Dowth henge		ME020-010	Henge	Late Neolithic
56	Cloghalea		ME020-009	Site of probable passage tomb and/or stone circle	Middle Neolithic

The following analysis will attempt to compensate for the skew towards the standing monuments in the archaeological literature by focusing as much as possible on the non-passage tomb monuments and leaving to other publications detailed descriptions of the megalithic art or the layout of the passage tomb chambers. Those aspects are best left to others who are publishing interesting and insightful work (e.g., Robin 2010, 2012; Cochrane 2012, 2013; Hensey 2015). However, it should be noted that some of the architectural and artistic aspects of the tombs do have relevance to discussions of power, movement, audience and performance, and will be explored where relevant.

4.1 Landscape history

Only a few pollen assessments have been carried out in the locality of the Brú na Bóinne complex which can provide information about the palaeoenvironmental history of the area. Pollen profiles from Thomastown bog, c.4 km to the south of Newgrange, show local woodland dominated by oak and elm, with alder and hazel, which persisted through to the early Christian period (Davis *et al.* 2018, 590). There was a significant decline in elm trees during the second half of the 3rd millennium BC (Parker *et al.* 2002), at which point agricultural activity becomes visible for the first time (Davis *et al.* 2018, 590). However, pollen assemblages from Knowth suggest that it was built in a cleared and agricultural landscape. Anaerobic conditions at that site led to good preservation of grass, leaf litter, mosses, plant seeds and insects, all of which suggest that turves used to build the mound were cut from rich meadow grassland (Davis *et al.* 2018, 629). All the strands of environmental evidence show that Newgrange and Knowth were built in an open grassland environment, most likely used for grazing, albeit with some scrub and

woodland and cereal cultivation in the vicinity (Lynch 2014, 20; Davis *et al.* 2018, 650–1). The construction of the later Neolithic monuments in the complex would have involved the felling of large quantities of trees. Charred wheat and barley grains from deposits dating to this period suggest cereal cultivation; both factors could have led to the rise in secondary and more diverse woodland at this time (Davis *et al.* 2018, 585, 651).

4.2 Mesolithic

Excavations at later monuments in the Brú na Bóinne area have recovered a scatter of early and late Mesolithic lithics including a handful of blades, flakes, cores and debitage. These derive mostly from secondary contexts such as topsoil, old land surfaces and imported layers of sod within turf mounds (e.g., Lynch 2014, 19, 24). A cache of early Mesolithic flints found within the cairn slip material at Newgrange was probably waste material from a lithic production site that was redeposited (Sternke 2014, 45). Field-walking projects (Cooney and Brady 1998; Cooney 2000, 3) have recovered several Mesolithic lithics from the area to the north and east of the core Brú na Bóinne area but field-walking in the Newgrange area and on the southern side of the River Boyne found only one possible later Mesolithic artefact and nothing that could be attributed to the earlier Mesolithic (Brady 2007, 217).

Further evidence for activity in this period comes from two radiocarbon dates from Knowth which show sporadic late Mesolithic activity: a charred hazelnut shell from a sod layer (6380–6080 cal BC; Table A4-3: UB-12888) and charcoal from a spread below Tomb 1C (4900–4610 cal BC; Table A4-3: GrN-18773). (Grogan 1991, 129; Schulting *et al.* 2018, 342; Schulting and McClatchie 2018, 381; Davis *et al.* 2018, 616). The overall picture is of very low-level background activity in both the early and later Mesolithic period, which fits into a wider regional pattern of scattered activity sites where groups were making use of south-facing slopes overlooking the River Boyne (Sternke 2014, 45). Any sense of continuity of occupation into the Neolithic period is mainly a product of taphonomy and recovery (Warren and Kador 2013) and there is currently no sense in which the Brú na Bóinne was significant in the Mesolithic period.

4.3 Early Neolithic

4.3.1 Palisaded enclosure and occupation at Knowth

Although several diagnostic early Neolithic flint tools and sherds of carinated bowl pottery have been found during field walking in the Boyne valley (Brady 2007; Eogan 2007, 134; Lewis *et al.* 2008, 58) direct evidence for activity in this period has been found only during investigations of later monuments, for example a pit with bowl pottery from beneath passage tomb Site L (Figure A4-1: 21; O’Kelly *et al.* 1978, 263–5). The most substantial evidence comes from Knowth, where on the western side, two curving arcs of a double palisaded enclosure have been excavated (Figure A4-2). If projected as a circle, this enclosure would have enclosed an area of 120 m (outer) and 100 m (inner) diameter (Eogan 2007, 135), although it could equally be oval or irregular in shape. The palisade trenches had intermittent gaps, including a causeway across the inner circuit that was pebbled (Eogan 1984, 219). Where preservation was good

there was evidence of irregularly spaced postholes in the trench, with posts averaging 25 cm diameter (Eogan and Roche 1999, 44). In one section of the outer trench the upper layer contained much charcoal, suggesting that the palisade here had been burnt (Eogan 1984, 223). Between both palisades were areas of pebbling, pits, and flint-knapping, which may be contemporary.

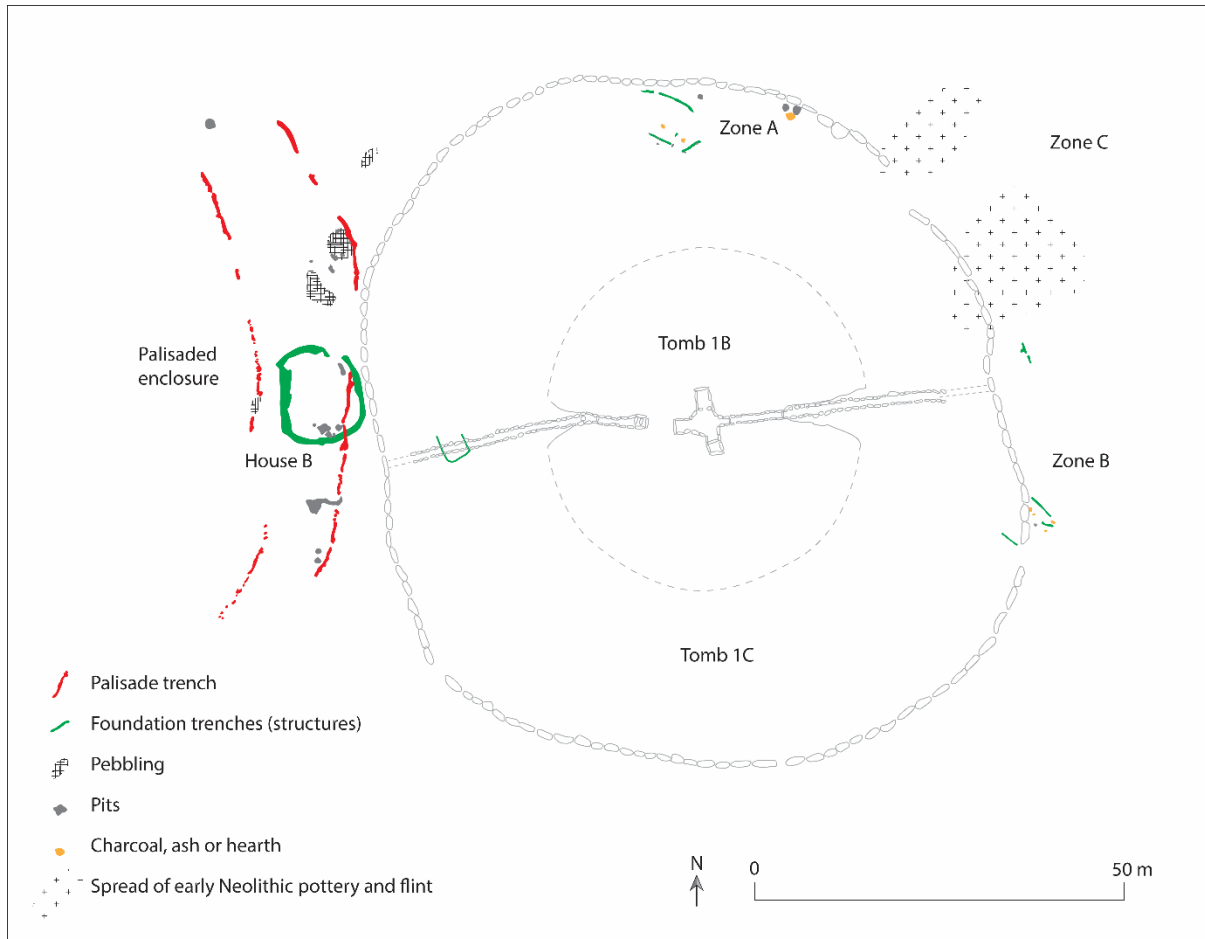


Figure A4-2 Early Neolithic palisaded enclosure and occupation at Knowth (after Eogan and Roche 1997, figs 1–3; Eogan 1984, fig 78; Cleary and Eogan 2018, fig 2.2)

Dating for this palisaded enclosure is not precise, although artefacts including carinated bowl pottery with pronounced rims and leaf-shaped arrowheads suggest an early Neolithic date (Eogan 1984, 218). Some relative chronology is provided by the fact that the outer palisade trench cuts an earlier timber structure. Measuring 12 by 10 m, this structure (House B) comprises a sub-rectangular trench, one side of which had a row of eleven postholes, with areas of burning (Eogan 1984, 211, 239). The only dating evidence, a radiocarbon date on combined charcoal from a pit within the structure, gives a broad indication of 3800–3380 cal BC (Table A4-3: BM-1076) for activity associated with this structure (Schulting and McClatchie 2018, 382). The palisaded enclosure must post-date this building, and pre-date the construction of the main tomb, giving a middle Neolithic date.

Ten discrete areas of burning and another possible structure were found nearby, with spreads of pottery, flint waste and pebbling as well as cereal remains and hazelnut shells (Eogan 1984, 233–7). A second

rectangular house (Figure A4-2) was found underneath the passage of the western tomb of the main Knowth mound, with foundation trenches showing that it was 3.5 m wide and at least 4.8 m long. It was associated with early Neolithic bowl pottery and was sealed by a 10 cm thick layer of natural sod, showing that some considerable time had elapsed before the passage tomb 1B was constructed (Eogan and Roche 1997).

Under the northern and eastern portions of the main tomb at Knowth, further early Neolithic activity was uncovered in three zones. In Zone A, three foundation trenches and post-holes were found which may represent a rectangular house (Eogan and Roche 1999, 7–16; Figure A4-2). In Zone B, a further four foundation trenches were found, again perhaps the remains of a rectangular structure. Zone C had no structural remains but an extensive area of grey-brown humus material with early Neolithic pottery and flint (Eogan and Roche 1999, 20). Although this north-eastern area of activity was referred to as the 'Earlier 'Western' Neolithic complex' by the excavator due to less pronounced rims in the pottery and what was thought to be a 'less accomplished' flint assemblage than the western area (Eogan and Roche 1999, 5), current radiocarbon dates from the two parts of the site are indistinguishable. Determinations on charcoal and grains of emmer wheat from Zones A and B have been modelled together to provide an estimated start date of 3725–3635 *cal BC* for this settlement activity, with an end date of 3650–3565 *cal BC* (Schulting and McClatchie 2018, 381). These dates fit with the broad single date from the structure under the western side of the tomb and within the broader Irish Neolithic 'house horizon' of 3720/3680–3640/3620 *cal BC* (McLaughlin *et al.* 2016, 125) although the buildings do not conform to the standard pattern for houses in this period. The early Neolithic palisaded enclosure probably enclosed the side of the hill that directly overlooks the most dramatic bend in the River Boyne. There may well have been occupation at a similar date on the opposite bank of the Boyne, attested by flint scatters there, although the enclosure at Rossnaree is likely to date from the early medieval period (Brady and Barton 2009; Brady 2011).

4.3.2 The cursus and other long enclosures

The cursus which crosses the ridge to the east of Newgrange has two parallel banks c.20 m apart, with the southern end terminating in a U-shape (Figure A4-3). It extends for about 100 m and may have continued further north (Condit 1997; Stout 2002, 33). Recent aerial photographs have identified the perimeter as defined by posts set within a continuous ditch (Condit and Keegan 2018, 112). Despite a recent flurry of discoveries of new cursus monuments in Ireland (Corlett 2014; Kenny 2014), a lack of excavation means that not even relative dating material is available from any of the Irish sites. Despite this, their morphology closely links them to British and particularly Scottish cursus monuments. In southern England linear earthwork monuments probably start to be built in 3795–3610 *cal BC* (68% probability; Whittle *et al.* 2011, 724) and one can perhaps cautiously place a similar estimate on the Newgrange cursus of construction in the 37th or 36th centuries BC. Also of possible early Neolithic date

are five newly identified oblong or ‘capsule-shaped’ long enclosures in the area surrounding Newgrange (Condit and Keegan 2018, 40, 69, 93–4), perhaps comparable to short cursus monuments and long enclosures in Britain.

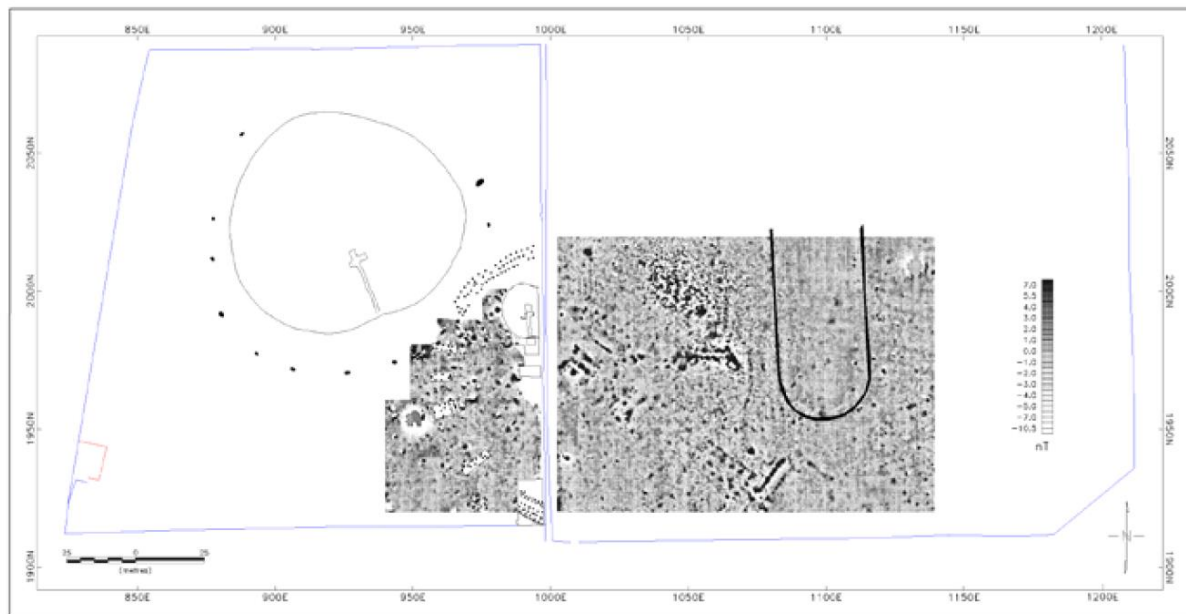


Figure A4-3 Geophysical survey results showing the Newgrange cursus and the pit-and-post circle, adjacent to the passage tombs of Newgrange Site Z © Kevin Barton, LGS

4.3.3 Summary

Although the evidence is slightly disjointed, Brú na Bóinne saw significant activity in the earlier Neolithic period, with most activity identified so far focusing on the ridge within the western part of the area, closest to the dramatic bend of the River Boyne. It seems that these areas of early Neolithic activity were remembered and deliberately chosen for the construction of the later passage tombs. At Knowth, the main passage tomb appears to be laid out adjacent to, but not encroaching upon or overlapping the ditches of the earlier palisaded enclosure to the west. This may suggest that traces of this monument were still visible and that its position was respected by the builders of the later tomb. Newgrange may similarly have been placed adjacent to the earlier cursus monument; remembered, marked or still recognised several hundred years later.

4.4 Middle Neolithic

4.4.1 ‘Settlements’ at Knowth and Newgrange

An area of middle Neolithic occupation was excavated under the north-eastern side of the main tomb at Knowth, extending beneath satellite Tomb 17. Nearly 600 stake-holes, 17 hearths and 10 isolated pits were associated with a dark charcoal rich layer, which contained decorated Carrowkeel pottery and Impressed Ware broad-rimmed vessels. Some of the stake-holes could be refined into arcs, suggesting several circular structures (Eogan and Roche 1999, 51). Two radiocarbon dates were obtained on charcoal

from this spread, but they have very wide error ranges making them of minimal use (4040–3350 cal BC; Table A4-3: UB-318 and 3990–3020 cal BC; Table A4-3: UB-319).

Similarly, beneath the passage tomb Site Z (Figure A4-1: 24) near Newgrange, was a small circular setting of cobbles, probably a hearth, as well as an area of burning with fragments of animal bones and flint chips and several postholes, eight of which formed the arc of a possible building. A hollow-based arrowhead, flint scrapers and a stone axe were also found (O’Kelly *et al.* 1978, 293–4). These features were established on the stripped surface surrounding Newgrange and have dates that correspond to the construction of that monument.

These areas have been interpreted as ‘settlements’ (Eogan and Roche 1999, 51) or ‘habitation sites’ (O’Kelly *et al.* 1978, 335), pre-dating the construction of the passage tombs. Although they clearly pre-date the tombs of Knowth 1 and Site Z, these places may well have been contemporary with some of the earlier passage tombs nearby (e.g., Tomb 3 and perhaps Tomb 1A at Knowth, and the earlier tomb underneath Newgrange). It is perhaps more likely that these were places bound up in aggregation of people at nearby monuments, particularly during their construction or ritual use (Carlin and Cooney 2017, 40).

4.4.2 Knowth passage tomb and satellites

The passage tomb at Knowth belongs to a group of large and elaborate ‘developed’ passage tombs that were built late in the passage tomb tradition (Schulting *et al.* 2018, 14). It is surrounded by at least 17 smaller ‘satellite’ tombs, each with their own histories of use and alteration (Figure A4-4). The complexities of this site have been revealed over four decades of archaeological excavation and analysis led by the late George Eogan (Eogan 1967). The latest volume from this extraordinary series of excavations, focusing on the large passage tomb itself (Eogan and Cleary 2018), includes a re-assessment of the dating evidence (Schulting *et al.* 2018).

The Knowth passage tomb was not built in one stage but has a complex history of enlargement and alteration. The sequence for the main tomb has been divided into three stages: Tombs 1A, 1B and 1C (Eogan and Cleary 2018, 1). Tomb 1A is a putative tomb that may have stood in this location or somewhere nearby, attested by the presence of seven decorated stones from Knowth that appear to have been re-used from an earlier tomb. This passage tomb is likely to have been dismantled when the larger tomb at Knowth was constructed (Eogan 1998). It has been noted that most of the satellite tombs at Knowth are orientated towards the centre of the hilltop (Eogan 1986, 96) and it is possible that may have been focused on Tomb 1A.

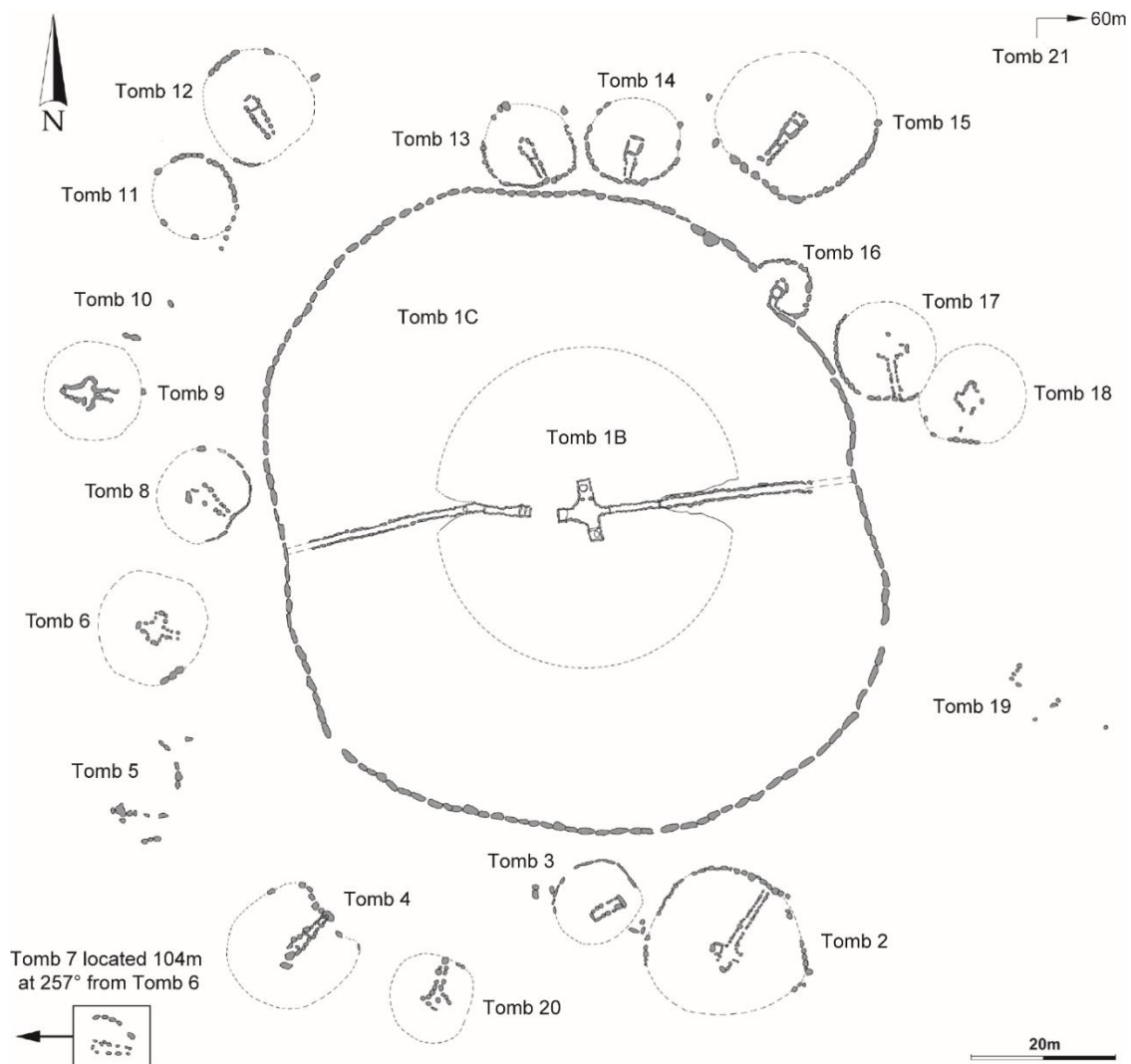


Figure A4-4 Knowth chambered tomb and satellite tombs (Cleary and Eogan 2018, fig 2.1)

The main tomb is thought to have been built in two main phases: the first (Tomb 1B) comprising two back-to-back chambers and their passages, surrounded by a stone cairn and small mound, and the second (Tomb 1C) involving an extension to the mound and the addition its surrounding kerbstones and exterior features, with extensions to the two passages (Eogan and Cleary 2018, 1; Figures A4-4 and A4-5). Many cremations and fragments of disarticulated unburnt human burials had been placed in the recesses and central space of the eastern cruciform chamber of Tomb 1B, accompanied by objects such as pestle pendants, stone beads, mushroom-headed and skewer bone pins, as well as the famous decorated flint macehead. Two miniature beads reminiscent of carved stone balls from north-eastern Scotland suggest long-distance contacts between these two areas (Sheridan 2014; see Chapter 7.4). A large sandstone basin, highly decorated, was found in the right-hand recess and a portion of another in the central area (Eogan 1986, 36–42). It has been suggested that these basins were used to grind and mingle the cremated dead (Cooney 2014).



Figure A4-5 Knowth passage tomb 1C, with decorated kerbstones, surrounded by the quartz and granite apron, with standing stone. One of the reconstructed satellite tombs can be seen in the background (author's photograph)

Forty radiocarbon determinations have been obtained from cremated and unburnt human bone from this chamber. One cremated bone gave a surprisingly early date (3635–3525 cal BC; Table A4-3: UBA-10340) and was therefore rejected from subsequent modelling because other determinations from same context all gave much later results (Schulting *et al.* 2018, 369). However, given that this date fits well with burial practices at other early passage tombs, including nearby Tomb 3 (see below), Baltinglass in Co. Wicklow (Schulting *et al.* 2017), and at Carrowmore and Carrowkeel, both Co. Sligo (Bergh and Hensey 2013; Kador *et al.* 2018), it could be cremated bone that was moved from an earlier context, perhaps from the putative Tomb 1A or from one of the early 'satellite' tombs.

Modelling of the results from the other samples of cremated and unburnt human bone by Schulting *et al.* (2018) from Tomb 1B East places the start of deposition in the left-hand recess in the range 3150–3030 cal BC and the end in the range 3075–2870 cal BC. Deposition in the right-hand recess started 3340–3100 cal BC with the final deposits of modelled as ending in the range 3095–2930 cal BC (Schulting 2018, table 4:5). Only a single determination (3350–3020 cal BC; Table A4-3: UBA-12675) is available from two cremated long-bone fragments from the end recess (Schulting *et al.* 2018, 338, 349).

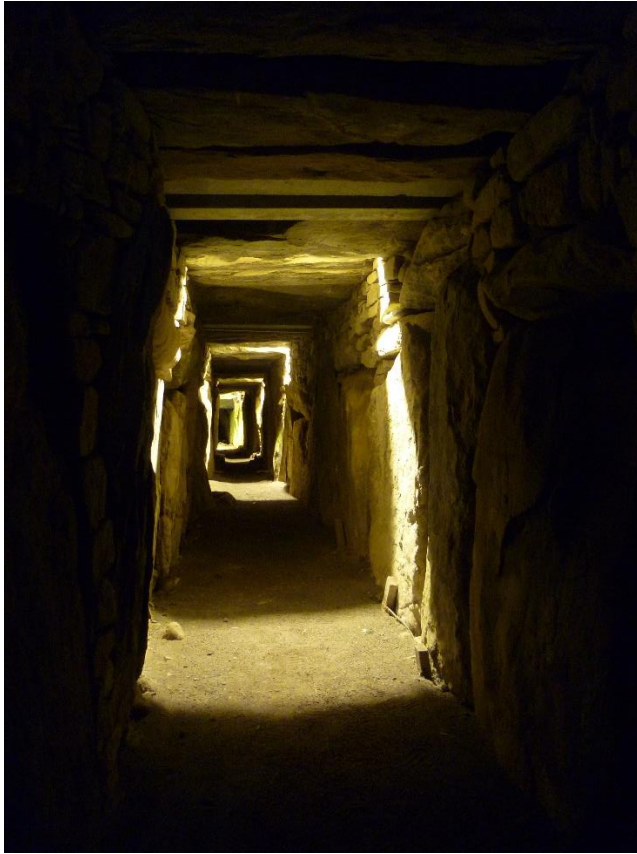


Figure A4-6 Knowth eastern passage (author's photograph)

The chamber of the much simpler and undifferentiated western chamber of Tomb 1B saw more limited excavation and therefore there are fewer human remains available for dating. A single sample on cremated human bone against Sillstone 2 returned a result of 3330–2920 cal BC (Table A4-3: UBA-12994), with most of its probability distribution (65%) lying in the period 3110–3010 cal BC, consistent with the main period of activity for the eastern tomb (Schulting *et al.* 2018, 350). These dates show that burials were probably being placed in the chambers of Tomb 1B both before and after the extension of the mound (Tomb 1C).

The two central chambers were covered with a cairn of large water-rolled loose stones. The original extent of this Tomb 1B is unclear, but Robin (2010, 385) has noted that the western passage turns a slight angle just at the point where this central cairn begins. Beyond this, the Tomb 1C mound was built of alternating layers of shale, boulder clay, sod and a mixture of shale and stones (Eogan 1986, 45) and the passages extended (Figure A4-6). Modelling of radiocarbon dates from pre-Tomb 1C phase provides a TPQ for the construction of that final phase, at some time after 3015 cal BC (Schulting *et al.* 2018, 342), late in or after the often-quoted range of 3200–3000 BC estimated for developed megalithic passage tombs (e.g., Hensey 2015, 95). Modelling the 11 pre-tomb dates as a single phase (incorporating charcoal outlier models where relevant) provides an estimate of a start date range for this activity of 3780–3370 cal BC (95% probability) and an end estimate of 3015–2730 cal BC (95% probability). Some caution needs

to be exercised here, as two of the determinations (UBA-12993 and UBA-14646) are particularly late (see Table A4-3). However, these are both on short-life material from seemingly secure contexts. An alternative model that excludes these dates gives an end range of 3310–2845 cal BC (95% probability; Schulting *et al.* 2018, 342–4).

It has been claimed that the passages at Knowth align with the sunrise and sunset at the autumn and spring equinoxes (Eogan 1986, 178) but recent survey work has shown that the alignment for the west passage is far from precise, being about two weeks out from the equinox date (Prendergast and Ray 2018, see discussion in Case Study 7). The stones used for the chambers and their passages, each weighing between 2 and 5 tonnes, are almost all greywacke, were probably brought from outcrops on the coast at Clogher Head (see Case Study 3, Figure 3-18). The 124 kerbstones placed around the perimeter of Tomb 1C are predominantly greywacke stone, but there are also some cleaved mudrock, sandstone, limestone, and igneous rocks. The chambers, passages, and kerbstones at Knowth include around 400 decorated stones, the greatest concentration of megalithic art in Western Europe (Smyth 2009, 29). Simple motifs appear to diminish in importance over time, with more organised and larger art often superimposed over earlier examples (Hensey 2015, 131). A number of features at the entrances to the passages show elaboration of the exterior space including standing stones, natural but unusual boulders, blocks with solution hollows and ‘stone settings’ as well as spreads of quartz, granodiorite, banded siltstone and limestone pebbles and stones which accumulated over some period (Eogan 1986, 48, 65; see Case Study 3). The large and extensive kerbstones with their megalithic art, collections of stones at the entrances and these platforms are all part of increasing external display at developed passage tombs, where public spectacle and ceremony outside the tomb became important, likely in front of a gathered audience (Thomas 1990; Hensey 2015, 96, 110). There were clearly role differences, if only temporarily during the times of ceremonies, between those who conducted rituals and entered the inner passages, while others observed or took part in mass ceremonies outside.

Surrounding the main mound at Knowth are at least 17 smaller ‘satellite’ tombs (Figure A4-4). Although disturbed by later Iron Age and early Christian as well as agricultural activities, enough of the satellite tombs has remained to show that both undifferentiated and cruciform chamber types were present, and several of the tombs had chambers with intact burial deposits of adults and children when excavated. Tomb 16, one of the best-preserved tombs, for example, had a minimum number of 16 burials in its chamber (Eogan 1984, 178). There was a stone basin in the right-hand basin of Tomb 2, with human bones outside it. Grave goods discovered include bone pins, a well-decorated bone or antler object, chalk balls, worked bone, bone beads and pendants and Carrowkeel ware pottery sherds (Eogan 1984, 180; Eogan 1986, 68).

Evidence for the methods of construction of the smaller tombs varied. Boulder clay is the predominant material used in the mounds and apart from the cores of Tombs 12 and 16, small stones were not used in

mound construction (Eogan 1984, 171). However, Tombs 4, 9, 15 and 16 did have arc-like settings of stones beneath the mound, defining concentric areas. The kerbstones are undressed and likely to be local glacial erratics, the passage and chamber stones mainly green grit. Most of the passage tombs appear to have been built on stripped ground, from which the natural sod had been removed. Outside the entrance to Tomb 4 were the remains of a circular area paved with quartz stones and surrounded by two concentric rings of stones, like the features outside the entrances to the main tomb (Eogan 1984, 170–5).

It has long been recognised that there are some relative chronological relationships between the construction of the main mound at Knowth and some of its satellite tombs, with Tombs 13 and 16 stratigraphically pre-dating Tomb 1C. The passage of Tomb 16 was re-aligned after Tomb 1C was built so that access to its chamber could be maintained. There are now radiocarbon dates for funerary activity at tombs 2, 3, 6, 9, 15, 16 and 17 (see Table A4-3). A single determination from cremated bone of 3355–3095 cal BC (Table A4-3: UBA-10339) from Tomb 3 may be the earliest for a burial from a satellite tomb. This fits with this tomb having a closed rectangular chamber without a passage, a likely early form (Hensey 2015, 27) and perhaps one of the first to be constructed at Knowth. Tomb 17 has yielded two dates on cremations, one from the socket of one of the chamber stones of 3330–2910 cal BC (Table A4-3: UBA-12687) and another from the upper fill of the passage giving a later result of 2875–2630 cal BC (Table A4-3: UBA-12688). This latter is the latest Neolithic result from the site. However, the main floruit of funerary activity (53 out of 60 determinations) for the complex can be modelled as starting in the range 3160–3045 cal BC and ending in the range 3020–2920 cal BC, spanning a period of as little as between 100 and 220 years in total (Schulding *et al.* 2018, 372–4).

In summary, the developed passage tomb at Knowth and its satellite tombs is an extraordinary complex within a complex. Located on the site of earlier Neolithic occupation and enclosure, the first small passage tombs, probably including Tombs 3 and 1A, were built adjacent to an area of contemporary middle Neolithic activity and settlement. This seems to have gone out of use as other tombs were built and used, including the much larger central Tomb 1B and its later extension to form 1C with its elaborate external features. The peak of activity seems to have been in the centuries either side of 3000 BC. Deposits of human remains continued to be made, in the smaller tombs at least, into the late Neolithic period.

4.4.3 Newgrange, ‘Great Stone Circle’ and nearby tombs

Newgrange is perhaps the best-known site in the Brú na Bóinne complex, with its dramatic reconstructed quartz façade and elaborately decorated entrance stone (Figure A4-7). The flat-topped roughly circular 11 m high mound is encircled by 97 kerbstones (Lynch 2014, 13). Like Knowth, it is one of the so-called ‘developed’ large passage tombs and there are many similarities between the two sites. The first structure on the site was probably a 45–50 m diameter turf mound, underlying and extending beyond the north-western part of the later tomb (Figure A4-8; Lynch 2014, 23). Modelling of dating evidence from

beneath and within this early turf mound places the construction at 3305–3125 *cal BC*, ending in 3240–3020 *cal BC* (95% probability; Schulting 2014, 47). It is of comparable size to the nearby tombs Sites L, K and Z (Figure A4-1: 20, 21 and 24) and is likely to be an earlier passage tomb, comparable to the putative Tomb 1A at Knowth.



Figure A4-7 Newgrange passage tomb and part of the Great Stone Circle, viewed from the south-west (author's photograph)

The base of the main mound was also constructed of turves, likely brought from varied places. Despite the varying sizes of the kerbstones, care had been taken to create a level top line by setting some of them in sockets and raising up others using boulders (Stout 2002, 44). The rest of the cairn material is loose water-rolled limestone, with some sandstone and granite stones, interspersed with layers of turves (O'Kelly 1982, 85). In places, the basal layer of cairn stones has lines of small revetment boulders which appear to be an integral part of the cairn structure (Figure A4-8; Lynch 2014, 38). The preferred model of radiocarbon determinations from this cairn gives an estimate of construction starting in 3190–2865 *cal BC* and ending at 3085–2595 *cal BC* (Schulting 2014, 47). The passage and roof box (Figure 5-6) at Newgrange are aligned precisely on the midwinter solstice sunrise, a phenomenon discussed further in Case Study 7.

Within the mound, the passage and chamber are highly decorated, with many of the stones carved before being put into position and hidden from view, but others, including the entrance stone, carved *in situ*, with the ornament stopping at ground level (O'Kelly 1982, 149). The chamber had three carved stone basins and contained a considerable quantity burnt and unburnt human remains, along with

pendants, beads, clay and chalk marbles and bone objects. The human remains were fragmentary and intermingled, but at least three or more individuals were represented, probably many more, mostly concentrated around the stone basins (O’Kelly 1982, 105–7). One fragment of unburnt cranial bone (NG10) from near the basin in the right-hand, highly decorated chamber (Figure A4-9) has been radiocarbon dated to 3340–3020 cal BC (Table A4-3: OxA-36079). This bone has been subject to ancient DNA analysis, showing that this male individual was the offspring of first-order incestuous union, either full siblings or parent/child (Cassidy *et al.* 2020). Based on comparison with societies elsewhere, this has been interpreted as a behaviour limited to ruling families of complex chiefdoms and early states, with this individual interpreted as a ‘god-king’ of Neolithic Ireland (Cassidy *et al.* 2020, 384–5).

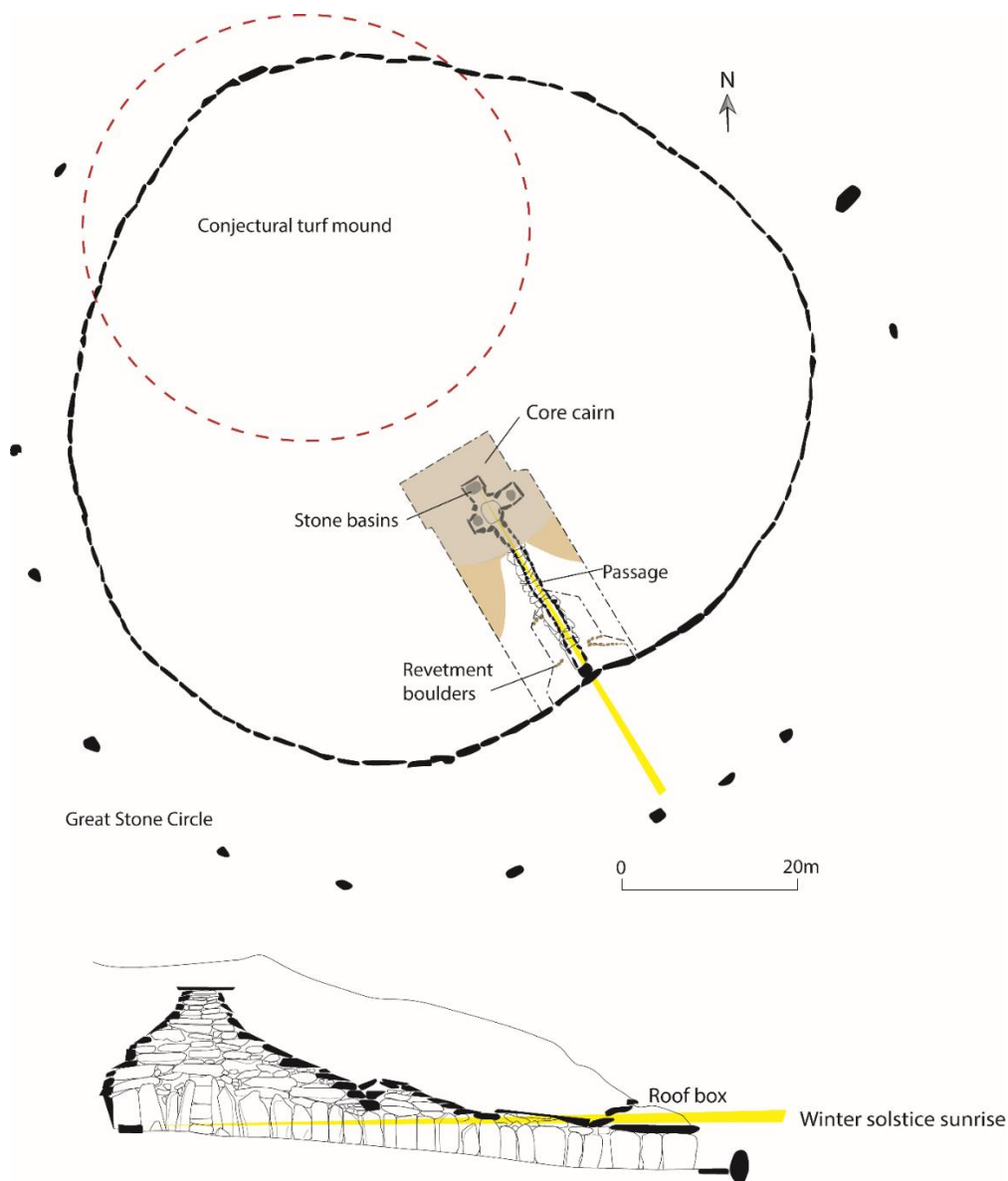


Figure A4-8 Plan and section of Newgrange passage tomb, showing early turf mound and midwinter solstice alignment (after figures in O’Kelly 1982)



Figure A4-9 Stone basin within right-hand recess of the chamber at Newgrange (author's photograph)

Abstracting from one single individual to a whole structure of society is problematic, especially given the mixing and movement of bone fragments within the tombs and so this is only one of several possible different interpretations for the status of this individual. Perhaps more interesting, when compared against the DNA of 38 other people buried in passage tombs in Ireland, genetic affinities were identified between the male buried at Newgrange and others buried elsewhere (Table A4-2; Cassidy *et al.* 2020). He had detectable distant kinship (closer than 6th degree relation, equivalent to, for example, second cousin or great-great-great uncle) with a male buried at Listhoggil court cairn (Sánchez-Quinto *et al.* 2019), the large central tomb at Carrowmore. The two related men are unlikely to have lived contemporaneously, the Listhoggil individual living least two, and probably many more, generations before the Newgrange individual. A relationship was also identified between the Newgrange individual and both CAK532 and CAK530, a male and female from Cairn K at Carrowkeel (Kador *et al.* 2018, table 8; Cassidy *et al.* 2020, 386). Again, the radiocarbon dates on these two individuals suggest that they are unlikely to be contemporaries with the Newgrange man, probably living several generations later (Table A4-2). These two individuals were buried late in the overall sequence of funerary activity at Carrowkeel, when unburnt human bones were the predominant practice (Kador *et al.* 2018).

Table A4-2 DNA relationships of NG10, male from right-hand chamber of the Newgrange passage tomb (information from Kador et al. 2018; Sánchez-Quito et al. 2019; Cassidy et al. 2020)

Individual	Location	Date (95% prob)	Sex	Relationship
car004	Listhogil court cairn, Carrowmore	3640–3380 cal BC	Male	<6th degree to NG10
NG10	Newgrange, east chamber	3330–3090 cal BC	Male	<6th degree to car004 and CAK532
CAK532	Carrowkeel, Cairn K	3015–2880 cal BC	Male	<6th degree to NG10
CAK530	Carrowkeel, Cairn K	2890–2630 cal BC	Female	<6th degree to NG10

Outside Newgrange tomb, there were significant spreads of cobbles and quartz pebbles in aprons or platforms around almost the entire southern half of the façade, centred on the entrance (Figure A4-10, see description in Case Study 3). Near this entrance was a foundation trench with six irregularly spaced postholes, a row of small stones and some further postholes interpreted as the remains of a small building (O’Kelly 1982, 76). This structure appears to pre-date the quartz layer, and so may be contemporary with the monument. A radiocarbon date obtained from a cattle tooth fragment from the subsoil under part of a quartz layer at the rear of the tomb of 2570–2290 cal BC (Table A4-3: UBA-25186) has been used to suggest that the quartz layer was not laid down until the latest Neolithic or early Bronze Age (Schulting 2014, 47). However, this single tooth may well have slipped between the stones (Carlin 2017, 15). The quartz-granite layer is spatially respected by a large post-and-pit circle of late Neolithic date and is covered by occupation debris containing Grooved Ware (Section A4.5.2), so must have been in place by the middle of the late Neolithic.

Surrounding Newgrange passage tomb are 12 standing stones referred to as the ‘Great Stone Circle’, standing in a circle of 104 m average diameter (O’Kelly 1978, 3; Figure A4-10). There are likely to have been more monoliths originally, although it is not clear whether the circle was complete. Excavations in search of missing stone holes have returned mixed results, sometimes finding convincing pits with packing material (e.g., GC-3 and GC-6, O’Kelly 1978, 80) but in other cases only revealing shallow hollows where an upright may have stood (e.g., GC-2, Ó Ríordáin and Ó hEochaidhe 1956, 58). Little attention has been paid to the monoliths of this stone circle, with discussions of their origin and geology absent from the literature, although cup marks have been noted on at least one of the stones (Ó Ríordáin and Ó hEochaidhe 1956, 55).

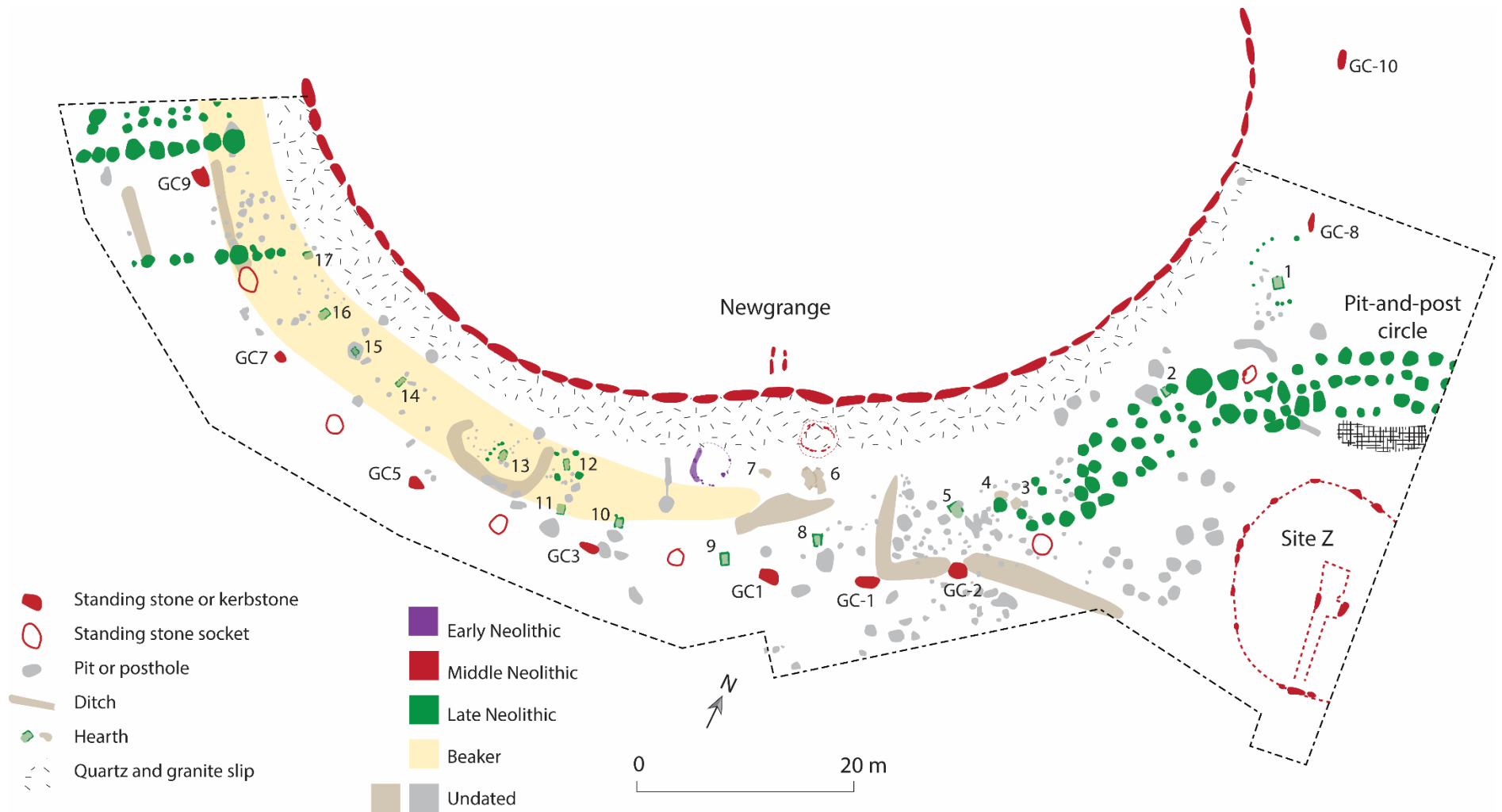


Figure A4-10 Southern façade of Newgrange chambered tomb, showing various excavated features including part of the pit-and-post circle, Site Z, the Great Stone Circle and late Neolithic occupation represented by hearths and pits (after O'Kelly *et al.* 1983, figs 2, 4, 8, 10 and 12)

O’Kelly argued that the stone circle was contemporary with or even earlier than the passage tomb (O’Kelly 1982, 82; O’Kelly *et al.* 1983, 15). In some areas the quartz layer appears to have accumulated against the upright stones and was later covered by late Neolithic occupation debris (O’Kelly *et al.* 1983, 10). However, during excavations of the post-and-pit circle, the base of GC-2 was found to be at a higher level than the pits, and therefore the stone circle was interpreted as post-dating this monument and the passage tomb (Sweetman 1985, 208). Although the stratigraphic detail remains confusing (see Bradley 1998 for discussion), the consensus is that the Great Stone Circle pre-dates much of the occupation and ceremonial activity outside but post-dates or is contemporary with the passage tomb.

To the west of Newgrange lie two small passage tombs, Sites K and L (Figure A4-1: 20 and 21), and to the east is another, Site Z (Figure A4-1: 24 and see also A4-3). Site L was originally 22–24 m in diameter, with cruciform chamber and a kerb of contiguous stones which flattened on the western side nearest Site K, suggesting that it was the later of the two (O’Kelly *et al.* 1978, 257) although no radiocarbon dates are available from these tombs. The mound of Site L was built of pure sand covered with turves, probably capped by a pile of stones. The chamber was of cruciform shape, within which burnt bone, fragments of bone pins, three small chalk balls, pottery and some fossils were found. Some of the burnt bone was found in the sockets for the orthostats of the end chamber, and so must have been placed there during construction. Human bone was also present in the outer passage and at the junction of the passage and outer kerb (O’Kelly *et al.* 1978, 258–61). The adjacent Site K was a more complicated monument, which had begun as a simple passage grave 8 m in diameter but had later been extended with a longer passage, and a larger mound of 20 m diameter surrounded by a circle of kerbstones. The primary mound was a mixture of turves and soil and the secondary mound of compact reddish soil with turf streaks. The chamber was a simple undifferentiated shape, with an annex off the right-hand side; it had been disturbed and only some fragments of burnt human bone and a chalk ball were found within (O’Kelly *et al.* 1978, 276–81). Interestingly when the passage was extended, the original blocking stone was retained, suggesting that access to the interior was prevented (Richards and Cummings 2017, 239).

Site Z, located on the eastern side of Newgrange, was a turf mound, covered with a layer of water-rolled stones and with a surrounding kerb 20 m in diameter. Several pieces of quartz and a few granite boulders lay outside the entrance. The chamber was of undifferentiated type, with a small side chamber; within this and the passage were found layers of cremated human bone. A basin stone was also found in the chamber, lying on top of two flat stones which covered a further spread of burnt human bone with two barrel-shaped beads. Other finds included two chalk balls and a small skewer pin (O’Kelly *et al.* 1978, 287–93). A radiocarbon date on a fragment of skull from this site of 3330–2920 cal BC (Table A4-3: OxA-36080) shows that it was used for burial at roughly the same time as the larger mound of Newgrange.

Although Sites K and L had been damaged by later agricultural activity, from antiquarian records it appears that they remained extant as mounds until relatively recent times (O’Kelly *et al.* 1978, 328–330).

Site Z, on the other hand, appears to have been deliberately destroyed at an earlier date. Based on some sherds 13th and 14th century pottery found in the entrance and tomb area, the excavators thought that this took place in the medieval period to facilitate agriculture (O’Kelly *et al.* 1978, 344). However, there are strong indications that this took place much earlier, perhaps in prehistory. Although most stones were broken and moved, some were left intact, including an unusual white limestone entrance stone and the decorated basin stone (O’Kelly *et al.* 1978, 290). Recognisable unburnt human remains from the passage or chamber were removed and placed into three pits dug outside the kerb, along with masses of greywacke fragments. The pits were closed with soil and quartz, on which burning took place, before being covered with water-rolled stones from the cairn (O’Kelly *et al.* 1978, 292). This suggests a degree of care to re-inter the human remains, although cremations were not treated in the same way. This could well have taken place in the late Neolithic or early Beaker period to facilitate the construction or use of the large post-and-pit circle (Section A4.5.3); Beaker pottery was found in some of the removed stone sockets (O’Kelly *et al.* 1978, 303–14).

4.4.4 Dowth passage tomb

The passage tomb at Dowth is the most dilapidated and least understood of the three major tombs (Figure A4-11). The mound has a diameter of 85 m, and of an estimated 115 kerbstones, only 66 are visible today (Stout 2002, 57). The original height and diameter of the mound are thought to have been very similar to Newgrange, although it appears to have been constructed of angular quarried greywacke and slate, rather than water-rolled stones (O’Kelly and O’Kelly 1983, 158; Stout 2002, 24). An 1847 excavation found the northern chamber and an adjacent souterrain, but the expected central chamber was not found, and the mound was left with an open crater (Harbison 2007). The construction of the souterrain, as well as further poorly recorded excavation and conservation works in the 1880s, have disturbed much of the prehistoric archaeology.

Two Neolithic chambers are known, located about 25 m apart on western side of the mound (Figure A4-12). The northern passage leads to a cruciform chamber with prominent orthostats (Eogan 1986, 133). Scattered fragments of a basin and a quantity of bones, both human and animal, were found here (Wilde 1849). Within an annexe off the right-hand recess is a massive rectangular slab with a large natural hole that opens into the ground (Robin 2010, 395). The southern passage is shorter, leading to a roughly circular chamber with a single recess. Again, vast quantities of bones were found in this chamber (Wakeman 1848). Survey work has shown that the passage points crudely towards winter solstice sunset, but it is not a precise alignment (Prendergast and Ray 2002, 34; see Case Study 7). No radiocarbon dating has yet been undertaken of the human remains. Some have speculated (e.g., Herity 1974, 34; Cooney 2000, 157) that there may be other undiscovered tombs on the east side of the mound, where there is a flattening of the kerbstones (Figure A4-12).



Figure A4-11 Drowth passage tomb, showing the relatively overgrown nature of the site (author's photograph)

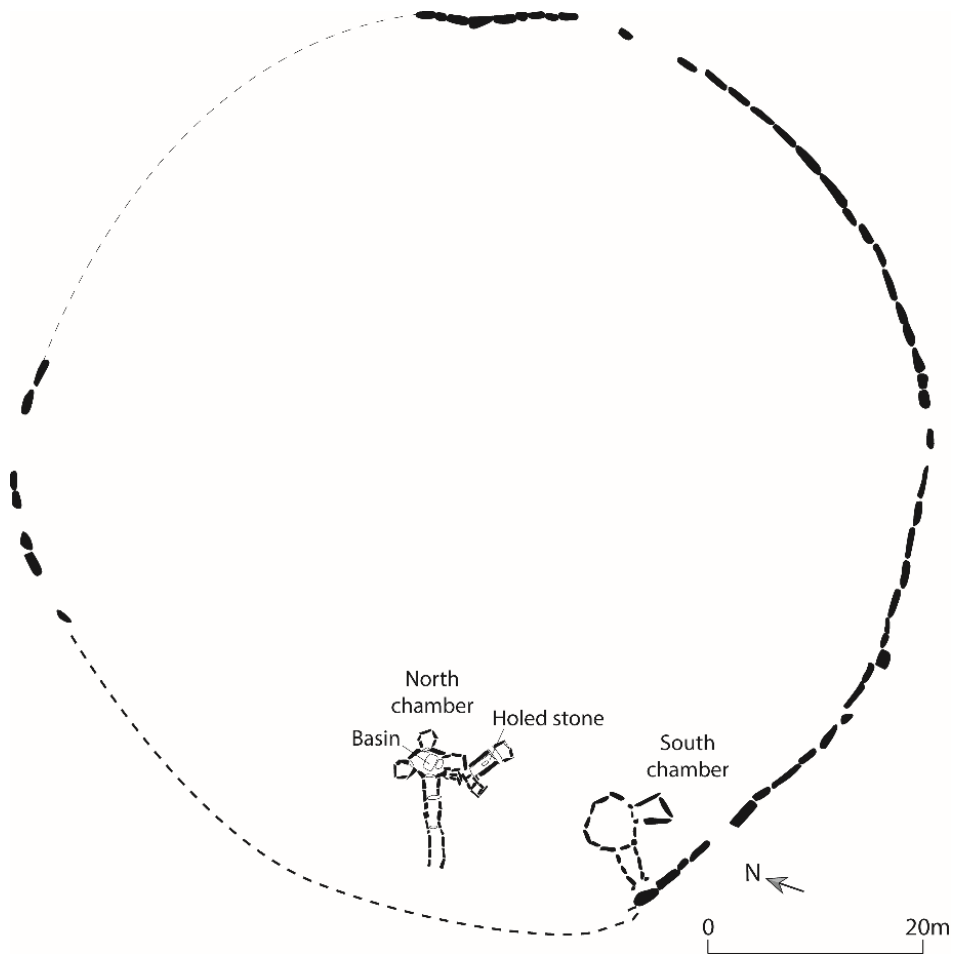


Figure A4-12 Plan of Drowth passage tomb (after O'Kelly and O'Kelly 1983, figs 3, 6 and 8)

Dowth sits within a cluster of smaller tombs. Recent geophysical survey in the area has identified two areas of high resistance which coincide with surface clusters of greywacke and other non-local stones (Fenwick 2015, 33–4). The re-use of greywacke stones in both the later souterrain in Dowth mound and a nearby medieval tower-house suggest that they were robbed from smaller passage tombs nearby (Fenwick 2015, 37). A ‘cromlech’ of four large upright stones was noted near to the church by mid-19th century antiquaries (Lewis 1837; Wilde 1849). Now destroyed, this could also have been a passage tomb. These all suggest that there were originally several smaller passage tombs clustered around the main tomb at Dowth, in a similar way to those around Knowth and Newgrange.



Figure A4-13 Rock art panel from one of the newly discovered passage tombs under Dowth Hall, during excavation in September 2017 (author’s photograph)

There are additional passage tombs in the wider Dowth area, along a prominent ridge. About 1 km to the east of Dowth passage tomb are two small passage graves, Sites I and J (Figure A4-1: 49 and 50), in the grounds of Dowth Hall. Site 49 is about 20 m in diameter, with 10 visible kerbstones as well as a quartz scatter near the entrance. Site 50 contains a passage grave with a chamber of five cells (O’Kelly 1978, 54–5). Recent excavations have revealed at least two further passage tombs, at least one with megalithic art, directly adjacent to the hall and partly destroyed by its construction of its foundations (Figure A4-13). Further to the east again, the stone monument at Cloghalea (Figure A4-1: 56) may also have been the remains of a sizeable passage tomb (Fenwick 2015, 28–29). Unfortunately destroyed in the late 18th and

19th centuries by quarrying, it was composed of 11 exceptionally large boulders and a 'kistven' (Pownall 1773); human remains were found in the vicinity (Wilde 1849).

Between Dowth passage tomb and Newgrange are three further tombs or mounds Sites F, G and H (Figure A4-1: 42, 43 and 44). Site F has been described as a possible long barrow (Cooney 2000, 158) but Fenwick (2015, 30) has argued that this is a partly destroyed passage tomb. Site F is a round mound 16 m in diameter with a few stones visible, and Site H is a 20 m circular mound where a decorated stone was found (O'Kelly 1978, 57–8). Several other small probable passage tombs (Figure A4-1: 28, 33, 35 and 36) stand on the river terraces in this area, and two standing stones (Figure A4-1: 38 and 39) of uncertain date.

4.4.5 Summary

The construction of the three major passage tombs of Newgrange, Knowth and Dowth was a major undertaking, involving many hundreds of people in obtaining and transporting the materials, transporting turves, moving, and erecting the larger stones and building the cairn structures. Just the cutting and movement of acres of turf would be an enormous task, and "prodigal extravagance" (Lynch 2014, 66), sacrificing acres of lush pasture. The smaller passage tombs in the area appear to have equally complex histories and would have taken substantial investment in time and energy to construct. We can expect that people were living relatively close to the monuments, at least temporarily during construction, and this may be attested by the areas of middle Neolithic settlement at Knowth and Newgrange. Settlement areas further afield, dating to this period or the later Neolithic, may be indicated by concentrations of lithic scatters around the monuments and along stream tributaries to the south of the Boyne (Brady 2007).

At Newgrange, Knowth and probably Dowth too, the tombs were enlargements of earlier smaller structures, and each had a complex sequence of construction, embellishment and use extending into the late Neolithic period. It has been suggested that the three passage tombs were constructed "as part of a single grand scheme intended to bind together the previously dispersed passage tomb distribution" (Fenwick 2015, 23), each one similar but different, and deliberately positioned as visual beacons along the bend of the Boyne. It may be that the three tombs were enlarged at a similar time, but they appear to have been built at three locations that were already important, and these locations endured as special locales, as smaller passage tombs and other timber structures continued to be built in their vicinity.

4.5 Late Neolithic

Most archaeologists writing about Brú na Bóinne have firmly divided the period of the passage tomb construction, the middle Neolithic, from activity characterised by the appearance of Grooved Ware pottery, in the late Neolithic. Eogan referred to this activity at Knowth as the 'Grooved Ware complex' (e.g., Eogan and Roche 1997, 101) and in his analysis of the radiocarbon dates from the site, Grogan

identified a “clear separation” between the passage tombs and late Neolithic activity (Grogan 1991, 129). The adoption of Grooved Ware pottery and changes in monument types have even been attributed to the arrival of ‘Grooved Ware people’ (Eogan 2003, 66). However, with new radiocarbon dates from Knowth and an increasing understanding of late Neolithic activity (e.g., Carlin 2017), this separation no longer stands up to scrutiny. Grooved Ware was not a short-term phenomenon but was used in Ireland between about 3100 and 2400 cal BC (Brindley 1999; Sheridan 2004, 30) and Carlin (2017) has shown that Grooved Ware was incorporated into the Irish passage tomb tradition throughout the floruit of the developed tombs. There was, however, a change in the location and form of activity in the late Neolithic, with the probable construction of new, large, and spectacular timber structures and earthen enclosures, associated with evidence for large-scale gatherings and feasting activities. These were built outside the passage tombs, in a continuation of the gradual shift (which had begun in the middle Neolithic) from activity focused on the interior to the exterior of these monuments (Carlin 2017, 22).

4.5.1 Knowth possible henge and square-in-circle structure

At Knowth, Grooved Ware pottery was found with deposits of human bone within Tombs 6 (Section A4.4.2) and 18, in what appear to be primary funerary contexts. The Grooved Ware pot (Vessel 73) from Tomb 6 is one of the earliest in Ireland but it is associated with a typical mix of burnt and unburnt human bone as well as a pestle pendant and bead fragment (Carlin 2017, 11–2). That from Tomb 18 was found with a rounded scraper, charcoal, animal bones and an unburnt human skull fragment (Roche and Eogan 2001, 128). Unaccompanied deposits of human bone were also placed in the Knowth tombs during the time that Grooved Ware was in use (Carlin 2017, 13). For example, in Tomb 1C West, cremation deposits were placed in the extension of the passage which have been dated to 2930–2700 cal BC (Table A4-3: OxA-21992) and 2880–2630 cal BC (Table A4-3: UBA-12681). At Tomb 15 a cist-like stone compartment contained a cremated adult female dating from 2920–2785 cal BC (Table A4-3: UBA-12683) and at Tomb 17, cremated bones from the passage gave a date of 2875–2630 cal BC (Table A4-3: UBA-12688). Funerary activities at the major passage tombs continued, albeit at a reduced scale, well into the late Neolithic period, as they did at other monument complexes such as Carrowkeel, where burials continued until 2900–2780 cal BC (Kador *et al.* 2018, 234).

Geophysical survey to the immediate south-east of the main Knowth mound has identified a concentric elliptical monument of unknown date beyond the limit of previous excavations (Figure A4-1: 5; Fenwick 2012, 819). It is defined by two widely spaced sediment-filled ditches, the larger of which measures 63 m across. These enclose a probable palisade and an off-centre cluster of anomalies in a circular area 22 m in diameter, which may be pit or post-holes. Although this is undated, it appears to have prehistoric characteristics and may well be a major late Neolithic monument of similar form to the Dowth henge (Section 4.5.4) or other double-ditched henges.

More easily assignable to the late Neolithic is a timber structure of 'square-in-circle' form, a type of structure now known across large parts of Britain and Ireland (see Chapter 5.6). The example at Knowth was located just 12 m from the entrance to the eastern tomb (Figure A4-1: 4; Eogan and Roche 1999, 101–222). Roughly 8 m in diameter, it was defined by four large post-pits forming a square, with two further large post-holes forming an entrance to the east. The square of posts is surrounded by a circle of 19 post-pits, the entrance area further enhanced with two additional double post-holes and three smaller post-pits flanking each side, forming an additional façade (see Figure 5-19; Figure A4-14).

Three of the central post-pits of the Knowth structure had a scoop or annex dug into their upper fills after backfilling, which contained unabraded Grooved Ware pottery, flint artefacts and a stone axe, as well as ash and charcoal. Similar material, seemingly deliberately deposited, was found in other post-pits, including some re-fitting pottery from upper and lower fills, leading the excavators to suggest that deposition took place at the time the structure was built, with the posts decaying in situ (Eogan and Roche 1997, 188). As is typical for these structures, deposition of finds was structured, not random – for example, many scrapers were snapped, flints dominated the entrance and central pits, and rim sherds were more common in the entrance pits (Eogan and Roche 1999, 106). Organic residues on Grooved Ware pottery from this structure have produced dates of 2880–2580 cal BC (Table A4-3: GrA-445) and 2620–2350 cal BC (Table A4-3: GrA-448). Together with a determination of 2580–2460 cal BC (Table A4-3: UBA-14781) on a charred hazelnut shell from a post-pit in the timber circle, they suggest a mid-3rd millennium date for the structure (Schulting *et al.* 2018, 377). The timber circle was also surrounded by a ring of nine small stones, interpreted as an outer boundary (Eogan and Roche 1997, 103).



Figure A4-14 Knowth square-in-circle timber structure, as reconstructed on site (author's photograph)

4.5.2 Late Neolithic occupation at Newgrange

A series of at least 18 hearths associated with pits and postholes representing intensive occupation were built over and beyond the edge of the quartz layer outside the passage tomb at Newgrange (Figure A4-10; O’Kelly *et al.* 1983, 10–35; Smyth 2014, fig 5.15). Most were rectangular stone settings, associated with large quantities of lithics and animal bone, and with Grooved Ware and Beaker pottery. Two of the hearths (1 and 13) were associated with nearby arcs of postholes and could have been located within structures (Cooney and Grogan 1994, 79) and Hearth 12 appears to have been set within a square of four substantial post-holes and so comprises a miniature ‘square-in-circle’ structure. The hearths appear to be carefully spaced around the circumference of the earlier passage tomb, within the Great Stone Circle. The more amorphous hearths (2, 3, 6 and 7) may be earlier in date (Figure A4-10). In the ‘far western area’, two parallel lines of large postholes 10.5 m apart, and apparently linked by wattled walls, ran radially up to the kerb of the passage tomb (O’Kelly *et al.* 1983, 35, fig 12). To the west of this were two more parallel lines of smaller postholes; the whole structure had been destroyed by fire.

The excavator described this occupation evidence as ‘squatting’ (O’Kelly 1982, 78) and attributed it to the Beaker period. However, there is a significant Grooved Ware component to the pottery assemblage, and although activity continued into the Chalcolithic or earliest Bronze Age, as attested by the quantities of Beaker pottery found in the middens and occasionally, within the tombs (Carlin 2017, 26), it generally derives from late in the sequence. Occupation seems to largely be a late Neolithic phenomenon and the hearths bear similarities to those within Orcadian houses of a similar date (see Appendix 5). One of these hearths (2) appears to be cut by a pit of the pit-and-post circle, suggesting that it pre-dates the digging of that circuit (Figure A4-10; Section 4.5.3). To the west of the main passage tomb entrance, these late Neolithic and Beaker features were covered by a bank of yellow clay which ran parallel with the kerb (O’Kelly *et al.* 1983, 26). It seems to deliberately cover some of the late Neolithic features, perhaps closing activity in this area, in much the same way as an earthwork henge might be created as the final activity at a ceremonial site. Yellow clay was similarly used to cover an area of similar late Neolithic activity around Tomb 15 at Knowth, represented by a concentration of Grooved Ware pottery in an area originally termed Beaker Concentration A (Eogan and Roche 1997, 202).

4.5.3 Newgrange post-and-pit circle, square-in-circle structures, and other timber monuments

Excavations in 1982–3 just south of Newgrange passage tomb revealed a large post-and-pit circle, part of which had been found by O’Kelly in his 1962–75 excavations (Figure A4-1: 25; Figure A4-10). The enclosure surrounded an area c.120 m in diameter, which encompassed the earlier passage tomb Site Z within its northern half. Its position appears to respect the quartz and granite layer described above. The complete circuit can be seen on geophysical survey results (Figure A4.3) showing that the enclosure is flattened to the south-east, much like the exterior of a passage tomb. It is approached from the south-

east by an elaborate avenue or entrance way, formed by two parallel lines of enormous pits, flanked by two lines of smaller pits, and crossed by a double façade. The box-like arrangement of features here looks very similar to the 'entrance chamber' at Ballynahatty (Hartwell 2002; Carlin 2016, 203). At the centre is a complex square structure surrounded by a ring of posts which has been interpreted as a version of a square-in-circle structure (Carlin and Cooney 2017, 45). It is possible that the construction of this major monument necessitated the decommissioning and removal of passage tomb Site Z, the off-centre position of which suggesting that it was not created to simply surround the passage tomb (Section A4.4.3).

The post-and-pit circle consists of six irregular rows of pits and had at least two standing stones on its outer edge (Sweetman 1985). The outermost pits appear to have held large wooden posts averaging 34 cm in diameter. There were then two circuits of pits, the outer row lined with clay and containing charcoal and burnt clay. It seems that these had been used for extensive burning and some contained burnt and unburnt animal remains, including pig, cattle, deer, and dog. The inner row of pits was more varied; not all were clay-lined, and some had contained posts (Sweetman 1985, 197–9). Continuing inwards, the next three circuits of pits contained quantities of burnt animal bone. Inside the arc were charcoal spreads and flint flakes indicative of occupation. The circle was associated with Grooved Ware, with Beaker pottery only found associated with the internal occupation features. The structure has been compared by some to a henge (e.g., Cooney 2006, 698) but it has many unusual features, not least the presence of burnt animal remains and multiple rings of pits. The circle produced 16 radiocarbon dates on charcoal associated with the burnt animal bone or from within the pits, and one on charcoal within the central occupation spread (Sweetman 1985, 218; Grogan 1991, 130). Despite these being on unidentified and often bulk charcoal samples, the determinations are remarkably consistent, and when modelled together (as a single phase of use, using a charcoal outlier model) give an estimated start use of the post-and-pit circle of 2640–2470 cal BC and an end date of 2560–2280 cal BC (95% probability, Figure A4-15).

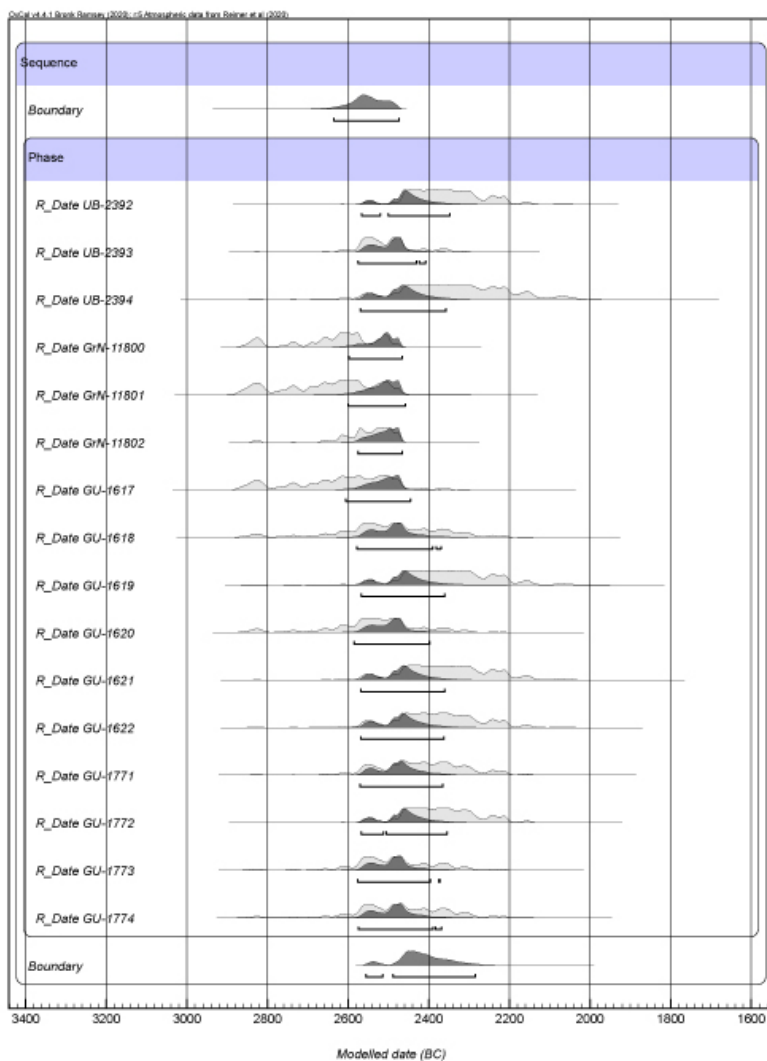


Figure A4-15 Probability distributions of dates from the post-and-pit circle at Newgrange. Each distribution represents the relative probability that an event occurs at a particular time. For each of the dates two distributions have been plotted: one in outline, which is the result of simple radiocarbon calibration, and a solid one, based on the chronological model used. The dates (from O’Kelly *et al.* 1983 and Sweetman 1985) have been modelled as single phase of use, using a charcoal outlier model

Seven, probably eight, square-in-circle timber structures have now been identified through aerial photography and geophysical survey in the immediate area around Newgrange, largely located on higher ground along the ridge where Newgrange itself is located (Figure A4-1: 4, 6, 7, 8? 9, 16, 25 and 37). Although none have been excavated, except for the small example set around a hearth (mentioned above; Figure A4-10, Hearth 12), based on comparison with the example at Knowth and others excavated elsewhere, these are likely to be late Neolithic in date.

Along the ridge to the west of Newgrange, beyond Sites K and L, is a uniform circular ditch measuring about 50 m in diameter, surrounded by a ring of what appear to be large six standing stones (Figure A4-1: 9; Figures A4-16 and A4-17; Rassmann *et al.* 2019, figs 10 and 11). Within is a classic large ‘square-in-circle’ four-post arrangement, measuring 21 m by 7 m, with a central box-like feature and a surrounding timber façade. The box-like feature bears a resemblance to the one at the centre of the pit-and-post

circle south-east of Newgrange (see Figure A4-3). This is the largest of the square-in-circle structures so far identified in Ireland. Although the ditch has an opening towards the east, facing Newgrange, the orientation of the structure is northwest–southeast, with two large pits or postholes to the northwest. This creates an alignment that matches that of Newgrange, either towards the midsummer solstice sunset or midwinter solstice sunrise (Davis and Rassman 2021). Another ditched enclosure surrounding a probable square-in-circle structure lies to the west (Rassmann *et al.* 2019, fig 10).



Figure A4-16 Geophysical survey of site 9 (NG16), an elaborate square-in-circle structure to the west of Newgrange, surrounded by a continuous ditch and probable stone circle. The major pits or postholes have been highlighted in red. © Steve Davis

Figure A4-17 shows six of the square-in-circle monuments that have been identified by geophysical survey and aerial photography in the Newgrange area (Condit and Keegan 2018, 25–30; Davis and Rassman 2021). Two of the structures (Sites 7 and 16) have timber avenues that approach the main entrances, which are generally to the east or south-east and marked by double pits and elaborated facades. Another two (6 and 37) have hints of a square arrangement at the centre, not dissimilar to the square structure at the centre of the pit-and-post circle described above.

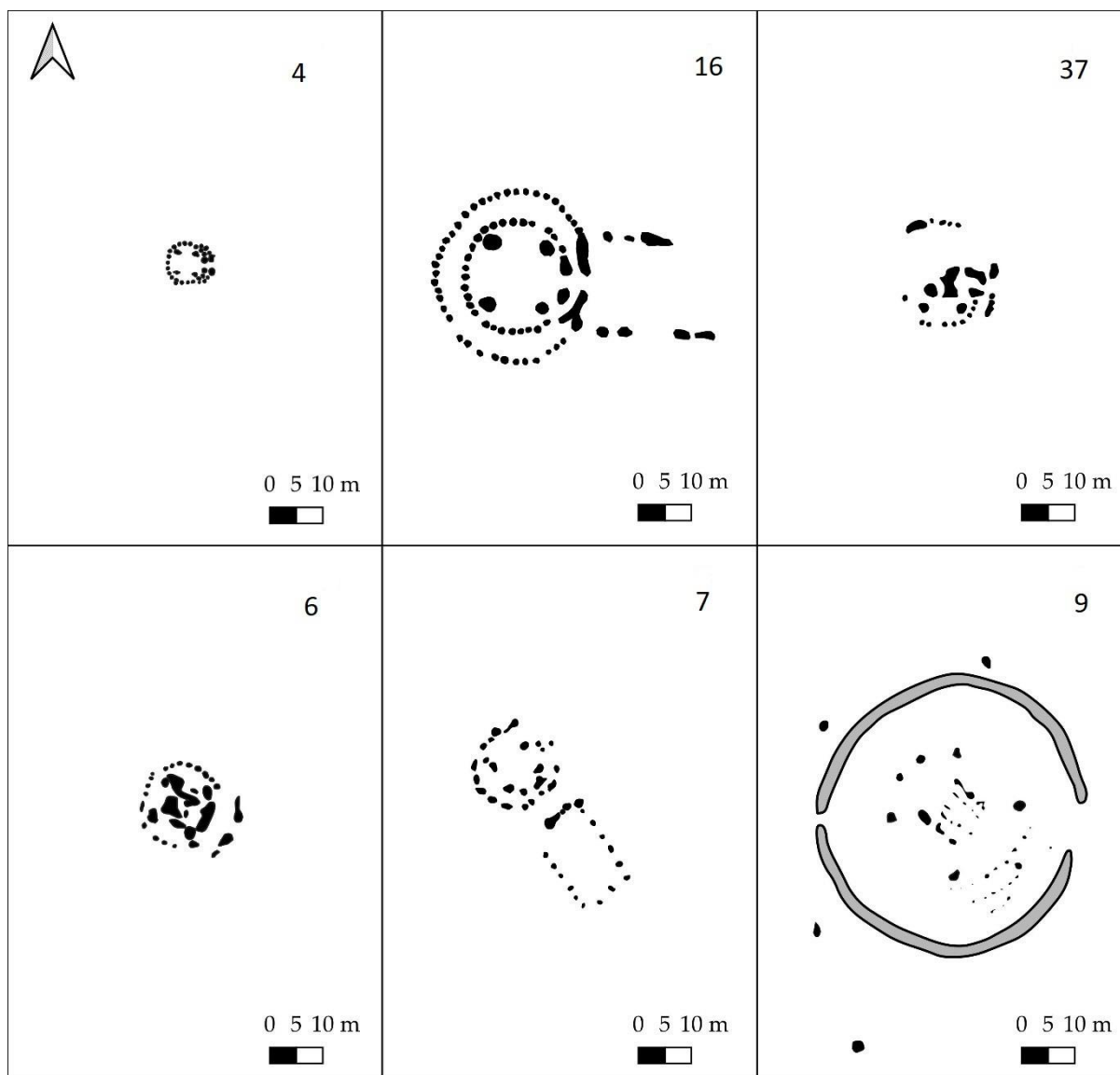


Figure A4-17 Brú na Bóinne square-in-circle structures drawn to same scale. Site 4; Knowth (excavated), Site 16 (aerial photography); Site 37 (geophysical survey); Site 6 (geophysical survey); Site 7 (geophysical survey); Site 9 (geophysical survey), (Davis and Rassman 2021, fig 11)

In addition to these square-in-circle monuments, a double circuit of pits, probably part of a complete timber circle, was uncovered during in 1984 to the west of Newgrange, between the main mound and Site L (Figure A4-1: 22; Sweetman 1987, 283). The full extent of this monument is not known, although the excavator estimated a circle 20 m diameter. Most of the pits held postholes, although some had been used for the deposition of animal bone, pottery and burnt material, and others were lined with clay (Sweetman 1987, 284–91). Unidentified charcoal from the base of one of the post-pits produced a radiocarbon date of 2580–2460 cal BC (Table A4-3: GrN-12828) and charcoal from one of the ‘rubbish pits’ a date of 2570–2290 cal BC (Table A4-3: GrN-12829). Beaker pottery was found at the site, largely in the upper parts of features. This circuit may surround an unknown passage tomb, another square-in-circle monument or may simply form a free-standing double timber structure.

Recent geophysical survey and limited excavations have revealed an unusual linear monument to the south of Newgrange, immediately east of Newgrange Farm (Figure A4-1: 17; Figure A4-18; Leigh *et al.* 2019). At least 120 m long and 40 m wide, laid out roughly east to west, it consists of four parallel rows of postholes. These are surrounded by a double-ditched rectilinear enclosure, thought to flank a now-denuded bank, with a façade of posts to the east. The pits appear to be postholes that held substantial oak posts but were also used for the deposition of butchered cattle and (probable) pig bone, some of it burnt. Portions of willow and alder branchwood may suggest some form of screens or wattling between the posts. A radiocarbon date obtained on charcoal from the basal fills of the outer ditch suggests construction in 2830–2460 cal BC (Table A4-3: UBA-38707), probably 2580–2470 cal BC (68% probability). Although the excavators have been described it as a ‘hybrid cursus’, the late Neolithic date and deposition of animal remains make it very unlike other cursus monuments known elsewhere. Instead, it appears to be an elaborate timber post structure, with close similarities to the post alignment identified through geophysical survey nearby: within the nearby Newgrange post-and-pit circle, and others at Oldbridge and Dowth (Davis and Rassman 2021).

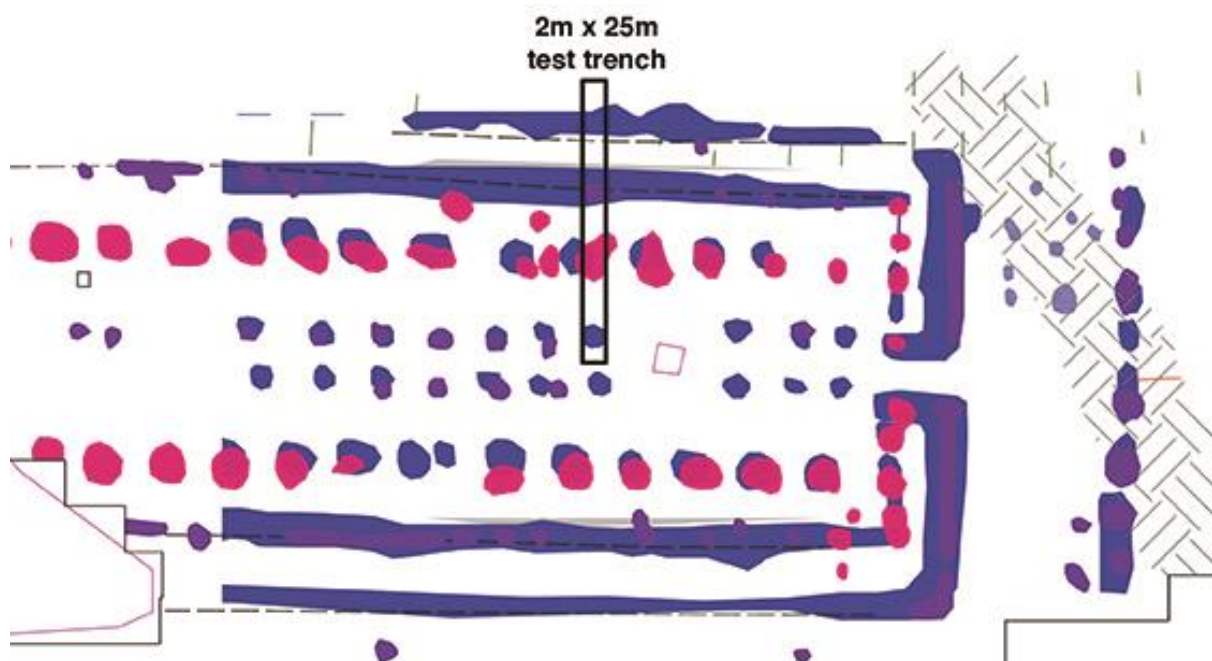


Figure A4-18 Plan of ditched linear timber monument to the east of Newgrange Farm (site 17) derived from geophysical survey and showing the location of the 2019 excavations (Leigh *et al.* 2018, 26)

Finally, aerial photography also enabled the discovery of the ‘Great Palisade’ (Figure A4-1: 18) three parallel lines of postholes forming a distinct arc that, if complete, appears to enclose an area c.900 m across enclosing the entire ridge on which Newgrange sits (Figure A4-19; Condit and Keegan 2018, 33–35, 72–6). It encloses not only Newgrange and part of the nearby cursus, but also the large linear post monument at Newgrange Farm and one of the square-in-circle monuments (site 16). This enormous palisade formed a significant division of the landscape, separating those monuments set on the ridge and uplands from those located on the lower river terraces. The date of this enclosure remains unknown, but

a late Neolithic date seems plausible given the associated with occupation of this date near Newgrange, placing it alongside palisaded enclosures in Britain and Ireland.

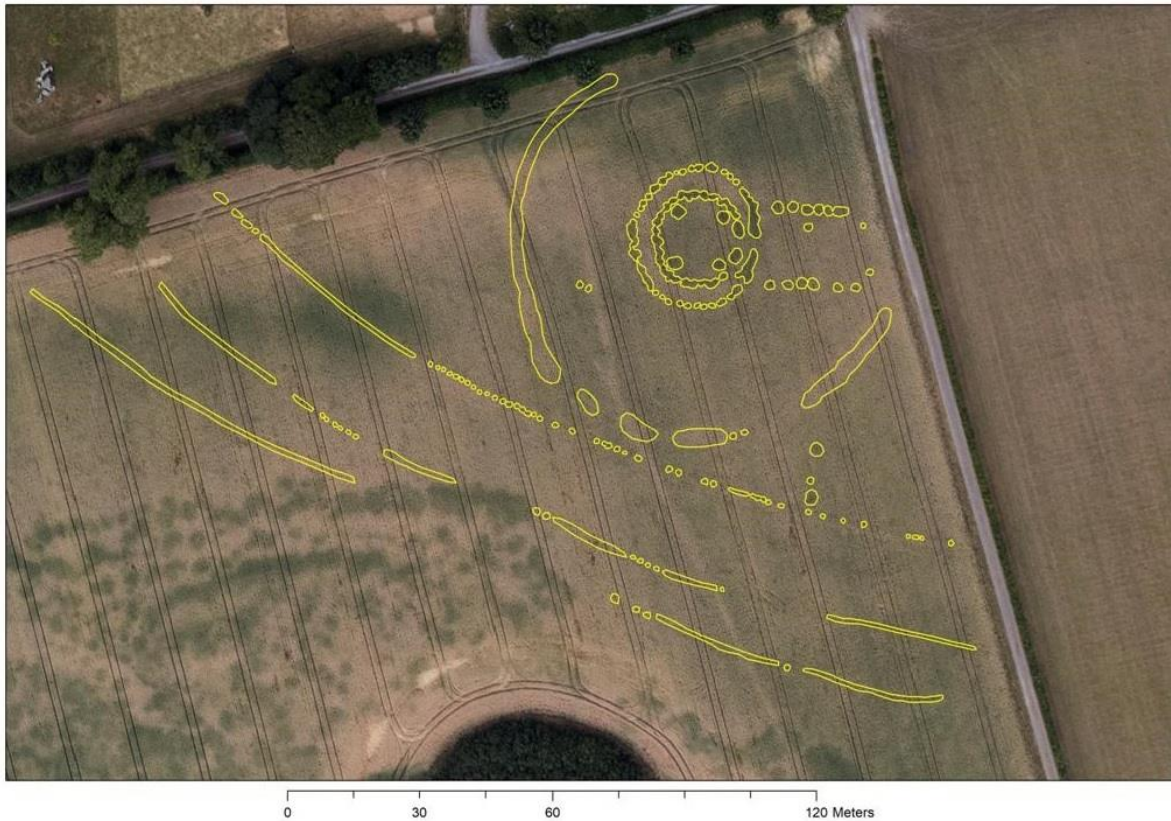


Figure A4-19 Aerial photograph overlain with cropmark interpretation, showing square-in-circle monument and avenue (site 16) and the enclosing triple 'Great Palisade' (site 18) (Condit and Keegan 2018, fig 30)

Assessments of the animal bones from the excavations around the southern perimeter of Newgrange have estimated the quantity of meat at an enormous 46,000 kg; this large quantity, the close association or articulation of bones and the lack of marrow extraction suggests that feasting was taking place on a large scale (Wijngaarden-Bakker 1986, 63; Mount 1994, 440). The double timber circle was dominated by pig bones, particularly astralagus and calcaneum (foot bones). Pig remains also dominated (79%) in the area excavated to the west of the tomb entrance, but here scapula, vertebrae, tibia, and teeth were deposited. Large numbers of pig teeth also appear to have been placed near the tomb entrance (Mount 1994, 438–9). In contrast, the central and eastern areas outside the tomb, including the post-and-pit circle, were dominated by cattle bones. These appear to have been deliberately deposited, with most bones from relatively inedible parts of animals and are perhaps related to processing carcasses for feasting in the vicinity (O'Sullivan *et al.* 1985, 219). It seems that different types of animals and body parts were deposited in specific areas of the site.

An assessment of pig molar wear has revealed that 70% of pigs were slaughtered between October and April (Wijngaarden-Bakker 1986, 75) suggesting that midwinter feasting was taking place at the site, as suggested at other late Neolithic ceremonial sites such as Durrington Walls (Wright *et al.* 2014). Pigs were

largely being killed between 2 and 2.5 years of age and were apparently particularly large animals compared to other Neolithic European pigs (Wijngaarden-Bakker 1986, 69). The low numbers of juvenile pigs and cows from the site, together with a lack of quern stones and rubbers, suggests that this was very much a consumption site, again a similar pattern to Durrington Walls. This feasting evidence, present at all the sites so far excavated, together with the sheer number and variety of timber post and pit structures, all point to intensive use of the area immediately surrounding Newgrange in the late Neolithic period, with potentially hundreds of people gathering at the site to undertake ceremonial activities, particularly at the solstice.

4.5.4 Dowth henge and the other circular enclosures

The term 'henge', denoting an earthwork enclosure, has not been used widely in Irish archaeological literature. Instead, the classification of 'embanked enclosure' is preferred because the construction process often involved the scraping up of material from the interior to form the bank, rather than digging ditches, as is the case of henges elsewhere. However, henge enclosures of various types are now being recognised, with embanked enclosures increasingly seen as an Irish variant of henge monuments (O'Sullivan *et al.* 2012).

Brú na Bóinne has one of the greatest concentrations of henge monuments anywhere in Ireland, although this may at least partly due to intensive study of the area over many years, with discoveries made most recently through analysis of Lidar imagery (O'Sullivan *et al.* 2012) and aerial photography (Condit and Keegan 2018). There are at least 10 embanked enclosures or henges known in the area, almost all of which are circular or sub-circular in plan, with a saucer-like profile (Stout 1991; Davis 2013; Davis and Rassman 2021). Unlike the square-in-circle timber structures discussed above, the henge monuments are all located on lower alluvial terrace between the passage tomb at Newgrange and the River Boyne (Figure A4-1), with other examples at Dowth to the east and at Monknewtown to the north.

The main henge at Dowth (Figure A4-1: 55) is the largest surviving enclosure within Brú na Bóinne, 175 m in diameter and with well-preserved banks that survive up to 4 m high. The good preservation is due to a lack of intensive agriculture, due to the site's location within the grounds of Dowth Hall (Stout 2002, 34; Fenwick 2013). It is ovoid in shape, internally domed in profile and with two opposing entrances (O'Sullivan and Downey 2012, 36). Although it has never been excavated, recent geophysical survey has shown that it has several internal features and that it possessed both internal and external banks with a substantial berm between the outer ditch and bank (Davis 2013; Rassmann *et al.* 2019).

The henge monuments to the south of Newgrange can be divided into two clusters. The western cluster comprises of three enclosures of similar size and form, spaced regularly along the river terraces and with elaborated entrances facing towards the south-east. These are (west to east): the 'Univallate Henge', the 'Geometric Henge' and Site P. The 'Univallate Henge' (Figure A4-20: 10) was originally identified by

geophysical survey (Davis *et al.* 2010), with more detail added from aerial photographs. It has an external enclosing bank with a remarkably regular internal segmented ditch. Its overall diameter is 128 m north–south and 117 m east–west with a probable entrance to the south-east. The enclosure surrounds a low central mound with an elongated H-shaped row of four large pits with terminal ditches (Condit and Keegan 2018, 36–40), which may be a passage tomb (Davis and Rassman 2021, fig 7).

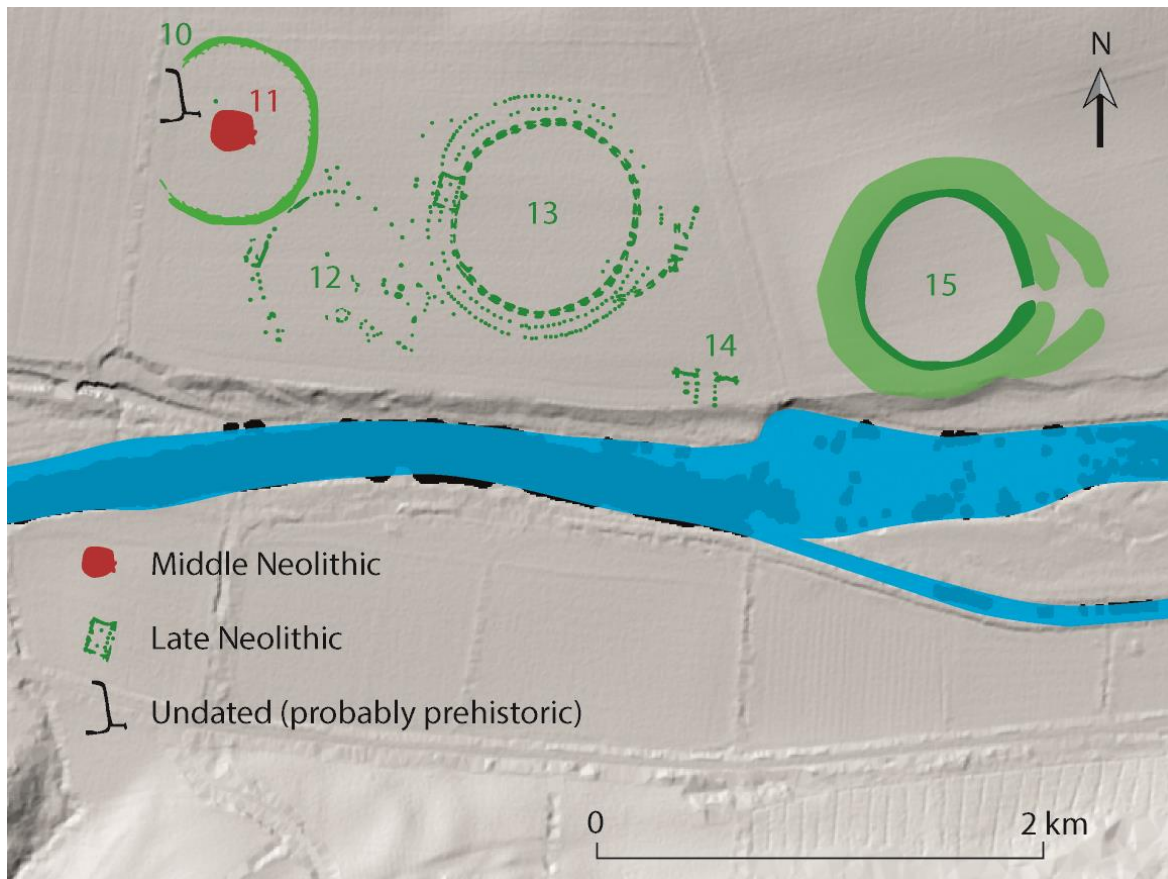


Figure A4-20 Detailed plan of western cluster of henges, south of Newgrange (after Condit and Keegan 2018, figs 61 and 78)

The ‘Geometric Henge’ (Figure A4-20: 13) lies immediately to the east. It measures 154 m north–south and 143 m east–west, defined by two outer rings of post-holes and an inner enclosure of regular double segmented ditches. On the eastern side is an annex, a separate curving section of segmented ditch and on the opposite, flattened, western side is a ditched rectangular ‘box’ feature. Close by, a post defined routeway with a facade appears to lead to the riverbank (Condit and Keegan 2018, 65–7).

Of the three, only Site P (Figure A4-20: 15) has earthworks that remain upstanding; it is 160 m in external diameter with a substantial surviving bank which has a stone core (O’Sullivan *et al.* 2012, 43). Recent aerial survey has identified an internal ditch and small outer bank. This site has a distinct curving annexe to the south-east surrounding the entrance, like that at the ‘Geometric Henge’ and the same as the shape of Dowth henge, suggesting that all three match a similar template (Davis and Rassman 2021, fig 2).

Another 98 m diameter enclosure (site 12), also with a possible rectangular structure on one side

(dubbed the 'Hidden Henge') lies between and to the south of the two westerly henges in the row (Condit and Keegan 2018, 58–9).

The second cluster of henge monuments lies to the south-east of Newgrange, with two large henges on the banks of the Boyne (Figure A4-21). Site A (27) survives as an earthwork enclosure with a large mound (presumably a passage grave, 28) at the centre, c.6 m high (O'Sullivan *et al.* 2012, 50). Recent aerial photographs have shown the enclosure has a small outer bank and annexe feature similar to Site P and the Geometric Henge, and similarly a distinct flattening on the western side of the perimeter (Condit and Keegan 2018, 85–9). To the north-east of Site A is a circular enclosure c.38 m in diameter, defined by a narrow bank and ditch (29), containing a smaller circular mound (Condit and Keegan 2018, fig 85). To the north-east geophysical survey has shown slight ditches inside and outside a broad bank, probably another henge enclosure although presently undated (Davis *et al.* 2013, 231; Figure A4-1: 40).

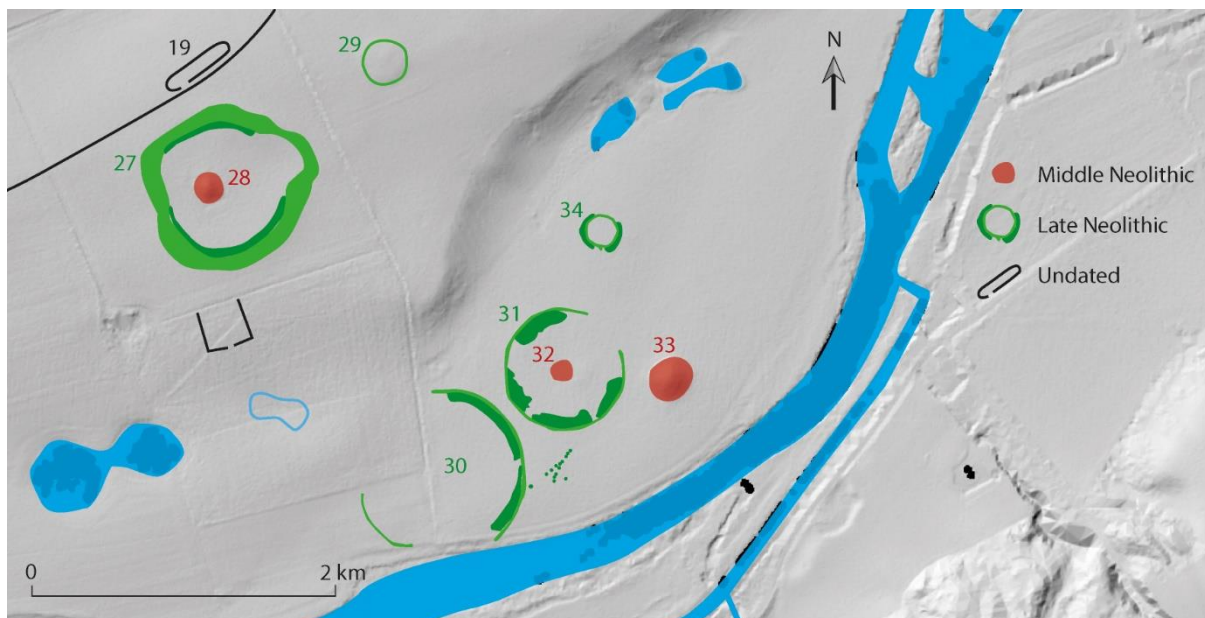


Figure A4-21 Detailed plan of eastern cluster of henges, south of Newgrange (after Condit and Keegan 2018, fig 112)

Closer to the river in this cluster are two embanked enclosures: site 30 is c.160 m across and site 31 measures c.120 m across (Figure A4-21). The smaller of the two has the remains of a low mound located near the centre (32; O'Kelly 1978). The larger is surrounded by a ditch just over 2 m wide, with a possible entrance to the east and a level interior (Condit and Keegan 2018, 124–8). To the north is a small circular enclosure, 39 m across, perhaps a small henge (Figure A4-21: 34).

Further afield, beyond the northern limit of the Brú na Bóinne study area, the embanked enclosure at Monknewtown is one of the few examples of these types of monuments to have been excavated. It contained several cremation burials in pits or small stone cists, including one of a child placed in a Carrowkeel ware bowl. Grooved Ware and Beaker pottery was also found, as well as later early Bronze Age burials and a timber structure interpreted as an early Bronze Age house (Sweetman 1976, 38). The

enclosure had been built by scraping up the interior to form the surrounding bank and formed part of a small cluster of monuments on the banks of the River Mattock, including a passage tomb (Stout 2010, 206) and a probably artificial circular pond, from which a late Neolithic radiocarbon date has recently been obtained (Davis *et al.* 2010, 142).

Irish embanked enclosures and henges are generally assumed to be late Neolithic in date, partly based on dating evidence from sites in Britain but also increasingly supported by new dates from developer-funded archaeology (e.g., Balregan 1, Co. Louth; Carlin and Cooney 2017, 46). This is supported by radiocarbon dates and pottery from Monknewtown, which suggest activity from the mid-Neolithic onwards (Smith *et al.* 1974, 269–70) although the construction of the enclosure was not dated directly. The large henges or enclosures to the south of Newgrange are all unique, enclosing a variety of features and with varying entrance and perimeter characteristics. Nevertheless, they appear to be placed in a regular layout with similar orientations (with entrances are to the south-east) and each draw on a similar repertoire; this suggests that they are contemporary or near contemporary. It should be noted however, that embanked enclosures and timber palisaded enclosures continued to be built in Ireland for some time, with the enclosure around a stone circle at Grange, near Lough Gur in Co. Limerick, built in the late Bronze Age (Roche 2004; Cleary 2015) and the concentric timber monument at Lismullin, not far from the Hill of Tara in Co. Meath, in the early Iron Age (O’Connell 2009). Without excavation we cannot assume that the recently discovered henges and palisaded enclosures at Newgrange are all late Neolithic in date, although this seems the most likely current deduction at present.

This description of numerous square-in-circle structures, timber circles and linear alignments, and embanked enclosures or henges, shows that late Neolithic Brú na Bóinne was a place of intensive building activity and ceremony, with these monuments particularly clustered in the central area south of Newgrange (Figure A4-1). Major excavations in the area have focused on the large passage tombs and their immediately adjacent areas, leaving large parts of the landscape little understood, and yet recent geophysical surveys, Lidar analysis and aerial photography are providing a wealth of new information. Only new excavations will provide details about chronological and stratigraphic relationships between these constructions and provide more detail as to the appearance and function of the monuments.

4.5.5 Summary

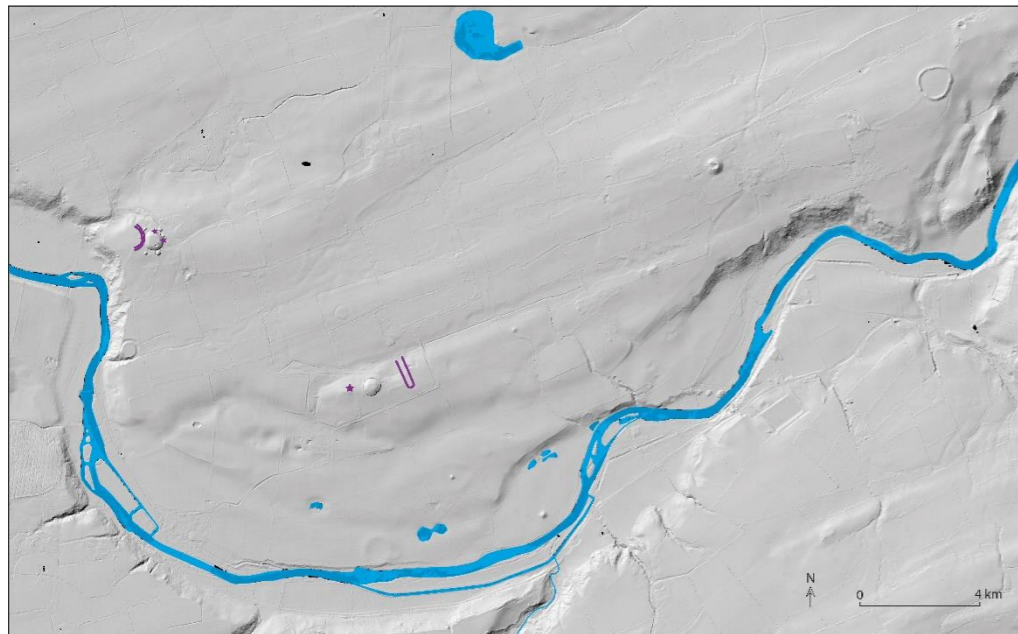
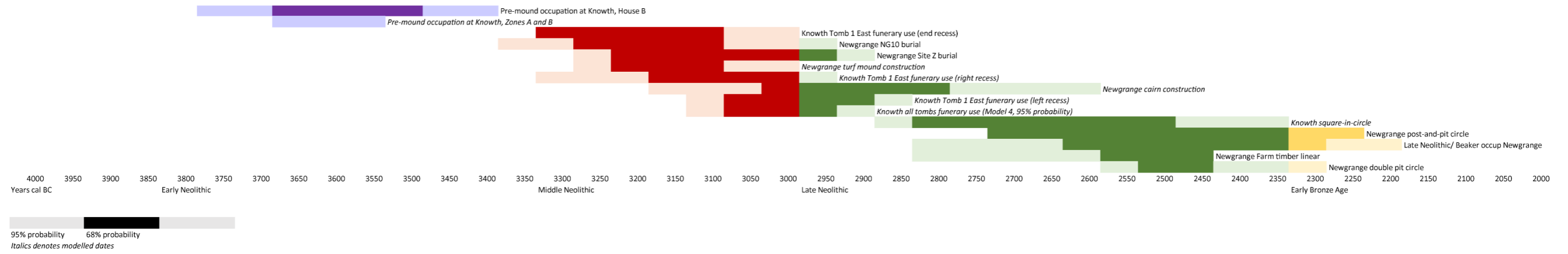
The late Neolithic period sees continuity, initially in the last funerary use of passage tombs such as Knowth and Newgrange, but mostly in the persistence of activity around the major passage tombs. This included the elaboration and alteration of earlier monuments, such as the creation of the quartz layer and Great Stone Circle at Newgrange, but also the construction of entirely new forms of spectacular timber, pit, and earthwork monuments close to the older tombs. There was also a significant change in the intensity and types of activity being carried out, with a shift away from closed structures of stone and earth to the use of timber and earth to the construction of open enclosures. Although some were

involved in funerary rites, such as the enclosure at Monknewtown, many may have been used for rites and gatherings of a non-funerary nature. The deliberate deposition of animal bones, flints and pottery in pits and post-holes at these monuments took place in ways paralleled at other late Neolithic sites across Britain and Ireland (e.g., Pollard and Ruggles 2001). It appears that people were gathering at the complex to take part of large-scale feasts and ceremonies. This settlement is attested by the dense concentrations of lithic scatters both near the major monuments but also in the wider area, including south of the river. Fieldwalking has recovered far more late Neolithic artefacts than early Neolithic or early Bronze Age suggesting intense occupation at this time (Brady 2007, 217).

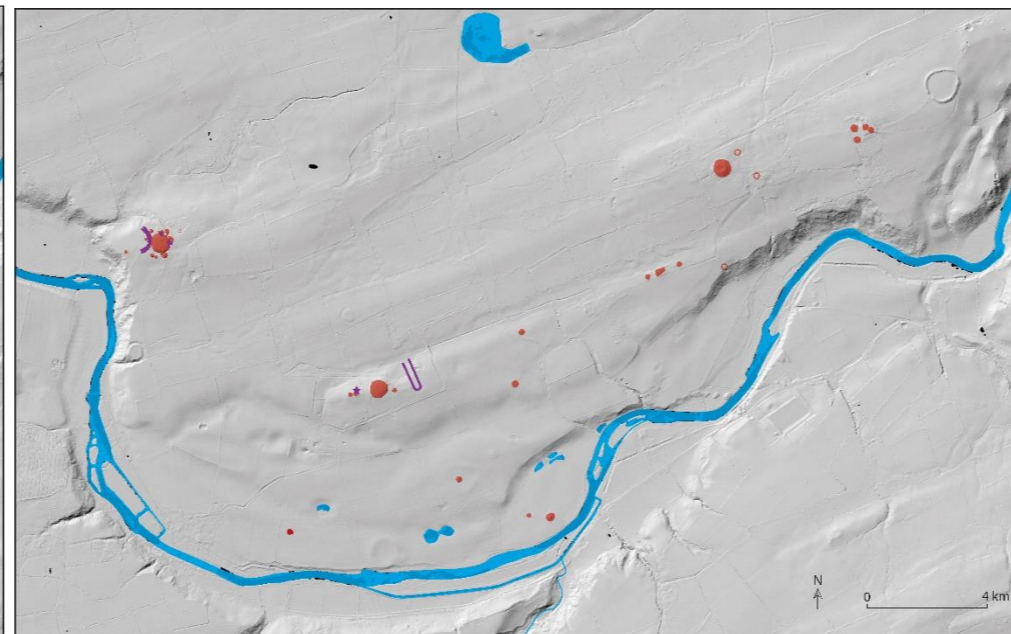
All three major passage tombs seem to have had significant activity focused on them in the late Neolithic period, but it is between Newgrange and the river where major monuments and feasting activity seems to have been concentrated. It is tempting to attribute this to the alignment of the tomb on the midwinter solstice, a calendrical event which seems to have held great significance here and at other late Neolithic sites such as Stonehenge, or perhaps a more intensive focus on the River Boyne. Without more detailed radiocarbon dating and excavation it is difficult to specify the duration and detailed sequence of late Neolithic activity at Newgrange, but the evidence may well represent several quite short-lived but intense gathering episodes.

There was a particular focus on encirclement or containment in the late Neolithic period, with the Great Stone Circle, the post-and-pit circle, Site A, the henge-like monument to the west of Newgrange and the 'Great Palisade' surrounding significant earlier sites, a practice is also seen with the yellow clay bank built around part of Newgrange. The construction of double-ditched henges at Dowth and the elliptical enclosure adjacent to Knowth also seem to have fulfilled this role. Some of these monuments drew on connections with other Neolithic communities across the Irish Sea, as with the four-post structures at Knowth and to the west of Newgrange, a type of monument which has parallels across Britain and Ireland (Pollard 2012). Alongside the introduction of Grooved Ware pottery and a greater use of flint from the chalklands of Northern Ireland (Eogan and Roche 1999, 101), this points to more diverse and further flung connections than in the previous periods. Other monuments however, particularly the geometric enclosures, the post facades and timber rectangular structures appear to be unique and may be distinctly Irish traditions. After the arrival of Beaker pottery from around 2450 BC (Carlin 2016, 204), deposition, occupation and ceremonial activity continued at sites in the Brú na Bóinne complex, although at present there is little evidence for further monument construction in the early Bronze Age.

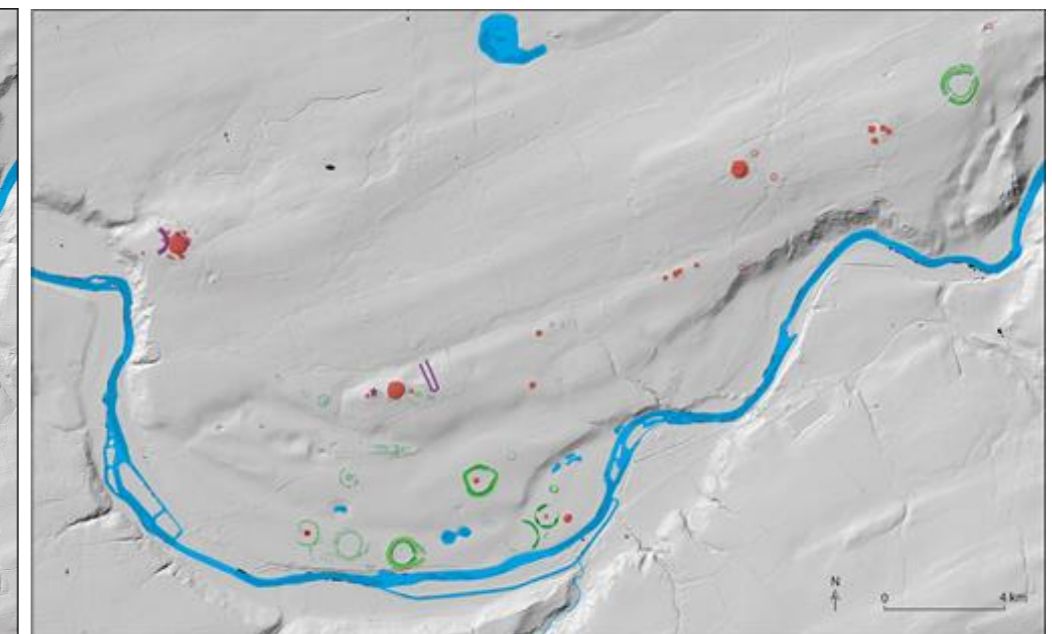
Figure A4-22 – Chronology summary for the Brú na Bóinne monument complex. Note that only monuments or sites with absolute dates are included.



Early Neolithic



Middle Neolithic



Late Neolithic

Table A4-3 – All radiocarbon dates from Neolithic monuments and occupation in the Brú na Bóinne complex

Laboratory number	Sample reference	Material	Context	Radiocarbon age (BP)	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	C/N ratio	Calibrated date range (cal BC) (95% confidence)
KNOWTH								
Pre-tomb occupation (Eogan and Roche 1997, 6, 18, 39; Whittle <i>et al.</i> 2011, table 12.3; Schulting <i>et al.</i> 2018, 342, 381; McClatchie <i>et al.</i> 2016, table S2; Schulting and McClatchie 2018, table A4:1)								
GrN-18773		Unidentified charcoal	Charcoal spread close to Pit 3, behind Kerbstone 123 of Tomb 1, within 'Early Western Neolithic complex' Zone A	5885±45				4900–4610
GrN-20179		Unidentified charcoal	15.90:1666. Fill of Foundation Trench 1, under north-east part of main tomb, within 'Early Western Neolithic complex' Zone A	5080±20	-25.2			3960–3795
GrN-20180		Unidentified charcoal	K90:179. Fill of Foundation Trench 1, under north-east part of main tomb, within 'Early Western Neolithic complex' Zone A	5040±15	-24.9			3950–3775
GrN-20181		Unidentified charcoal	K92:72. From fill of posthole to west of Foundation Trench 6, on east side of main tomb, within 'Early Western Neolithic complex' Zone B	5345±20	-24.7			4320–4050
UBA-14662		<i>Triticum dicoccum</i> (emmer wheat grain)	K90 S179. Fill of Foundation Trench 1, Structure I in Zone A	4853±25				3710–3530
UBA-14663		<i>Triticum dicoccum</i> (emmer wheat grain)	K90 S170. Fill of Posthole 3, Structure I, Zone A	4863±28				3710–3530
UBA-14664		<i>Triticum dicoccum</i> (emmer wheat grain)	K90 S170. Fill of Posthole 3, Structure I, Zone A	4877±34				3770–3530

UBA-14666		<i>Triticum</i> sp. (wheat grain)	K91 S67. Fill of Foundation Trench 7, Structure II, Zone B	4778±25				3635–3520
UBA-14667		<i>Triticum dicoccum</i> (emmer wheat grain)	K91 S67. Fill of Foundation Trench 7, Structure II, Zone B	4856±26				3710–3530
Pre-satellite tomb occupation (Burleigh <i>et al.</i> 1976, 34; Eogan 1984, 133, 194, 215; Eogan 1986, 225; Smyth 2009, 117; Whittle <i>et al.</i> 2011, table 12.3)								
BM-1076	2/ 1970	Charcoal (unidentified)	Fill of Pit 6 in sub-rectangular House B, under Kerbstone 10 of Tomb 8, associated with Neolithic pottery	4852±71				3800–3380
UB-318		Charcoal (unidentified)	Dark layer beneath mound of Tomb 17	4875±150				4040–3350
UB-319		Charcoal (unidentified)	Same as UB-318	4795±185				3990–3020
BM-1075		Charcoal (unidentified)	Fill of trench under western side of Tomb 8	2515±50				800–420
Tomb 1C basal sod layers (Smith <i>et al.</i> 1971, 453; Eogan 1984, 184; Eogan 1991, 130; Bronk Ramsey <i>et al.</i> 2002, 62–3; Schulting <i>et al.</i> 2018, 191, 342, 344, 350, tables 4:4 and 4:6; Davies <i>et al.</i> 2018, 616)								
UB-358	5	Humic acid	Basal redeposited sod layer of mound, Cutting 36	6835±110				5990–5550
UBA-12888	18	Hazelnut shell	K98 S10. Yellow/brown sod layers beneath first layer of stones on northern side of Capstones 19–23, western passage	7386±29				6380–6080
GrN-12357		Charcoal (<i>Corylus avellana</i>)	Basal sod layer of mound, behind orthostats 19 and 20 of the eastern passage	4405±35				3320–2910
GrN-12827		Wood fragments (unidentified)	Basal sod layer of mound, behind orthostat 75 of eastern passage	4465±40				3350–2970
GrN-12358		Charcoal (<i>Corylus avellana</i>)	Spread on old land surface underlying basal sod layer, behind orthostats 6 and 7 of the eastern passage	4490±60				3370–2930
GrN-14646		Hazelnut shell	K91 S66. Basal sod layer on north-western side of mound, around packing stones at the back of Kerbstone 35	4330±23				3015–2895
UBA-12991		Hazelnut shell	Basal sod layer south of Capstones 19–23	4646±27				3520–3360

UBA-12992		Hazelnut shell	K92 S146. Northern side of east passage, bottom of socket of Orthostat 72	4639±27			3520–3360
UBA-12993		Hazelnut shell	K92 S55. Southern side of east passage, 0.6m below top of basal sod layer, opposite Orthostats 13, and 14	4404±24			3100–2920
UBA-12990	WS17	Wood (<i>Corylus avellana</i>)	0.8m below top of basal sod layer on southern side of eastern passage	4495±25			3345–3095
OxA-7786	UB-4090	Charcoal (unidentified)	Humic basal layer of tomb	4890±40	-25.3		3780–3540
UB-357	4 and 5	Charcoal (unidentified)	Basal redeposited sod layer of mound, Cuttings 29/30, and 36	4745±165			3950–3020
UBA-14647	50057	Bos mandible	From 'wood and bone deposit' south of extension of eastern tomb's passage	4301±24			3010–2880
UBA-12887	S52-5	Wood (<i>Corylus avellana</i>)	Same as UBA-14647	4503±27			3350–3090
Tomb 1B East (Schulting <i>et al.</i> 2018, 344, 393, tables 4:2 and 4:8; Cleary and Eogan 2018, 107–34)							
UBA-10341	170a	Cremated human bone (adult)	Blanket deposit (Horizon 2) in Compartment 4, left recess	4449±21	-20.9		3335–3015
UBA-10340	161	Cremated human bone	Deposit I in left recess	4779±25	-21.4		3635–3525
UB-6350	1	Human bone	Deposit 3, fill of Pit 2, right recess	4418±49	-28.0		3340–2910
UB-6351	2	Human bone	East corner of sillstone behind large stone, left recess	4333±43	-24.0		3090–2880
UB-6352	3	Human bone	Primary deposit in base of Pit 1, Segment 2, right recess	4529±38	-23.9		3370–3090
UBA-12995	50133	Cremated human bone	Pit A, left-hand recess. One adult and one juvenile in this group (Schulting <i>et al.</i> 2018, Table 4:2;	4397±28	-23.9		3100–2910
OxA-21923	50134	Cremated human bone	Pit B, left-hand recess. Female adult and juvenile in this group	4496±29	-19.8		3360–3090
OxA-21924	50134	Cremated human bone	Same as OxA-21923	4446±30	-20.1		3340–2930
OxA-21983	168	Cremated human bone	Compartment 2, left-hand recess	4340±50	-21.4		3260–2880

OxA-21925	170	Human bone (adult rib)	Compartment 4, left-hand recess	4401±30	-21.5	10.9	3.1	3290–2910
OxA-21926	173a	Cremated human bone (adult)	Compartment 6, left-hand recess	4331±30	-20.3			3030–2890
OxA-21927	173b	Human bone (adult mandible)	Compartment 6, left-hand recess	4388±29	-21.1	10.7	3.1	3100–2910
OxA-21928	173c	Human bone (adult mandible)	Compartment 6, left-hand recess	4423±29	-21.0	10.8	3.1	3330–2920
OxA-21929	174d	Human bone (juvenile ilium)	Compartment 6, left-hand recess	4383±31	-21.3	12.8	3.1	3100–2910
OxA-21884	175	Cremated human bone (adult)	Compartment 8, left-hand recess	4512±33	-25.6			3360–3090
OxA-21885	161a	Cremated human bone	Deposit I, blanket deposit (possibly sealing layer), left-hand recess	4461±32	-23.6			3340–3010
UBA-12674	161b	Human bone (adult metatarsal)	Deposit I, blanket deposit (possibly sealing layer), left-hand recess	4381±22	-22.9	10.4	3.2	
OxA-21930	161b	Human bone (adult metatarsal)	Duplicate of UBA-12674	4424±30	-21.3	10.9	3.1	
Weighted mean 161b: OxA-21885 + UBA-12674				4396±18				3095–2920
UBA-12673	163a	Cremated human bone	Same as OxA-21885	4362±38	-20.6			3100–2900
UBA-21931	163b	Human bone (sub-adult cranial frag)	Same as OxA-12674	4428±29	-21.7	10.8	3.1	3330–2920
UBA-12675	50142	Cremated human bone	Deposit B, right recess	4476±39	-19.4			3350–3020

OxA-21941	50143	Cremated human bone	Deposit C, right recess	4543±32	-18.2			3370–3100
UBA-12678	50146b	Cremated human bone	Deposit 1, right recess	4379±25	-19.9			
OxA-21887	50146b	Cremated human bone	Same as UBA-12678	4476±32	-18.1			
Weighted mean 51046b, UBA-12678 + OxA-21887				4416±20				3265–2925
UBA-12677	50144d	Cremated human bone	Cremation 4 (one adult and one juvenile), against north-east corner of right recess	4416±24	-23.0			
OxA-21886	50144d	Cremated human bone	Cremation 4 (one adult and one juvenile), against north-east corner of right recess	4469±32	-18.7			
Weighted mean 50144d, UBA-12677 + OxA-21886				4435±20				3325–2935
OxA-21888	422a	Cremated human bone	Burial deposit (Deposit 2) in upper fill of Pit 1 (one adult male and three juveniles), right recess	4498±23	-12.9			3345–3090
OxA-21933	422b	Human bone (adult vertebrae)	Burial deposit (Deposit 2) in upper fill of Pit 1 (one adult male and three juveniles), right recess	4430±31	-21.6	10.7	3.2	3330–2920
OxA-21934	218b	Human bone (adult vertebrae)	Deposit 3, right recess	4480±31	-21.2	11.1	3.2	3350–3030
OxA-21935	218b	Human bone (neonate vertebral arch)	Same as OxA-21934	4470±31	-21.1	11.1	3.1	3340–3020
UBA-12679	50148a	Cremated human bone	Deposit 4, right recess	4459±25	-18.3			
OxA-21989	50148a	Cremated human bone	Same as UBA-12679	4526±32	-11.4			
OxA-21990	50148a	Cremated human bone	Same as UBA-12679	4462±32	-16.5			
Combined 50148a, UBA-12679 + OxA-21989 + OxA-21990				4478±17				3340–3040
OxA-21991	425	Cremated human bone	Deposit 5, densely packed spread of bone that extended into the central section of the right recess. Deposit contained at least four adult and six juvenile cremations	4426±34	-12.0			

UBA-12680	424	Cremated human bone	Deposit 6, south-western corner of right recess. Deposit contained cremated remains of three adults and five juveniles, and unburnt remains of an adult	4410±27	-21.3			3310–2910
OxA-21984	183	Human bone (cranial fragment)	Same as UBA-12680	4450±45	-21.9			3340–2930
Tomb 1B and 1C West (Schulting <i>et al.</i> 2018, table 4:2, Cleary and Eogan 2018, 84, 247–9)								
UBA-12994	50163	Cremated human bone	Against Sillstone 2, Tomb 1B	4431±26	-23.8			3330–2920
OxA-21993	50158	Cremated human bone	K98, CR3. Dense concentration of cremated bone from the passage floor in from of Orthostat 29, passage extension Tomb 1C	4423±36	-27.7			3330–2910
OxA-21992	50159a	Cremated human bone	K98, CR5. To rear of Orthostat 5, passage extension Tomb 1C, possibly later insertion	4261±31	-10.9			2930–2700
UBA-12681	50159b	Cremated human bone	Same as OxA-21992	4160±23	-19.0			2880–2630
Tomb 2 (Burleigh <i>et al.</i> 1976, 33; Eogan 1974, 82–4; Eogan 1984, 22, 194; Eogan 1991, 130; Eogan and Roche 1997, 202; Whittle <i>et al.</i> 2011, table 12.12; Schulting <i>et al.</i> 2018, 351, table 4:2)								
BM-786		Charcoal (unidentified)	Spread in gap between Kerbstones 16 and 17, associated with Beaker pottery	3185±225				2030–900
BM-785	3 (1967)	Charcoal (unidentified)	Spread of charcoal within mound, 1m to the west of socket 31, close to disturbed area with Beaker pottery	4158±126				3100–2340
GrN-15368	'Burial 1'	Human bone	Inside socket 7 in passage, an adult male cranium and femur jumbled with animal bones. NB - originally called 'Burial 15'	4375±40				3270–2890
OxA-22025	50166	Cremated human bone	From under the stone basin in the chamber	4437±31	-20.8			3340–2920
UBA-10339	120	Cremated human bone	Scatter around basin	4507±25	-19.0			3355–3095
Tomb 3 (Eogan 1984, 29; Schulting <i>et al.</i> 2018, table 4:2, 352, 369–70)								
UBA-10338	110	Cremated human bone	Central deposit near eastern end of chamber, thought to be one individual 15–20 years old	4687±24	-25.8			3530–3370
Tomb 6 (Eogan 1984, 312; Brindley 1999, 31; Schulting <i>et al.</i> 2018, 358, table 4:2)								

OxA-22026	104a	Cremated human bone (adult)	Right recess	4375±29	-21.0			3100–3050
UBA-12682	104b	Cremated human bone (sub-adult)	Same as OxA-22026	4385±23	-21.6			3090–2915
OxA_21937	104c	Human bone (adult)	Same as OxA-22026	4377±29	-22.5			3100–2910
GrN-9325		Charcoal (mixed, including <i>Quercus</i> sp.)	Left recess, putatively associated with Grooved Ware pot no.3773, recovered from around edge of a cremation deposit	3750±70				2450–1950
Tomb 9 (Eogan 1991, 130; Hedges <i>et al.</i> 1993, 215; Whittle <i>et al.</i> 2011, table 12.12; Schulting <i>et al.</i> 2018, table 4:2)								
GrN-11714		Charcoal (unidentified)	Cremation deposit in end recess	4415±50				3340–2910
OxA-22027	50171	Cremated human bone	Deposit 1 in end recess	4357±30	-19.7			3082–2902
Tomb 15 (Eogan 1984, 308–12; Schulting <i>et al.</i> 2018, 354, table 4:2)								
OxA-21889	595a	Cremated human bone	Segment 4 of chamber	4394±35	-20.1			3310–2908
OxA-21874	598	Cremated human bone	Segment 3 of chamber, primary deposit	4453±29	-22.1			3340–3020
OxA-21942	599	Cremated human bone	Segment 3 of chamber, secondary deposit	4430±31	-17.2			3330–2920
UBA-12683	3771	Cremated human bone	30-40cm above floor level, in apparent association with undecorated Beaker pot	4265±24	-22.8			2920–2785
Tomb 16 (Eogan 1984, 194; Eogan 1986, 83; Whittle <i>et al.</i> 2011, table 12.12; Schulting <i>et al.</i> 2018, 359, tables 4:2 and 4:7)								
BM-1078	4/1973	Charcoal (unidentified)	Spread sealed in mound (Area 4, Sq. 26), 0.33m below surviving tomb of mound	4399±67				3340–2900
OxA-21875	637	Cremated human bone	Primary deposit in chamber	4440±28	-20.7			3340–2930
UBA-12684	639a	Cremated human bone	Secondary deposit in chamber	4362±25	-23.6			

OxA-21890	639a	Cremated human bone	Same as UBA-12684	4416±33				
Combined 639a, UBA-12684 + OxA-21890				4382±20				3090–2915
OxA-21876	639b	Human bone (infant tibia)	Secondary deposit in chamber	4386±29	-22.2	12.2	3.1	3100–2910
OxA-21891	641	Cremated human bone	Tertiary deposit in chamber	4400±32	-11.9			3310–2910
UBA-12685	644	Cremated human bone	Primary deposit in passage	4317±34	-24.4			3020–2880
UBA-12686	645	Cremated human bone	Secondary deposit in passage	4362±34	-24.4			3100–2900
Tomb 17 (Eogan 1984, 133; Whittle <i>et al.</i> 2011, table 12.12; Schulting <i>et al.</i> 2018, 357, 369, table 4.2)								
UB-318		Charcoal (unidentified)	Thin dark layer beneath mound	4873±150				4040–4020
UB-319		Charcoal (unidentified)	Same as UB-318	4797±185				3990–3020
UBA-12687	728	Cremated human bone	Chamber, rear recess, inner side of socket 11	4425±38	-22.8			3330–2910
UBA-12688	726	Cremated human bone	In upper fill of passage	4152±23	-20.7			2875–2630
Tomb 18 (Schulting <i>et al.</i> 2018, 377–8, table 4:2)								
OxA-22028	747	Cremated human bone	Left (western) recess, under floorstone	4434±30	-22.2			3330–2920
Square-in-circle timber structure (Eogan and Roche 1997, 136; Schulting and McClatchie 2018, table A4:2)								
GrA-445		Charred residue	Interior surface of pottery sherds in post-pit 16	4130±35				2880–2580
GrA-448		Charred residue	Interior surfaces of pottery sherds in post-pit 7	3985±35				2620–2350
UBA-14782		Hazelnut shell	K91:38:26. Fill of post-pit 5	4560±29				3490–3100
UBA-14781		Hazelnut shell	K91:31:24. Fill of post-pit 8	3987±27				2580–2460
Later occupation (Eogan 1991, 130; Eogan and Roche 1997, 202)								
BM-1077		Charcoal (unidentified)	Dark layer overlying 'Early Western Neolithic' layer north-east of Tomb 1. Associated with Beaker and Grooved Ware pottery	3118±48				1498–1265

NEWGRANGE							
Main tomb (O’Kelly 1969, 140; Smith <i>et al.</i> 1971, 452; Vogel and Waterbolk 1972, 73; O’Kelly 1972, 226; O’Kelly 1982, 230, fig 12; Lynch 2014, 22–8, 35–6, 39, fig 8; Schulting 2014, 46, table 6; Cassidy <i>et al.</i> 2020, supp info, 20)							
GrN-5462-C	1	Charcoal (small twigs)	Burnt soil ‘putty’ used to park and seal interstices at each end of Roof Slab 3 in passage	4425±45	-26.0		3340–2910
GrN-5463	2	Charcoal (small twigs)	Burnt soil ‘putty’ used to park and seal interstices between roof slabs, from under cross-lintel which supports boulder cap at junction of passage and chamber	4415±40	-24.8		3330–2910
GrN-9057		Vegetation, mainly moss	Transported turves (F8) under north side of cairn behind Kerbstone 53, possibly part of earlier passage tomb	4480±60	-28.5		3370–2930
UB-360		Turves, humic acid	Upper sod layer within mound, 60–90 cm above old land surface	2250±45			400–190
UB-361		Turves, humic acid	Basal sod layer under south side of cairn, 5–20 cm above old land surface	4535±105			3520–2920
UBA-23059	21	Crab-apple endocarp (<i>Malus sylvestris</i>)	Lens of green/grey sticky clay (F34) within boulder clay underlying old land surface at rear of mound, Cutting 58S	4478±32			3350–3020
UBA-25186	46	Cattle tooth	Subsoil under cairn slip outside kerbstones, Feature F84, Trench A	3933±37			2570–2290
UBA-23061	24-2	Waterlogged <i>Ranunculus sp.</i> seeds	Turves close to top of earlier turf mound, Feature F8	4371±38			3100–2900
UBA-23060	15	Hazelnut shell	0.45m within earlier turf mound	4544±37			3370–3100
UBA-23053	12	Pig metacarpal	Turves within earlier turf mound, Feature F8, Cutting 56S	4524±33			3370–3100
UBA-23054	18	Cattle metacarpal	Immediately under earlier turf mound, on top of old land surface, Feature F8/F6E, Cutting 57S	4579±37			3500–3100
UBA-23055	52	Cattle femur	Re-deposited turves under cairn, Feature F61, Cutting 77S	4649±35			3520–3360
UBA-23056	57	Cattle rib	Fill (F110) of socket for Kerbstone 71, Cutting 71S	4124±32			2870–2570
UBA-23058	53	Cattle bone fragments	From cairn slip (F73) outside Kerbstone 79 in Trench A	4334±35			3080–2890

OxA-36079	NG10	Human bone (cranial fragment)	Right-hand chamber	4473±29	-21.19	11.6	3.2	3340–3020
Passage tomb Site Z (Cassidy <i>et al.</i> 2020, supp info, 20)								
OxA-36080	NGZ1	Human bone (cranial fragment)	Fill of 'skull pits'	4421±30	-22.44	11.2	3.2	3330–2920
Late Neolithic – Beaker occupation (O'Kelly 1972, 227; O'Kelly 1982, fig 7; O'Kelly <i>et al.</i> 1983, 2, 15–16, fig 4b)								
GrN-6342	3	Charcoal (unidentified)	Fill of small pit, south of and adjacent to Hearth 1. Intermixed with Beaker pottery and charred grains of naked barley and emmer wheat	3885±35				2470–2200
GrN-6343	4	Charcoal (unidentified)	Fill of oval pit north-west of and adjacent to Hearth 1. Pit contained undecorated bowl pottery and was under earth/stone layer	3990±40				2630–2350
GrN-6344	5	Charcoal (unidentified)	Fill of eastern end of short curved trench to south of Hearth 1. Contained mixed pottery: Beaker, undecorated bowl, Grooved Ware, and a few fragments of Food Vessel	4050±40				2850–2460
Post-and-pit circle (O'Kelly <i>et al.</i> 1983, fig 4a, 21; Sweetman 1985, 199–201, 205–7, 218)								
UB-2392	9	Charcoal (unidentified)	Fill of pit in Square 29f	3885±55				2560–2200
UB-2393	10	Charcoal (unidentified)	Fill of pit in Square 32c	3985±45				2630–2340
UB-2394	11	Charcoal (unidentified)	Fill of pit in Square 32c	3875±90				2580–2040
GrN-11800		Charcoal (unidentified)	Burnt animal bone deposit (Burial 7) inserted into south side of Pit 14, inner arc, Cutting 1	4070±40	-25.0			2860–2470
GrN-11801		Charcoal (unidentified)	Fill of clay-lined Pit 11, Cutting 1	4070±60	-25.0			2870–2470
GrN-11802		Charcoal (unidentified)	Fill of Pit 6, outer arc, Cutting 1	4030±35	-25.0			2840–2460
GU-1617	1	Charcoal (unidentified)	Fill of Pit 1, outer arc, Cutting 1	4050±65	-25.0			2870–2340
GU-1618	2	Charcoal (unidentified)	Fill of Pit 2, inner arc, Cutting 1	3980±75	-25.0			2860–2210

GU-1619	3	Charcoal (unidentified)	Fill of Pit 3, outer arc, Cutting 1	3885±70	-25.0			2570–2140
GU-1620	4	Charcoal (unidentified)	Burnt animal bone deposit (Burial 5), Cutting 3	4000±65	-25.0			2850–2290
GU-1621	5	Charcoal (unidentified)	Burnt animal bone deposit (Burial 25), Cutting 3	3890±75	-25.0			2580–2140
GU-1622	6	Charcoal (unidentified)	Occupation spread inside pit circle	3907±70	-25.0			2580–2150
GU-1771	1	Charcoal (unidentified)	Deposit in clay-lined Pit 18, Cutting 3	3935±70	-25.5			2630–2200
GU-1772	2	Charcoal (unidentified)	Fill of clay-lined Pit 23, Cutting 4	3900±60	-25.9			2570–2200
GU-1773	3	Charcoal (unidentified)	Large deposit near surface of fill of Pit 28, Cutting 2	3975±60	-25.6			2840–2280
GU-1774	4	Charcoal (unidentified)	Burnt animal bone deposit (Burial 31), Cutting 3	3965±65	-25.6			2840–2200
Double pit circle (Sweetman 1987, 286, 289)								
GrN-12828		Charcoal (unidentified)	Basal fill of Pit 1	4000±30				2580–2460
GrN-12829		Charcoal (unidentified)	Fill of Pit 6, which also contained burnt clay, pottery, and stone bowl fragment	3930±35				2570–2290
Newgrange Farm linear timber structure (Condit and Keegan 2018, 101)								
UBA-38707		Charcoal (unidentified)	Basal fill of outer ditch	4034±33				2830–2460
Oldbridge log boat (Brady 2018)								
UBA-27787		Wood (<i>Quercus sp.</i>) – outer layer of heartwood	Boat timber	4410±37				3330–2910

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5 Stenness-Brodgar, Orkney

The cluster of 40 islands known today as Orkney is located 10 km from the north-east coast of mainland Scotland. Although often perceived today as remote, these islands are in a highly accessible and nodal position at the apex of sea routes around Britain and Ireland, providing a northerly link between north-east Scotland, the Western Isles and beyond. These maritime sea routes, as well as the low-lying fertile agricultural land, are key to understanding how Orkney was a dynamic and innovative place in the Neolithic period.

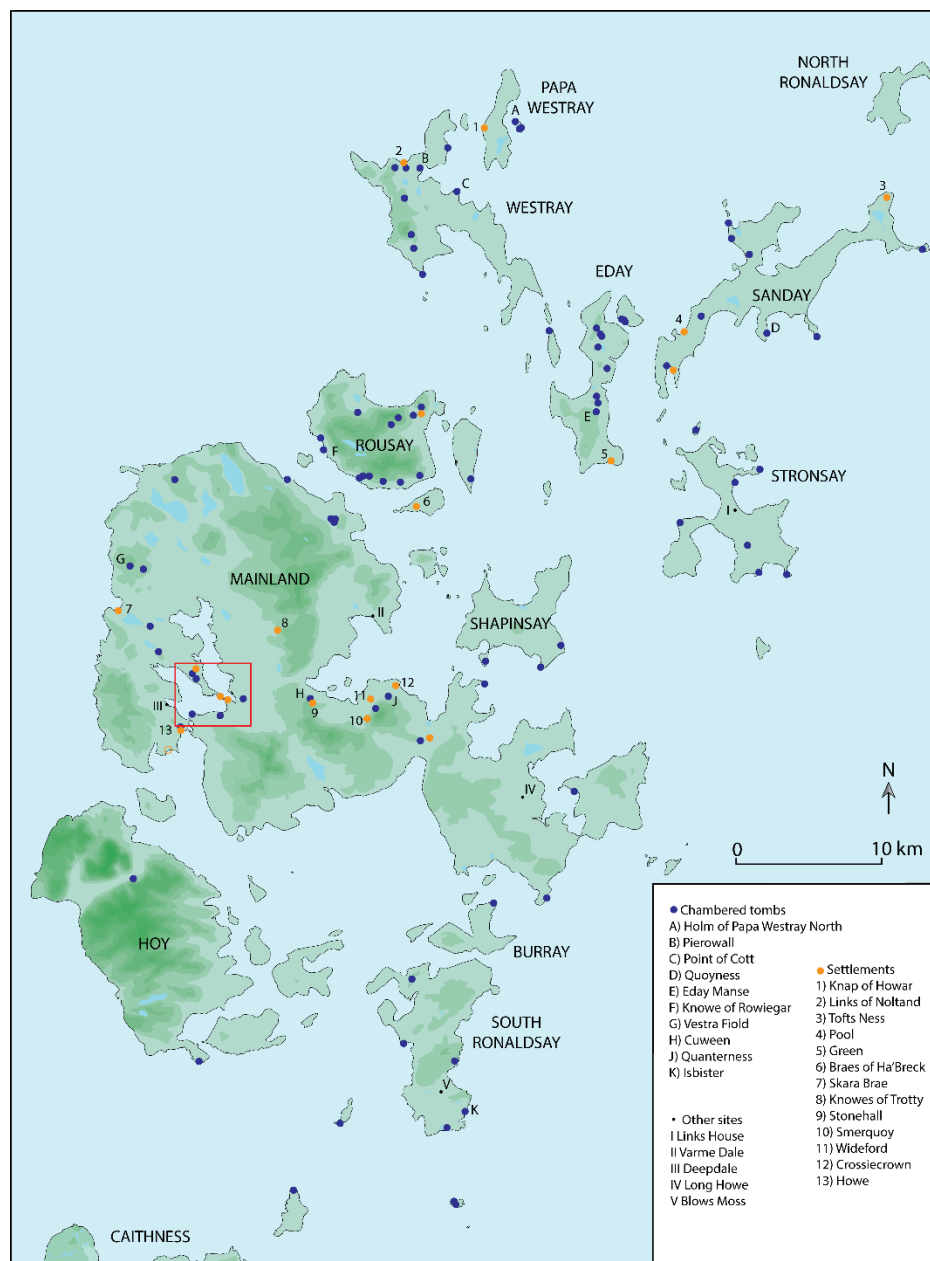


Figure A5-1 Map of Orkney archipelago showing Neolithic chambered tombs and settlements, with sites mentioned in this case study identified. The Stenness-Brodgar monument complex is within the red box (for detail see Figure A5-2)

The Stenness-Brodgar monument complex is located at the centre of the western Mainland (Figure A5-1 and Figure A5-2), in a unique topographic location. The monuments and settlements are located on a pair of narrow promontories that jut out across two adjacent lochs: the saltwater Loch of Stenness to the west and the freshwater Loch of Harray to the east. The lochs sit within a large natural bowl, surrounded by low hills, with views west to the distinctive hills of Hoy. The significance of this topographic location is discussed further in Case Study 4.

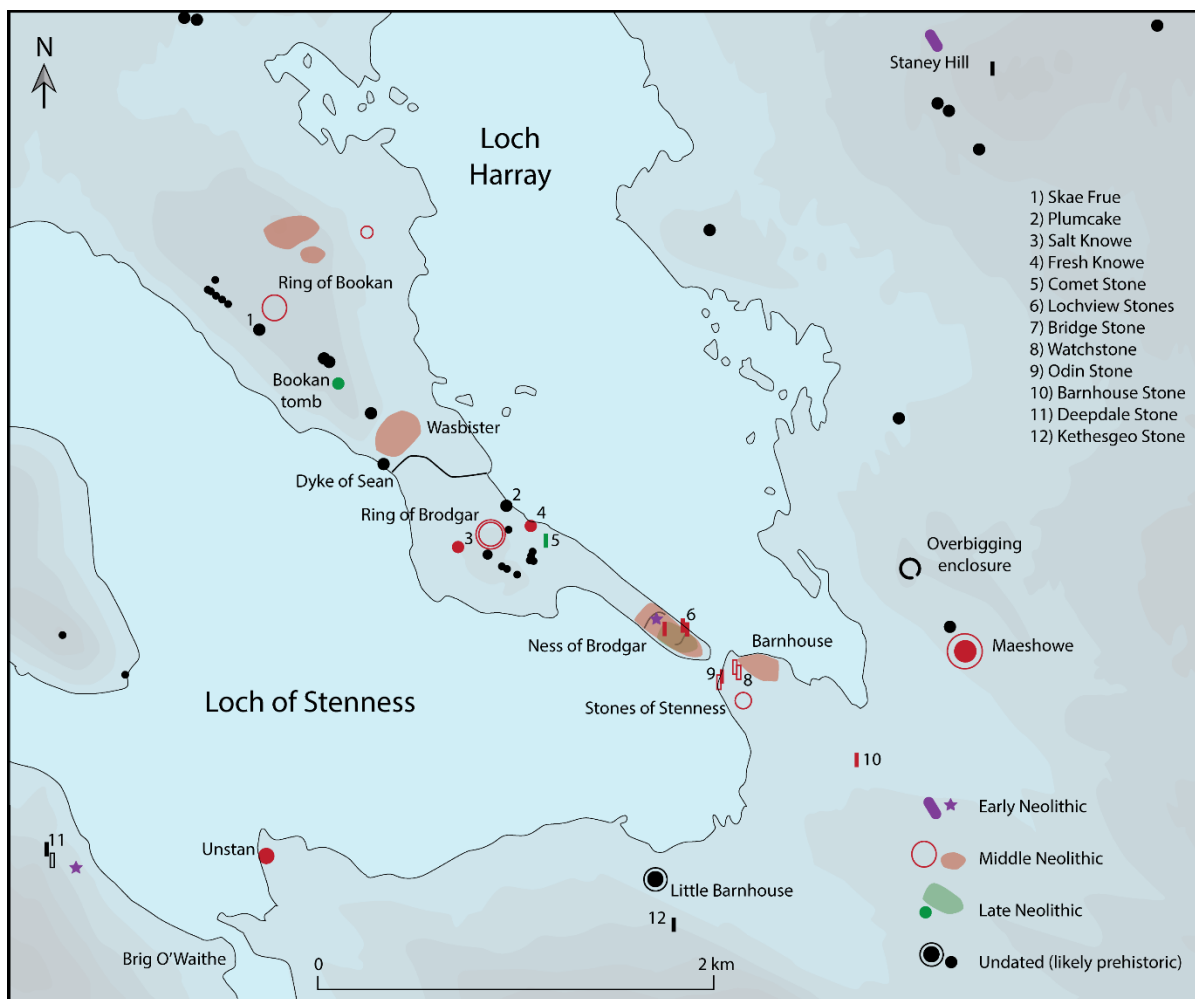


Figure A5-2 Map of Stenness-Brodgar monument complex in relation to wider topography, with key sites shown

Since the earliest antiquarian activity in Orkney, the stone circles and spectacular passage tombs clustered in this area have attracted attention. However, it was not until the discovery of Barnhouse settlement in 1985, and the uncovering of the Ness of Brodgar structures from 2004 onwards, that the extent of intensive occupation of this landscape became clear. The narrow Stenness-Brodgar peninsula was the focus of monumental, ceremonial and settlement activity in the Neolithic, with activity peaking between 3125–2850 cal BC (Bayliss *et al.* 2017, 1182). Although the Neolithic on Orkney is traditionally divided into two periods: early and late, with a divide around 3200 BC, in this appendix the template of early, middle and late Neolithic has been retained to allow easy comparison with other case studies. It

also helps to stress the continuity in activity across the middle Neolithic period (Carlin and Cooney 2020, 321).

The Orkney islands are famous for their extraordinary Neolithic archaeology and the area has provided evidence for the development of many significant ideas relating to Neolithic cultures and society (e.g., Childe 1942; Renfrew 1973; 1979). Due to the construction of most structures in stone and the lack of intensive modern agriculture, the islands have incredibly good preservation of both prehistoric settlements and monumental architecture. Orkney is often seen as very distinct from other areas of Neolithic Britain and Ireland, and although it has some unusual and even unique features, it was closely connected to other areas. Recent radiocarbon dating projects of both individual sites (e.g., Schulting *et al.* 2010) and broader syntheses (e.g., Bayliss *et al.* 2017), as well as recent and ongoing excavations, are rapidly changing our ideas about the chronology and patterns of Neolithic activity. Although this case study focuses on the Stenness-Brodgar complex, the only major monument cluster on the islands, aspects of this case study will summarise wider Orcadian trends, to set the complex into context.

5.1 Landscape history

The islands of Orkney are almost entirely gently inclined sedimentary rocks, primarily flagstones and sandstones of Old Red Sandstone age. The land is generally low-lying and gently undulating, although it rises towards the western part of the mainland, where dramatic cliffs fall sharply to the sea (Figure A5-1). Only the island of Hoy has any significant high ground, where two rounded and steep-sided hills stand up to 477 m high. The effects of glaciers, leaving moraines and tills, can still be seen in several places, particularly on central Mainland.

The relative level of the seas around Orkney has risen some 10 m since the early Holocene, reaching its present position only in around 2000 BC (Wickham-Jones *et al.* 2016, 30). At the start of the Neolithic, the level may have been about 1.5 m lower than present, and over the period there would have been noticeable further changes in sea level, with the loss of land and changing coastal topography. This had a particularly dramatic effect on inland lochs such as the Loch of Stenness, where water levels were much lower in the 5th and 4th millennium BC (see Chapter 4, Case Study 4).

Orkney is well-known for its lack of trees, but this was not necessarily the case in prehistory. Closely dated pollen sequences and several recently discovered early timber houses have proved that trees were present in the Neolithic. It is now possible to closely map the changing woodland cover throughout prehistory (Farrell *et al.* 2014; Bunting *et al.* 2018; Bunting *et al.* forthcoming). The site of Blows Moss on South Ronaldsay (Figure A5-1: V) provides the longest pollen sequence on Orkney. It shows that in the Mesolithic period, arboreal pollen made up a significant percentage of the total pollen count; 40% in 8000 BC, 80% in 7400 BC, 50% in 7210 BC and 70% in 6480 BC (Farrell *et al.* 2014, 230). These woodlands were dominated by birch, willow and hazel, with lesser quantities of oak, pine, alder and elm. There is a

drop in tree coverage to 30% in about 5390 cal BC, which may relate to Mesolithic activity on the islands, such as the introduction of red deer or perhaps climatic factors (Timpany *et al.* 2017). This amount of woodland cover persisted until the start of Neolithic occupation, when it declines further to 10–12%, a level that is retained until the Bronze Age (Farrell *et al.* 2014, 231). The main cause of woodland loss at that time seems to have been anthropogenic, corresponding with an increase in ‘disturbed grassland’ (i.e., grassland under cultivation or erosion) (Bunting *et al.* 2018, 9). At the start of the Neolithic much of the mainland was covered in grassland and so extensive clearance of trees would not have been necessary for grazing or agriculture, although clearly timber was felled to build the earliest houses (Section A5.3.1). Pollen evidence from the ditch at the Ring of Brodgar suggests that it was built in an open grassland environment, like the Stones of Stenness and Barnhouse (Downes *et al.* 2013, 97–9). Small stands of varied woodland appear to have persisted; these precious resources would have required protection or careful management to ensure their survival (Bunting *et al.* forthcoming). Neolithic people living in Orkney would probably have had slightly different relations with trees to those residing in other parts of British and Ireland (Chapter 4.5).

5.2 Mesolithic

Mesolithic flint flakes and artefacts have been recovered from several locations in Orkney, mainly from fieldwalking but also excavated from sites such as Point of Cott, Westray (Findlay 1997). Current evidence suggests that the areas around the Lochs of Stenness and Harray were important wetland locations, as attested by a concentration of Mesolithic flints, finds and hearth sites that surround them (Timpany *et al.* 2016, fig 6 and table 3). A dense flint scatter at Deepdale, on the south-west bank of the Loch of Stenness, comprises largely early Neolithic flintwork but with a small Mesolithic component (Richards 2005, 10). Eighteen Mesolithic narrow-blade artefacts have been found during excavations at the Ness of Brodgar, all from residual contexts (Anderson-Whymark 2020, 214). Together with eight Mesolithic radiocarbon dates on charcoal and animal bone deriving from later contexts (Table A5-1, from Structures 5 and 8), these show that they show that the isthmus was frequented in this period. The dated artefacts are all from the northern end of the Ness of Brodgar settlement and suggest human activity between the 7th to 5th millennium BC. It is likely that the peninsula and surrounding wetlands provided a valuable resource of fish, waterfowl and plants such as reeds.

Elsewhere, microliths were found among the flint assemblage from Wideford Hill (Richards and Jones 2016b, 38) and there is evidence for Mesolithic settlement at Links House on Stronsay, where a large lithic assemblage and evidence for timber buildings has been uncovered, dating to c.7050–6650 cal BC (Lee and Woodward in prep, cited in Farrell *et al.* 2014, 230). Of similar nature to the earlier phase of this activity is the settlement at Long Howe, eastern Mainland, dating to around 6740 cal BC (Farrell *et al.* 2014, 230). It may be that many more Mesolithic sites are now submerged under the sea (Richards *et al.* 2016a, 224).

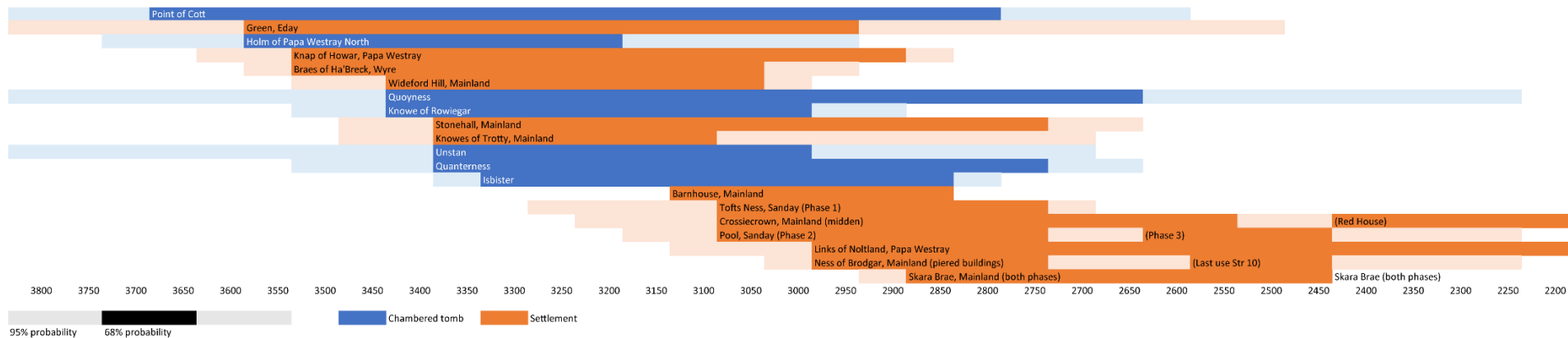


Figure A5-3 Chronology of well-dated Neolithic settlements and chambered tombs in Orkney. Data for the settlements is derived from Bayliss *et al.* 2017; data for the chambered tombs is based on modelling radiocarbon dates on human remains from each site as single phase of funerary use. Note that the lengthy period of use for some of these chambered tombs may represent more than one phase of activity rather than continuous use as implied here, although the dates for these sites are intermittently spread with no clear phasing evident

5.3 Early Neolithic

Recent Bayesian modelling of radiocarbon dates places the earliest Neolithic activity on Mainland in *3730–3480 cal BC (95% probability; Griffiths 2016, fig 10.2: Start Orkney Neolithic)*. This is late compared to the start of Neolithic activities in the rest of Britain and Ireland and may indicate that it took some time for a stable Neolithic population to become established on the islands. However, there are glimpses of earlier activity including an increase in ‘disturbed ground’ (Section A5.2) between 4000–3800 cal BC (Bunting *et al.* 2018, 9); some early radiocarbon dates on short-life charcoal from a pit containing cereal grains at Varme Dale, Mainland; occupation at Links House dating to 3970–3790 cal BC (Griffiths 2016, 296–7); and an early form of Neolithic bowl from the forecourt at Vestra Fiold chambered tomb (Richards *et al.* 2013b, 174). It is therefore likely that the current radiocarbon chronologies do not accurately reflect the beginning of Neolithic occupation on Orkney, as very few early tombs have been excavated and the neighbouring region of north-east Scotland was occupied far earlier.

5.3.1 Settlement

The earliest domestic structures on Orkney were probably built of timber. Two circular buildings with central scooped hearths have been excavated at Wideford Hill on Mainland, later replaced by a sub-rectangular timber structure which was then rebuilt in stone (Richards and Jones 2016b). Other examples are known from Braes of Ha’Breck on Wyre and Green on Eday (Lee and Thomas 2012; Coles and Miles 2013). Radiocarbon modelling of dates from these three sites shows that timber buildings were in use from *3560–3360 cal BC (95% probability; Bayliss et al. 2017, fig 6: start_timber_houses)*, probably from *3445–3370 cal BC (68% probability)*. Within a few hundred years, by about 3400 BC, these structures were replaced in stone (Bayliss *et al.* 2017). Richards has argued that rebuilding timber structures in stone was part of fixing disparate identities to place, with the house becoming symbol of endurance (Richards *et al.* 2016a, 230) but it may simply have been the case that communities quickly realised the scarcity of timber on the islands and the availability of easily splitting and workable local sandstone, choosing to abandon their traditional practices of timber construction in favour of stone skills more usually reserved for tombs.

The first stone houses on Orkney were of linear form, with perhaps the most famous being Knap of Howar on Papa Westray (Figure A5-4), a typical farmstead consisting of a pair of adjacent buildings adjacent with interiors divided by upright slabs (Ritchie 1983). Stone houses were in use from *3490–3300 cal BC (95% probability; Bayliss et al. 2017, table S5: start_linear)*, probably from *3410–3330 cal BC (68% probability)*. The architecture of these houses finds close parallels in early Neolithic timber halls or houses built in mainland Scotland, for example at Lockerbie, Dumfries and Galloway, and Crathes Warren Field, Aberdeenshire (Sheridan 2013, fig 12.2). There are also similarities to the earliest chambered tombs on Orkney, which also had interior spaces divided by cross-slabs. So close are the similarities that two structures at Howe, interpreted as a stalled cairn and a ‘mortuary house’ by the original excavator (Ballin

Smith 1994), have been re-interpreted as houses (Carey 2012, 14–5). It is likely that people combined aspects of timber hall architecture and stone tomb construction in creating these houses.



Figure A5-4 Knap of Howar early Neolithic house, Papa Westray (author's photograph)

Cereal production seems to have been important at these early settlements – c.6000 barley grains were recovered from a timber structure at Wideford Hill and a comparable amount from a stone house at Ha'Breck on Wyre (Richards *et al.* 2016a, 230). Querns have been found at Knap of Howar and Smerquoy (Gee *et al.* 2016, 89), but are much less common at later Neolithic settlements. Cattle and sheep were important (Ritchie 1983, 56); residue analysis on plain bowls from the early Neolithic settlement at Stonehall shows that they were being used to cook cattle milk and meat (Jones 2000, 129). Birds, shellfish and fish were also exploited, with the residents of Knap of Howar practicing deep-sea fishing (Sturt 2005).

Both plain and highly decorated round-based bowls, the latter known as Unstan bowl pottery (Clarke 1983; Henshall 1985, 65; Sheridan 2016), were in use from the start of the Orcadian Neolithic (Jones *et al.* 2016, 409). The distinctive Unstan bowl has a wide vertical band or collar which was decorated with grooves or slashes (Figure A5-5). This style of pottery is closely related to the use of stalled tombs and early settlements such as Knap of Howar but has a long chronological currency. Unstan bowls remain in use alongside Grooved Ware throughout the middle Neolithic, as seen at Pool for example (MacSween 1992, 261).



Figure A5-5 Unstan bowl pottery from Unstan chambered tomb (Clouston 1885, figs 2 and 3)

The earliest evidence for settlement at the Stenness-Brodgar complex lies beneath the later buildings of the Ness of Brodgar settlement. Like the samples dated to the Mesolithic (Section A5.2), there are several animal bones dating from the early Neolithic from the site (Table A5-1: Structure 8: OxA-36942; Structure 14: OxA-36927, OxA-35925, Beta-442885), although these were residual within later contexts. In addition, in a sondage excavated below Structure 14, several sherds of modified carinated bowl were found in a charcoal-rich layer just above the natural boulder clay, associated with charred animal bone dating to 3520–3340 cal BC (Card *et al.* 2020, 50; Table A5-1: Beta-442885). Although not yet related to any known structures, these appear to indicate early Neolithic activity on the peninsula. Flintwork from the period is limited to one leaf-shaped arrowhead and two plano-convex knives (Anderson-Whymark 2020, 215). On the edge of the Loch of Stenness, a hearth, ephemeral walling and features cut into the boulder clay may also be early; a sherd of round-based bowl was found in soil layers above these features (Card *et al.* 2020, 51). It seems unlikely that the two earliest buildings found so far, Structures 5 and 27,

pre-date 3200 cal BC (see Section A5.4.1.2) but aside from the sondage mentioned, excavations have not yet reached the earliest layers of the settlement.

5.3.2 Chambered tombs

Traditionally, Neolithic chambered cairns on Orkney have been divided into two groups, with the majority defined as Orkney-Cromarty (O-C) tombs and the rest as Maeshowe type tombs. The classification was developed by Henshall (1963; Davidson and Henshall 1989), although the Maeshowe group was quickly renamed the Quoyness-Quanterness (Q-Q) group, as Maeshowe appears exceptional (Renfrew 1979, 201–2). The O-C group cairns, found in Orkney and northern mainland Scotland, are enclosed rectangular stone chambers divided into compartments by tall slabs projecting from the walls and with roofs formed of large flat lintels. Each cairn usually has an access passage leading to between two to fourteen compartments, with the longer versions often called ‘stalled cairns’ (Davidson and Henshall 1989, 19) and variations known as ‘tripartite’ and ‘Bookan’ (Sharples 1985). Q-Q type tombs (plus the related site of Maeshowe) have a longer entrance passage leading to a normally rectangular chamber with a high corbelled roof, with between three and fourteen subsidiary chambers (Figure A5-6). Davidson and Henshall (1989, 90) suggested that the two types were built by two separate cultural groups, an idea taken further by Hedges (1984).

Renfrew *et al.* (1976) viewed the two types of chambered cairn as chronologically distinct, with the O-C tombs being earlier in the Neolithic and associated with round-based Unstan bowls, and the Q-Q group falling later in the Neolithic, often associated with Grooved Ware pottery. However, the division between the two groups was never clear cut, with the two types probably being contemporary and tombs such as Isbister clearly of hybrid form (Sharples 1985; Figure A5-6). In the last few years, new excavations and re-assessments of the chronology of sites using Bayesian analysis of radiocarbon dates have tended to confirm this latter judgement; any sequence in the typology of tomb types is currently complex and uncertain (Ashmore 2000; Schulting *et al.* 2010; Hutchinson *et al.* 2015; Griffiths 2016; Sheridan and Schulting 2020).



Figure A5-6 Exterior and interior photographs of Cuween chambered tomb (Q-Q type) and Isbister chambered tomb (O-C or hybrid type), both on Mainland Orkney, showing the difference between their architecture (author's photographs)

Unfortunately, few chambered tombs have accurate construction dates, although radiocarbon dates on human remains from several different types of tombs are available (Figure A5-3), showing the main period of funerary use. These indicate that the earliest type of tombs being used for burial in the 36th and 35th centuries BC were short, stalled chambers of O-C type set within rectangular cairns; namely Point of Cott (Barber 1997) and Holm of Papa Westray North (Ritchie 2009). These tombs are both located on the most northerly islands and are associated with round-based early Neolithic pottery. Point of Cott was later extended using drystone walls to form an elaborate horned cairn, part of a wider process of aggrandisement that took place at tombs across western and northern Scotland, creating a focus on the forecourt area (Sheridan and Schulting 2020, 205). The apparently long period of funerary use at this site may comprise two discrete episodes of deposition (Barber 1997, 60). From around 3400 BC onwards, alongside the continued construction and use of rectangular stalled tombs (such as Knowe of

Rowiegar on Rousay), people began to construct Q-Q types of chambered tomb. These distinctive tombs are characterised by a circular or oval cairn revetted with tall walls giving an appearance of stone towers, and long passage entrances leading to a tall, corbelled chamber with recessed cells (Sharples 1984, 116–7). Over time, more diverse and larger versions of chambered tombs were constructed (contrasting with a decline in tomb construction elsewhere in Britain). Several examples display megalithic art, including Pierowall and Eday Manse, where the decorated stones, once located at the entrances, are closely comparable with examples from the Brú na Bóinne complex (Figure A5-7). Others incorporate elements of O-C architectural traditions, such as Isbister on South Ronaldsay which has a long rectangular chamber divided by vertical slabs, but set within a circular cairn, with recessed chambers and a corbelled roof. We should perhaps see chambered cairns on Orkney as representing a repertoire of traditions built by different communities, with the two distinct types of tomb converging and developing over time. No definite early Neolithic chambered tombs are currently known from the Stenness-Brodgar area but the cairn at Staney Hill on the opposite side of Loch Harray (Figure A5-2) appears to be a long cairn with horns at the south-east end and may well date to the earlier part of the Neolithic. The site remains unexcavated.



Figure A5-7 Megalithic art from Pierowall chambered tomb on Westray (left) and Eday Manse on Eday (right). The horned spiral motif has close parallels at passage graves further south including Knowth in Co. Meath, Barclodiad y Gawres on Anglesey, Calderstones in north-west England and Temple Wood in Argyll (Robin 2008, 63; author's photographs)

5.3.3 Summary

There is currently nothing to indicate that the Stenness-Brodgar area had any great significance in the early Neolithic period, although the area was certainly frequented and there are hints of early Neolithic occupation beneath the Ness of Brodgar complex. Elsewhere, both settlements and chambered tombs are scattered widely across all the islands of the archipelago. Richards has interpreted this period on Orkney as having strong kin-based differentiation, with early communities having a degree of fixity in terms of place. He sees the emergence of stone houses and communal tombs as the beginning of a move towards 'house societies', based on Levi-Strauss's anthropological model (Richards and Jones 2016a, 8), where groups of people were bound not only by kinship but within wider affinities and social choices,

focused on a central dwelling structure. These groups, it is argued, were involved in rivalries and competition with each other. While helpful to move beyond traditional assumptions of households and families, it should be remembered that this model draws largely on analogy, with little concrete evidence for this kind of social organisation on Orkney; large and distinctive houses only emerge at Barnhouse and probably Ness of Brodgar late in the Neolithic. Future work on human remains from tombs, including DNA and isotope analysis, may help us understand biological kinship patterns.

5.4 Middle Neolithic

5.4.1 Settlement

Between 3200–3000 BC, there was a trend of conglomeration and nucleation of Neolithic settlements on Orkney. For example, at Stonehall on Mainland there are three areas of occupation located 50–100 metres apart (Stonehall Farm, Meadow and Knoll) which were occupied at the same time (Richards *et al.* 2016b). At Pool on Sanday, 14 Neolithic structures were occupied from before 3100 BC to shortly after 2500 BC, albeit with a hiatus of between four to nine generations between two phases of Grooved Ware-associated occupation (MacSween *et al.* 2015, 297–302). These are just a few of the many late Neolithic settlements now known on Orkney (Figure A5-1); even settlements that have been excavated such as Skara Brae and Barnhouse, extend well beyond the boundaries of these investigations (Brend *et al.* 2020, figs 3.17 and 6.22). During this period, the practice of superimposing sequential houses and the deposition of large quantities of midden material created large settlement mounds (Bayliss *et al.* 2017, 1184), culminating at villages like Skara Brae, where the stone houses were encased within thick deposits of midden (Richards *et al.* 2016a, 244). These middens may have been regarded as a material of transformation, of vitality, and a conspicuous way of showing longevity and wealth (Thomas 2013, 233). At the same time, the layout of houses changes from the earlier ‘stalled’ arrangement to smaller more rounded houses with side recesses and furniture (Richards *et al.* 2016a, 235). Of fundamental importance to these houses was the presence of a central square hearth and the orientation of the building on cosmological principles, in particular referencing the cardinal or solstitial directions (Downes and Richards 2005, 58; Richards 1996a; Figure 5-12). The cruciform house layout can be estimated to start between 3240–3075 cal BC (95% probability; Bayliss *et al.* 2017, table S5: *start_cruciform*), probably in 3165–3100 cal BC (68% probability). Each of the Neolithic settlements so far excavated appears to have produced incised Grooved Ware in their own distinctive styles (Jones *et al.* 2016, 309). Grooved Ware was being made and used at Barnhouse from 3160–3090 cal BC onwards (86% probability; Richards *et al.* 2016c, fig 6: *start Barnhouse*) and at Pool from 3210–2935 cal BC (95% probability; MacSween *et al.* 2015, fig 9: *start Phase 2.2-2.3*).

In practical ways, life in middle Neolithic Orkney continued as before, with a reliance on cattle, pig and sheep, as well as wild resources. Cereal remains including wheat and barley have been found at Links of Noltland, Skara Brae and Pool settlements (Hunter 2000, 122–3). A recent study of human bones from

Isbister has shown that life for people living during this period often included hard, even severe, physical labour and that incidents of interpersonal violence were common (Lawrence 2012, 521, 558). Several Neolithic settlements have a larger, more elaborate structure where special objects were deposited and with a separate or enhanced function, such as House 2 at Barnhouse. Certain buildings became increasingly elaborate, for example with red clay render coating one of the buildings at Crossiecrown (Card *et al.* 2016). At the Ness of Brodgar there is an extraordinary concentration of these elaborate monumental buildings. Although parallels have been drawn between these structures and contemporary chambered tombs (e.g., Richards 2005, 130), only Maeshowe has similar distinctive corner buttresses.

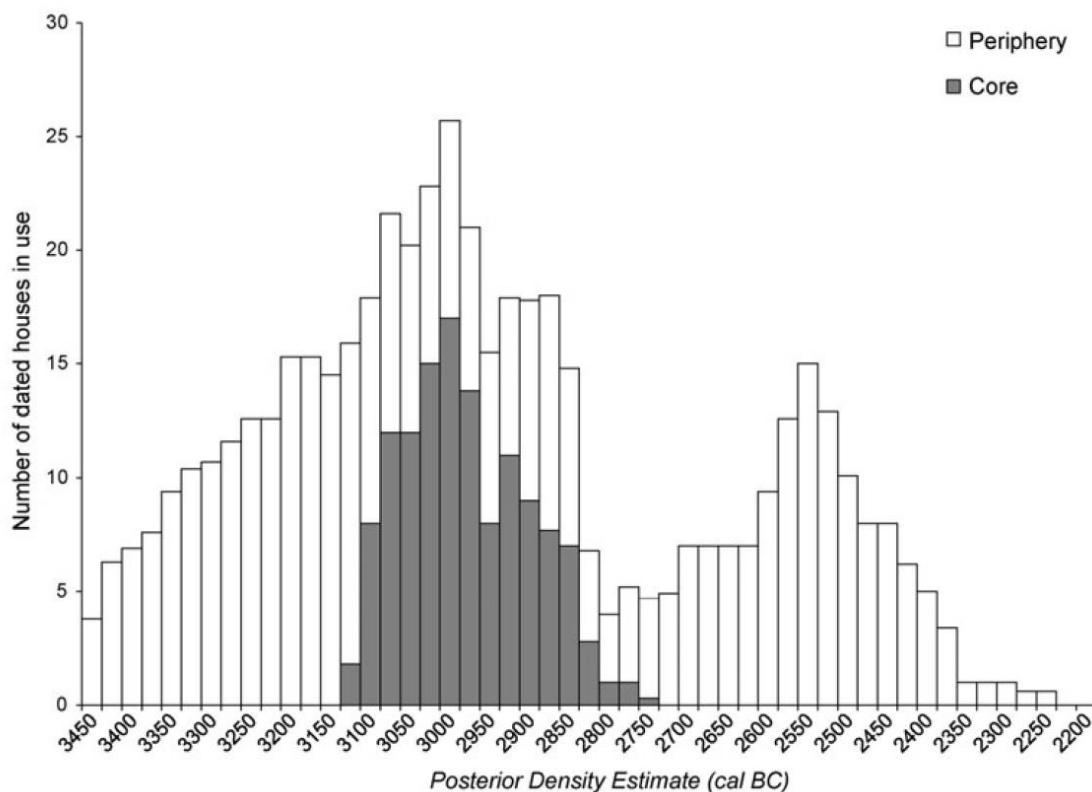


Figure A5-8 The number of dated Neolithic houses in use in Orkney during the later fourth and third millennia BC. The 'core' in dark grey represents the settlements of Barnhouse and Ness of Brodgar, the 'periphery' by all other settlements (reproduced from Bayliss *et al.* 2017, fig 7)

The number of houses in use on Orkney gradually increased from the start of Neolithic occupation to around 3000 BC (Figure A5-8). For a time around the peak, c.3100–2900 BC, it seems that most occupied houses were located within the Stenness-Brodgar complex, where there was a massive concentration of both population and activity. For example, in around 3000 BC there were 16 houses are occupied in the Stenness-Brodgar 'core', but only 9 elsewhere in the 'periphery' (i.e., elsewhere on Mainland and other islands). Some caution must be exercised in interpreting these numbers; many of the settlements have only been partially excavated and the peak is largely comprised of structures at Barnhouse and the Ness of Brodgar, which may not be typical settlements. However, they must have been occupied while stone circles and henge monuments were being built nearby, and there are hints of even further intense

occupation along the Bookan ridge and further south at Wasbister, both likely comprising Neolithic structures, from geophysical survey of this area (Brend *et al.* 2020, 86–9).

5.4.1.1 Barnhouse

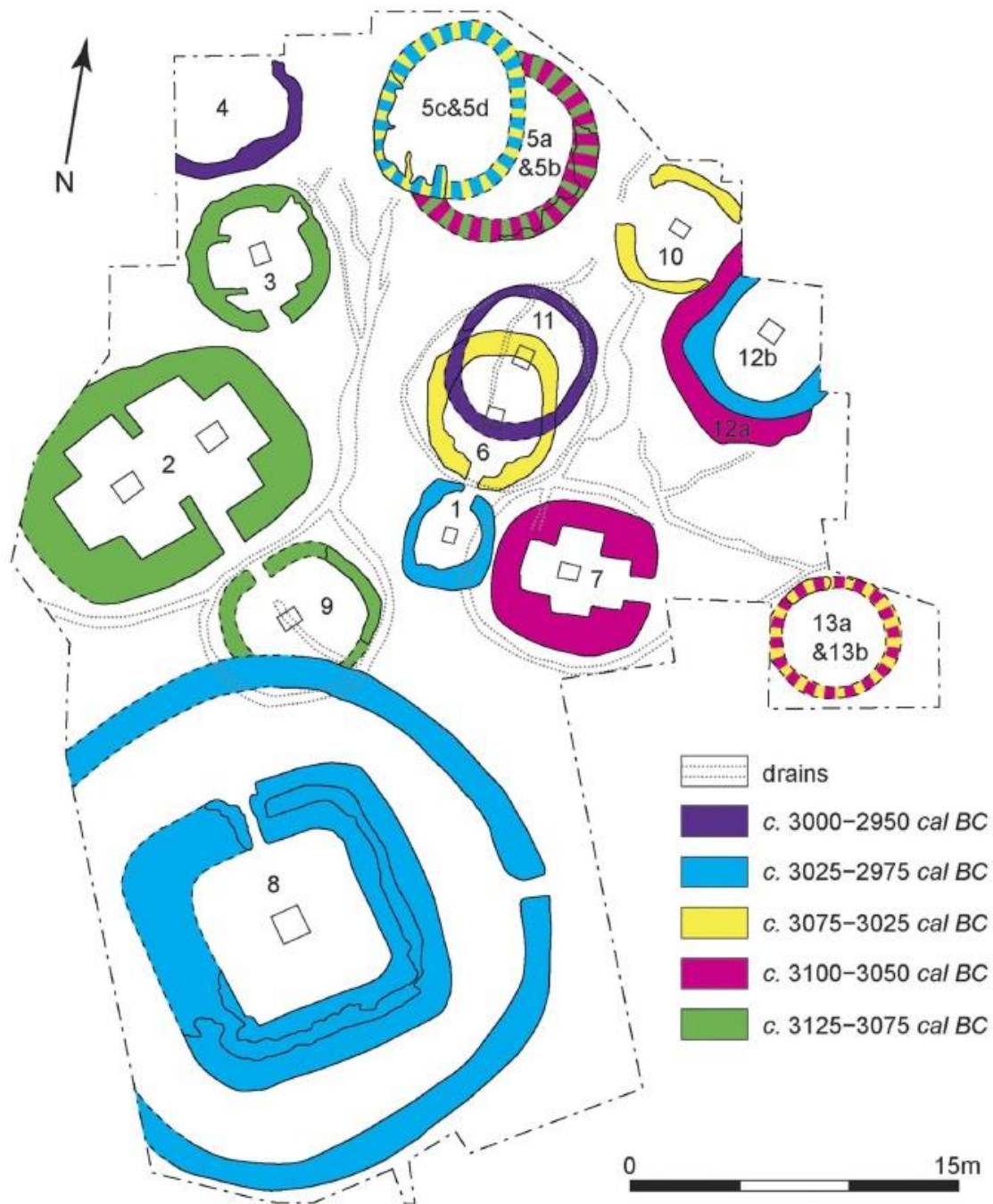


Figure A5-9 Plan of Barnhouse settlement, phased according to radiocarbon dating (Richards *et al.* 2016c, fig 12)

The settlement at Barnhouse, on the shores of Loch of Harray, was discovered during fieldwalking in 1984 and was partly excavated between 1985 and 1991 (Richards 2005). Unexcavated structures are known from geophysical survey to exist further east (Brend *et al.* 2020, 201). Habitation began in 3160–3090 cal BC (86% probability; Richards *et al.* 2016c, figs 6–8: start Barnhouse), probably in 3135–3100 cal BC (68%

probability) with the construction of Houses 2, 3 and 9 (Figure A5-9). These buildings form a discrete cluster, with Houses 2 and 9 forming a pair with opposed entrances and all three set within the same drainage system. House 2 is the largest house in the settlement, with a dual cruciform shape and high-quality external walling (Richards 2005, 129). It is divided into two symmetrical halves by masonry piers, each with a central fireplace, like some of the houses at nearby Ness of Brodgar. The house is unusual in many ways and appears to have had a different purpose or status. For example, the only pots with beef residue came from this structure (Jones *et al.* 2005, 290) and it contained the only evidence for cereal processing (Richards 2005, 147). The inner, more secluded western half was used differently, with the hearth used less often, but objects being deposited in pits below the floor (Figure A5-10). The Grooved Ware found in this half was more highly decorated and maceheads may have been made here (Richards 2005, 151). These appear to be highly formalised activities which took place within a restricted space.



Figure A5-10 The inner, restricted side of House 2 at Barnhouse, accessed by walking through the entrance and down a passage (right) before turning through a doorway. Note that the remains visible today are reconstructions (author's photograph)

The first phase of House 5, a simple circular structure, may also date from this early phase of the settlement (Richards *et al.* 2016c, 212). Over the next 100 years, the settlement began to grow with the construction of simple round houses and cruciform houses, none of which were as elaborate as House 2. Many of these were rebuilt or modified, and some went out of use before the end of the occupation period; each had a central square hearth. Grooved Ware pottery (over 6000 sherds were found on the

site) was used to cook and store dairy, meat and milk-related products, as well as foods made from barley, perhaps largely processed off site (Jones and Richards 2005a, 34). There was a working area within the village, with activities including pottery production, bone and wood working, and possibly hide working (Jones and Richards 2005a, 34). Domestic animals eaten at the site include cattle, sheep/goat and pig (King 2005). At the periphery of the settlement was a large open-air hearth, with evidence for regular fires and with much associated Grooved Ware pottery as well as several fragments of pitchstone (brought from Arran), perhaps relating to feasting and exchange activities (Jones and Richards 2005a, 45).

Towards the end of the settlement's occupation, a monumental square house surrounded by a wall was built over the earlier House 9 in the southern part of the village. This building, Structure 8, was built in 3010–2955 cal BC (95% probability; Richards *et al.* 2016c, fig 10: *build S8*), probably in 3000–2975 cal BC (68% probability). It was one of the last structures to be used, with activity continuing until 2915–2870 cal BC (95% probability; Richards *et al.* 2016c, fig 10: *end S8*), probably 2905–2880 cal BC (68% probability). Structure 8 was built directly over the earlier exterior communal hearth but was a radical departure from earlier construction. The inner house was 8 m by 8 m, surrounded by a raised yellow clay platform enclosed by a substantial stone wall of c.1.3 m thickness (Hill and Richards 2005, 159). The platform had a series of hearths, pits and boxes, where burning and the deposition of large Grooved Ware pots, pumice and flint scrapers took place. These burnt deposits had been tracked into the inner building, which had a series of small boxes set into the floor near the entrance (Hill and Richards 2005, 190). This building shares many similarities with features within the nearby Stones of Stenness and with Structure 10 at the Ness of Brodgar settlement (Figure A5-11). It has been suggested that the thick exterior walls of Structure 8 wrapped the building in layers, increasing the distance between the highly charged interior space and the outside (Richards 2013). Another similar structure at Barnhouse has not yet been excavated (Edmonds 2019, 249).

Unlike many Neolithic settlements on Orkney, Barnhouse was founded in relatively empty area without evidence for earlier occupation (Richards *et al.* 2016c, 217). It is hard to look at the plan of Barnhouse settlement and not see indications of social inequalities – the small circular houses compared to the grander and much more finely-built Structures 2 and 8. However, these more elaborate structures may well have had a particular ceremonial purpose serving the whole community, albeit with secluded inner spaces where presumably only certain people could enter. Pottery from Barnhouse draws on a consistent set of decorative styles that may have reinforced a sense of identity and community; similar decoration is not found at the village of Skara Brae for example (Jones and Richards 2005b, 200). Jones (2000; 2005) has suggested that at least three vessels found at Quanterness were made at Barnhouse, due to similarities in decoration and the inclusion of olivine-basalt, found as a filler in early phases of Houses 3 and 5. Did one community make use of both the settlement at Barnhouse and the tomb at Quanterness? The similarities of Grooved Ware pottery from Barnhouse to other far-flung places, including the east

coast of Ireland (Knowth) and mainland Scotland (Balfarg Henge), suggest longer distance connections were also maintained.

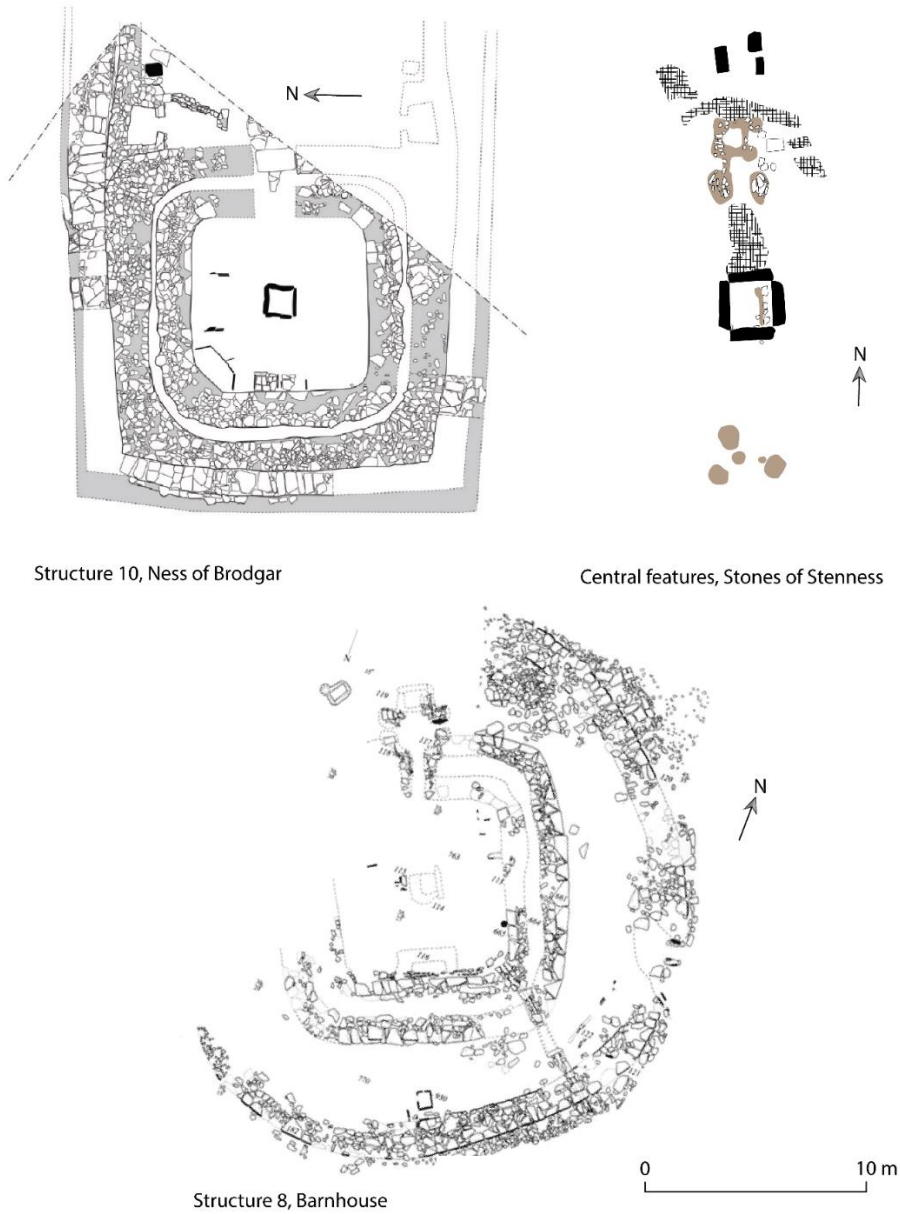


Figure A5-11 Comparison plans of Structure 10 at Ness of Brodgar, the central features within the Stones of Stenness and Barnhouse Structure 8 (after Card *et al.* 2020, fig 9.5; Ritchie 1976, fig 2; Hill and Richards 2005, fig 6.10). Compare these with Maeshowe, Figure A5-19

The settlement at Barnhouse may not have been permanently occupied on a year-round basis. Potentially people from different areas of Orkney may have come to Barnhouse at particular times of year or stages of life to take part in communal ceremonies or gatherings. The fact that maceheads appear to have been manufactured at House 2 but also broken examples are often found in the Stenness-

Brodgar area, particularly near the stone circles (Challands *et al.* 2005, 225), might suggest their role in ceremonies. Several grinding and hollowed stones from the settlement, particularly from House 2 and Structure 8, may relate to crushing of bone or ochre, again perhaps related to funerary rituals or ceremonies involving body decoration. These ceremonial activities must have related to the nearby stone circles and monumental structures.

5.4.1.2 *Ness of Brodgar*

Excavations on the narrow isthmus that divides the Lochs of Harray and Stenness have revealed part of a large stone-built complex of at least 36 structures, and probably many more (Figure A5-12). Known as the Ness of Brodgar, excavations at this site are continuing annually; the account presented here will no doubt change. Space does not permit a detailed description of all the structures and sequence, so only the key points are elucidated here. Readers looking for further detail should refer to Card *et al.* 2020 and future publications.

All the buildings at the Ness of Brodgar were built of tight courses of carefully selected blocks and slabs, usually with double-skinned walls and central hearths. Buildings were built, altered, dismantled and rebuilt so many times, often incorporating midden material into their wall cores and levelling layers, that the area gradually became a mound; an Orcadian tell. To the south was an enormous midden mound, at least 4 m deep and 70 m in diameter, itself partly covering earlier buildings including the unusually large and well-made Structure 27 (Section A5.3.1; Card *et al.* 2020, 96). The structures were bounded off from the rest of the peninsula by a substantial regularly faced boundary wall to the north, up to 6 m wide, and a less substantial boundary wall to the south (Card *et al.* 2020, 65). Several radiocarbon dates from layers below this southern wall (Table A5-1) show that it was built after 3330 cal BC and a date from the construction layer below the northern wall gives a similar estimate, after 3360 cal BC. The northern boundary wall had been demolished by about 3000 cal BC, possibly to allow the extension of settlement in this direction (see below) but the southern boundary remaining standing throughout the life of the settlement.

Two partially excavated structures, Structures 5 and 27, may be early in the sequence of occupation so far identified at the Ness of Brodgar. Structure 5 was a finely built elongated oval building at the northern end of the site, measuring at least 15 m long, with a primary phase that included orthostatic divisions typical of early Neolithic houses, although no pottery earlier than Grooved Ware has been found (Card *et al.* 2020, 51, fig 4.15). This building has similarities to the early Neolithic stone House 5 at Braes of Ha'breck on Wyre (Farrell *et al.* 2014, fig 4). The northern boundary wall curves neatly around this structure, and as both were built directly on the natural glacial till, they are thought to have stood contemporaneously. This wall is dated to sometime after 3360–3100 cal BC (Table A5-1: SUERC-80662) by animal bone from the construction layer.



Figure A5-12 Plan of Ness of Brodgar, based on excavations up to 2019 (after Card *et al.* 2020, figs 5.1, 5.3, 6.6, 9.27)

Structure 27 at the southern end of the settlement, beneath the large midden mound, was a large rectangular building with enormous orthostatic slabs lining the internal wall face, as well as set at right angles to define recesses or stalls. The external walls were finely built, with pick-dressing in places (Card *et al.* 2020, 116–21). Although currently undated, a sherd of early Neolithic carinated bowl from a nearby

pit may be associated with this structure, and its close similarity to the structure underneath the 'Howe of Howe', just 3 km to the south-west on the far side of the Loch of Stenness, which pre-dated a Quoyness-Quanterness style chambered tomb, may suggest a mid-4th millennium BC date (Ballin Smith 1994). Both Structure 5 and 27 have wall cores of redeposited glacial till, rubble and shillet, rather than the more usual midden material, again suggesting their early phase in the occupation sequence. However, the architectural sophistication of Structure 27 and its incised decoration, may suggest a later date for this structure (Card *et al.* 2020, 120); excavation over the next few years will hopefully provide more dating evidence.



Figure A5-13 Structure 12 under excavation at the Ness of Brodgar, looking west across the southern hearth and showing the stone piers which are a defining feature of these buildings. The subsidence of the structure is also evident (author's photograph)

A few earlier buildings of the main complex (e.g., Structure 20) had interiors divided by standing slabs and appear to have been roofed with organic materials, but in the majority of structures the divisions were formed by substantial stone piers and the roofs were formed of stone slates (Ackerman 2020). Earlier structures (e.g., Structures 17, 18, 28, 33 and 36) are around 10 m long by 7 m wide and are very similar in layout to Structure 2 at Barnhouse, and indeed some, like Structure 14, had a similar paired arrangement with a smaller structure opposite the entrance. Over time these structures were rebuilt, enlarged and elaborated to form monumental hall-like structures (Figure A5-13). Structure 8, the largest found so far is c.18 m long by 9.5 m wide externally and has a total of four major and one minor internal divisions, each with one or two enormous hearths. The buildings excavated so far appear to be arranged around a central paved courtyard area, with a small standing stone at the centre (Card *et al.* 2020, 72;

Figure A5-14). Objects including polished stone spatulas, collections of animal bones, occasional human bones, polished axe heads, a carved stone ball and complete Grooved Ware pots were deliberately placed within the buildings either as foundation deposits during construction, or as closing deposits at the final use. In between, the structures appear to have been kept clean of debris despite intensive use.



Figure A5-14 Looking down into the central courtyard area, where a small standing stone stands (author's photograph)

Can the Ness of Brodgar be called a settlement? Certainly, the wear of the floors and repeated episodes of use and clearing out of the hearths suggests prolonged and intensive occupation, as well as sporadic cooking for large numbers of people (Card *et al.* 2020, 82). Their diet appears to be largely reliant on cattle, as attested by the huge numbers of cattle bones (85% of the assemblage), alongside sheep (13%) and occasional pig and red deer (Mainland *et al.* 2020, 267), and pilot residue analysis of the pottery that suggests people were cooking beef and dairy products (Towers and MacSween 2020, 261). Over 72,000 flaked stone artefacts and 90,000 sherds of Grooved Ware from the site so far give a sense of the scale of occupation. There is evidence for the manufacture or at least maintenance of stone axe heads, the use of varied stones for flint-knapping and as hammers, and the manufacture of pottery. However, these do not appear to be ordinary houses, but rather dramatic structures designed to impress, finished with high skill. In Structure 12, for example, the corners of piers were constructed of fine yellow sandstone blocks that had been imported from at least 6 km away and pick-dressed, mostly facing south as if they were meant

to be seen by people entering from that direction (Card *et al.* 2020, 81). Over 900 architectural stones from the site have been incised, carved, cup-marked, pick-dressed, chiselled or painted, the largest group of markings from any single Neolithic site in northern Europe (Thomas 2020, 132). The decoration is abstract and almost entirely geometric and linear, although many were faintly incised and were built into walls where they could not be seen, suggesting that marking was not always done for display. Pigments of red, white and black were also used to colour selected stones (Thomas 2020, 135; Figure A5-15); the same colours were used to decorate pots (Towers and MacSween 2020, 264).



Figure A5-15 A replica of the 'Brodgar stone' created by Chris Gee, showing how the art may originally have looked with the additional of colour pigments (author's photograph)

There were regional connections; not only were stones used for building and tools brought from varied parts of the Orkney archipelago, but the range of materials (not seen at contemporary settlements elsewhere on Orkney, where local materials tend to be used) and varied forms suggest that people were coming together at the Ness of Brodgar from across Orkney (Clarke 2020, 243). There are also hints of longer-distance connections, evidenced by pitchstone from the Isle of Arran, Lewisian gneiss used to make maceheads and small quantities of Den of Boddam flint cobbles, from Aberdeenshire. The pitchstone, only found elsewhere on Orkney at nearby Barnhouse, had been worked using a type of blade manufacture not normally found on Orkney, suggesting that it was brought by long-distance travellers who knew how to work this material (Anderson-Whymark 2020, 214). The Ness of Brodgar was not simply a settlement then, but a central place where people gathered to build, to take part in feasts and to take part in ceremonies relating to life events, seasonal cycles or communal proceedings. Standing against this theory is that during the peak of occupation within the Stenness-Brodgar, the number of dwellings occupied across the rest of Orkney appears to drop significantly compared to the earlier and later Neolithic (Bayliss *et al.* 2017, fig 7), so there is a sense in which the focus of energy and building was located within the complex. Perhaps it was a place that was continually occupied by some members of the community, but also a place of periodic mass gatherings.



Figure A5-16 Excavations in progress at Trench T in August 2018, showing the depth of material in the midden mound. In the foreground, Structure 27 is beginning to be revealed © Gaius Cornelius, CC-BY SA 4.0, Wikimedia Commons

The chronological phases of the Ness of Brodgar have been subjected to Bayesian analysis (Card *et al.* 2018) and this provides two models for the sequence, depending on whether the late activity at Structure 10 (Section A5.5.1) is seen as part of a continuous phase of activity at the site, or a separate, later phase. Although 42 further dates are now available (Card *et al.* 2020, app. 1), none of these drastically change this modelling, published in 2018 (see Table A5-1). Frustratingly, this is largely because detailed contextual and stratigraphic information is not available for most of the new samples; presumably, this will be made available in future publications. However, the new dates do show more hints of Mesolithic and early Neolithic activity (Sections A5.2 and A5.3.1), provide more precise dating for the remodelling of Structure 12 and allow the deposition activity at the midden mound in Trench T to be modelled.

The earliest stalled and piered buildings are currently undated, but by comparison with House 2 at Barnhouse, dated to 3125–3090 *cal BC* (95% probability; Richards *et al.* 2016c, fig 11: *foundation*) these are likely to have been built in the 32nd or 31st century BC. The later, larger piered buildings including Structures 1, 8, 12 and 14 are better dated, and were occupied from at least 3060–2950 *cal BC* onwards (95% probability; Bayliss *et al.* 2106, 246: model 1) or 3020–2920 *cal BC* (95% probability: model 2). The Ness of Brodgar and Barnhouse were thus occupied at the same time, which is also when the Stones of Stenness were built (Figure A5-31). The large midden mound at the southern end of the site (Figure A5-

16) can be modelled as a single phase of activity, starting in 3000–2780 cal BC (95% probability: Figure A5-17), probably 2950–2870 cal BC (68% probability). Activity at Ness of Brodgar stretches across the middle-late Neolithic boundary imposed here; collapse, rebuilding and significant changes to the site will be discussed in Section A5.5.1.1.

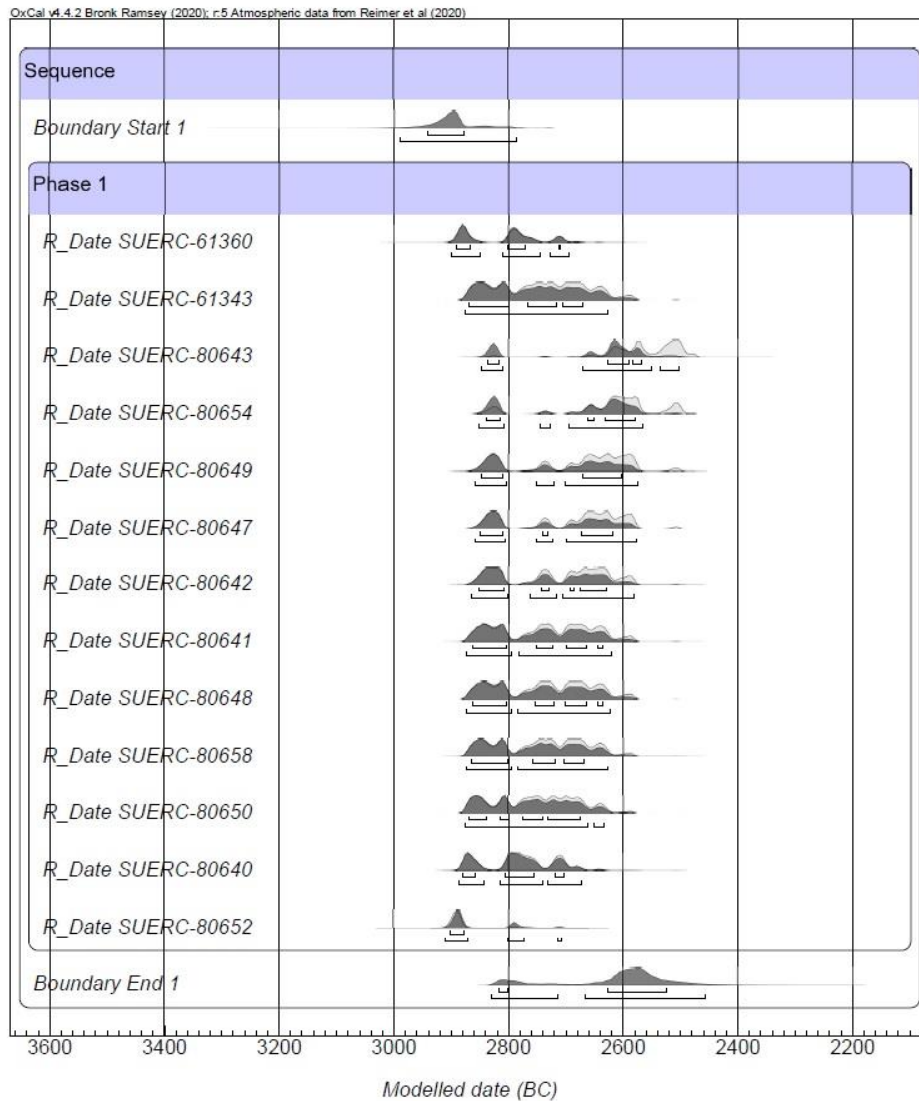


Figure A5-17 Modelling radiocarbon dates from the Ness of Brodgar midden as a single phase provides a broad estimate for the period of its deposition

5.4.1.3 Bookan ridge

To the north of the Ness of Brodgar, close to the Ring of Bookan (Section A5.4.3.3) lies another probable Neolithic settlement. Geophysical survey has identified a large circular ditched enclosure which appears to contain a monumental building (Card *et al.* 2020, fig 27.5). Along the ridge to the east are suggestions of substantial buildings of sub-rectangular form, like those found at the Ness of Brodgar and Barnhouse (Figure A5-18). The demolition of the northern boundary wall at the Ness of Brodgar in about 3000 BC, and the possible construction of the much longer boundary, the Dyke of Sean, further north (Card *et al.* 2020, 69; Figure A5-2), may suggest an expansion of settlement at that time. This site has not been

excavated but suggests the intriguing possibility that there were three settlements in the complex, each associated with a nearby ceremonial monument.

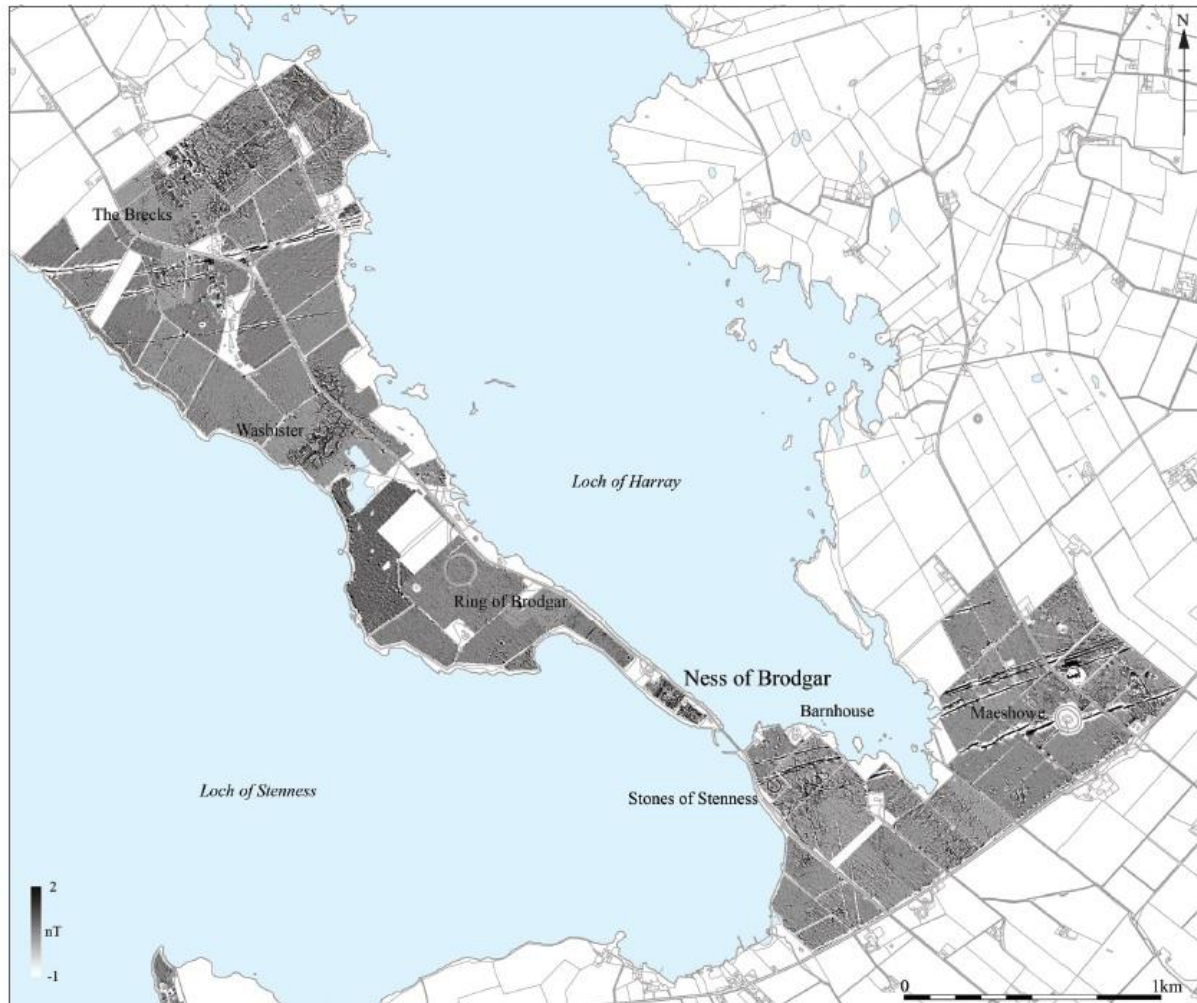


Figure A5-18 Gradiometer survey results of the Stenness-Brodgar area. Extensive anomalies can be seen in the Washister and Bookan ridge ('The Brecks') both of which appear to be at least partly Neolithic settlements. © Historic Scotland, contains Ordnance Survey data reproduced under licence no. 100017509

5.4.2 Chambered tombs

All types of chambered tombs appear to have been continuously used for funerary purposes throughout the middle Neolithic period, although some (e.g., Holm of Papa Westray North) may have been abandoned by this time (Figure A5-3). Whereas burials within the O-C tombs appear to have emphasised or at least retained some sense of the individual, at Q-Q tombs there was far more intermixing and fragmentation of burials, suggested to be a deliberate method of negating unequal status within the community (Sharples 1985, 70). Q-Q tombs such as Quoyness and Quanterness appear to be associated, at least during the late stages of their funerary use, with Grooved Ware pottery which probably emerges during the 32nd century BC (Schulting *et al.* 2010, 38; Sheridan and Schulting 2020, 208). At least 34 plain and incised vessels of this type were found mixed throughout the bone deposits at Quanterness, although largely in the later deposits (Cowie and MacSween 1999, 52); these tombs were in use when

Grooved Ware first emerged, alongside the continued use of Unstan bowl pottery (Bayliss *et al.* 2017, table S4). For a considerable period, the use of different styles of pottery in tombs and at settlements, as well as architectural decisions appear to have been cultural choices, rather than related to any chronological sequence.

There are several chambered tombs in the Stenness-Brodgar complex. Although these appear to be spaced at relatively regular spatial intervals, this is unlikely to reflect any true prehistoric patterning due to partial survival and recognition, as well as various periods of construction and use. One, called Little Barnhouse at the southern end of the Loch of Stenness was only confirmed as a chambered tomb, rather than a glacial mound, in 2001, when geophysical survey revealed a 2 m-wide circular ditch of 40 m diameter (Challands 2001; Figure A5-2). Further research revealed that the mound had been opened in the 1890s, when a 3 m diameter chamber with a flagstones roof and possibly two side-chambers was uncovered. Several other mounds and cairns in area have not been explored in modern times but may well cover Neolithic structures or tombs. These include Fresh Knowe and Salt Knowe (Figure A5-2), two large mounds on opposite sides of the Ring of Brodgar. Measuring 38 m in maximum diameter and standing 5.7 m tall, Fresh Knowe is close to the Loch of Harray. Salt Knowe is a maximum of 40 m in diameter and stands about 6 m high. Although antiquarian investigations failed to find any trace of internal structures at either mound (Farrer 1861), these are of the right size and shape to be chambered tombs.

5.4.2.1 *Maeshowe*

Maeshowe is the largest, most elaborate Orcadian chambered tomb (Davidson and Henshall 1989, 144; Challands *et al.* 2005), most closely related to others in the Q-Q group. The tomb was built on a glacial knoll which was levelled to create a flat platform (Childe 1956, 167–8), with a layer of lacustrine silt from the nearby loch later added to the site (French 2005, 380). This broad platform is surrounded by a continuous wide, shallow ditch and outer bank, once a substantial wall preventing physical or visual access (Richards 1993, 300; Cummings and Richards 2017). The ditch varies from 13–18 m across at ground level and is up to 1.4 m deep, except on the north-west side where the ground drops away (Childe 1956, 169–72; Renfrew 1979, 23–6). There is no entrance or causeway across the ditch and no indication that it was ever filled with water (Wickham-Jones *et al.* 2016, 39; *contra* Richards 1996b). The mound itself is slightly oval, measuring 38 m by 32 m and 7.3 m high (Davidson and Henshall 1989, 143). The chamber is covered by an inner core of rubble, surrounded by a wall up to 4.3 m high, with the rest of mound made up of clay and stone, with a layer of peat at the base (Figure A5-19; Childe 1956).

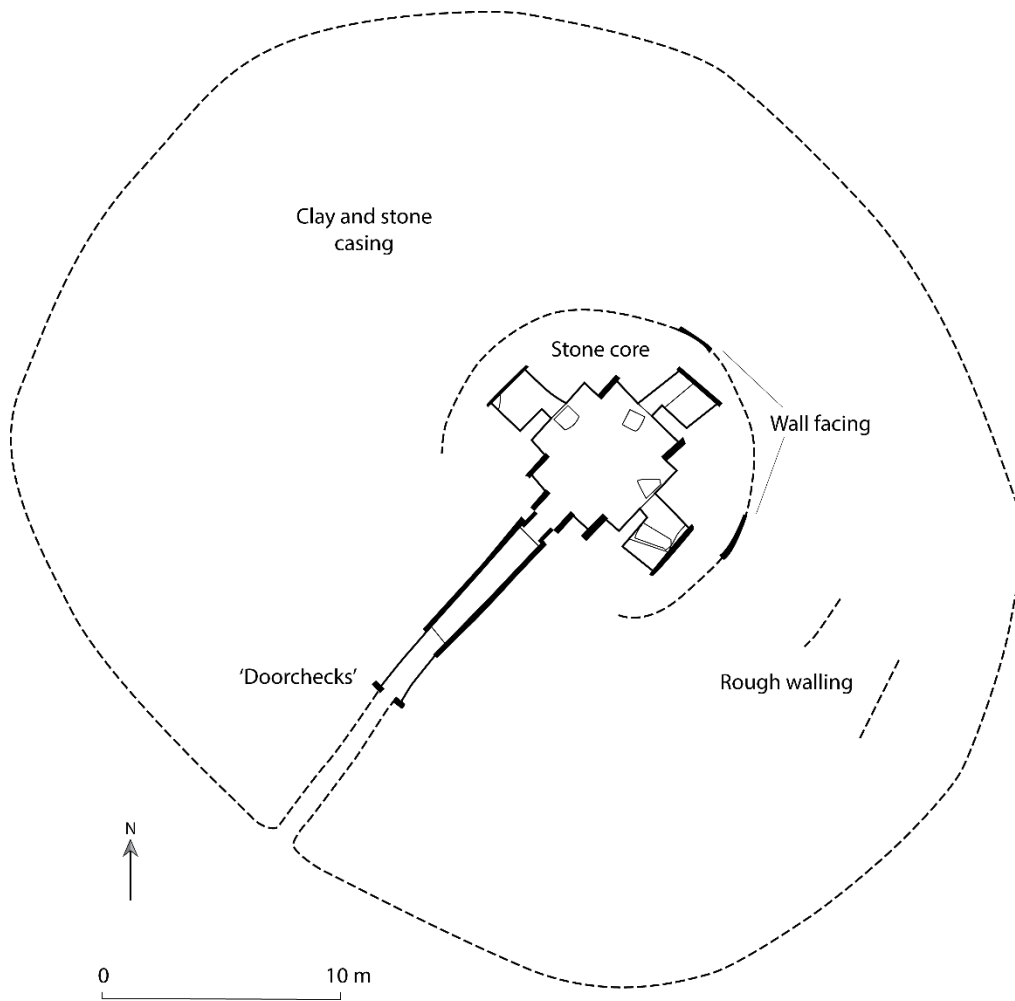


Figure A5-19 Plan of Maeshowe (after Henshall 1963, 143)

The high inner chamber was built of closely corbelled stones, with sophisticated masonry and precise joints (Figure A5-20). In each corner is a square buttress, the inner side of which consists of a single upright slab, these four stones ranging in height from 2.4–2.9 m. There are rectangular cells in each of the three walls with openings above ground level, each with a large blocking stone (Davidson and Henshall 1989, 144). The chamber is accessed along a straight passage, consisting of four enormous stones averaging 5.6 m long, laid to form a box-like corridor aligned on the midwinter sunset (see Chapter 5, Case Study 8). The outer end of the inner passage had a closing stone that, when opened, sat inside a recess within the passage. This stone, found in the passage by Petrie (1861, 355) left a 0.47m gap at the top when closed. It has been suggested that this had a similar effect to the lightbox at Newgrange (Burl 2005, 30; MacKie 2009, 23; Figure 5-6). Unfortunately, any human remains in the chamber had long been cleared out prior to the earliest investigations, with only one fragment of human skull and some animal bones found in the cells (Petrie 1861, 356).



Figure A5-20 Interior of Maeshowe, showing three of the four upright standing stones that form part of the corner buttresses, three of the side chambers with their corresponding blocking stones, and the entrance passage © Jim Richardson

Although nine radiocarbon determinations are available on material from surrounding ditch and one from beneath an associated bank, these provide only an unhelpfully broad range, bracketing the construction to after 4040 cal BC and before 2500 cal BC (SRR-791 providing a TPQ for the bank; Q-1482 and SRR-505 providing a TAQ for the northern ditch: Table A5-1). Several architectural features of Maeshowe are paralleled in the wider Q-Q group of chambered cairns on Orkney, particularly at Quoyness and Quanterness, and it is possible that Maeshowe dates to a similar mid-3rd millennium BC period. It is currently not possible to say whether Maeshowe was the earliest of this group (Piggott 1954, 243) or was the culmination of this architectural tradition (Renfrew 1979, 31; Sharples 1985; Richards *et al.* 2016a, 241). Parallels have been drawn between the Q-Q group of chambered tombs and Irish passage tombs, particularly Newgrange and Knowth. Links include the use of pecked designs reminiscent of Irish passage tomb art, and specifically at Maeshowe, the orientation on the winter solstice, the cruciform layout and slightly larger right-hand chamber. Sheridan has argued that the construction of Maeshowe was a deliberate strategy by an ambitious and widely travelled Orcadian elite to enhance their power by appropriating an exotic tradition (Sheridan 2004, 2014; Schulting *et al.* 2010, 39–41). However, the dating evidence from Quanterness and Quoyness suggests that they were built before the major passage tombs of the Boyne Valley (Appendix A4.4.2 and A4.4.3) and many of these features were Orcadian in origin.

Maeshowe had a complex sequence, the earliest phase of which has close parallels to Neolithic houses and other monumental structures. Excavations in 1991 found the remains of stone-paved pathway covering a drain below the clay platform, and this is interpreted as evidence for an earlier structure on the site (Challands *et al.* 2005). A recently discovered sketch of the tomb from 1861 shows a possible hearth in the centre of the floor (Figure 5-13), which together with the cruciform layout, corner

buttresses and levelled clay platform seem to reflect those of monumental houses nearby (Figure A5-11). This phase of Maeshowe may have been built at a similar time to Structure 8 at Barnhouse, around 3000 BC.

The stone sockets for the four pillars inside Maeshowe underlie the side walls of the chamber, so they clearly pre-dated the construction of the chamber which encased them (Cummings and Richards 2017, 245). Together with the long slabs that make up the inner passage these may have formed a free-standing stone circle or other arrangement. A large stone socket discovered on the platform at the rear of the tomb strengthens the case (Richards 1996a, 197; Challands *et al.* 2005, 245). Pollard (2009, 345) and Darvill (2016, 104) have compared the four central standing pillars with square-in-circle timber or stone settings elsewhere in Britain and Ireland (there is a probable example nearby at the Comet Stone (A5.4.3.4)). The mix of four tall stones (c.5.6 m) and four smaller stones (c.2.5 m) may reflect similar patterning evident at the Stones of Stenness. Potentially a very similar sequence to that site could have taken place here, with a final stage being the construction of the chambered tomb itself, like Calanais in the Outer Hebrides, where a passage tomb with four upright slabs was also constructed within a stone circle (Ashmore 2016). Categories of houses, monumental structures, stone circles and chambered tombs may be rather fuzzier than previously thought.

In summary, Maeshowe combines Orcadian chambered tomb, stone circle and monumental house architecture, with a winter solstice alignment apparently inspired by Irish megalithic tombs but also drawing on local topography. The incised Neolithic artwork at Maeshowe is subtle and 'Orcadian' in style, with parallels to that found at the Ness of Brodgar and Skara Brae (Bradley *et al.* 2000, 59–60). Other tombs on Orkney, such as Pierowall, have megalithic art that displays much closer parallels to the Boyne Valley tombs, and links between the two areas are further evidenced by closely comparable early Grooved Ware pottery, maceheads and miniature carved stone ball beads (Sheridan 2014; Carlin 2017).

5.4.2.2 *Unstan*



Figure A5-21 Exterior view of Unstan chambered tomb, with Loch of Stenness beyond (author's photograph)

Located on the edge of the Loch of Stenness this tomb is located outside the main complex but is only 2 km to the south-west and within site of the main monuments (Figures A5-2 and A5-21). The tomb, like Isbister, is of a hybrid form, with a circular mound 13 m in diameter, containing a roughly rectangular stalled chamber, accessed by a long passage off one long side and with a side cell (Henshall 1963). The site gives its name to Unstan pottery, as 20–30 of these bowls were found within the chamber when it was excavated in 1884 (Clouston 1885; Figure 5-5). Two crouched skeletons were discovered in the side chamber, and several more contracted skeletons as well as disarticulated remains in the main compartment. The hybrid form of the tomb, and three radiocarbon dates on human remains from within (Olalde *et al.* 2018, supp info 65–6; Table A5-1) suggest that it was built and used after 3400 BC.

5.4.3 Monuments

During the middle Neolithic, people on Orkney began to erect large standing stones, either in circles, in arrangements of four, in pairs or singly. The largest concentration of all these types of stone monument on the islands are found in the Stenness-Brodgar complex. By far the largest monument, both in size and number of stones, is the Ring of Brodgar. Two smaller monuments, the Stones of Stenness and the Ring of Bookan, may have been of similar importance to each other, although because the former still survives as a monument and has seen extensive excavation, it is far better known.

5.4.3.1 *Stones of Stenness*

The tall and slender Stones of Stenness, with their distinctly angled tops, are the tallest standing stones on Orkney, with the tallest (Stone 2) standing 5.7 m high. Only four remain today, of an original 11 or 12 (Figures A5-22 and 23). The stones are surrounded by traces of an outer bank and a rock-cut ditch with a

single causeway in the north, enclosing an area of c.44 m diameter. The site has a recent history of attempted destruction and uninformed restoration (Ritchie 1976, 3–7). The only excavations took place in 1973–4, when three cuttings were made across the ditch, missing stone sockets were targeted and large parts of the interior investigated (Ritchie 1976; Figure A5-22).

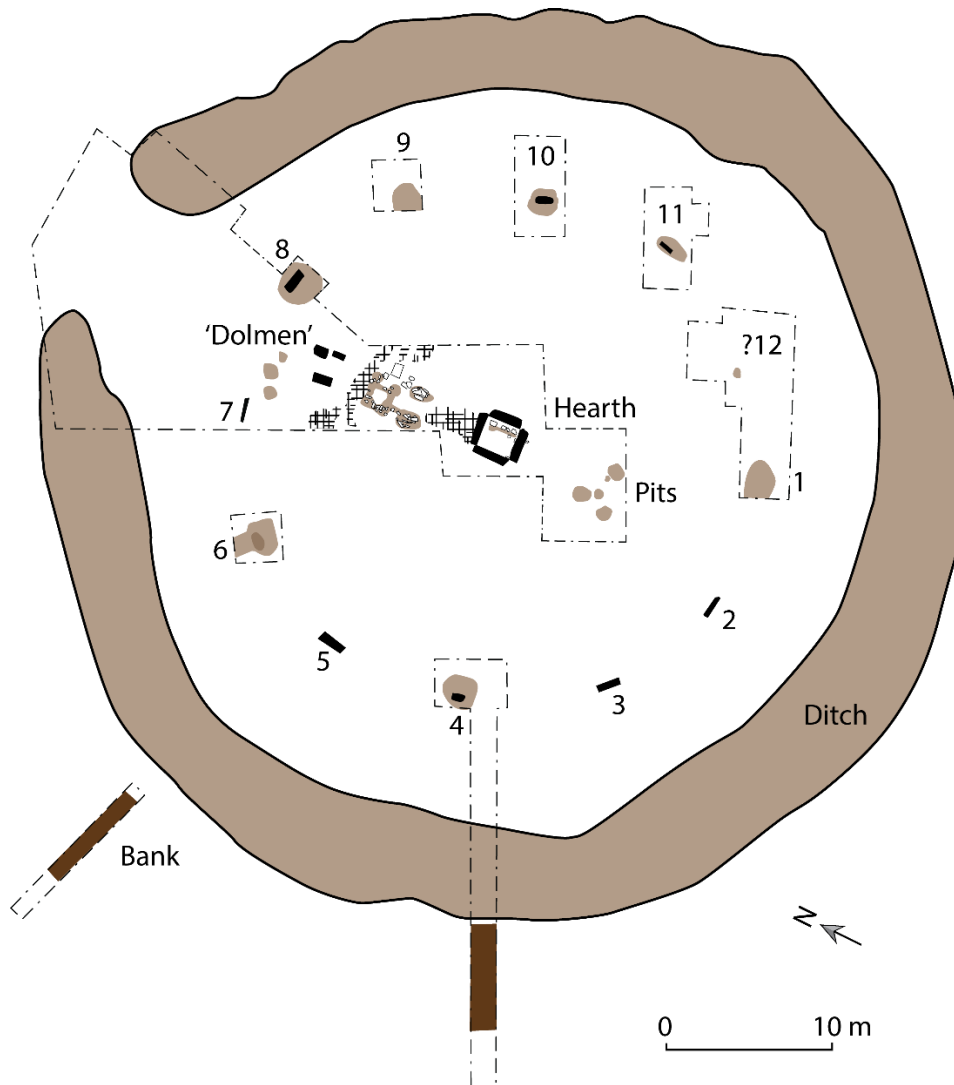


Figure A5-22 Detailed plan of Stones of Stenness (after Ritchie 1976, fig 2)

Using Ritchie's stone numbering, Stones 2, 3, 5 and 7 are still standing, the latter two of these re-erected in 1906–7 by the Office of Works. Stone 4 is a substantial stump that was found to sit in a deep stone-hole, chocked with massive boulders. During the excavations, the stumps of Stones 8, 10 and 11 were uncovered. Stones 1, 6 and 9 were only represented by the holes in which they had been erected, with all three stoneholes disturbed by the removal of the uprights. Stonehole 9 was very clean, with no sign of either stump or packing stones and there is no evidence for Stone 12, with only a slight hollow found. Although we should not necessarily project our idea of a 'complete' stone circle onto the past, it is quite possible that this stonehole had been removed by later ploughing (Ritchie 1976, 10).

The lithology of the standing stones has been described by Collins (1976, 44–5) as blue-grey calcareous flagstones (Stones 2 and 3), slightly coarser flagstones (Stones 5, 7 and the ‘dolmen’ stones, see below), carbonate-rich siltstone (Stone 8), a grey flagstone (Stone 11) and a final group richer in iron oxide, probably limonite (Stones 4, 6 and 10). Although this might suggest stones obtained from a variety of locations, all the stones except for Stone 7 were of a similar thickness and had similar load castings (bulges and lumps between the bedding planes). Collins (1976, 45) suggested an origin for the stones on the edge of the Loch of Stenness, an idea supported by the observation that the water levels would have been somewhat lower than today, exposing the rocky sides of the loch (Bates *et al.* 2016, 405). Alternatively, the stones may have been quarried further afield; the hilltops of Vestra Fiold (7 km to the west) and Staneyhill (4 km to the north-east) have been identified as a stone quarry sites (Section 5.4.3.2).



Figure A5-23 Stones of Stenness, looking south-west towards the mountains of Hoy (author’s photograph)

The surrounding ditch was 2.3 m deep, the bottom 1 m of which was cut into solid rock down to a flat bedding plane (Ritchie 1976, 10). Clare (1987, 470) has noted that digging ditches is alien to Orkney, and certainly the ditch here, and the examples at nearby Maeshowe and the Ring of Brodgar, are not typical of wider Orcadian practice, suggesting that the idea of them was imported from elsewhere. Above a thin layer of silty loam, a deposit within the ditch contained bones of wolf or dog, cattle and sheep, as well as

twigs and wood (Ritchie 1976, 10). Modelling of radiocarbon determinations on these animal bones, and on material from the central hearth and elsewhere, dates this activity to *3030–2895 cal BC (95% probability; Bayliss et al. 2017, fig S10: build_stenness)*, probably in *2975–2905 cal BC (68% probability)*; it is likely that the monument was constructed shortly before this date. Grooved Ware pottery, further animal bones and human bones were recovered from the western ditch terminal, both within the primary silts and higher up (Ritchie 1976, 12). Although Richards (1996; 2013, 78) has suggested that this ditch (as well as those encircling Maeshowe and the Ring of Brodgar) was filled with water in the Neolithic, there is little direct evidence to support this.

At the centre of the stone circle and henge was a large square setting made up of four large stones, which contained cremated bone (at least some of which was animal), more Grooved Ware pottery and quantities of ‘cramp’ (Ritchie 1976, 13). Cramp is a product of burning using seaweed as fuel, collected as part of cremation practices (Photos-Jones et al. 2007). This monumental hearth, measuring 2 m across internally, appears to have been preceded by a small hearth in the same position. A feature below the hearth was interpreted as the setting for a horizontal timber and standing post (Ritchie 1976, 15).

To the north of this hearth, towards the henge enclosure causeway, was an area of flat paving slabs, a pair of stone holes from which the stones had been removed and another square setting with circular depressions at each corner and slots between (Ritchie 1976, 13). On either side remnants of low walls perhaps extended to enclosure the central area. Two further smaller standing stones (later re-interpreted as a ‘dolmen’ structure) continue the arrangement of linear features towards the entrance. There are clear parallels between these features and the monumental Structure 8 at nearby Barnhouse, built over a pre-existing open-air hearth (Hill and Richards 2005). This monumental hearth appears to have been removed, perhaps directly to the Stones of Stenness, before Structure 8 was constructed. The building had a similar square setting within the threshold of the entrance (interpreted as a robbed-out hearth), with a flagstone path leading towards the entrance (Richards 2013, 72). The radiocarbon date estimate for the start of activity in this building of *3000–2975 cal BC (68% probability, Richards et al. 2016c, 213)* suggests that Structure 8 was built shortly before the Stones of Stenness, but the two structures are likely to have been in use at the same time (Figures A5-24 and A5-31). There are strikingly similar Grooved Ware pots from Barnhouse and the Stones of Stenness, further underlining the close links between the two sites (Richards et al. 2016c, 220).



Figure A5-24 Aerial view of the Stones of Stenness and the reconstructed structures of Barnhouse settlement © Crown copyright, Historic Environment Scotland, DP059845

Richards (*et al.* 2016a, 241) has argued that the henge began as a representation of a large house-like structure, before the creation of the stone circle and then the ditch. Although the Stones of Stenness is clearly a complex monument with multiple phases, at the moment there is little indication from the radiocarbon dates for a sequence along the lines that Richards suggests, with a date of 2880–1450 cal BC (Table A5-1: SRR-592) on decomposed wood from the square timber structure within the entrance, albeit having a large error range, being later than the animal bones from the ditch and central hearth. It could be argued instead that some of the open-air communal activities that once took place close to the village at Barnhouse were removed some distance away and a monumental setting created for them, where larger numbers of people could gather.

5.4.3.2 *Ring of Brodgar*

This spectacular stone circle has 21 standing monoliths today, with the position of another 10 marked by stumps or packing stones visible in the turf but is thought to have originally comprised about 60 uprights (Figures A5-25 and 26). The standing stones form a circle of 103 m diameter, surrounded by an enormous rock-cut ditch of 123 m diameter, over 4 m deep. Two additional stones stood just inside each of the two narrow causeways which lead to the north-west and to the south-east (Downes *et al.* 2013, 90, 100).



Figure A5-25 Ring of Brodgar, showing the wide and deep external ditch (author's photograph)

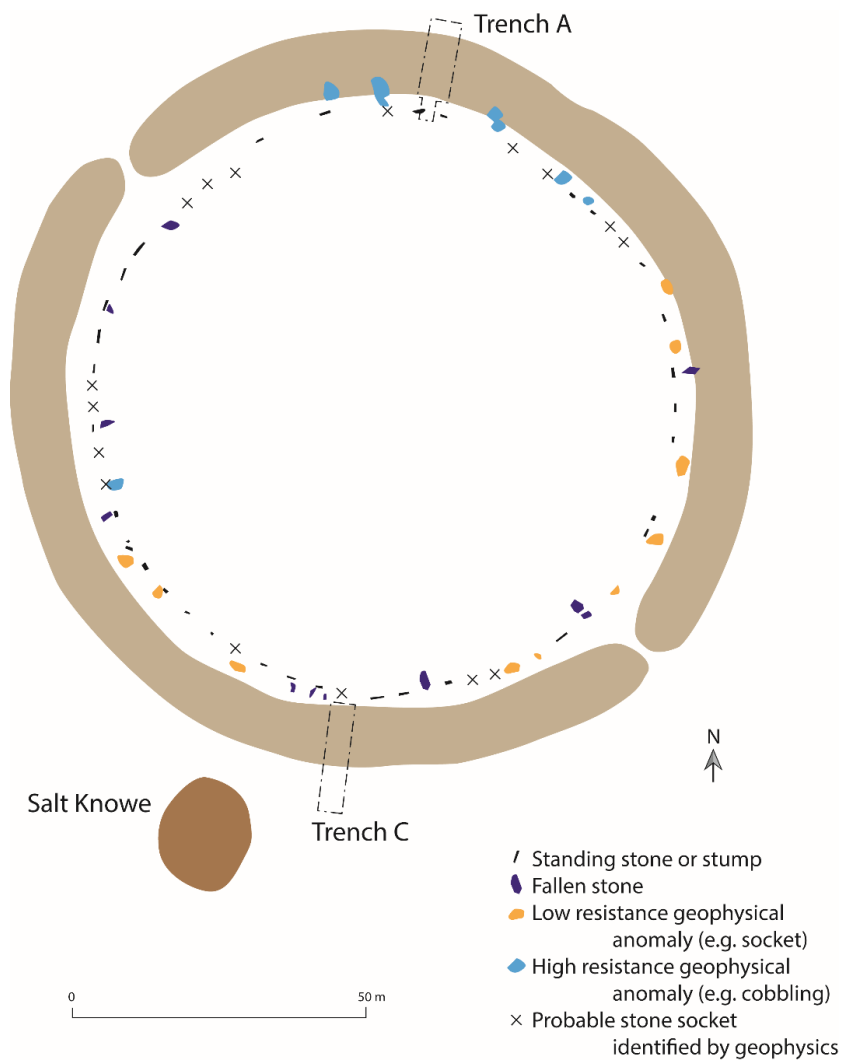


Figure A5-26 Plan of Ring of Brodgar showing position of trenches dug by Richards (after Brend *et al.* 2020, fig 5.28)

The Ring of Brodgar is largely unexcavated, except for three sections dug across the enclosing ditch, opened in 1973 by Renfrew, two of which were re-excavated and extended in 2008 by Richards (Figure A5-27). Both projects aimed to obtain material for radiocarbon dating, but unfortunately no suitable material was recovered. Although Richards (e.g., 2013, 78) has often claimed that the ditch held water, citing the use of a pump during modern excavations, there is currently no evidence to suggest that this was the case in prehistory (Wickham-Jones *et al.* 2016, 39). Renfrew recorded deep soil outside the ditch, which he interpreted as the remnants of outer bank (Renfrew 1979, 41) although Richards (2013, 79) has questioned whether this might instead have been an outer wall.



Figure A5-27 Excavations across the rock-cut ditch at the Ring of Brodgar showing the amount of effort that went into its excavation through the bedrock © Kerri Cleary

The standing stones at the Ring of Brodgar are similar to those used at Maeshowe and the Stones of Stenness, with the distinctive angled tops typical of the angled beds of Orcadian sandstone geology. The spacing of the stones around the circle is not even, with clustering nearer the entrance causeways and particularly in the south-east quadrant (Downes *et al.* 2013, 101). Seven different types of lithology have been identified, with variations in colour, texture and shape evident in the remaining stones (Downes *et al.* 2013, 106). These sandstones were laid down in an open sea and so have a variety of preserved ripples, swirling patterns, worm burrows and mudcracks in them, making each stone distinctive (Figure A5-28). It is tempting to think that people selected them intentionally for these unusual surface features.



Figure A5-28 Two of the sandstone uprights at the Ring of Brodgar (author's photographs)

The stones do appear to have been transported from several different sources, with the closest source of yellow Eday sandstone being from Houton near Orphir, 9 km to the south-east. The other sandstones are likely to be derived from similar sources to the Stones of Stenness, probably Staneyhill and Vestra Fiold (Richards *et al.* 2013a, 124–7). The stone outcrop at Vestra Fiold, with clear evidence of prehistoric quarrying, has the characteristic fault lines between 45–60 degrees required to produce the characteristic angled tops to the stones and the lateral fault lines being substantial distances apart, allowing for stones of up to 6 m in length (Richards *et al.* 2013a, 127–8). It has been argued that the bringing together of individual stones from different places was as a form of gathering and materialising different social groups (Richards *et al.* 2016a, 241–2). The people who built the Ring of Brodgar appear to have had an intimate knowledge of local geology, perhaps seeing rocks as having animate qualities and mythological associations (Edmonds 2019, 163). Both Staneyhill and Vestra Fiold have horned cairns located near the rock outcrops which might indicate long term recognition of their importance in the landscape from earlier in the Neolithic. Although Richards (*et al.* 2013b) has argued, based on his excavations at the site, that Vestra Fiold was built in the mid-3rd millennium BC as a deliberately archaic structure, the dates relied upon are animal bones, which elsewhere are known to have been deposited many centuries after the primary use of tombs. Within the forecourt area of the horned cairn were human cremations in association with an early Neolithic bowl (Richards *et al.* 2013b, 173–4) suggesting a much earlier date for this site.

Richards (2004, 110) has suggested that the monoliths at the Ring of Brodgar were gradually added over a long period time, but there is no evidence for this currently. A series of 15 OSL dates were obtained on

ditch fills sampled during the 2008 excavations in Trenches A and C (Sanderson *et al.* 2010). These have been modelled to provide an estimate the completion of the Ring of Brodgar ditch in 2750–2210 cal BC (95% probability; Bayliss *et al.* 2017, supp material, 8–9, fig S8: *Ring of Brodgar*), probably 2600–2330 cal BC (68% probability). However, this modelling is not satisfactory, as it combines the dates from the two trenches together, and it is clear the different sides of the monument had quite different fill sequences and radically different OSL dates. The dates from Trench A were substantially earlier and would appear to provide a date for the first fills forming there shortly after 3000 BC. Considering that the Ring of Brodgar henge ditch was dug in a similar way to those at the Stones of Stenness and Maeshowe, this is a more likely date for this activity.

The Ring of Brodgar is one of the largest stone circles in the country, comparable to those at Stanton Drew, Avebury and perhaps Phase 1 of Stonehenge. The size, larger number of stones and deep ditch are all unusual for Orkney, suggesting the import of ideas, although the size of the enclosed area is not dissimilar to the area encircled by the bank at Maeshowe. Interestingly, the site appears to have been kept clean of cultural debris, and geophysical survey found an absence of magnetic enhancement that might indicate burning or funerary activities (Card *et al.* 2007, 50). This is in direct contrast to the Stones of Stenness and may indicate different purposes and activities at the two stone circles.

5.4.3.3 *Ring of Bookan*

The Ring of Bookan, which lies on higher ground 1.6 km north-west of the Ring of Brodgar, appears to be another henge monument with a partly rock-cut ditch. It encloses a flat area measuring about 44.5 m by 38 m, very similar in size to the Stones of Stenness (Ritchie 1976; Card 2005). There is no sign of any causeway across the ditch. Within is an irregular mound and several buried stones, but it is not clear whether this is the remains of a chambered cairn or some other structure. Local tradition recalls a ‘chamber’ here being accessible in the early 19th century (Card 2005, 54) and it is possible that another ‘monumentalised house’, akin to Structure 8 at Barnhouse, the structure under Maeshowe and the settings within the Stones of Stenness, may have stood here.

5.4.3.4 *Standing stones*

Several standing stones are concentrated in the Stenness-Brodgar area (Figure A5-2), part of a wider tradition of erecting individual standing stones across Orkney. To the south-east of Maeshowe, and in line with the Stenness-Brodgar peninsulas, stands the Barnhouse Stone (Figure A5-2: 10). It stands 3.2 m high with a tapering shape wider at the top than the base. It has been noted that this stone aligns with the passage of Maeshowe, with the midwinter setting sun setting directly over the top of this monolith (MacKie 1997, 351; 2009, 21).

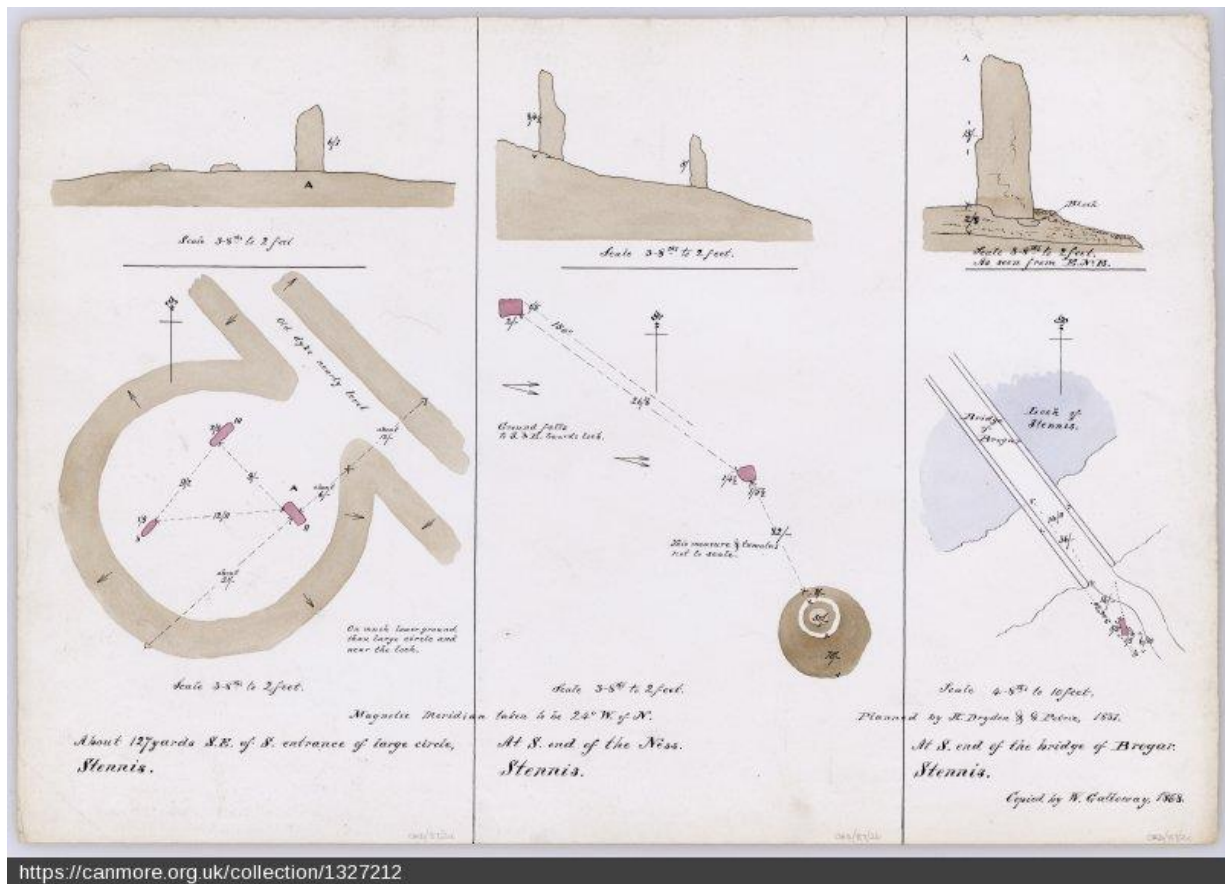


Figure A5-29 Plan of the Comet Stone, the Lochview stones and the Watch Stone, by H Dryden and G Petrie in 1857. 1868 copy by W Galloway © Society of Antiquaries of Scotland

Closer to the Stones of Stenness and Barnhouse is the Watch Stone, which was once one of a pair (Figure A5-2: 9); a broken stump was recorded approximately 14 m south-west during road widening in the 1940s (Challands *et al.* 2005, 216). The Watch Stone stands 5.6 m high, almost the same as the tallest stones at the Stones of Stenness, which might suggest that it was quarried from a similar location. To the north-east once stood the 2.5 m high Odin Stone, which although destroyed in 1814, was excavated in 1991 (Challands *et al.* 2005, 214). Interestingly this stone appears to have been set upright on its angular end, so the top would have been flat, perhaps so that the natural hole through the stone was easily accessible. About 7 m to the south-east another similar stone socket was excavated in 1988, suggesting that the Odin stone was also one of a pair of stones. A possible third socket nearby was the location of intense burning (Challands *et al.* 2005, 215). These four or five stones stood close to the loch, and perhaps defined some sort of processional route towards the Stones of Stenness. Another pair of stones were located at Deepdale, the site of an earlier Neolithic settlement on the south-west side of the Loch of Stenness, of which only one remains standing (Garrow *et al.* 2005, 258).

On the Brodgar peninsula, a pair of stones stand in the garden of Lochview, close to the site of the Ness of Brodgar settlement and nearby midden (Figure A5-2: 6) It has been suggested that these standing stones may have formed some sort of entrance arrangement with the nearby southern boundary wall

(Card *et al.* 2020, 68). A small standing stone has been excavated in a paved open-air setting within the settlement itself (Card *et al.* 2018, fig 3; Figure A5-14). Closer to the Ring of Brodgar, 140 m south-east of the stone circle, is the 2.5 m high Comet Stone (Figure A5-2: 5). Located on a small mound and with two stone stumps nearby (RCAHMS 1946), it is likely to have been part of a more complex setting, perhaps originally of four posts in a square (Figure A5-29), similar to square-in-circle monuments found elsewhere in Britain and Ireland, and perhaps therefore dating to late in the monumental sequence at the Stenness-Brodgar complex. A feature found through geophysical survey to the north-east of the Ring of Bookan may also be some form of square-in-circle arrangement, although the 'circle' here is more of a square with rounded corners (Brend *et al.* 2020, fig 4.19).

It has been suggested that some of these monoliths formed an avenue leading between the Stones of Stenness and Ring of Brodgar, and although there is no direct evidence for this (Challands *et al.* 2005, 212) it does seem that some of the stones were related to patterns of movement around the complex. Others were clearly positioned at focal points the one at the centre of the Ness of Brodgar complex, and the Barnhouse Stone may relate to astronomical alignments. Others, like the Comet Stone, may be vestiges of more complex monuments.

5.4.4 Summary

The middle Neolithic is a transitional period in Orkney, when settlements became increasingly nucleated, sometimes with larger and elaborate structures within them. Large circular monuments were also built, and all of these were concentrated particularly on the Stenness-Brodgar peninsula. Although burial continued within chambered tombs, mostly within Q-Q and hybrid types, on the whole new chambered tombs do not appear have been constructed in large numbers.

5.5 Late Neolithic

5.5.1 Settlement

There is a general decline in the construction of houses and settlements in the 28th century BC (Bayliss *et al.* 2017, 1182); the hiatus in activity at Pool (Section A5.4.1) is typical of this Orkney-wide lull in settlement intensity. Settlement appears to have particularly declined within the Stenness-Brodgar complex, where there was a shift to the creation of new forms of monumental structure. After this hiatus, Grooved Ware pottery tends to have more consistent applied decoration, including cordons and other complex patterns (Towers and Card 2015). Particular, and sometimes spectacular, practices relating to the deposition of animal remains became more common. At the Links of Noltland settlement, there was a foundation deposit of 30 interlocking cattle skulls beneath Structure 9 (Moore and Wilson 2011, 22–3). Perhaps the most spectacular example comes from the decommissioning of a monument structure at the Ness of Brodgar.

5.5.1.1 *Ness of Brodgar*

Shortly after 3000 BC, the roof of the enormous Structure 8 appears to have collapsed, and only the northern end was rebuilt on the same ground plan. Over the southern end was erected a very different building, Structure 10, a square chamber surrounded by two concentric drystone walls, each 2 m thick. This replacement had occurred by 2990–2895 cal BC (95% probability; Card *et al.* 2018, fig 7, model 1: *end_st8_start_st10*). Structure 10, 15 m by 15 m in size, had a forecourt area to the east, containing standing stones and small cells on either side of the entrance (Card *et al.* 2020, 102–9). Parallels can be drawn with Structure 8 at Barnhouse and Maeshowe chambered tomb. The entire building was enclosed within a 1 m wide pathway, and the external facing was finely constructed. In a primary arrangement, the internal chamber was 8 m square, with an entrance passage defined by a single threshold slab, with a large central hearth and a dresser-like arrangement against the back wall. Pick-dressed slabs of red and yellow sandstone were used in the walling.

After a structural collapse, the interior was rebuilt with corner buttresses and new walls, and the hearth rebuilt. A foundation deposit comprising a human arm bone, a white-tailed sea eagle wing bone, a carved stone ball, an unusually decorated pot and several cattle bones was placed under one of the new buttresses (Card *et al.* 2020, 105). Dates obtained on this material suggests that this occurred after 2860 cal BC (Table A5-1). A free-standing heavily decorated dresser was built, and the building saw intense use of the hearth and the preparation of pigments (Card *et al.* 2020, 107). The hearth was last used in 2550–2460 cal BC (95% probability; Card *et al.* 2018, fig 7: *central_hearth_st10*), after which the building was subject to series of major decommissioning events when the walls were reduced in height and the interior filled with rubble and midden (Card *et al.* 2020, 107). Huge quantities of cattle bone were then placed on the pathway surrounding the structure (Figure A5-30), largely cattle tibiae which had been broken open for marrow extraction. An estimated 400 animals are thought to be represented in this deposit (Mainland *et al.* 2020, 273), probably brought to the site as joints of meat, and presumably consumed during feasting events. This is thought to have taken place in either 2340–2200 cal BC (95% probability; Card *et al.* 2018, fig 7, model 1: *structure_10_cattle*) or 2565–2360 cal BC (95% probability; Card *et al.* 2018, fig 9, model 2: *st10_cattle*).

When Structure 10 was built, other buildings at the Ness of Brodgar remained in use, including Structures 1, 12 and 14, and the northern end of Structure 8 (Card *et al.* 2020, 102). New buildings were constructed but these tended to be much smaller in size, less well-built, often re-using stone from nearby demolished or collapsed buildings. By this time, the midden at the southern end of the settlement had become a substantial mound, and the central area of the site had also accumulated a significant depth of cultural material. The end of activity in the dated piers structures is estimated to have occurred in 2855–2665 cal BC (95% probability; Card *et al.* 2018, fig 9, model 2: *end_NoB_piered*), although Model 1 suggests the occupation continued slightly later (Card *et al.* 2018, 250). The final event at the site was in the early

Bronze Age, when a red deer skeleton was deposited over the bone deposit in Structure 10, dated to 2210–1980 cal BC (Table A5-1: SUERC-55468).



Figure A5-30 The external northern wall of Structure 10, with its exterior paved pathway, where the extensive bone deposit was uncovered (author's photograph)

5.5.2 Chambered tombs

There is no evidence for the construction of chambered tombs in the late Neolithic period, although it is possible that a few Bookan type tombs and stone cists were built and used for burial during this period (Dalland 1999). Some existing funerary structures continued to be used for burial, including Quanterness, Quoyness, and probably Point of Cott and Isbister (Figure A5-3). This means that some of the oldest monuments, such as Point of Cott, were used for burial over a period of nearly a millennium, although only for small numbers of people (12 individuals were recovered from this tomb; Barber 1997). The addition of external platforms to these tombs suggests that the focus of rituals and ceremonies may have shifted to the outside of the chambers (Crozier *et al.* 2016, 209), like the trajectory with developed passage tombs in Ireland. The burial of two infants within the structures at the Ness of Brodgar suggest that very young children may have been treated differently in death (Boyar 2020). It has been suggested that the people buried at Isbister were those with special status potentially deriving from physical ailments and disabilities, with the rest of the dead disposed of in archaeologically invisible ways, perhaps in the sea (Lawrence 2012, 576). Certainly, the dead seem to be become less visible at the end of the

Neolithic period in Orkney. At several Q-Q chambered tombs, the deposition of animal bones took place after the monuments had been used for human burial. For example, at Cuween the skulls of 24 dogs and at Isbister several white-tailed sea eagle bones and talons were placed in the chambers (Clarke *et al.* 2017, 79). At Pierowall, the remains of about 70 mammals, mostly sheep, were found intermixed with the collapsed cairn revetments (Sharples 1984). This secondary use of tombs for the deposition of animals begins the late Neolithic and ends in the early Bronze Age (Bayliss *et al.* 2017, table S5). There are similarities here with the closing deposits at Structure 10 at the Ness of Brodgar.

5.5.2.1 *Bookan*

The unusual tomb of Bookan lies 1 km to the north-west of the Ring of Brodgar. Although Henshall (1963, 84–5) regarded this simple architecture as an O-C tomb, the monument is quite unlike others of that class as it has orthostatic uprights defining the interior spaces. The oval cairn, angular architecture and lack of stalls have closer affinities with the Q-Q group and to domestic architecture at settlements such as Ness of Brodgar and Barnhouse. The original oval mound measured 7 m north–south and c.5 m east–west (Card 2005). Within was a circular wall, surrounding a stone-built chamber divided into five ‘cists’ by upright slabs, with a low, narrow passage to the south. Earlier investigations by James Farrer had found portions of human skull and other bones in the chamber (Petrie 1866); further fragments and phosphate analysis which showed that the central and south-east compartments had been used for burial. After a period of abandonment, the tomb was monumentalised by three roughly concentric stone revetments, creating a stepped cairn 16 m in diameter. No absolute dating is available for the tomb, but Petrie’s description of the Grooved Ware found in the tomb suggests that it had applied decoration and was therefore remained in use until late in the Neolithic sequence (Card 2005, 182). Similar tombs of this type, such as Huntersquoy on Eday, two examples on the Calf of Eday (north-west and south-east) and Taversoe Tuick on Rousay, are similarly undated.

5.5.3 Monuments

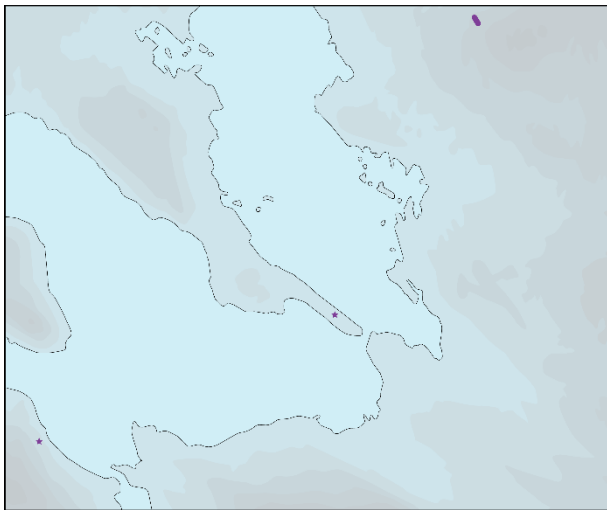
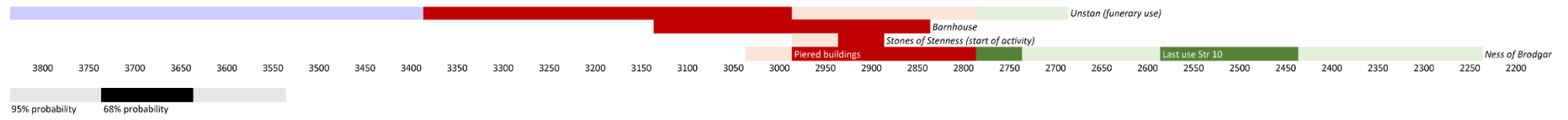
There is no current evidence for the construction of stone monuments in the late Neolithic on Orkney, although use of existing structures likely continued and it is quite possible that unexcavated smaller monuments, such as the Comet Stone setting, were built during this period. The late Neolithic Structure 10 at the Ness of Brodgar might be considered more of a monument than a domestic dwelling and certainly had monumental elements such as the outer stone wall and standing stones in the forecourt.

5.5.4 Summary

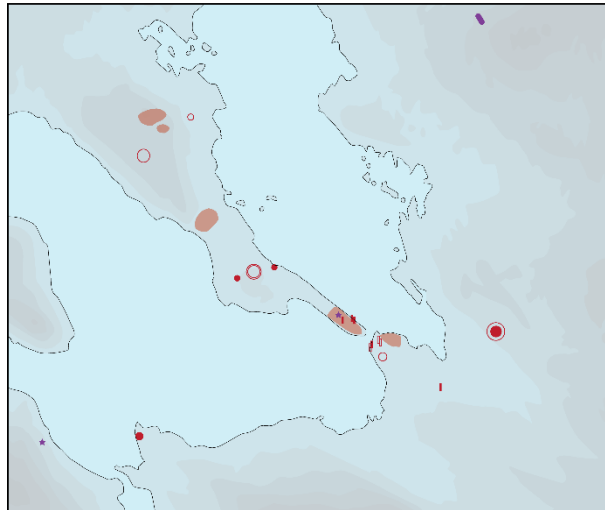
The late Neolithic saw a further shift in settlement patterns, with the concentration of occupation at the Stenness-Brodgar complex coming to an end, seemingly at the same time as a general decline in the intensity of occupation across Orkney. Such a decline in other parts of Britain and Ireland might be viewed in light of the arrival of the first metals and Beaker-using people in the 24th century BC, but this major social break occurs much earlier in Orkney and cannot be attributed to the same cause. Whatever

drew people to congregate in large numbers, create spectacular monuments, make specialist ceremonial objects and take part in feasts at Stenness-Brodgar, had ceased to be relevant, and a much more dispersed settlement pattern is in evidence through the rest of the Neolithic. This is not to say that activity at sites like the Ness of Brodgar entirely ceased. As can be seen at Structure 10 there were ceremonial feasting events marking the closure of such sites. At this time numbers of houses across the islands had increased again to a secondary peak around 2500 BC (Figure A5-8). Settlements of this date such as Skara Brae, or at least the phase that has been excavated, comprised small square houses with rounded corners, miniature versions of structures such as Structure 10 at Ness of Brodgar and Structure 8 at Barnhouse. Small quantities of Beaker pottery are found at older monuments and settlements, such as Holm of Papa Westray South and Knowe of Yarso tombs, and at Ness of Brodgar, Rinyo and Links of Noltland settlements (Downes *et al.* 2005, 56), suggesting these places were sometimes frequented after the adoption of Beaker pottery and sites such as Tofts Ness were reoccupied in this period. A series of small cairns, ring ditches and mounds scatter the Brodgar peninsula, including Plumcake Mound and South Knowe. These remain little understood, but some may be early Bronze Age burial mounds (Card 2005, 59). On the Bookan ridge, structures which are likely to be Bronze Age houses have been unveiled through geophysical survey, and a disc barrow stands on the shore of the Loch of Stenness (Brend *et al.* 2020, 129–30). This was a landscape that continued to be inhabited and used for the construction of monuments.

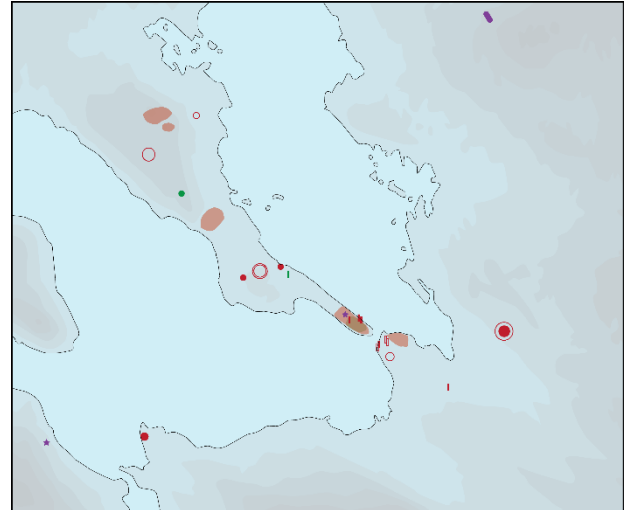
Figure A5-31 Chronology overview of Stenness-Brodgar



Early Neolithic



Middle Neolithic



Late Neolithic

Table A5-1 All radiocarbon dates from Neolithic monuments and occupation in the Stenness-Brodgar complex

Laboratory number	Sample reference	Material	Context	Radiocarbon age (BP)	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	C/N ratio	Calibrated date range (cal BC) (95% confidence)
UNSTAN (Olalde <i>et al.</i> 2018, supp info 65)								
SUERC-73438		Human bone, adult male mandible	Chamber, exact position unknown	4491±32				3350–3030
SUERC-73433		Human bone, right petrous temporal, adult male	Chamber, exact position unknown	4541±32				3370–3100
SUERC-73434		Human bone, young adult male maxilla	Chamber, exact position unknown	4503±32				3360–3090
NESS OF BRODGAR (Card <i>et al.</i> 2020, app 1)								
Structure 1								
SUERC-55466		Carbonised residue	Adhering to thick (14 mm) rock-tempered Grooved Ware pottery sherd from Context 2144, a firm dark reddish brown silt clay up to 0.2 m thick, used to level the area in the western inner part of [1176], SF 7423	4305±30	-25.0±0.2			3020–2880
SUERC-55462	A	Animal bone, large ungulate rib, burnt	Final use south hearth fill 3603, below upper hearth fills 3247 and 3248. SF 1907	4158±30	-25.1±0.2			2880–2630

UBA-26531	B	Animal bone, large ungulate rib, burnt	Same as SUERC-55462	4225±37	-15.5			2910–2670
SUERC-55465	A	Animal bone, large ungulate	Hearth fill 3247, soft mid-grey brown layer of silt, uppermost hearth fill above final use fill, SF 14290	4115±30	-21.4±0.2			2870–2570
UBA-26536	B	Animal bone, large ungulate	Same context as SUERC-55465	4175±30	-23.4			2890–2630
SUERC-80669		Animal bone, large ungulate neonate	Context 6932, associated with human neonate burial	4196±24	-14.7			2895–2675
Structure 3								
SUERC-80633		Animal bone, ovicaprid	Context 143, hearth fill	4314±24	-27.5			3015–2885
Structure 5								
OxA-X-2633-41	<240>	Animal bone, burnt mammal	Context 410, fine peat ash deposit	5432±38	-27.5±0.2			4360–4170
SUERC-61344	<251>	Charcoal, <i>Betula</i> sp.	Context 458, a charcoal-rich ashy silt interpreted as a fire-spot	4608±30	-25.0 (ass)			3520–3190
SUERC-61637	<248>	Carbonised grain, <i>Hordeum vulgare</i>	Context 461, a raked ash deposit probably from fire-spot	4337±29	-23.5±0.2			3030–2890
UBA-29752	<257>	Carbonised grain, <i>Hordeum vulgare</i>	Context 441, primary fill of hearth cut below the cist	4384±30	-25.5±0.22			3100–2910

UBA-29753	<243>	Animal bone, unidentified burnt	Context 456 a ?hearth deposit	6042±36	-28.0			5050–4830
UBA-29754	<249>	Animal bone, unidentified burnt	Context 462, a ?hearth deposit	5212±35	-20.5			4230–3950
OxA-36991		Charcoal, <i>Betula</i> sp.	Context 8136	4502±30	-25.28			3360–3090
OxA-36809		Charcoal, <i>Betula</i> sp.	Context 8135	7993±37	-28.1			7060–6700
Structure 7								
SUERC-55463	A	Animal bone, burnt ungulate long bone	Within central hearth, from Context 2680, levelling layer in base of hearth setting, SF 2017	4294±30	-26.1±0.2			3020–2870
UBA-26532	B	Animal bone, cow tibia	Same context as SUERC-55464	4379±50	-19.6			3330–2890
Structure 8								
SUERC-60417		Carbonised residue	Adhering to large, thick (16mm) heavily rock-tempered Grooved Ware body sherd. From Context 2213, a dark yellowish grey clayey silt, part of the midden infill in the central part of the structure, SF 5299	4350±35	-28.7±0.2			3090–2890
UBA-26535		Animal bone, burnt large ungulate rib	Context 3806, lowest hearth deposit, SF 12851	4380±34	-21.5			3100–2900
OxA-36924		Animal bone, sheep carpal	Context 6348	4307±31	-17.45			3020–2880

OxA-26923		Carbonised grain, <i>Hordeum vulgare</i>	Context 8215	4500±31	-23.78			3360–3090
OxA-36943		Animal bone, small mammal	Context 8200	4611±34	-22.91			3520–3190
OxA-36942		Animal bone, small mammal	Context 3851	4889±35	-24.77			3770–3540
OxA-36946		Animal bone, small mammal	Context 6350	5323±32	-23.15			4320–4040
OxA-36945		Animal bone, large ungulate rib	Context 6339	6785±33	-18.73			5730–5630
OxA-36944		Animal bone, sheep	Context 8216 [can't be sheep]	7782±38	-15.75			6690–6500
OxA-38648		?	Sample from Hearth Group 6309 – taken for archaeomagnetic dating, no further details					
OxA-38778		?	Sample from Hearth Group 6309 – taken for archaeomagnetic dating, no further details					
Structure 10								
SUERC-55464	A	Animal bone, calcined cattle femur	Central hearth area, Context 3488, the uppermost fill within hearth, SF 10823	4020±30	-19.6±0.2			
UBA-26534	B	Animal bone, calcined large ungulate	Same context as SUERC-55474	3915±32	-21.5			
OxA-32032	C	Animal bone,	Same context as SUERC_55474, replicate of UBA-26534	4012±33	-20.7±0.2			

		calcined large ungulate						
OxA-32447	C	Animal bone	Replicate of OxA-32032 and UBA-26534	4009±38	-20.8±0.2			
Weighted mean SF bone 10823 (T' = 5.6; v = 2; T'(5%) = 6.0)				3975±20				2575–2460
SUERC-55457	A	Red deer antler, calcined	Central hearth fill Context 3482, SF 1524	4019±30	-18.0±0.2			
UBA-26530	B	Animal bone, calcined large ungulate	Same context as SUERC-55457, SF 1524	4278±39	-23.6			
SUERC-60627	C	Animal bone, calcined large ungulate	Replicate of UBA-26530, SF 1524	4200±31	-25.2±0.2			
Weighted mean SF bone 1524 (T' = 2.5; v = 1; T'(5%) = 3.8)				4230±25				2910–2700
SUERC-55458		Animal bone, calcined cattle humerus	Central hearth fill, Context 3490 (in situ burning), SF 1560	4350±30	-26.3±0.2			3080–2890
UBA-26529		Carbonised residue	Residue adhering to interior of Grooved Ware from Context 4381, a levelling surface under the south-west corner buttress, SF 18080	4271±42	-26.4±0.2			3020–2700
OxA-30950		Carbonised residue	Residue adhering to interior of Grooved Ware (skeuomorph pot) from Context 4381, a levelling surface under the south-west corner buttress, SF 16858	4231±37	-24.0±0.2			2920–2670
SUERC-72682		Human bone, arm	Under rebuilt internal southern wall, Context 5989, SF 20850	4157±32	-21	11	3.2	2890–2630

SUERC-72683		Animal bone, large cattle	Under rebuilt internal southern wall, Context 5989, SF 27356	4083±32	-21.6	6	3.4	2860–2490
SUERC-72684		Animal bone, large cattle	Under rebuilt internal southern wall, Context 5989, SF27394	4138±28	-21.6	5.3	3.3	2880–2580
Structure 10 bone deposit								
SUERC-55468		Animal bone, red deer metacarpal proximal and shaft	Bone deposit, Context 1403. SF 38E – an articulated red deer skeleton that overlay the main bone spread	3720±32	-21.6±0.2	8.0±0.3	3.4	2210–1980
SUERC-55472		Animal bone, cattle tibia distal and shaft	Bone deposit, Context 1403, SF32, SF 32	3946±33	-21.4±0.2	5.0±0.3	3.3	2570–2300
SUERC-55473		Animal bone, cattle tibia distal and shaft	Bone deposit. Same context as SUERC-55472, SF 72	3832±33	-21.6±0.2	5.4±0.3	3.4	2460–2140
SUERC-55474		Animal bone, tibia proximal and shaft	Bone deposit. Same context as SUERC-55472, SF 98	3900±30	-21.9±0.2	5.4±0.3	3.5	2470–2290
OxA-30798		Animal bone, cattle tibia distal	Bone deposit. Same context as SUERC-55472, SF 139	3901±33	-21.0±0.2	4.5±0.3	3.2	2480–2230
OxA-30799		Animal bone, cattle mandible	Bone deposit. Same context as SUERC-55472, SF 147	3912±34	-21.1±0.2	5.2±0.3	3.1	2560–2280
OxA-30800		Animal bone, cattle	Bone deposit. Same context as SUERC-55472, SF 213	3915±33	-21.1±0.2	5.5±0.3	3.1	2560–2290

		tibia distal and shaft					
OxA-25033	CBNB 2	Animal bone, cattle	Bone deposit	3829±27	-21.2±0.2		2460–2140
OxA-25032	CBNB 1	Animal bone, cattle	Bone deposit	3878±26	-20.9±0.2		2470–2230
Structure 12 and annex							
UBA-26533		Animal bone, calcined large ungulate	Context 4509 a black charcoal hearth fill. SF 2340	4447±31	-25.3		3340–2930
SUERC-60419	A	Carbonised grain, <i>Hordeum vulgare</i>	Black charcoal hearth layer, Context 4509	4100±28	-25.2±0.2		2870–2500
UBA-29335	B	Carbonised grain, <i>Hordeum vulgare</i>	Same context as SUERC-60419	4149±30	-22.0±0.22		2880–2620
OxA-32069	C	Carbonised grain, <i>Hordeum vulgare</i>	Same context as SUERC-60419	4114±30	-27.4±0.2		2870–2570
SUERC-55467	A	Carbonised residue	Carbonised residue adhering to Grooved Ware pottery sherd. From Context 2306, located between wall and orthostat in annex, a large spread of pottery. SF 10100	4197±30	-26.2±0.2		
UBA-26528	B	Carbonised residue	Same context as SUERC-55467.	4246±39	-26.4±0.2		
Weighted mean SF 10100 (T' = 1.0; v = 1; T'(5%) = 3.8)				4215±24			2900–2695
UBA-29338	B	Carbonised residue	Adhering to interior of Grooved Ware sherd from Context 5337, SF 21623	4148±35	-27.2±0.2		2880–2580

SUERC-60626	A	Carbonised residue	Adhering to interior of Grooved Ware sherd from Context 5337, SF 20850	4155±31	-27.4±0.2			
UBA-29337	B	Carbonised residue	Same as SUERC-60626	4145±37	-26.8±0.22			
OxA-32310	C	Carbonised residue	Same as SUERC-60626	4187±29	-27.1±0.2			
Weighted mean SF 20850 (T' = 1.0; v = 2; T'(5%) = 6.0)				4165±19				2880–2635
Structure 14								
SUERC-60418	<2499>	Carbonised grain, <i>Hordeum vulgare</i>	Context 4662, western hearth, red silt clay burnt layer.	4369±25	-23.8±0.2			3090–2910
UBA-29336	<2424> B	Carbonised grain, <i>Hordeum vulgare</i>	Context 4613, ashy deposit of rake out from eastern hearth.	4386±41	-23.4±0.22			3320–2900
OxA-36808		Charcoal, <i>Pinus sylvestris</i>	Context 4645	4403±31	-26.9			3320–2910
SUERC-80667		?	Fill of central division [555], Context 5551, Trench	4429±25	-27.4			3330–2920
OxA-36928		Carbonised grain, <i>Hordeum vulgare</i>	Context 4639	4435±34	-22.09			3340–2920
OxA-36926		Animal bone, large ungulate rib	Context 4633	4603±31	-19.73			3520–3130
OxA-35925		Animal bone, sheep long bone	Context 5049	4707±30	-23.61			3630–3370
OxA-36927		Animal bone, large	Context 4640	4817±36	-25.5			3650–3520

		burnt ungulate						
OxA-36947		Animal bone, sheep femur	Context 5054	6385±33	-25.35			5480–5220
Structure 16								
OxA-36929		Animal bone, sheep rib	Context 3380	5589±36	-21.94			4500–4350
Structure 27								
SUERC-80651		Animal bone, ovicaprid	Natural silting, interior of Structure 27, Trench T, Context 5811. Silting occurred after abandonment and initial robbing of structure.	4272±24	-22.5			2920–2875
Boundary walls								
SUERC-35999	7741	Charcoal, <i>Pinus sylvestris</i>	Greyish brown midden, Context 3029, beneath southern boundary wall	4450±30	-25.6±0.2			3340–2930
SUERC-36004	1263	Charcoal, <i>Betula</i> sp.	Same context as SUERC-35999 (also described as 'early build-up against or under Structure 35')	4430±30	-25.6±0.2			3330–2920
SUERC-36000	1263	Charcoal, <i>Pinus sylvestris</i>	Same context as SUERC-35999	4420±30	-25.1±0.2			3330–2920
SUERC-80659		Animal bone, ovicaprid	Collapse of secondary revetment of northern boundary wall into ditch, Context 1510, Trench N	4415±25	-21.4	7	3.3	3320–2920
SUERC-80660		Animal bone, cattle	Primary fill of main ditch associated with northern boundary wall, Context 1518	4461±21	-21.8	6.5	3.3	3335–3025
SUERC-80661		Animal bone, large ungulate	Fill between northern boundary wall and secondary revetment	4448±25	-21.6	7.1	3.3	3340–2940
SUERC-80662		Animal bone, ovicaprid	Construction layer for northern boundary wall, Trench J, Context 455	4524±22	-21.5	7	3.3	3360–3100
Trench T midden								

SUERC-61360		Animal bone, burnt ?aurochs phalanx	Context 5816, a midden layer above the clay capping sealing the earliest phase of midden deposition, Trench T, SF 22469	4219±27	-22.6±0.2			2910–2690
SUERC-61343		Animal bone, ?aurochs skull	Context 5822, a midden layer above the clay capping sealing the earliest phase of midden deposition, Trench T	4146±31	-22.5±0.2	5.0±0.3	3.2	2880–2620
SUERC-80643		Animal bone, cattle	Context 5806, midden	4047±24	-16.1			2665–2470
SUERC-80654		Animal bone, large ungulate	Context 4823, midden	4073±24	-20.3			2850–2490
SUERC-80649		Animal bone, cattle	Context 5835, rubble	4099±25	-20.1			2860–2500
SUERC-80647		Animal bone, large ungulate	Context 5827, midden	4105±21	-21.7			2860–2570
SUERC-80642		Animal bone, large ungulate	Context 4899, midden	4119±21	-19.9			2865–2575
SUERC-80641		Animal bone, large ungulate	Context 4880, rubble	4134±24	-22.1			2875–2580
SUERC-80648		Animal bone, large ungulate	Context 5828, midden	4136±25	-22.4			2880–2580
SUERC-80658		Animal bone, cattle	Fill of cut for lower upslope revetment, Context 4838	4142±24	-19.4			2875–2620
SUERC-80650		Animal bone, large ungulate	Context 4899, midden	4154±24	-22.9			2880–2630
SUERC-80640		Animal bone, cattle	Context 4827, midden	4189±24	-20.5			2890–2670

SUERC-80652		Animal bone, mammal	Context 5836, midden	4260±21	-23.1			2915–2875
Non-structure contexts								
Beta-442886		Charcoal, <i>Betula</i> sp.	In sondage under Structure 14, context 5073	4400±30				3270–2910
Beta-442885		Animal bone, large ungulate, burnt	In sondage under Structure 14, context 5074	4620±30				3520–3340
SUERC-6191		Charcoal, <i>Ericales</i> sp.	Trench E, Context 47	4280±35	-25.0±0.2			3020–2770
SUERC-6684		Humic acid	Bulk soil, Trench E, Context 47	3160±40	-27.2±0.2			1510–1300
SUERC-6685		Humic acid	Bulk soil, Trench C, Context 75	4085±40	-27.4±0.2			2870–2490
SUERC-6761		Animal bone, mammal, burnt	Trench C, Context 86	4185±45	-27.0±0.2			2830–2630
SUERC-6762		Animal bone, mammal, burnt	Trench E, Context 47	4225±40	-22.4±0.2			2920–2670
SUERC-6764		Charcoal, <i>Betula</i> sp.	Trench C, Context 75	4320±40	-26.0±0.2			3080–2880
SUERC-9542		Animal bone, mammal, burnt	Trench E, Context 3	4285±35	-27.0±0.2			3020–2780
SUERC-80657		Animal bone, mammal	Primary Iron Age ditch fill	4465±24	-21.6			3335–3025

SUERC-80668		Animal bone, large ungulate	Under curving wall in Trench P, Context 4899	4161±22	-21.7	6.1	3.3	2880–2630
STONES OF STENNESS (Ritchie 1976, 10, 50; Sheridan and Higham 2006)								
OxA-16482		Animal bone, wolf or dog	Organic basal ditch fill 1 B16	4178±38				2890–2630
OxA-16483		Animal bone, cattle hoof core	Organic basal ditch fill 2 B17	4209±39				2910–2630
OxA-16484		Animal bone, cattle left radius	Organic basal ditch fill 4	4346±39				3090–2890
OxA-16485		Animal bone, cattle mandibular ramus	Organic basal ditch fill 5 B13	4243±39				2930–2670
OxA-17783		Animal bone, cattle hoof	Organic basal ditch fill 5 B25	4111±32	-21.13			2870–2570
OxA-18037		Animal bone, sheep bone, cremated/burnt	Central hearth-like feature	4305±35				3020–2882
SRR-350		Animal bones, unidentified	Organic layer at base of main ditch section	4310±70	-21.9			3330–2670
SRR-351		Charcoal, unidentified	Associated with cremated bone in central hearth-like feature, associated with cramp and Grooved Ware sherds	4190±70	-28.7			2920–2570
SRR-592		Wood fragments, unidentified	Bedding trench of a putative small timber structure	3680±270	-25.0			2880–1450

MAESHOWE (Renfrew 1979, 197, 202; Davidson <i>et al.</i> 1976, 354; Richards 1993, app 1)							
Q-1481		Peat	Basal layer above bedrock, Layer 9K, from south section of ditch surrounding chambered tomb	3765±70			2460–1970
SRR-524	8A	Peat	Basal layer above bedrock, Layer 9F/H, from south section of ditch	3445±50			1890–1620
Q-1482		Peat	Basal layer from north section of ditch, 0.68-7 m below ground level	4135±65			2890–2500
SRR-505	D	Peat	Same context as Q-1482	4133±65			2890–2500
SRR-504	C	Peat	Lower of two organic layers on the inner slope of the north section of the ditch, 0.80-85 m below ground level	3662±45			2200–1900
SRR-791	5A	Peat	Old ground surface beneath bank	5090±60			4040–3710
BARNHOUSE (Richards <i>et al.</i> 2016c, table 1)							
SUERC-59554		Animal bone, calcined large mammal, fragment	Context 130, infill within House 2, following its abandonment. Overlies context 321.	4308±29	-21.2±0.2		3020–2880
SUERC-59555		Animal bone, calcined large mammal, fragment	Context 136, Spit 1 within House 9. Stratigraphically later than context 281	4364±29	-20.8±0.2		3090–2900
SUERC-57981		Animal bone, calcined cattle left humerus shaft	Context 145, upper fill of western hearth in House 2. Stratigraphically later than context 374	4305±30	-20.6±0.2		3020–2880
SUERC-57982		Animal bone, calcined	Context 145, upper fill of western hearth in House 2. Stratigraphically later than context 374	4362±39	-23.0±0.2		3100–2900

		cattle radius shaft					
SUERC-53360		Animal bone, calcined large ungulate scapula fragment	Context 148, fill of large cut through lower floor layers (to recover original hearth stones); associated with final occupation of House 3. Stratigraphically underlies 205, later than context 146.	4408±31	-23.8±0.2		
UBA-22563		Animal bone, calcined large ungulate scapula fragment	Replicate of SUERC-53360	4444±30			
Weighted mean SUERC-53360 + UBA-22563 (T' = 0.7; v = 1; T'(5%) = 3.8)				4437±22			3330–2930
SUERC-57983		Animal bone, calcined large ungulate long bone	Context 148, fill of large cut through lower floor layers (to recover original hearth stones); associated with final occupation of House 3. Stratigraphically underlies 205, later than context 146.	4302±30	-24.0±0.2		3020–2880
SUERC-57984		Animal bone, calcined large ungulate rib	Context 148, fill of large cut through lower floor layers (to recover original hearth stones); associated with final occupation of House 3. Stratigraphically underlies 205, later than context 146.	4415±30	-28.2±0.2		3320–2910
UBA-22544		Charred residue	SF 1801, pottery sherd. Context 171, midden deposit abutting House 3. Stratigraphically underlies 205	4519±26	-27.2±0.22		3360–3100
UBA-22589		Animal bone, calcined	Context 191, later occupation/midden deposit over demolished House 7. Stratigraphically later than Houses 7, 9 and 11	4287±28			3010–2870

		cattle left tibia fragment						
SUERC-57985		Animal bone, calcined cattle right tibia fragment	Context 191, later occupation/midden deposit over demolished House 7. Stratigraphically later than Houses 7, 9 and 11	4138±30	-16.5±0.2			
UBA-22590		Animal bone, calcined cattle right tibia fragment	Replicate of SUERC-57985	4511±41				
Weighted mean SUERC-53360 + UBA-22563 (T' = 54.6; v = 1; T'(5%) = 3.8)				4274±25				2925–2875
SUERC-57986		Animal bone, calcined cattle left scapula fragment	Context 200, spread of ash/midden deposit associated with later activity in the central area. Stratigraphically later than context 396 and House 7	4575±30	-26.3±0.2			3500–3100
SUERC-57990		Animal bone, calcined cattle right pelvis fragment	Context 200, spread of ash/midden deposit associated with later activity in the central area. Stratigraphically later than context 396 and House 7	4455±30	-22.0±0.2			3340–3010
SUERC-59556		Animal bone, calcined medium-sized mammal	Context 200, spread of ash/midden deposit associated with later activity in the central area. Stratigraphically later than context 396 and House 7	4483±26	-22.5±0.2			3350–3030

UBA-22546		Charred residue	SF 1841, pottery sherds x 3, decorated with grooves, abraded. Context 205, upper midden deposit later than construction of House 3, same as context 250. Stratigraphically overlies 171 and 1004.	4337±38	-29.3±0.2			3090–2880
SUERC-53369		Charred residue	SF 1852, pottery sherds x 9, decorated with grooves. Context 205, upper midden deposit later than construction of House 3, same as context 250. Stratigraphically overlies 171 and 1004.	4505±31	-29.9±0.2			3360–3090
UBA-22545		Charred residue	SF 1818, 33 sherds, plain. Context 205, upper midden deposit later than construction of House 3, same as context 250. Stratigraphically overlies 171 and 1004.	4344±30	-29.9±0.2			3080–2890
SUERC-53361		Animal bone, calcined ungulate long bone fragment	Context 281, ash spread in House 9. Stratigraphically later than Context 1044 and House 8	4337±29	-23.9±0.2			
UBA-28537		Animal bone, calcined ungulate long bone fragment	Replicate of SUERC-59560	4320±27				
Weighted mean SUERC-53361 + UBA-28537 ($T' = 0.2$; $v = 1$; $T'(5\%) = 3.8$)				4328±20				3015–2895
UBA-22557		Charred residue	SF 1860, pottery sherd. Context 321, a small pit within western area of House 2. Stratigraphically later than contexts 374 and 498, earlier than House 8	4273±37	-27.5±0.2			3020–2700
OxA-3500		Charred barley grain	Context 374, intermediate occupation around House 2 north-east hearth	4420±75	-26.8			3340–2900
SUERC-53362		Animal bone,	Context 396, layer overlying demolished House 7, associated with ceramic firing zone.	4431±31	-23.6±0.2			3330–2920

		calcined ungulate skull fragment	Stratigraphically later than House 7 and constituent contexts 754 and 398				
OxA-2735		Naked barley grain	Context 398, fill of central hearth from House 7	4460±70	-27.3		3360–2920
SUERC-59561		Animal bone, calcined large mammal bone	Context 441, primary occupation deposit in House 3, stratigraphically later than context 146	4394±29	-25.3±0.2		
UBA-28538		Animal bone, calcined large mammal bone	Replicate of SUERC-59561	4432±44			
Weighted mean SUERC-59561 + UBA-28538 (T' = 0.5; v = 1; T'(5%) = 3.8)				4406±25			3265–2915
OxA-3498		Barley grain	Context 498, primary occupation of House 2	4590±75	-24.4		3610–3030
OxA-3499		Barley grain	Context 498, primary occupation of House 2	4570±75	-21.3		3530–3020
UBA-22550		Carbonised residue	SF 6322, pottery sherd. Context 619, intermediate midden spit central area. Stratigraphically earlier than 670, later than 924	4349±41	-27.2±0.22		3100–2890
SUERC-57991		Animal bone, calcined sheep/goat right pelvis fragment	Context 619, intermediate midden spit central area. Stratigraphically earlier than 1015, later than 924	4394±30	-19.0±0.2		3270–2910
SUERC-57992		Animal bone, calcined cattle right	Context 619, intermediate midden spit central area. Stratigraphically earlier than 1015, later than 924	4382±30	-27.4±0.2		

		pelvis fragment					
UBA-22591		Animal bone, calcined cattle right pelvis fragment	Replicate of SUERC-57992	4353±28			
Weighted mean SUERC-57992 + UBA-22591 (T' = 0.5; v = 1; T'(5%) = 3.8)				4367±21			3080–2910
SUERC-53559		Animal bone, calcined ungulate long bone	Context 654, spit 5, lower midden below House 12. Stratigraphically earlier than 924	4492±27	-18.7±0.2		3350–3090
SUERC-57993		Animal bone, calcined ungulate long bone	Context 654, spit 5, lower midden below House 12. Stratigraphically earlier than 924	4357±30	-21.5±0.2		3090–2900
SUERC-57994		Animal bone, calcined large ungulate long bone fragment	Context 654, spit 5, lower midden below House 12. Stratigraphically earlier than 924	4445±30	-22.3±0.2		3340–2930
SUERC-53363		Animal bone, calcined cattle left humerus	Context 670, floor around interior of periphery of House 11, stratigraphically later than context 619	4448±31	-20.3±0.2		3340–2930
SUERC-59562		Animal bone, calcined	Context 670, floor around interior of periphery of House 11, stratigraphically later than context 619	4352±29	-21.9±0.2		3080–2900

		large mammal long bone					
SUERC-59563		Animal bone, calcined large mammal long bone	Context 670, floor around interior of periphery of House 11, stratigraphically later than context 619	4412±26	-21.6±0.2		
UBA-28539		Animal bone, calcined large mammal long bone	Replicate of SUERC-59563	4310±34			
Weighted mean SUERC-59563 + UBA-28539 (T' = 5.7; v = 1; T'(5%) = 3.8)				4375±21			3085–2910
SUERC-59564		Animal bone, calcined large mammal distal humerus fragment	Context 687, from flagstone drain covering in House 5b. Stratigraphically earlier than context 225, and later than 828 and 794	4412±26	-20.6±0.2		3310–2910
SUERC-59565		Animal bone, calcined sheep/goat left radius fragment	Context 687, from flagstone drain covering in House 5b. Stratigraphically earlier than context 225, and later than 828 and 794	4488±26	-20.9±0.2		3350–3040
SUERC-53356		Animal bone, calcined sheep	Context 754, fill of great drain outside House 7. Stratigraphically earlier than context 396	4448±31	-25.5±0.2		3340–2930

		proximal left tibia					
OxA-2736		Naked barley grains	Context 754, fill of great drain outside House 7. Stratigraphically earlier than context 396	4360±70	-23.4		3340–2880
SUERC-57995		Animal bone, calcined large ungulate long bone fragment	Context 754, fill of great drain outside House 7. Stratigraphically earlier than context 396	4393±30	-24.1±0.2		
UBA-22592		Animal bone, calcined large ungulate long bone fragment	Replicate of SUERC-57995	4354±33			
Weighted mean SUERC-57995 + UBA-22592 (T' = 0.8; v = 1; T'(5%) = 3.8)				4375±23			3085–2910
OxA-3764		Birch charcoal	Context 763, floor deposit in Structure 8	4400±65	-26.9		3340–2900
OxA-3763		Birch charcoal	Context 763, floor deposit in Structure 8	4360±60	-26.3		3330–2880
OxA-3765		Birch charcoal	Context 763, floor deposit in Structure 8	4475±65	-26.8		3370–2930
SUERC-53374		Birch charcoal	Context 769, ash fill of hearth 1236 on platform of Structure 8	4483±31	-25.0±0.2		
UBA-22561		Birch charcoal	Context 769, ash fill of hearth 1236 on platform of Structure 8	4358±42	-25.1±0.22		
Weighted mean SUERC-53374 + UBA-22561 (T' = 5.7; v = 1; T'(5%) = 3.8)				4440±25			3330–2930
SUERC-53375		Ericaceae roundwood charcoal	Context 769, ash fill of hearth 1236 on platform of Structure 8	4425±31	-27.4±0.2		3330–2920

OxA-2737		Naked barley grains	Context 828, ash spread on the clay floor to the east of hearth of House 5b	4400±70	-24.4			3340–2900
OxA-3501		Barley grains	Context 924, lower midden in north central activity area	4450±75	-23.7			3350–2910
SUERC-53364		Animal bone, calcined cattle left radius	Context 924, spit 5 lower midden in north central activity area, north of House 6. Stratigraphically later than 654, underlying 619	4433±31	-24.1±0.2			
UBA-22543		Animal bone, calcined cattle left radius	Replicate of SUERC-53364	4371±43				
Weighted mean SUERC-53364 + UBA-22543 (T' = 1.4; v = 1; T'(5%) = 3.8)				4412±26				3100–2925
SUERC-57996		Animal bone, calcined pig right metacarpal III	Context 924, occupation/midden deposit. Stratigraphically later than context 654 and earlier than context 619	4543±30	-26.3±0.2			3370–3100
SUERC-58000		Animal bone, calcined sheep/goat left calcaneum	Context 924, occupation/midden deposit. Stratigraphically later than context 654 and earlier than context 619	4490±30	-27.4±0.2			3350–3030
SUERC-58001		Animal bone, calcined cattle right tibia shaft fragment	Context 924, occupation/midden deposit. Stratigraphically later than context 654 and earlier than context 619	4319±30	-?±0.2			

UBA-22593		Animal bone, calcined cattle right tibia shaft fragment	Replicate of SUERC-58001	4437±35			
Weighted mean SUERC-58001 + UBA-22593 (T' = 6.6.; v = 1; T'(5%) = 3.8)				4370±23			3090–2910
UBA-22554		Birch charcoal	Context 984, layer in the platform associated with its use. Stratigraphically later than 1158	4366±36	-26.4±0.22		3100–2900
UBA-22553		Ericaceae roundwood charcoal	Context 997, layer of ash within hearth 930 on Structure 8 platform 1007. Stratigraphically later than 1163	4271±44	-28.3±0.2		3010–2700
OxA-2734		Naked barley grain	Context 1004, ash from final fire in hearth fill from House 12	4520±70	-23.6		3500–2930
OxA-3766		Barley grain	Context 1044, fill of a pit from House 9	4420±60	-25.1		3335–2910
SUERC-53370		Ericaceae roundwood charcoal	Context 1163, Structure 8. Bottom fill of hearth 930. Stratigraphically later than 1158, underlies 997	4455±31	-27.3±0.2		3340–3010
UBA-22594		Ericaceae roundwood charcoal	Context 1163, Structure 8. Bottom fill of hearth 930. Stratigraphically later than 1158, underlies 997	4285±35	-28.1±0.22		3020–2780
SUERC-53372		Birch charcoal	Context 1196, fill of small pit 1195 dug into clay surface to south of entrance as part of later reuse of Structure 8	4494±31	-26.9±0.2		3360–3040
UBA-22555		Ericaceae roundwood charcoal	Context 1196, fill of small pit 1195 dug into clay surface to south of entrance as part of later reuse of Structure 8	4470±37	-27.4±0.22		3350–3020
SUERC-53371		Ericaceae roundwood charcoal	Context 1197, discrete ash deposit within northern hearth on eastern area of platform of Structure 8. Underlies context 769, stratigraphically later than 1158	4409±31	-27.5±0.2		3320–2910
UBA-22556		Ericaceae roundwood charcoal	Context 1197, discrete ash deposit within northern hearth on eastern area of platform of Structure 8.	4336±38	-27.4±0.22		3090–2880

			Underlies context 769, stratigraphically later than 1158				
UBA-22562		Ericaceae roundwood charcoal	Context 1205, from central fireplace to west of northern hearth 1207, on eastern area of the platform of Structure 8. Underlies context 769, stratigraphically later than 1158	4390±38	-27.3±0.22		3320–2900
UBA-22595		Ericaceae roundwood charcoal	Context 1205, from central fireplace to west of northern hearth 1207, on eastern area of the platform of Structure 8. Underlies context 769, stratigraphically later than 1158	4347±38	-26.6±0.22		3090–2890
SUERC-53373		Ericaceae roundwood charcoal	Context 1207, discrete ash deposit from northern hearth, eastern area of platform of Structure 8. Underlies context 769, stratigraphically later than 1158	4420±31	-27.0±0.2		3330–2920
UBA-22560		Ericaceae roundwood charcoal	Context 1207, discrete ash deposit from northern hearth on eastern area of platform of Structure 8. Underlies context 769, stratigraphically later than 1158	4341±43	-27.7±0.22		3100–2880

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