LANCASTER IMPRINTS 32

From An Ancient Eden to a New Frontier:

An Archaeological Journey along the Carlisle Northern Development Route

FROM AN ANCIENT EDEN TO A NEW FRONTIER:
AN ARCHAEOLOGICAL JOURNEY ALONG THE CARLISLE NORTHERN DEVELOPMENT ROUTE

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Front cover: *The CNDR under construction, looking south across Stainton West and the River Eden floodplain; Neolithic leaf-shaped arrowhead from Stainton West*
Rear Cover: *The palaeochannel at Stainton West under excavation (top); Hadrian's Wall (Stone Wall) at Knockupworth (middle); a possible Bronze Age sauna at Stainton West (bottom)*

LANCASTER IMPRINTS

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8

DEPOSITION AND TREE FELLING: THE EARLY NEOLITHIC PERIOD AT STAINTON WEST

F Brown

Following the abandonment of the Mesolithic encampment in the later part of the fourth millennium cal BC (*Ch 4, p 147*), the Stainton West element (Fig 104) of the Eden's terrace system seems to have become marginalised (the Hiatus Phase), possibly because it became wetter and was more prone to flooding (*Ch 6, p 187*). Despite this, lithic evidence suggests that it was not entirely abandoned, and the site witnessed a renewal of more intensive activity (Early Neolithic Phase) from around 3800 cal BC. This, however, does not seem to have represented direct settlement, or to have been primarily geared towards subsistence.

In the Early Neolithic period, the conditions at Stainton West do seem to have become drier once again, with a lower-energy environment returning to the *Principal palaeochannel*, which, at this point, may have usually been a more-or-less stagnant pond, or minor oxbow lake fed and drained by a stream, rather than a fully active branch of the Eden. People may have been drawn back to this part of the floodplain/terrace interface partly because of these generally drier conditions, the presence of the pond or, as previously (*Ch 5, p 147*), the slightly drier island in this part of the floodplain. It may also have remained a good place to fish, hunt, or forage for fruit and vegetable resources, and may have been a convenient point of departure into the floodplain, or for fording the Eden.

However, topographical reasons may not have been the only pertinent factors, the upstanding midden (*Ch 4, p 115*) and the coppices and clearances (*Ch 3, p 88*) that distinguished this as a place for repeated visitation in the Late Mesolithic period perhaps having continued to have been maintained to some extent, or persisted in one form or another, despite the site's marginalisation. Artefactual remnants of the earlier intensive phase of occupation may also have been visible, littered around these clearances and recognised as being significant. It may also have been a place that was remembered or mythologised in folk memory and oral histories. If this was the case, then the exposure, by a particularly erosive reactivation episode, of massive ancient tree boughs and trunks in the *Principal palaeochannel* (*p 236*), which seems to mark the beginning of this phase of activity, may have been understood as being, in some way, auspicious, and helped to catalyse and motivate the sequence of activities that ensued over the subsequent two millennia or more.

Most of this activity was restricted to the *Principal palaeochannel*, where two successive natural stratigraphic units (*Ch 2*) accumulated throughout the Early Neolithic period, in the first half of the fourth millennium cal BC. Both deposits were rich in waterlogged organic materials and provided a wealth of palaeoenvironmental information, indicating that a dramatic and fundamental change was taking place in the Stainton West environment, which was probably, to some extent, due to humans and, very possibly, the result of an intensification of land-management practices, including those associated with farming. These deposits also contained well-preserved and stratified cultural materials (artefacts and timber structures), suggesting that votive activity, of a similar sort, was taking place in the channel when both deposits were accumulating.

Significantly, the stratigraphic positioning and dating evidence from these remains, and the associated natural deposits, have enabled three broad phases of human activity to be identified within the channel, and these have been used within the chronological model (*Ch 1, pp 30-1*). The earliest of these has been termed the '*Earliest early Neolithic activity*', followed by '*Early Neolithic I*', whilst the third phase is defined as '*Early Neolithic II*'. There was also some contemporaneous evidence for tree felling in the *Grid-square area*, as well as a few lithic finds there. Accordingly, this evidence, which lies beyond, and is stratigraphically isolated from, the *Principal palaeochannel*, has been defined as the '*Early Neolithic activity in the Grid-square area*' phase in the chronological model.

The *Principal Palaeochannel:* Natural Deposits

The two natural deposits accumulating within the *Principal palaeochannel* during the earlier Neolithic period comprised the *Earlier Neolithic organic deposit*, which was succeeded by the *Earlier Neolithic alluvium*.

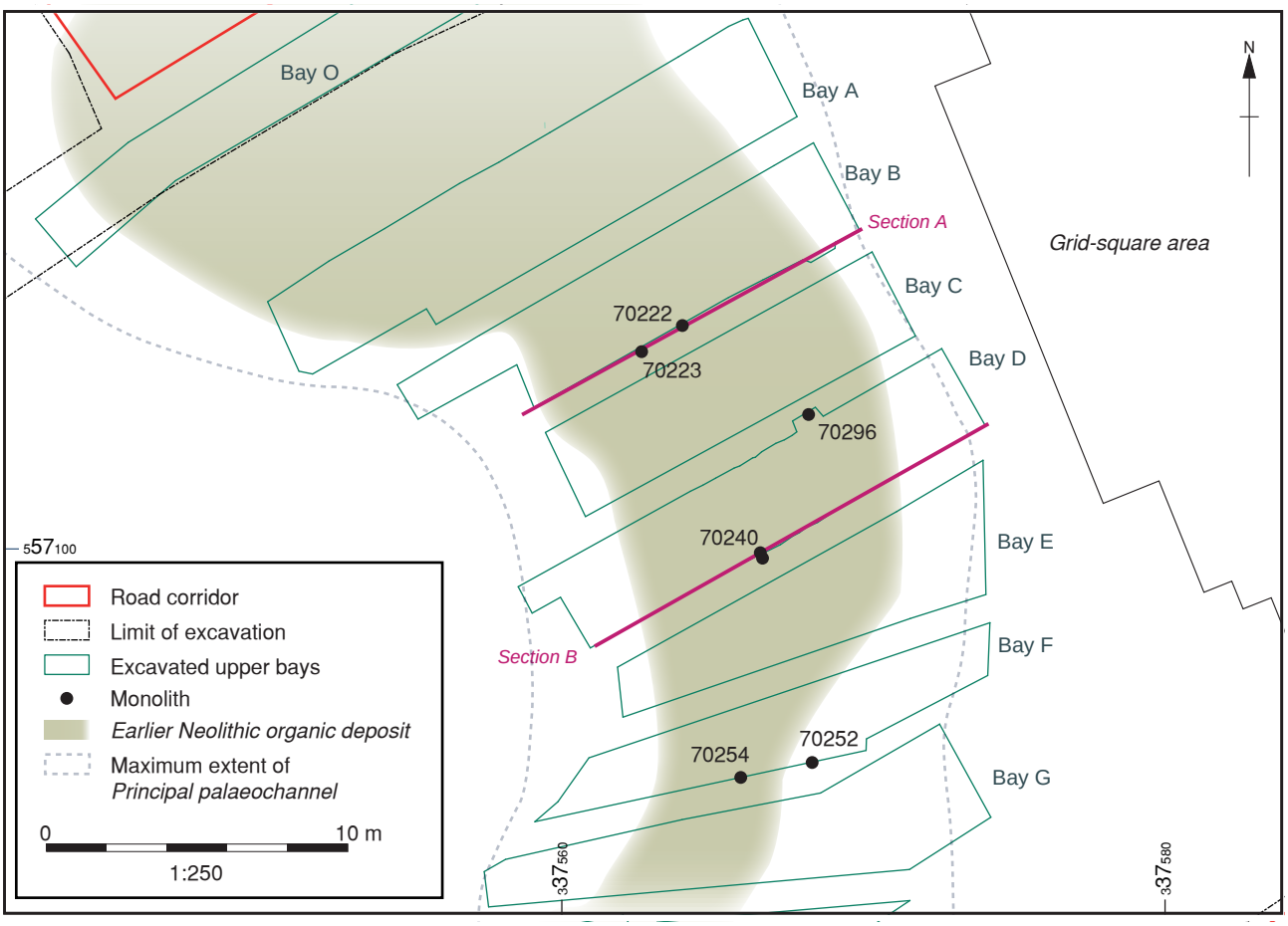


Figure 105: The extent of the Earlier Neolithic organic deposit *in the* Principal palaeochannel

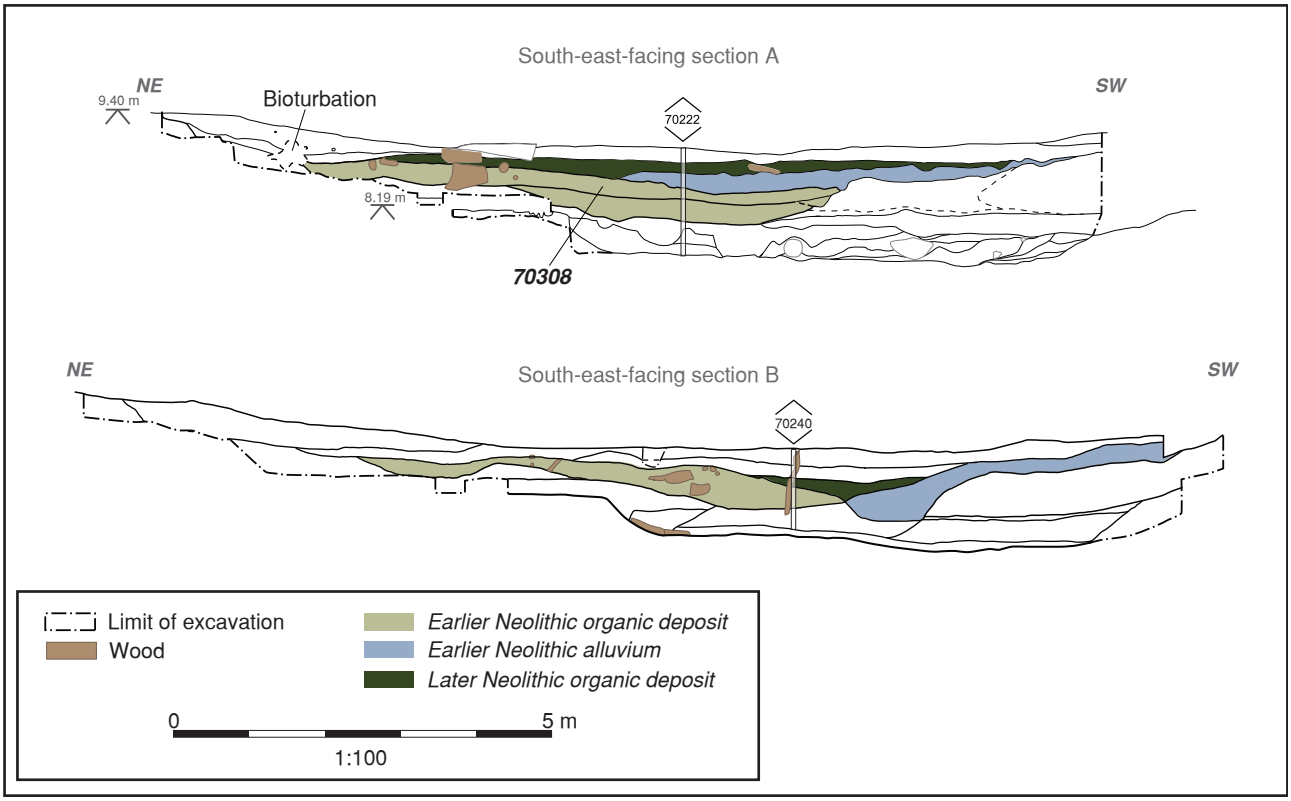


Figure 106: The Earlier Neolithic organic deposit *and* Earlier Neolithic alluvium *in the* Principal palaeochannel

These have been differentiated because the former seems to have accumulated in a relatively low-energy environment within the channel, whilst the latter formed in wetter, slightly higher-energy, conditions.

Earlier Neolithic organic deposit

The dark organic-rich deposit, classified as the *Earlier Neolithic organic deposit* (*Ch 2, p 49*), relates to a phase of deposition that followed the higher-energy phase leading to the formation of the *Mesolithic alluvium*, and the *Mesolithic/Neolithic alluvium* (*Ch 6*). It is also apparent that the *Earlier Neolithic organic deposit* accumulated in a slightly more sinuous *Principal palaeochannel* than had existed previously.

This organic-rich deposit extended along the full length of the exposed channel (Fig 105). However, it did not always extend right up to the banks, partly because it had been eroded by later fluvial activity and partly because its formation was restricted to the deeper, presumably wetter, central part of the channel (Fig 106). In some places, where the *Mesolithic alluvium* and the *Mesolithic/Neolithic alluvium* had been eroded, this deposit sat directly on top of the *Mesolithic organic deposit* (*Ch 3, p 70*), and, where this was the case, the two were often practically indistinguishable during excavation; instead, an horizon had to be extrapolated from the sediment profiles at the edges of the channels, where the alluvial deposits separated them.

Where it was sampled at its centre (Bay D; monolith 70240), the *Earlier Neolithic organic deposit* comprised an *in-situ* wood peat, composed of variously humified and fragmented broadleaved-woodland remains (including wood, fruit (nuts), and leaf-litter), alongside a minerogenic alluvium, which also contained finely fragmented/macerated plant material (*Appendix 19*). A sample (monolith 70223), from the channel in Bay B, recorded apparently sloping alternating humic and poorly humic silt-dominated laminae (*ibid*). This can be interpreted as evidence for a seasonally varying sluggish stream and/or sedimenting pond, with alternating summer (humic) and winter (minerogenic) laminated silt deposition possibly taking place. Woodland-rooted reworked medium and fine sands were present, which record a rise in the River Eden's base level, the decay of woodland roots (trees dying), and the development of monocotyledonous-type wetland vegetation (*ibid*). This indicates that this deposit may have accumulated over an extended period, given that there was sufficient time for woodland to develop, become established, and then be succeeded by wetland vegetation.

The date range for the *Earlier Neolithic organic deposit* was partly ascertained through a series of radiocarbon dates obtained from short-lived twigs and hazelnuts from four monoliths (70222, 70296, 70252, and 70254), and other comparable short-lived items recovered during the excavation and sampling of this deposit (*p 272*). These dates all form elements of the '*Early Neolithic I*', and when modelled, suggest that this *Earlier Neolithic organic deposit* accumulated between *3940 cal BC* and *3650 cal BC (p 298*).

Earlier Neolithic alluvium

There was a change in the sedimentation regime in the *Principal palaeochannel* during the Early Neolithic phase, suggesting slightly wetter conditions, which led to the formation of the *Earlier Neolithic alluvium*. This was a highly organic sediment that was more minerogenic in character and stratigraphically later than the *Earlier Neolithic organic deposit*. It only survived along the south-western edge and centre of the channel (Fig 107), however, which might suggest that it partially derived from inundation from a channel to the west. It was thicker and more substantial at the channel edge (Fig 106), whereas in the centre it was often lenticular, and frequently not present, presumably having been eroded by later episodes of active flow.

The alluvium varied in character and appearance across the channel, reflecting localised variation in the formation processes in operation. On the south-western side, it tended to be sandier and pinkish (rather than grey) in colour, because its composition was affected by a greater erosional/colluvial input from the steeper channel bank on this side. It was darker, siltier, and more organic in the centre. In the south-west, the *Earlier Neolithic alluvium* was obviously interposed between the *Earlier Neolithic organic deposit* and a Late Neolithic channel deposit (*Later Neolithic organic deposit*; *Ch 10, pp 328-9*). However, in the centre of the channel, the boundary between these latter deposits was much less obvious and it was occasionally impossible to define with any confidence. As such, the horizon had to be extrapolated from the edges.

Where it was characterised in Bay F (*Appendix 19*), the *Earlier Neolithic alluvium* comprised massive, layered, mainly humic, silts with frequent silty laminae. These contained very abundant woody roots and leaf- and bud-tissue remains, as well as occasional woody fragments. The plant materials, particularly horizontally oriented leaf layers, suggested that the deposit was formed by the slow accumulation of humic silts in a sluggish stream, under woodland fen conditions. Blackened amorphous root material may possibly indicate local charring. Although the channel stream was slow-flowing, some higher-energy events or episodes were indicated by relatively high proportions of Carboniferous pollen spores (*Appendix 16*) that point to some erosion of the natural geological sediments.

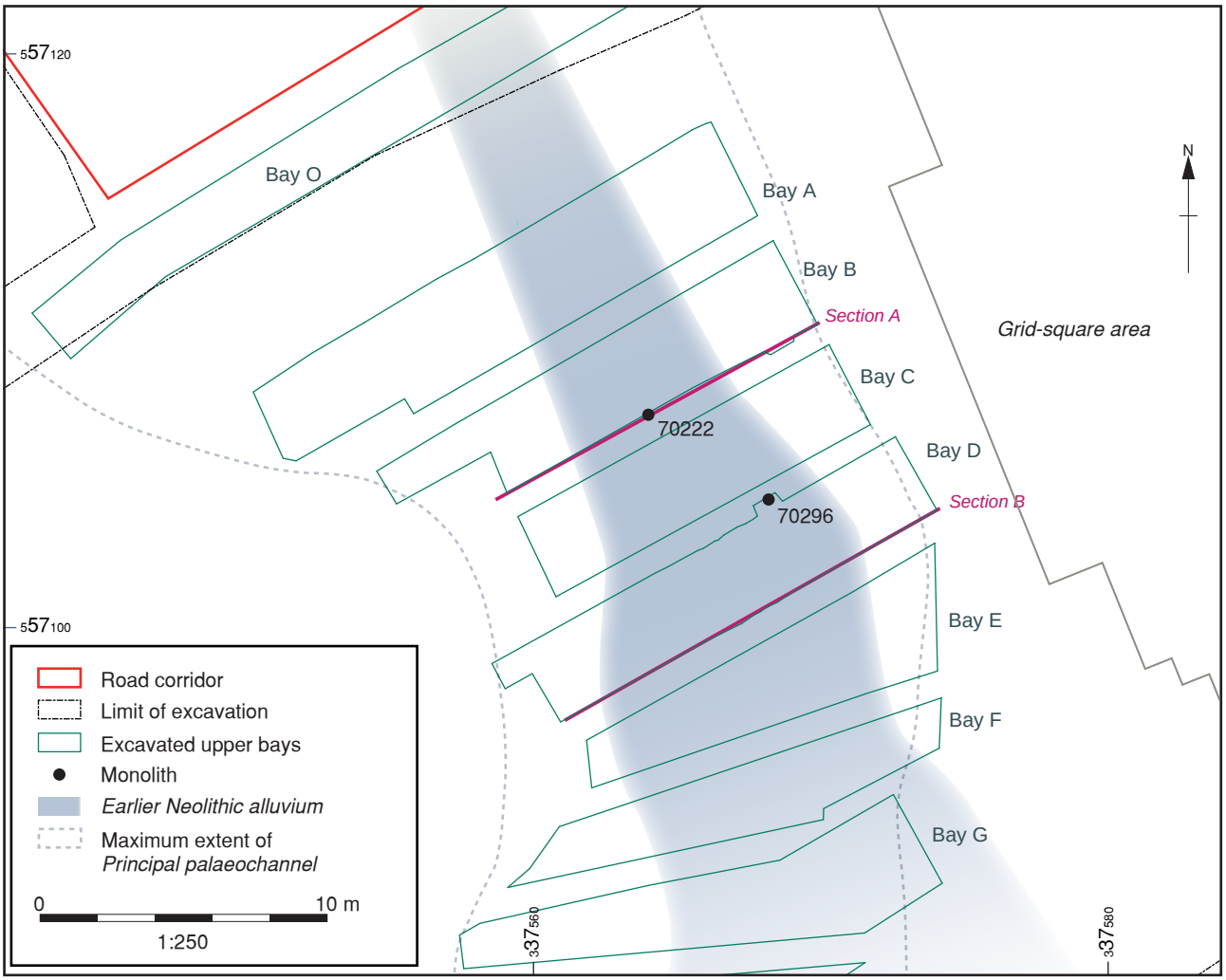


Figure 107: The extent of the Earlier Neolithic alluvium *in the* Principal palaeochannel

In a similar fashion to the underlying *Earlier Neolithic organic deposit*, radiocarbon dates were obtained from short-lived materials extracted from monoliths (70222 and 70296), which provide some indication of the date of the Earlier Neolithic alluvium. All of these dates form elements of '*Early Neolithic II*,' and their modelled ranges suggest that this natural deposit accumulated between *3690 cal BC* and *3370 cal BC* (*p 298*).

The First 'Neolithic' Activity in the Channel

In the *Principal palaeochannel* (Bay B), a small *c* 0.5 x 0.5 m structure (***75935***; Fig 108) was composed of a tangle of 23 pieces of unworked wood (**75936-40**; **75942-4**; **75952-7**; **75999**; **76010-13**; and **76017-20**; Fig 109), which included ten pieces of elm, and also hazel, alder, and indeterminate species (*Appendix 13*). The individual pieces varied in length, but were generally under 0.5 m, and tended to be just less than 50 mm in diameter, with the appearance of being arranged in a V-shaped formation (Pl 87). However, the wood was not interwoven and, as such, the arrangement may relate to a collapsed structure of some description. One possibility is that this had acted as a fish trap, perhaps fastened together by organic ties that had since decayed; it is notable that there was no evidence for beaver gnawing, so they do not seem to have been responsible for it. This formation seems to date to just before the construction of the major Neolithic structures in the channel (*below*), and a piece of hazel (**76011**) from the structure has been radiocarbon dated to *3950-3870 cal BC* (*SUERC-42027*; *pp 291-2*). This putative fish trap has, on this basis, been tentatively assigned to the '*Earliest early Neolithic activity*' chronological phase (*p 233*), representing the first 'Neolithic' man-made structure in the channel, although it is possible that it was constructed at a time when farming had not been fully established in the area. However, it has been suggested (from isotopic analysis) that fish, especially marine species, were no longer eaten following the switch to farming (*cf* Richards *et al* 2003; Richards and Schulting 2006), but there is good evidence from other parts of Europe, such as Denmark and north Germany, that fish did indeed continue to form an important component of the Neolithic diet (*cf* Fischer 2002; Terberger *et al* 2012).

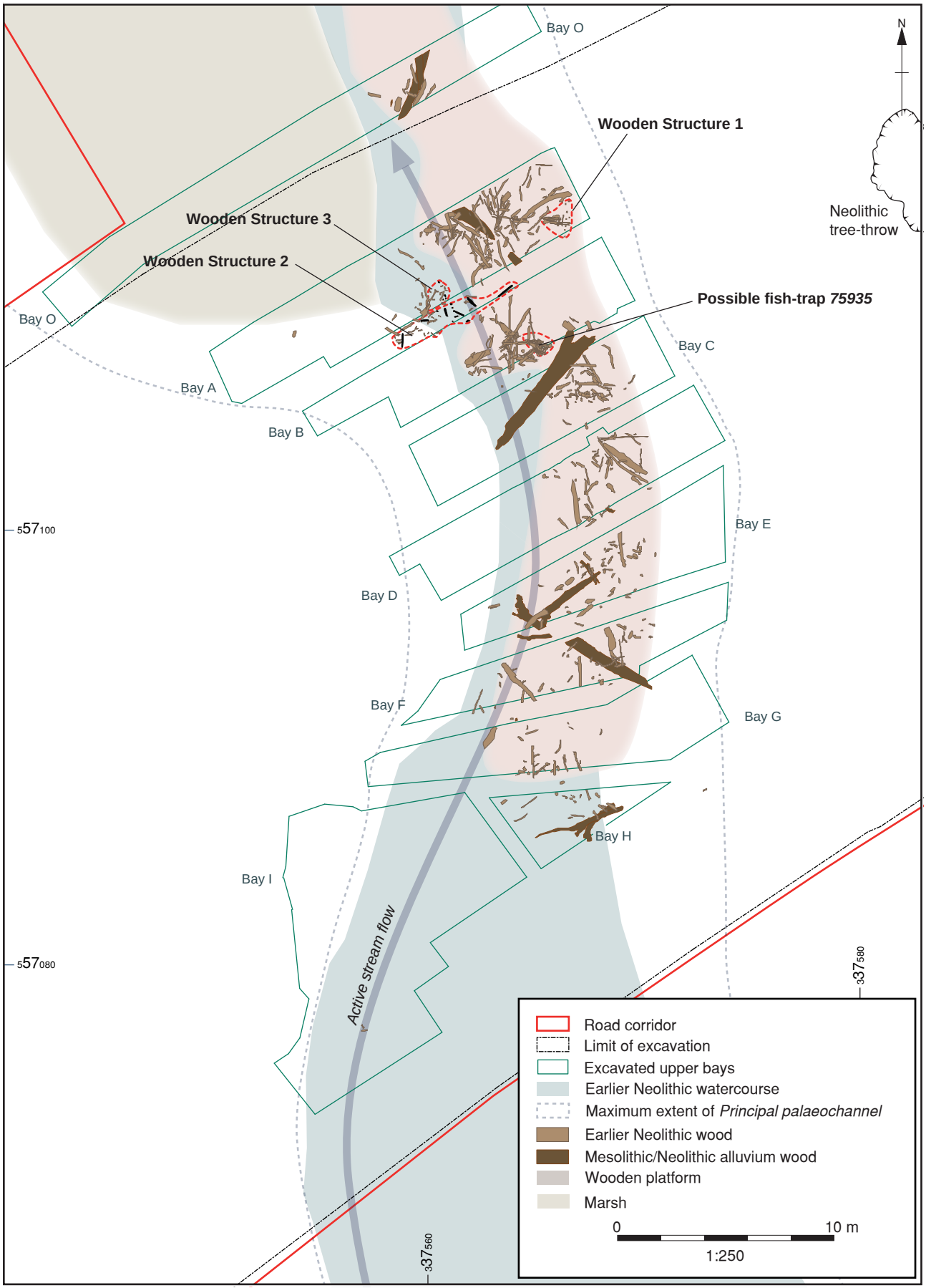


Figure 108: Wooden structures and in-situ *stakes in the* Earlier Neolithic organic deposit*, and the underlying boughs from the* Mesolithic/Neolithic alluvium

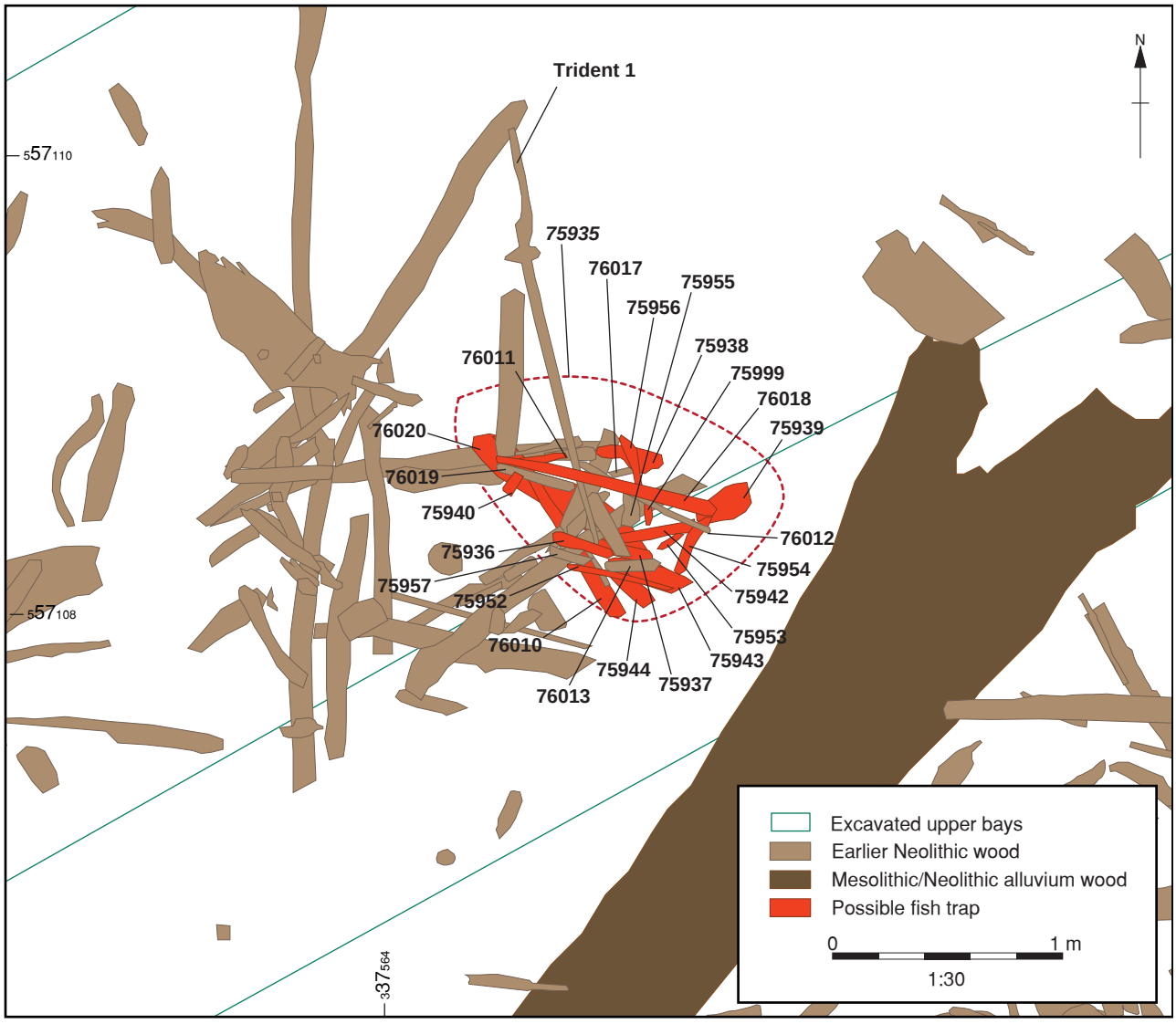


Figure 109: Possible fish trap **75935**

Plate 87: Wooden structure **75935**, *in Bay B, looking south-east*

'Early Neolithic I' Activity in the Channel

Probably shortly after the '*Earliest early Neolithic activity*' phase, during the '*Early Neolithic I*' phase, the *Principal Palaeochannel* seems to have been used by humans in a very different way to that in which it was used in preceding periods (*Ch 3*). This phase equates with the deposition of the *Earlier Neolithic organic deposit* (*p 235*), and at this time the channel seems to have been 'monumentalised', with architectural enhancements, including the construction of a wooden platform and related post-settings, being used to emphasise it and distinguish and subdivide the space that it circumscribed. It then became the focus for a particular set of what often seemed to be discursive (*sensu* Barrett 1994, 72-81) activities and practices, evidenced by acts of deliberate, probably votive, deposition of diverse material assemblages. The overall effect was to increase the spatial heterogeneity

of the channel and to transform it into a receptacle for a meaningful assemblage of material culture, thereby co-opting it and imbuing it with a community's identity and history, perhaps as this was renegotiated or reinvented (*cf* Thomas 2013, 351-3, on monuments).

Wood

A large assemblage of worked and unworked wood (*Appendix 13*) was associated with the '*Early Neolithic I*' phase, most being found in the *Earlier Neolithic organic deposit* (Fig 110). However, some of the pieces now thought to have been associated with this deposit were originally recorded as belonging to the *Later Neolithic organic deposit* (*Appendix 13*), and, at times, their provenance was not always clear-cut, despite a detailed consideration of all the evidence during post-excavation analysis (including a three-dimensional GIS model of the channel).

The character of the wood associated with the *Earlier Neolithic organic deposit* was markedly different from that recovered from the underlying *Mesolithic/Neolithic alluvium* (*Ch 6, p 188*). In that deposit, there were many large, unworked oak trunks or boughs, comprising dendrochronological Cluster 2, whereas no wood of this kind occurred in the upper deposit. Instead, there were quantities of coppiced and also worked wood, some of it being used to construct *in-situ* wooden structures (Table 21 summarises the differences between these deposits).

Overall, the impression given by the wood within the *Mesolithic/Neolithic alluvium* is that it entered the channel by natural agency, probably via several flooding events (*Ch 6, pp 188-9*), whereas the wood in the *Earlier Neolithic organic deposit* seems to have entered the channel during a less fluvially active phase, probably, to a significant degree, by human agency (*p 240*). In neither deposit was there any evidence (in the form of *in-situ* root systems or fallen trees with roots attached) for mature trees actually

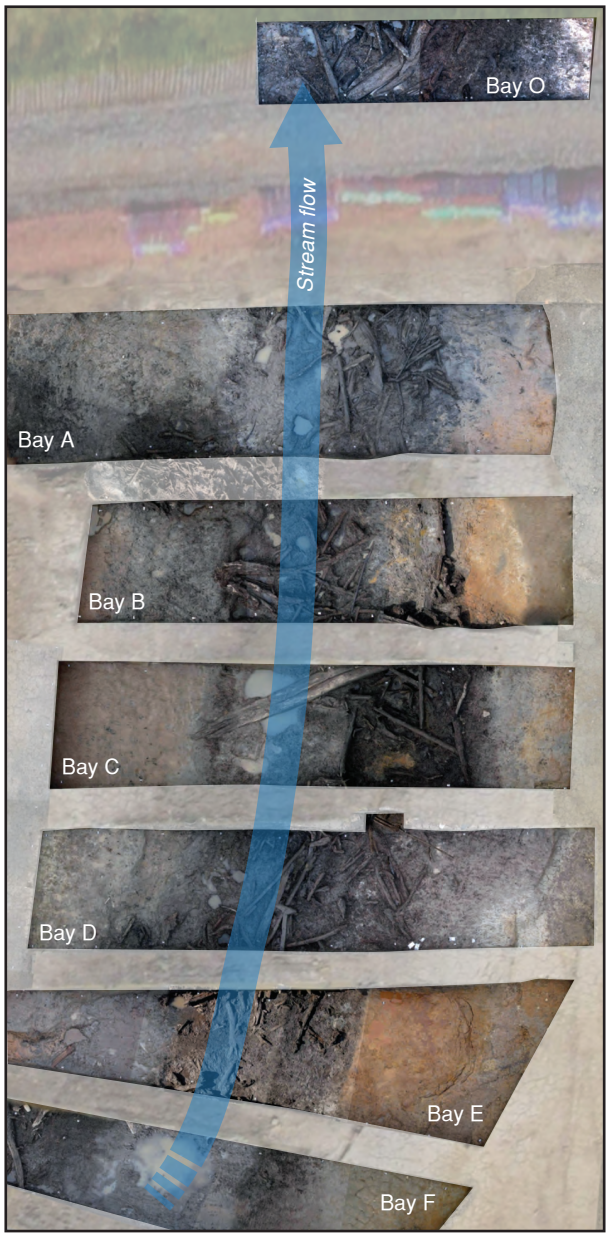


Figure 110: Composite image of wood preserved within the Earlier Neolithic organic deposit

Mesolithic/Neolithic alluvium	***Earlier Neolithic organic deposit***
Generally, less wood of any kind	Wood frequently occurred within deposit
Wood occurred within what would have been the active stream course	Wood occurred directly above and also slightly to the east of the wood within the *Mesolithic/Neolithic alluvium*, much of this adjacent to what would have been the contemporary active stream course
Frequent large, eroded, and rootless and branchless, unworked oak trunks and boughs, many of which can be matched to a single dendrochronological cluster (Cluster 2; 15 pieces)	No large, unworked oak trunks or boughs; Included dendrochronological Cluster 3, which comprises only two pieces – both worked timbers
No wood that has definitely been worked	Large amounts of worked wood (evidence for the cutting and splitting of large trees), including wooden artefacts
No structural wood	Several *in-situ* wooden structures, made from worked wood from coppiced trees
Wood deposited in the channel by flooding events	Much of the unworked wood could have derived from coppiced woodlands and may have been laid to form an *ad hoc* platform

Table 21: The contrasting characteristics of the wood within the Mesolithic/Neolithic alluvium *and the* Earlier Neolithic organic deposit

growing in the channel, although it is possible that immature stands of hazel or alder encroached upon it (*p 287*). Significantly, the massive trunks within the *Mesolithic/Neolithic alluvium* also protruded up into the *Earlier Neolithic organic deposit*, and the best explanation for this is that fluvial erosion in the channel had exposed these trunks and boughs just prior to the formation of the *Earlier Neolithic organic deposit*.

The wood associated with the *Earlier Neolithic organic deposit* was characterised by two distinct working techniques (*Appendix 13*, for a detailed discussion). Firstly, there were quantities of roundwood, much of which seemed to have been derived from coppiced woodland. This was either deposited in the channel (by natural or human agency, or a combination of both) in the form of unmodified pieces, or had been selected and/or altered by humans for use in stake-built constructions. This coppice technique can be contrasted with a second technique that was concerned with the felling and splitting of large mature trees. The wood derived from various parts of this process was then seemingly selectively deposited in the channel, but was never used within the stake-built structures, perhaps best exemplified by three wooden artefacts (a paddle and two tridents; *Appendix 13*), which had been carved out of split planks, being deliberately deposited in the channel, probably at the end of their useful lives.

The wooden platform

The roundwood in the *Earlier Neolithic organic deposit* not employed within stake-built structures (see *p 249* for a discussion of the species represented) was predominantly concentrated on the eastern side of the channel and also towards its northern end (Bays O, A, and B; Fig 108). This was slightly further towards the east than the wood that occurred in the *Mesolithic organic deposit* (*Ch 6*, *p 189*), which may, in part, be attributed to changes in channel morphology, the accumulation of alluvium and colluvium to the west encouraging the stream to flow further eastwards. The likely course of the active stream, which was probably usually no more than a trickle at this time, can be interpreted from the sediment profiles, the majority of the wood in the *Earlier Neolithic organic deposit* being found just to the east of this (as opposed to the large trunks within the *Mesolithic/Neolithic alluvium* that lay within it). The western side of the channel had a steeply sloping profile, whereas, contrastingly, the eastern side declined very gently. It was on this gentle slope that much of the roundwood was found, particularly in the northern part of the channel. Other evidence suggests that the channel was ponded into a near-stagnant pool in this northernmost part of the site, supported by the more laterally extensive distribution of wood there. There was also a second, much smaller, area of wood concentrated towards the south-eastern part of the channel, in Bays G and H.

Although fluvial transport cannot be entirely discounted, overall, the depositional signature for the roundwood in the *Earlier Neolithic organic deposit* (a low-energy, highly organic environment) suggested that much of this material had been deliberately gathered and deposited, rather than being a natural accumulation. While it is very difficult to establish this beyond all doubt, it is not clear how the distribution could have occurred through purely natural processes. This was particularly the case with the wood from Bays O to G on the gently sloping eastern side of the channel, which seems to have been deposited there, or rearranged, to form a rudimentary platform, consolidating the bank and the boggy area adjacent to the stream. It is also possible that the large oak trunks of dendrochronological Cluster 2, exposed by erosion, provided a base for this.

This platform was a large feature, some 6 m wide, and extended for at least 34 m north, though it is likely that it actually extended further northwards, beyond Bay O, continuing along the eastern side of the ponded area that seems to have existed in this part of the site (*p 233*). The structure of this platform was not, however, particularly coherent, as it was composed of unworked pieces of wood, probably opportunistically sourced, repositioned or thrown down in a vaguely ordered fashion. Many of the pieces were long, pole-like forms, which may have been preferentially selected, possibly from managed (coppiced) woodland, and these occasionally seemed to have been arranged roughly perpendicular to each other, so as to form a loose lattice (Pl 88). The wood occurred throughout the full depth of the deposit. There was no such similar arrangement evident on the steeper western bank, suggesting that it was the eastern bank that provided ingress into the channel for people moving from the direction of the terraces (*Ch 2*, *p 40*) into the floodplain.

Stake-built structures

The best evidence for human activity in the channel during the formation of the *Earlier Neolithic organic deposit*, and for the dating of this activity, is provided by several stake-built structures (Wooden Structures 1-3; Fig 108) within the northern part of the channel, in Bays A and B (see *Appendix 13* for details of the individual components), probably contemporary with the wooden platform (*above*). These structures were constructed from sharpened roundwood stakes and unworked branches (both usually of alder or hazel, and often showing evidence for coppicing) driven upright into the channel deposits to form

Plate 88: The loose lattice of timber forming a rudimentary platform over Mesolithic trunks, looking south-east, from Bay B to C

stake lines or fences. Wooden Structure 2 provided the best evidence that they probably formed the latter, as it preserved horizontal withies interwoven with the stakes.

Wooden Structure 1 was revealed on the eastern side of the channel (Fig 111), and comprised 20 pieces of wood. Ten (**76015** and **76028-36**) formed an approximately north/south line of vertical, *in-situ* stakes, 1.7 m in length, and seemingly following the edge of the channel (Pl 89). These were all of roundwood (*c* 30-50 mm in diameter, and of variable surviving length), and many had evidently been coppiced, all but four of them also having been sharpened by stone-axe cuts (Pl 90); where they could be identified to species, they were either of hazel (six) or alder (one). The other ten pieces lay in a horizontal attitude to the west of this stake line. Eight (**75906-9** and **75912-15**) were parallel to each other, orientated approximately east/west, whilst the two other pieces (**75910-11**) were perpendicular, following the same alignment as the fence. These latter did not seem to be interwoven with the other pieces; rather, they appeared to be underneath them, perhaps to provide support (Pl 91). The overall impression was thus not of a collapsed panel, but instead perhaps of a short (1.35 m) structure leading from the fence towards the centre of the channel. All the pieces were unworked and were 10-25 mm in diameter, except for **75913,** of 40 mm-diameter trimmed hazel. Indeed, it is possible that they may have formed the collapsed remnants of a basket-like construction, the ties of which had since perished.

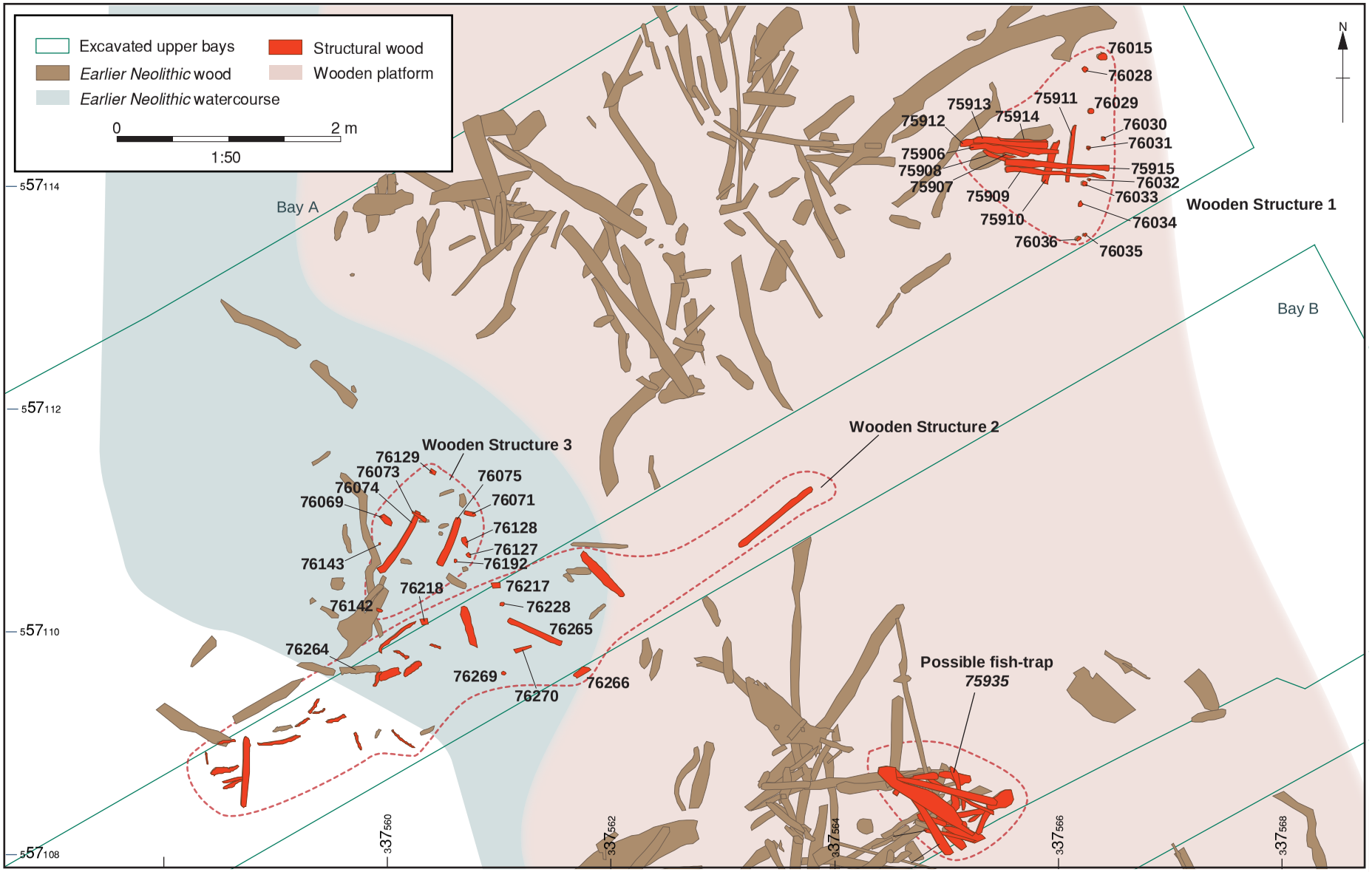


Figure 111: Wooden Structures 1-3

Plate 89: The stake line forming part of Wooden Structure 1, looking north

*Plate 90: Axe-cut stakes **76029**, **76030**, and **76031***

Wooden Structure 2 was aligned approximately south-west/north-east, and survived for 6 m within the palaeochannel (Pl 92). It formed a fence, comprising 30 individual pieces of wood, constructed from at least 13 stakes (or sails), six of which (**76228**, **76266**, **76217**, **76218, 76270**, and **76269**) remained embedded in the palaeochannel deposits, whilst the others had been displaced, lying at more horizontal attitudes within the *Earlier Neolithic organic deposit*. These provided evidence that the fence had collapsed when this was still forming. The stakes were all of coppiced roundwood (*c* 30-80 mm in diameter, and varied in length), and most of them had been sharpened by axe blows, although three

Plate 91: The setting of horizontal timbers in Wooden Structure 1

Plate 92: The excavation of Wooden Structure 2, looking west

(**76218**, **76264**, and **76265**) were apparently unmodified. Interwoven between the stakes were thinner (*c* 20-30 mm-diameter) wands (withies) of largely hazel and alder, many of them evidently coppiced, which suggests a hurdle construction. These lighter elements were better preserved towards the western end of the fence, and the overall impression, from the disposition of the surviving structure, was that there was progressively greater displacement of its elements towards it eastern end.

From their arrangement, it is possible that Wooden Structures 1 and 2 were actually one continuous, or semi-continuous, fence stretching across the full width of the channel, as there was only a *c* 3 m gap separating them. The gap can possibly be explained by differential preservation caused by the channel morphology, as this area was on the periphery of the distribution of surviving pieces of wood and may have been slightly drier, leading to the decay of any posts. Alternatively, any posts in this area may have been removed by a flood pulse, perhaps also explaining the disarray of the posts at the eastern end of Wooden Structure 2.

Wooden Structure 3 lay immediately to the north of Wooden Structure 2, forming a tight (1.3 x 0.85 m) cluster of 11 pieces. These also comprised predominantly hazel, or occasionally alder, roundwood (in this case measuring *c* 30-55 mm in diameter), with many pieces bearing evidence for coppicing. Five stakes (**76127-9**, **76143**, and **76192**), at the periphery of the distribution, were evidently *in situ*, and all of these had been sharpened by axe working (Pl 93). An outlier of the cluster in the south-west (**76142**) may actually have been a beaver-gnawed piece (Pl 94), and is thus not certainly a true member of the set. The other pieces were not necessarily *in situ*, although **76071** and **76073** had been trimmed at one end and may have been displaced stakes, and **76069** and **76074-5** had been coppiced. It is difficult to categorise

*Plate 93: Sharpened stakes **70128**, **76192**, and **76071** in Wooden Structure 3*

Plate 94: Beaver-gnawed piece ***76142***

this structure, although it does not seem to have been a fence; rather, perhaps it was some kind of rack or setting associated with Wooden Structure 2.

The date of these structures was established through the radiocarbon dating of various elements of Wooden Structures 1 and 2 (*p 298*). Most were comparable, although one from a woodchip associated with Wooden Structure 2 seems to indicate an intrusive item. This aside, the remaining dates indicate that both structures (and presumably also Wooden Structure 3) belonged to a single, short-lived, phase of activity, defined as '*Wooden structures*' in the chronological model (*Ch 1, pp 30-1; Appendix 20*). The modelled dates (Fig 112) indicate that it probably took place between *3820-3700 cal* BC (*Start*) and *3750-3650 cal* BC (*End*).

Given their dating, character, and arrangement in the channel, it is probable that these wooden structures were all elements of a single large structure, principally a fence stretching across the channel, just before it widened out into what was probably a ponded area. It is possible that the intention was simply to demarcate the space, and separate and emphasise the pond from the narrower channel to the south. Another possibility was that the fence acted as a fishing weir (*eg* Fischer 2007; Lozovski *et al* 2013a), designed to channel fish, or eels migrating downstream to the Solway Firth, into baskets (traps) positioned in gaps in the fence. However, this latter explanation does not explain why the wooden platform, along the eastern bank, seemed to have continued north of the wooden structures, along the eastern side of the pond (*p 240*). Neither does it explain the other wooden settings and deposited materials in the channel, often south of the pond (*p 264*).

In addition to these structures, driven stakes survived *in situ* within the channel, indicating other activity. None were dated, but, as they often only survived as short lengths of wood, it is probable that they had decayed *in situ*, when the *Earlier Neolithic organic deposit* was still forming, rather than being driven in from higher levels in the channel.

In Bay O (Fig 113), there were two isolated *in-situ* stakes, one (**76506**) of hawthorn-type, the other hazel (**76504**), that had been driven vertically into

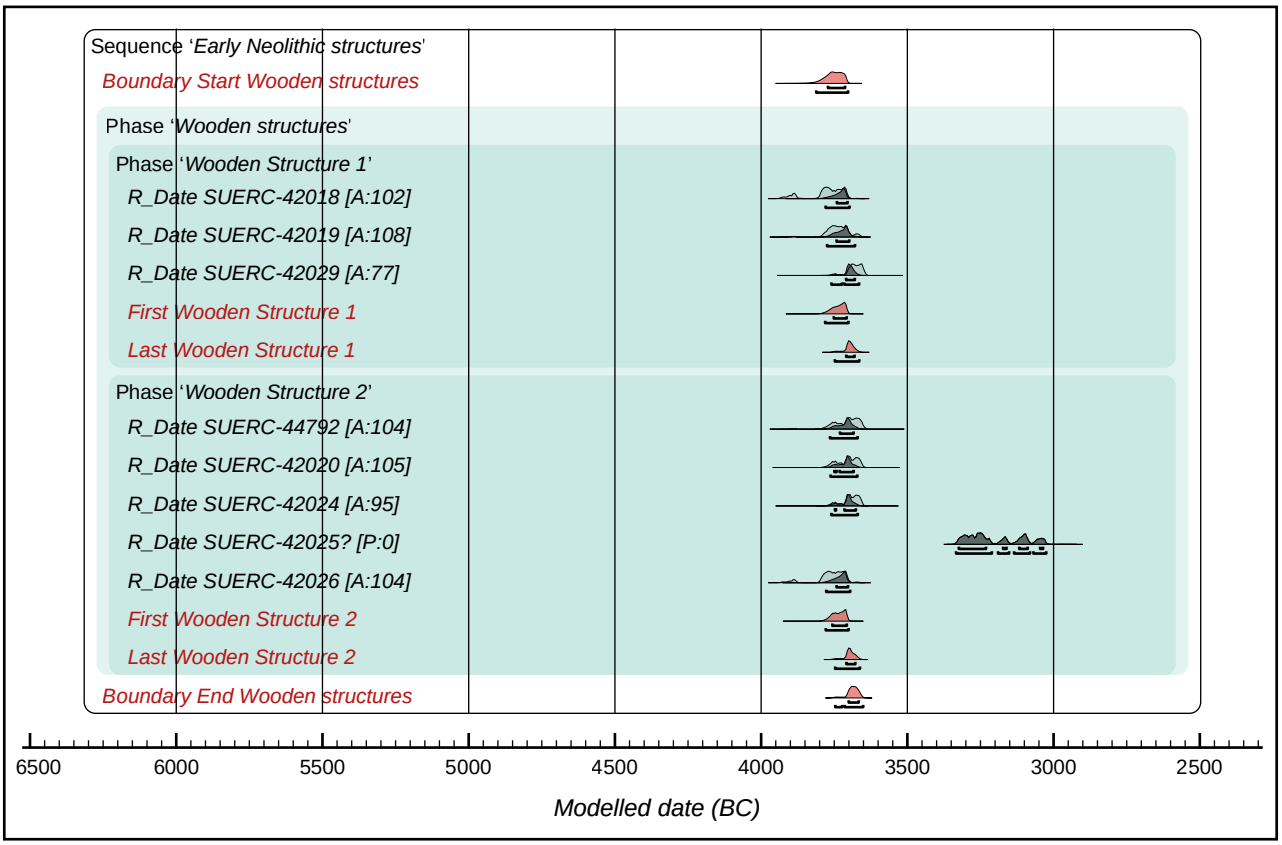


Figure 112: Radiocarbon dates and dendrochronological wiggle-matched dates for the wooden structures

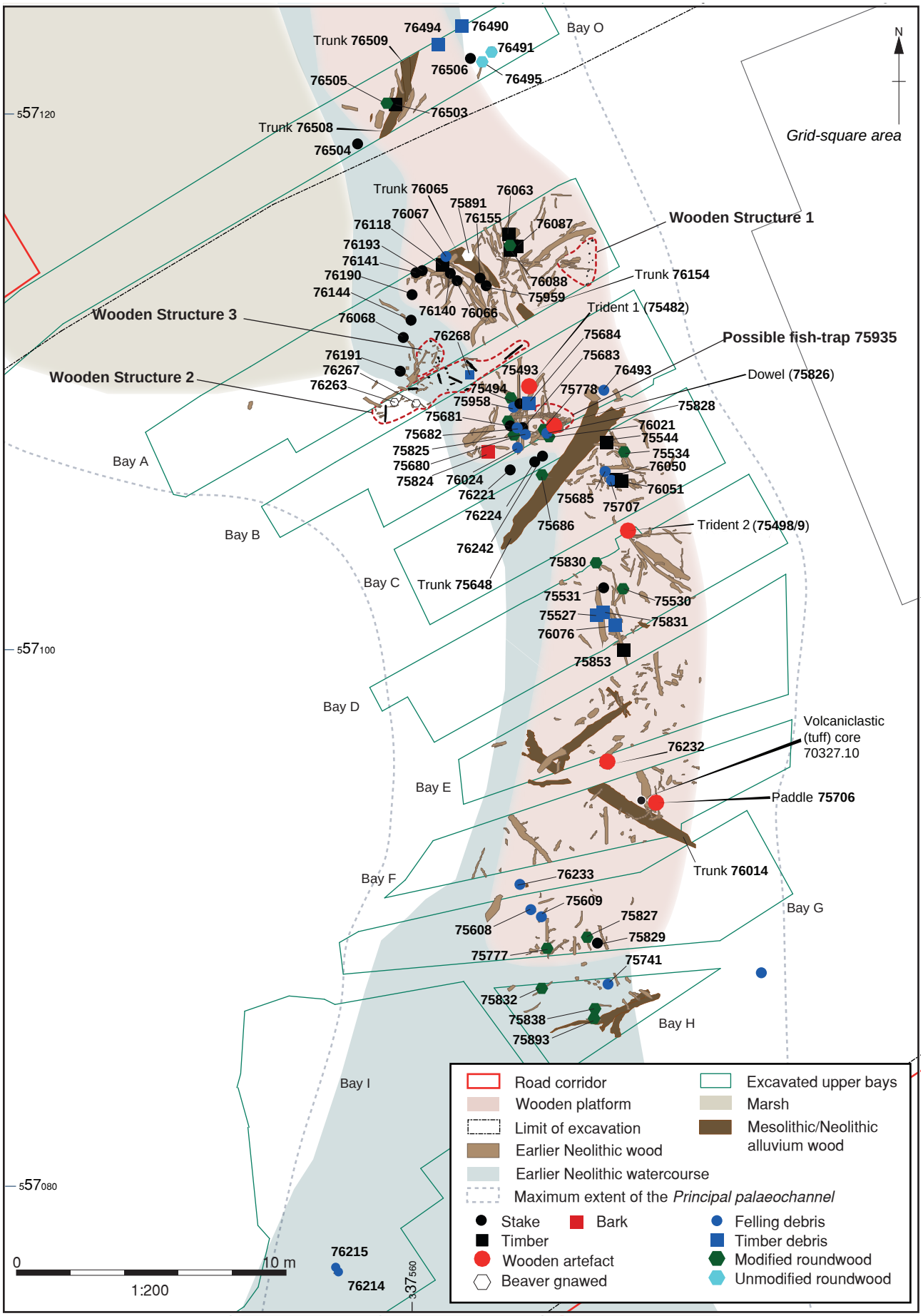


Figure 113: Wooden artefacts and non-structural worked wood in the Earlier Neolithic organic deposit

the channel. Further to the south, in Bay A, were two stakes, **76144** and **76190,** though not obviously associated with the other structures. It is not certain that they were paired, although they were only 1 m apart. Stake **76190** was vertically set, coppiced roundwood hazel, 35 mm in diameter, surviving to a length of 110 mm, and had been sharpened with a stone axe. Piece **76144** was very similar, although 44 mm in diameter and only 82 mm survived; it was at 40° from the horizontal, which may either reflect the angle at which it was driven or suggest that it had been displaced.

Some 3 m to the east were two more vertically set pieces (**76155** and **75959**), which may have been driven. They were only 0.35 m apart, **76155** being to the north and west of **75959**. The latter was unworked coppiced wood (not identified to species), measuring 40 mm in diameter and surviving to a length of 170 mm, while the other was an oak roundwood branch, 65 mm in diameter and surviving to 0.5 m in length.

There was also a group of three pieces (**76221**, **76224**, and **76242**) of *in-situ*, driven wood in the baulk between Bays B and C. These were set in a 1.4 m-long line, orientated broadly south-west/north-east, and appeared to be associated with each other, but were otherwise in apparent isolation. In the south-west, **76221** was alder/hazel coppice, that had been axe-sharpened (Pl 95) and measured 43 mm in diameter, surviving to a length of 0.84 m. It had apparently been driven in with some force, as the tip had been crumpled against a stone or hard substrate. Piece **76224** was similar, being coppiced hazel roundwood, 49 mm in diameter and 0.7 m long, also sharpened at the tip. The most robust was **76242**, comprising a straight elm branch, 118 mm in diameter and surviving to a length of 0.91 m. The tip had been sharpened to a 'pencil

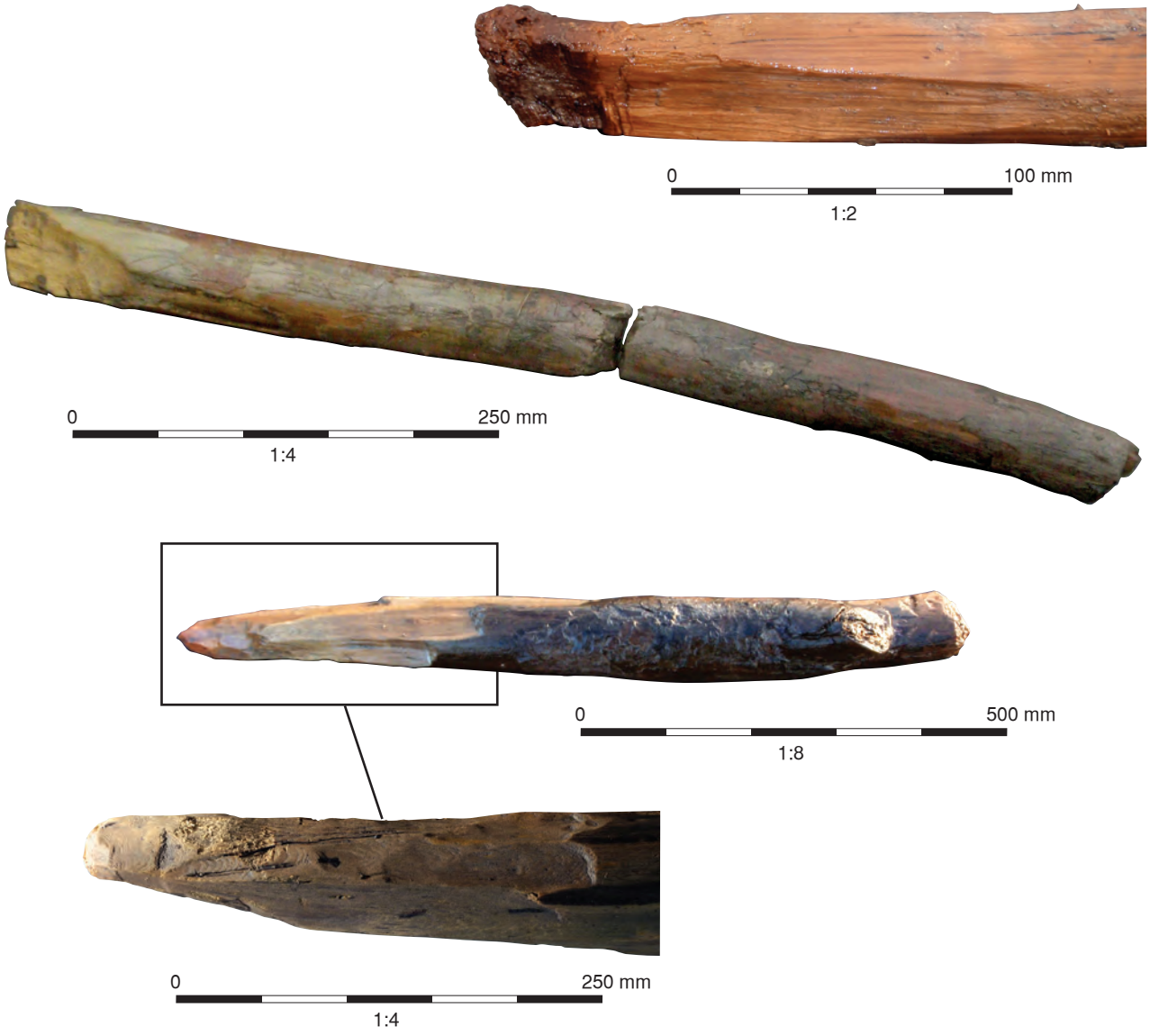


Plate 95: Sharpened stakes ***76221*** *(top),* ***76224****, and* ***76242***

point' by multiple axe-cut facets. One further *in-situ* trimmed and coppiced hazel roundwood stake (**75829**), in the south of the channel (Bay G), was recorded as being within the *Later Neolithic organic deposit*, but it might more properly belong with the other structures in the *Earlier Neolithic organic deposit*, particularly as it penetrated into this deposit.

Wooden artefacts, woodworking debris, and other non-structural worked wood

Aside from the wooden platform and stake-built structures, there were also 32 items of worked roundwood, which were non-structural. These were often in clusters that appeared to represent naturally displaced or deliberately dismantled stakes or withies derived from the known structures, or other former installations in the channel (*Appendix 13*). As these were fairly numerous, they perhaps indicate that the structural modification of the channel was once more extensive and complex and, possibly, that this was subject to manipulation and rearrangement. Within this assemblage were four pieces (**75681**, **75891**, **76263**, and **76267**) of coppiced wood, which seemed to have been beaver-gnawed, rather than axe-trimmed (Pl 96), all from within 6.5 m of each other, on the western side of Bays A and B. Whilst it is just possible that these pieces, which had been sharpened by the gnawing, may have been opportunistically selected for use as stakes by humans, they do suggest that beavers were still in fairly close proximity. As such, they also provide information on the nature of the nearby vegetation, much of which comprised alder or hazel coppice, supporting the other palaeoenvironmental evidence (*p 284*).

In addition to the non-structural roundwood, the *Earlier Neolithic organic deposit* was associated with a small collection of split wood (four of timber; 27 of debris/timber debris (large woodchips produced by stone axes); and one of worked bark), as well as five carved wooden artefacts (*Appendix 13*). The taphonomy of the timber and debris was, if anything, even less straightforward than that of the coppiced wood. There was no evidence, in the form of tree stumps, concentrations of woodchips, or other woodworking residues, for the *in-situ* felling and splitting of large trees within the palaeochannel, and, in any case, its immediate environment is unlikely to have supported the growth of mature trees. Whilst it is possible that this material may have washed in from the banks adjacent to the channel, the pattern of its distribution (Fig 113) does not suggest this and, also, it might be

*Plate 96: Beaver-gnawed pieces **75681** (top), **75891** (left), **76263** (bottom left), and **76267** (right)*

expected that smaller woodchips, cut branches, and stumps would have been washed in. This, coupled with the fact that none of the timbers seem to have been used in the structures (*p 239*), makes it possible that the debris and timbers (along with the wooden artefacts) had been deliberately selected and deposited by humans. This material also commonly clustered in ways that made no apparent sense in terms of the channel morphology or hydrodynamics. It is often the case that the non-structural worked wood was either incorporated into the rudimentary platform (*p 240*) or seems to have been associated with it, though it was otherwise associated with Wooden Structures 1-3, or the other *in-situ* embedded stakes.

Despite the conditions being favourable for preservation, the split wood was rare in the extreme southern part of the palaeochannel, with only two oak woodchips (**76214** and **76215**) present in Bay I. Indeed, no further examples of worked pieces were encountered until 13.5 m further to the north, within Bays H and G. There, in an area measuring 5 x 3 m, a discrete cluster of oak and alder felling debris (**75608**, **76233**, and **75741**) was identified, together with pieces of coppiced and charred roundwood (**75777**, **75827**, **75838**, and **75893**), and a single unburnt modified roundwood (**75832**). An additional piece of oak felling debris (**75609**) and an *in-situ* stake (**75829***; p 249*), although from a later channel deposit (*Appendix 13*), might also have formed other members within this cluster, as their coincidence seems suspicious. The large proportion of burnt pieces within this cluster is somewhat unusual for the wood in the channel, and, in addition to their close proximity and relative isolation, it may indicate that they were associated with each other. This may, in turn, suggest that they were either more or less *in situ* or that, if in a secondary context, they had not travelled far. It is not certain whether these represent the surviving residue of activities enacted in, or close by, this part of the channel, or whether they were a deliberately deposited selected subset. The lithic objects in the area (*p 256*) also suggest that it may have been a focus for activity.

Another occurrence of worked wood, some 5 m further to the north-east, consisted of two pieces (**75706** and **76232**) within 2 m of each other (respectively in Bay F and baulk E/F). The first was a carved-wooden artefact, thought to be a broken paddle (*Appendix 13*), which had been whittled down from a tangentially split oak log. This seemed to have been deliberately deposited, being propped up against the northern side of one of the large oak trunks (**76014**) of dendrochronological Cluster 2 (Pl 97; *Ch 6*, *p 195*), which has been dated to the late Mesolithic period (shortly after 4274 cal BC; *Appendix 20*). It is not thought likely that the paddle dated to this time, however, as it was certainly within the securely dated *Earlier Neolithic organic deposit*, and

Plate 97: Paddle ***75706****,* in situ *on trunk* ***76014*** *and opposite tuff core 70327.10*

was probably contemporary with a hazelnut that was closely associated with it, radiocarbon-dated to *3920-3660 cal* BC (*SUERC-32632*; *p 293*). The most likely explanation for this was that the oak had been exposed by channel erosion in the Neolithic period, and it is possible that, in its deposition, the paddle deliberately referenced it. This idea gains credence when it is also considered that the same trunk seemed to have been deliberately referenced by the placement of a very large worked tuff core (70327.10; *Appendix 2*), of a geology not native to the site, that had been propped up against its south side directly opposite the paddle. The paddle seems, therefore, to have been placed at the southern extent of the wooden platform, and close to its eastern edge.

It may be no coincidence that the other wooden artefact (**76232**; Pl 98) in the area was also a worked object. This had been tangentially split out of a larger oak timber, with a little additional shaping leaving it broadly triangular in section, though it was incomplete, as its ends had been broken, and its function is unknown. It also lay further into the channel than the paddle and, unlike it, had no obvious associations. It is assumed that it had been deposited or discarded, although, if it had been deposited, it is not possible to be sure that it had not been displaced subsequently.

A further group of worked wood (in Bay D), some 4 m to the north, comprised seven pieces (**75853**, **76076**, **75527**, **75831**, **75530**, **75531**, and **75830**) that seemed to have been incorporated into the fabric of the wooden platform. Oak timbers (**75853** and **75527**) and oak debris (**75831**; Pl 99; **76076**; Pl 100) occurred in a tight cluster, amongst other pieces of unworked wood, along the edge of what was probably the active stream, and had obviously been placed in association with each other. Slightly further to the north were two items of modified roundwood (**75530** and **75830**) and either a stake tip or tangential woodchip (**75531**).

More worked wood lay 3 m to the north (in Bay C), also amongst the mass of unworked wood that formed the platform. Four pieces of debris (**75707**, **76050**, and **76051**) were close together, in a manner suggestive of deliberate placement (Pl 101), the western two being

*Plate 98: Wooden artefact **76232***

*Plate 99: Oak debris **75831**, incorporated in the wooden platform, in Bay D*

Plate 100: Radially split oak timber ***76076****, once incorporated in the wooden platform, in Bay D*

*Plate 101: Tree-felling debris (****75707****,* ***76050****, and* ***76051****), apparently intentionally placed*

tangentially split pieces of oak, and another piece of timber debris (**75685**) was immediately to the north-west. Further towards the edge of the channel, 1 m to the north-east, was a relatively large (1.5 x 0.1 m) coppiced length of hawthorn-type roundwood (**75534**), that had been trimmed at one end with a stone axe. This lay directly on top of a carefully shaped, squared radial oak timber (**75544**; 0.8 x 0.12 m), possibly a plank (Pl 102), which bore faint grooves on its upper surface. These two pieces seemed to be part of a vague lattice, formed with other adjacent roundwood, and abutted a large trunk (**75648**) to their west. This was part of dendrochronological Cluster 2 (dating to 4212-4167 cal BC; *Ch 6, p 195*; *Appendix 20*) and presumably had been exposed by erosion, as it had originally been deposited at the same time as the *Mesolithic/Neolithic alluvium*. It is interesting to note that timber **75544** had 140 surviving rings, which, although they could not be dated by dendrochronology, did not match the Cluster 2

*Plate 102: Trimmed and coppiced roundwood **75534**, above plank **75544***

*Plate 103: Carved dowel **75826***

sequence, so it is almost certainly of a different date than the large trunk.

Items of worked wood also occurred within the platform to the north and west of trunk **75648** (within baulk B/C and Bay B). Those immediately adjacent included a possible modified elm roundwood (**75686**) and a piece of oak debris (**76493**), the former also adjacent to a line of three *in-situ* stakes (*p 247*), whilst some 2 m to the west, though in close association, were two carved artefacts (**75826** and **75482**). Object **75826** was a straight dowel (0.25 m in length and 23 mm in diameter), at one end circular in section, at the other, triangular, with faint toolmarks visible along its length (Pl 103). This was similar to the tapering end of the other object, a fork-like carved wooden trident (Trident 1 (**75482**)), which had been broken in antiquity, but its form can be reconstructed from a more complete, and later, example (Trident 2 (**75498/9**); *pp 271-3*). When complete, the trident

*Plate 104: Trident 1 (**75482**)* in situ

would have had three tines (of which only one survived; Pl 104), above which were two wings or steps projecting out from the sides of a long, tapering shaft; it had been very skilfully carved out of a single radially split plank of mature oak, using stone tools. In total, it measured 1.82 m, with the length from the step to the tip of the surviving prong being 0.56 m. It had evidently been carefully placed on top of the wooden platform, aligned approximately north/south, following its eastern edge (on the landward side of the channel), and was closely associated with several pieces of chert from the same serially smashed nodule (Knapping group 116; *p 268*). It has been radiocarbon dated by surviving sapwood to *3900-3660 cal BC* (*SUERC-26379*; *p 294*), and modelling of the dates suggests that it could have been contemporary with the wooden platform and stake-built structures (*p 240*). It should be noted that the trident was physically directly above possible fish-trap ***75935*** from the earlier episode of Early Neolithic activity (*p 236*). The function of this object is not entirely clear, various uses being possible, though it could have been associated with fishing, for instance an eel spear, or was perhaps designed to secure a fishing net or boat (*Appendix 13*).

To the south-west of the trident, and north of the stake line (*p 241*), were 14 pieces of worked wood, amongst the dense mat of unworked wood forming the platform, one of the densest concentrations in the channel. The most likely explanation is that these pieces were deliberately incorporated into the platform, although they were varied, and included coppiced roundwood (**75493**, **75778**, **76021**, and **75680**) from blackthorn and alder; displaced alder and hazel stakes (**75494**, **75683,** and **75681**; *p 249*); together with felling debris (woodchips **75958**, **75682**, **76024**, **75825**, and **75828**) derived from alder, elm, and oak trees; as well as two hazel slabs (**75684** and **75824**; Pl 105). Significantly, one of the short-lived modified roundwood items (**75778**; a piece of alder with axe chopmarks on its shaft) was radiocarbon dated to *3790-3660 cal* BC (*SUERC-42028*; *p 294*), suggesting that it was contemporary with nearby Trident 1 (*above*), whilst woodchip **75825** had been apparently placed in association with a split tuff-cobble core in a manner that suggested these materials had been deposited together.

Several pieces of worked wood were recorded in the same area as Wooden Structures 2 and 3 (*pp 244-5*), some 2.5 m to the north-west, which did not seem to be integral to them. These included two of the beaver-gnawed, coppiced roundwood (**76263** and **76267**; *p 249*), a piece of oak timber debris (**76268**), and two displaced trimmed and coppiced hazel roundwood stakes (**76191** and **76068**), which had probably once been part of either Structure 2 or 3 and had been washed downstream a further 2 m from them.

Another cluster of worked wood lay 2 m to the north-east (in Bay A), where *in-situ* stakes **76144** and **76190**

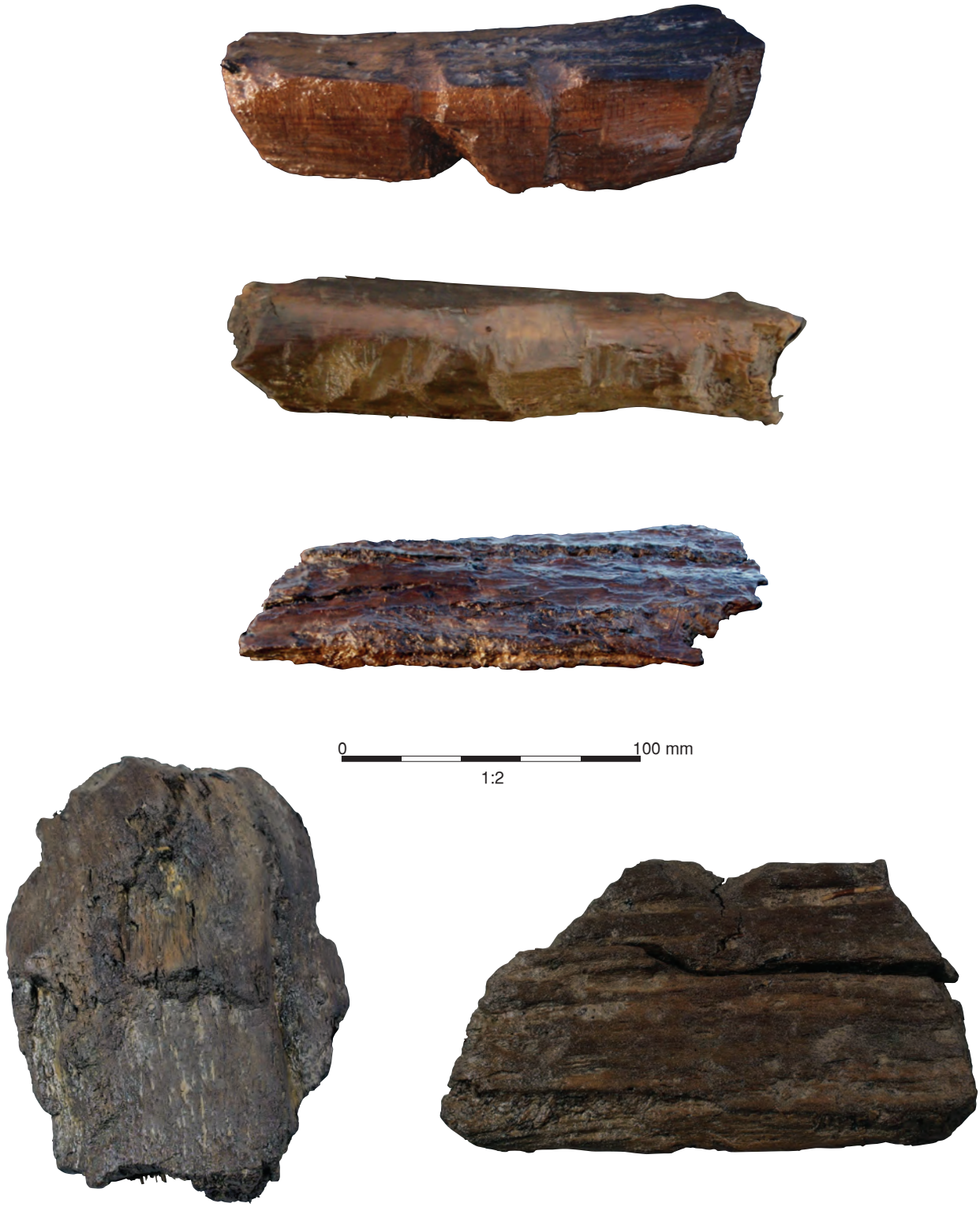


Plate 105: Worked wood in the platform in Bay B: partially charred, radially split woodchip ***75958*** *(top); coppiced alder roundwood* ***75778****, with axe chop marks on its shaft; slabs of hazel bark* ***75824****; and tangentially split woodchips* ***75825*** *and* ***75828***

were also found (*p 248*). Many of these pieces, alongside much unworked wood, formed part of the wooden platform, overlying two oak trunks (**76065** and **76154;** Pl 106) from dendrochronological Cluster 2, their deaths dating to the winter of 4144 cal BC and shortly after 4217 cal BC respectively (*Ch 6, p 195*). These were therefore contemporary with the *Mesolithic/Neolithic alluvium*, but had been exposed by erosion, prior to the accumulation of the *Earlier Neolithic organic deposit*.

The Bay A cluster contained the now familiar range of items encountered in the other clusters, such as

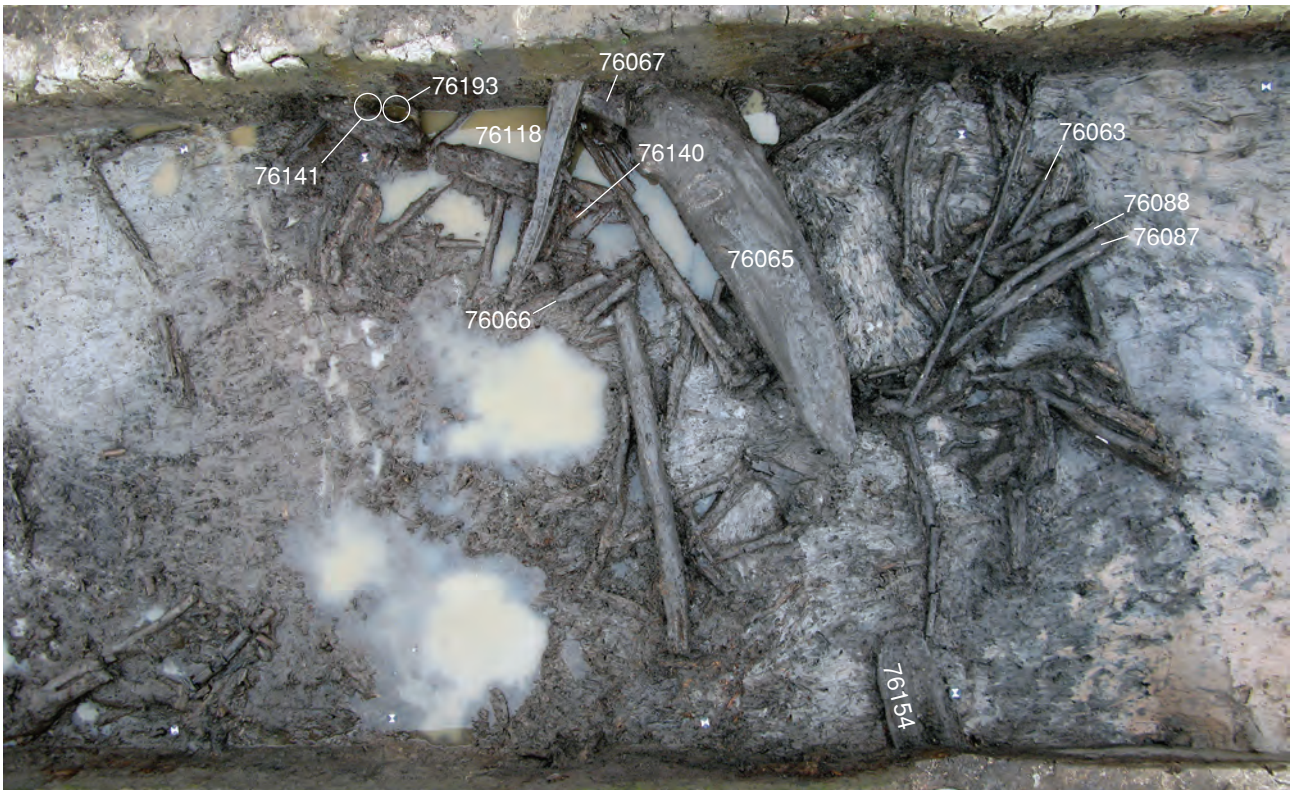


*Plate 106: Worked wood in Bay A associated with Mesolithic oak-trunks **76065** and **76154***

displaced stakes (**76141**, **76140**, **76193**, and **76066**), most of which were hazel, though one possible charred oak stake (**76193**) was present, and other items of modified roundwood. These latter items included one of the beaver-gnawed pieces of hazel roundwood (**75891**) and, 2 m west of Wooden Structure 1 (*p 241*), three relatively long, straight pieces of timber (**76063**, **76087**, and **76088**) in close proximity to each other, surrounded by other, similarly long and straight, pieces of unworked wood. These could once have formed elements of stake-built structures, that had seemingly been dismantled, with their structural elements being repositioned. Other items in this cluster included a piece of elm felling-debris (**76067**) and also a large oak plank (**76118**; Pl 107). Based on the ring dimensions, this latter timber had grown very slowly, with 159 rings surviving, which have been matched to dendrochronological Cluster 3 (*Appendix 20*).

Several pieces of worked wood were spread over 6 m of Bay O, to the north, being interspersed with pieces of unworked wood, and it seems likely that the platform continued in this direction. At the base were oak trunks **76508** and **76509**, both part of dendrochronological Cluster 2 (*Appendix 20*). These respectively dated to shortly after 4226 cal BC and 4282-37 cal BC (*Ch 6, p 195*), and both again seem to have been exposed by erosion sometime before the platform was constructed. This was very well-demonstrated by the direct superimposition of a radially split oak plank (**76503**; Pl 108), on top of trunk **76509**. The plank had 184 surviving rings, and has been radiocarbon dated by wiggle matching (Cluster 3; *Appendix 20*) to *3740-3690 cal* BC, which is thus *c* 500 years younger than trunks **76508** and **76509**. This date also indicates that this plank, and also the oak plank from Bay A (**76118**; *above*), similarly matched to dendrochronological Cluster 3, are potentially broadly contemporary with Wooden Structures 1-3, worked alder **75778** (*pp 254-5*), and Trident 1 (**75482**; *pp 253-4*). Immediately to the west of plank **76503** was a displaced willow/poplar stake (**76505**), whilst two other displaced or repositioned hazel stakes (**76495** and **76491**) were present in the area of an *in-situ* stake (*p 247*), which was also associated with oak and alder woodchips (**76494** and **76490**).

Lithics

Quantities of worked and unworked stone were also recovered, in addition to the wood retrieved from the *Earlier Neolithic organic deposit*. This was similarly mostly deposited within the *Principal palaeochannel*, often in the same zones in which the wood clustered, and it is likely that the wood and stone were associated. The material included a large collection of coarse-stone items, comprising unworked and worked objects, several fine polished-stone axeheads, and a small collection of flaked lithics. Significantly, it seems that the unworked coarse stones had been deliberately deposited in the channel, and a component of the worked stone may have entered in a similar manner. Other worked stones seem, more probably, to reflect activity along the banks of the channel, and may have

*Plate 107: Plank **76118**; tangentially split elm debris **76067**; tangentially split, heavily charred debris **76087**; and **76063** and **76088**, roundwood coppiced hazel with trimmed ends*

*Plate 108: Plank **76503***

been, more or less, *in situ*, or had eroded only a short distance into the channel from its banks. This was also probably true of a proportion of the unworked stone, although identifying these from the background quantities of deposited stone is not possible.

Although the majority of the coarse-stone objects had originally been deposited into the *Earlier Neolithic organic deposit*, several were also recorded from the Mesolithic deposits (*Chs 3-4*), with larger numbers deriving from the *Earlier Neolithic alluvium* and the *Later Neolithic organic deposit*. However, sometimes the original attribution of material to a particular deposit is questionable, and this is particularly true at the edges of the channel, where the stratigraphic sequence was compressed and somewhat vague. For example, it is probable that the material distributed along the banks (particularly the eastern bank), and originally recorded as being within the *Mesolithic alluvium* (*Ch 6, p 196*), was actually intrusive in this deposit, either being compressed or trampled into it. Similarly, the material within the *Mesolithic/Neolithic alluvium* (*Ch 6, p 196*) may have sunk or been compressed into this deposit, and material from later channel deposits may have been residual, periodically eroding from higher up the banks or out of earlier deposits.

When broken down into individual stratigraphical units, the coarse stones show little clear spatial patterning, but when looked at in combination, rather clearer and, at times, striking patterns emerge. This suggests that, despite some displacement from primary contexts and, possibly, misattribution or vertical movement, they largely lay within the same zones in which they were used or deposited in the Neolithic period. As a consequence of this rather complicated taphonomy, some stones not actually collected from the *Earlier Neolithic organic deposit* have been included in the '*Early Neolithic I*' phase.

The same also appears true of the flaked lithics, which probably date to the Early Neolithic period. These were predominantly finds from the *Early Neolithic organic deposit* and *Earlier Neolithic alluvium*, though it is considered, given the complexity of the taphonomic processes that operated in the channel (*p 262*), and the uncertainty about the original stratigraphic provenance of the material, that most of these probably relate to the '*Early Neolithic I*' phase of activity. This is further strengthened by spatial analysis, which indicates that many of the flaked lithics clustered together and, where they occurred, they were very often in close spatial association with other Neolithic artefacts or wooden structures, associated with the '*Early Neolithic I*' phase. A few comparable flaked lithics were also recovered from the *Mesolithic/Neolithic alluvium* (*Ch 6, p 196*), which, again, based upon their spatial affinity with the material in the later deposits, suggest that these also relate to '*Early Neolithic I*' activity. Additionally, 42 pieces recorded within the *Later Neolithic organic deposit* have been considered alongside the Early Neolithic material, for although some material does appear to be native to this deposit (*Ch 10, p 338*), much of it may actually have been residual and relates to the Early Neolithic activity. Finally, one flaked-lithic item was recovered from the *Chalcolithic alluvium* (*Ch 11, p 367*), which again was probably residual, dating to the Early Neolithic period.

Unworked coarse stones

The majority of the coarse stone comprises unworked cobbles of volcaniclastic stone (*Appendices 2* and *6*), which, in terms of its macroscopic identification (and *in lieu* of impracticable comprehensive geochemical analysis), was mostly consistent with stone that has otherwise been categorised and referred to as 'tuff' (*eg Appendix 3*). The stones were distinctively blue, grey, or green in colour and were first encountered within peaty deposits (Pl 109; subsequently identified as being the *Earlier Neolithic organic deposit*, the *Earlier Neolithic alluvium*, and the *Later Neolithic organic deposit*), when the palaeochannel was evaluated (*Ch 1, p 19*). It was recognised that they were out of place within such a low-energy environment, so they were systematically

Plate 109: Worked and unworked volcaniclastic stones lying amongst the wood in the low-energy Earlier Neolithic organic deposit, *including 70327.10 propped on trunk* ***76014***

collected and recorded in three dimensions (Fig 114) when the channel was fully excavated. In total, *c* 1300 pieces of such 'foreign' stones were retrieved from the palaeochannel deposits and, although the distribution may have been more extensive, they seemed to have been dwindling towards the north, occurring in fewer numbers within Bay A and almost disappearing from Bay O.

The sheer mass and frequency of the occurrence of this material is highly unusual, as it was not found in such large quantities in any other parts of the site, and was not present within the geological substrate (*Basal sands and gravels*): not a single instance of it was recovered from the exposures of this (despite a conscious search). Its distribution, with stones predominantly occurring in the middle part of the channel sequence rather than

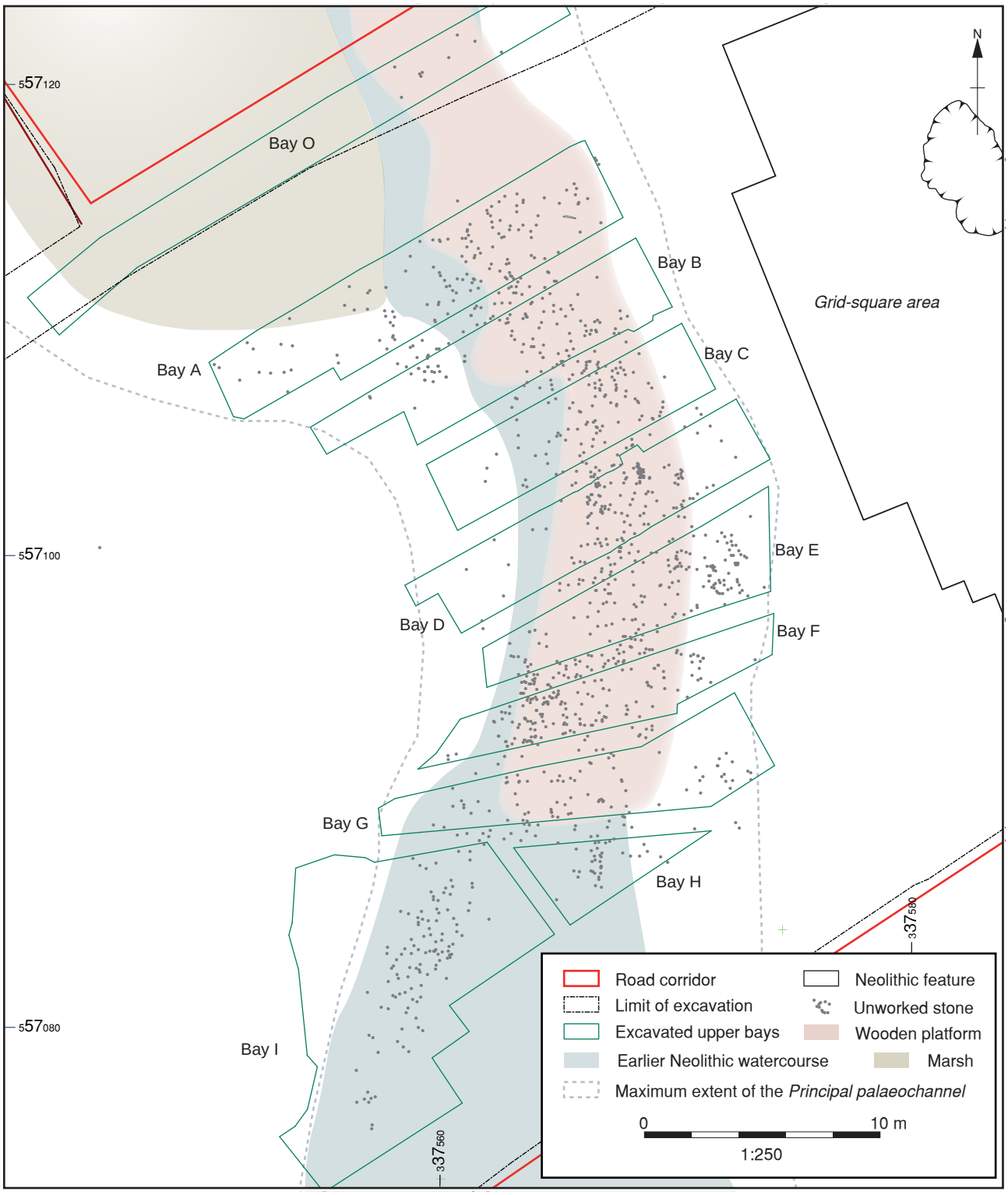


Figure 114: Unworked coarse stone in the Principal palaeochannel, *associated with* 'Early Neolithic I' *activity*

at its base, further supports this. Moreover, the flow regime in the later phases of the palaeochannel lacked sufficient energy to transport such massive stones, so it must be concluded that these were brought to Stainton West by humans.

Whilst tuff was certainly brought onto the site in earlier times (being used in tool manufacture within the *Grid-square area* (*Ch 4, p 122*) and, possibly, occasionally ending up in the channel), the tradition of depositing/discarding quantities of unworked tuff into the channel started in the earlier Neolithic period, and probably continued into the later Neolithic. It is not certain why this material was deposited in the channel, as it was too thinly distributed ever to have been a pavement-type deposit, so it does not appear to have been structural. Instead, it seems more likely that it was individual stones that were tossed into the waters. Much of the material would have been suitable for working, and, as it had not been tested, its potential had not been proven. In the absence of other plausible explanations, its deposition therefore appears to have been votive, even sacrificial.

Worked coarse stones

Analysis (*Appendix 2*) has demonstrated that a proportion (*c* 10%, 123 pieces) of the coarse-stone assemblage from the palaeochannel had been worked. Of this component (which was the only element subject to detailed study), around 85% fell within the range of volcaniclastic (generally tuff) and related rocks which outcrop in the central Lake District (amongst these were several sub-types of tuff identified during a raw-material study (*Appendix 6*), including spotted, epidosite, rhyolite, andesite, and dacite tuff). Only one metamorphic rock was recognised, the remainder almost entirely comprising sedimentary rocks, from sandstone to mudstone, many of which could have derived from the local micaceous silty mudstone bedrock. Coarse- and medium-grained igneous rocks, metamorphic rocks, and limestone were conspicuously rare, although these have been reported widely from the glacial-till deposits elsewhere in and around the Solway Firth (*Appendix 2*). In terms of its potential for use in tool manufacture, the tuff was of a good quality and often could have been used to produce the range of flaked tools recovered from the site (*Appendix 2*). Indeed, some stones were of sufficient size and quality that they could have been used for the manufacture of polished-stone axes. However, despite these inherent properties, and the fact that the material was valuable enough to warrant bringing to the site, the nature of the working was notably crude and wasteful.

Cores/core tools were the main type of worked coarse stones from the *Principal palaeochannel*, which were probably for use in heavy-duty tasks, such as working wood and butchery (*Appendix 2*). There was also a range of flakes, flaked stones, and cobble tools (*below*). The core tools had been simply and quickly made, with a large flake being struck from one end of an ovoid cobble to create an angled face, then smaller flakes detached from the upper end of this face, using the inner platform to create an angled cross-section (Pl 110). A range of shapes had been selected for the core tools, from rounder, ovoid cobbles to flat, and there was a wide size range, with most clustering around 90-160 mm in length and 60-120 mm in width.

The cores seem mainly to have been unfinished core tools, with only one or more removals. On some cores,

Plate 110: Worked coarse stones from the Principal palaeochannel*: wedge-shaped tools*

there were traces of pecking along a cobble's edge, which might indicate failed attempts to detach more flakes from a face, perhaps failing because of the intractable nature of the rock. The intention, of course, may have been simply to obtain a flake, although this seems a wasteful strategy. The angled edges of the core tools and damage on the opposing end may suggest their use as heavy-duty wedges, which had been hammered into place (*Appendix* 2).

The large flakes (classified as regular and irregular types) had been detached from cobbles of material similar to the cores and core tools, but despite efforts at refitting, none of the flakes matched any of the cores, which suggests that working happened elsewhere, prior to their discard and deposition in the channel. This was supported by the fact that coarse-stone knapping debitage, another indicator of *in-situ* working, was not recovered in any significant quantities from the channel. The flakes comprised primary, secondary, and inner-reduction technology, but most of them were 'opening-type' flakes; these latter largely had cortex. Two of the flakes did resemble thinning flakes, but these were anomalous, and there was no convincing evidence for a flaking industry to produce finely shaped blocks of stone to serve as axe blanks. Several flakes had been edge-retouched and many exhibited use-wear, in the form of edge damage. These flakes were possibly also used as wedges or as crude knives (Pl 111), perhaps for butchery, as has been suggested for the Skaill knives common to Grooved-Ware sites in Orkney (Clarke 2006), and the Late Neolithic flake (and core) tools from the Ness of Brodgar, also in Orkney (Clarke 2021).

The large and interesting range of cobble tools (unmodified cobbles worn into shape by their use) is unusual for a mainland British site. These include faceted cobbles, hammerstones (facially pecked and plain types), and pounders/grinders. The faceted cobbles were an undistinguished tool type, with small facets pecked and/or ground on parts of their surface. The pounder/grinders (Pl 112) were larger, with more extensive pecked and ground facets, and a face that had been worn flat and smooth. Two larger pounder/grinders appeared to have been reused as hammerstones, whilst another had been reused as a core.

The facially pecked hammerstones formed the most interesting group; with a few exceptions, elongated cobbles were selected for a use which left small amounts of pecking on a face towards one or both ends of the tool. They could have been used as knapping hammerstones, but do not seem to have been put to sustained and intensive use, and, given the lack of breakages, it seems more likely that they were used to shape flaked lithics rather than coarse stone. The plain hammerstones were a disparate group in terms of size and wear pattern; they tended to have pecking and or flaking damage in no particular pattern, suggesting that they were used in various different

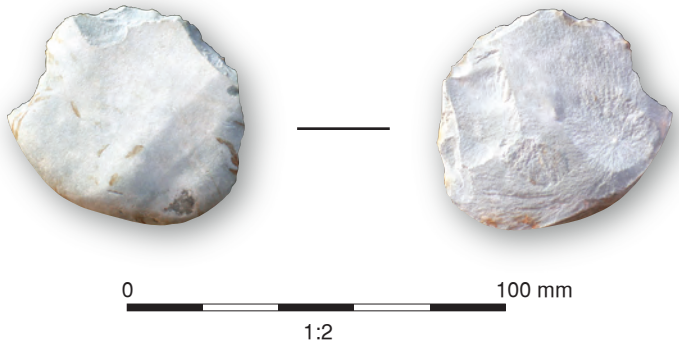


Plate 111: Worked coarse stone from the Principal palaeochannel*: flake knife 70259.2*

Plate 112: Worked coarse stones from the Principal palaeochannel*: pounder/grinder 70090.60*

Plate 113: Worked coarse stones from the Principal palaeochannel*: anvils 70094.10 and 70134.10*

ways, and some show damage indicative of heavy use. One very heavily worked cobble tool has been classed as a multi-hollowed cobble, similar to items recognised in Grooved-Ware assemblages in Orkney (Clarke 2005; 2006). On either end of this oval cobble were broad, rounded, roughly pecked facets and, on either face, there were central areas of pecking which formed deep circular depressions. There were also coarsely pecked areas on both sides of the cobble, forming indentations.

The anvils were identified purely on the basis of the presence of pecking traces, whether localised or spread on one, or more, of the flat surfaces of a cobble, and included several different forms (Pl 113). Those from the palaeochannel were generally larger and more heavily worn than those found elsewhere on the site (*Appendix 2*). It is possible to imagine a wide variety of tasks for which they might have been used, and, individually, they could have been put to many different types of work, although presumably, close proximity to water, or the palaeochannel in particular, was desirable.

The ground stones were hand-held grinders or polishers made on cobbles, and grinding slabs formed from split cobbles. These could potentially have been put towards a variety of uses, of which axe finishing was one. In this context, it is also significant that there were three *polissoir* fragments from the palaeochannel, each made from a slab of heat-damaged quartzitic sandstone (*Appendix 2*). It is possible that these all derived from a single object, as they seemingly share the same fracture along a bedding plane, although the edges are too damaged to support refitting. Such an object would have functioned as a large grinding slab and was probably similar to another Cumbrian example, from Ehenside Tarn (Darbishire 1874; Pl 114). Typologically, such objects sit most comfortably in the earlier Neolithic period and it is therefore quite possible that the *polissoir* from Stainton West was used at the site then. However, the date, provenance, and taphonomy of the fragments suggest that, if this was the case, this object may have been curated for an extended period of time, before being burnt, smashed, and deposited during the later Neolithic period (*Ch 10, pp 339-41*).

The spatial distribution of the coarse-stone tools (*Appendix 9*) shows a few notable trends (Fig 115). The flakes/flake tools, interpreted as potentially being cutting implements (possibly for butchery, bone-splitting, or dismemberment), were generally from the central, active part of the channel, adjacent to the platform, whilst the heavier-duty cores and core tools, potentially for woodworking (or heavy-duty butchery and dismemberment), had a wider distribution across the channel, also extending south of the platform. It is unlikely, however, that major amounts of woodworking took place within the channel, given the lack of small woodchips and the nature and patterning of the larger woodworking debris (*pp 249-56*), so, if the cores and core tools were primarily associated with this activity, this probably took place elsewhere, and their distribution reflects their discard/deposition into the channel. Importantly, the lack of refits and debitage (*pp 268-9*) suggests that both the flakes/flake tools and cores/core tools had not been manufactured within the *Principal palaeochannel*, but were then either used and discarded, or intentionally placed, into it. The coarse-stone tools (ground stones and anvils), probably associated with grinding/polishing/

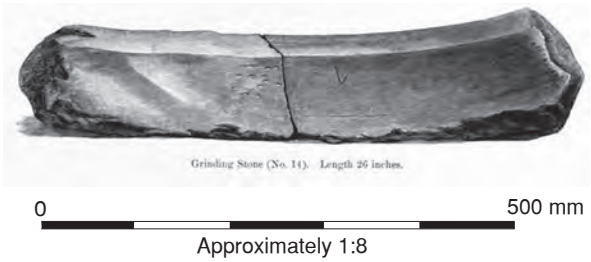


Plate 114: The complete polissoir *from Ehenside Tarn, now in the Manchester Museum collection (Darbishire 1874)*

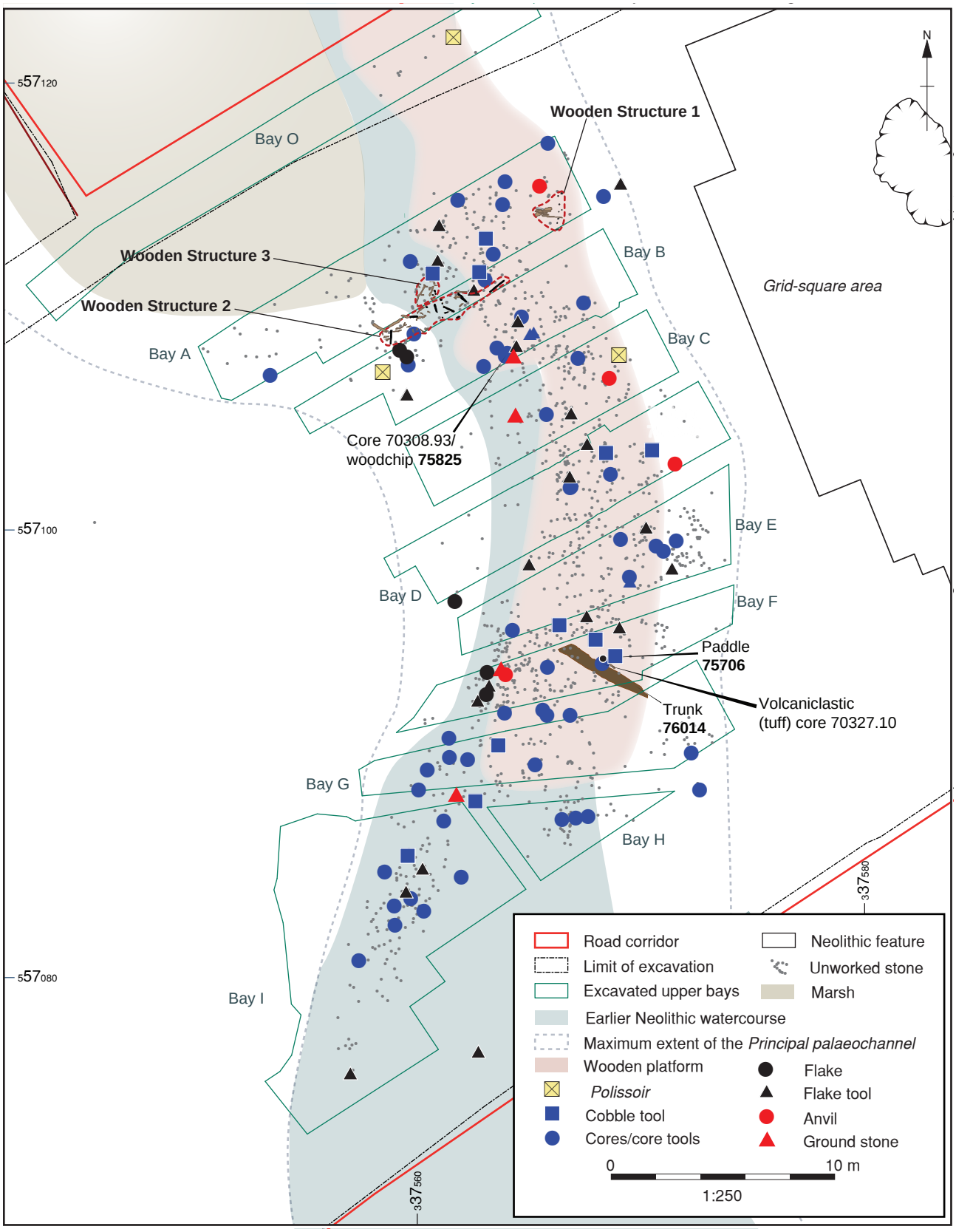


Figure 115: The distribution of worked coarse-stone artefacts in the Principal palaeochannel, *possibly associated with* 'Early Neolithic I' *activity*

smoothing, tended to be distributed along the edges of the channel and may have been largely *in situ* where they were used.

There were also some variations in the distribution of coarse-stone tools along the channel that probably related to different activity foci and emphases of

use. Around the fringes of the northern ponded area (*p 246*), there was a dispersed scatter of coarse stones, including cores and core tools, and flakes and flake tools. The three *polissoir* fragments were also apparently distributed around this ponded area, though these were probably deposited during the later Neolithic period (*Ch 10, pp 339-41*). Further to the south, the central part of the channel had similar proportions of coarse stone, apart from having far fewer core tools and more anvils and ground stones, the latter particularly concentrating just south of the pond. Similarly, more anvils and ground stones clustered in the southern part of the central channel. There, these formed part of a diverse assemblage, which also included flakes

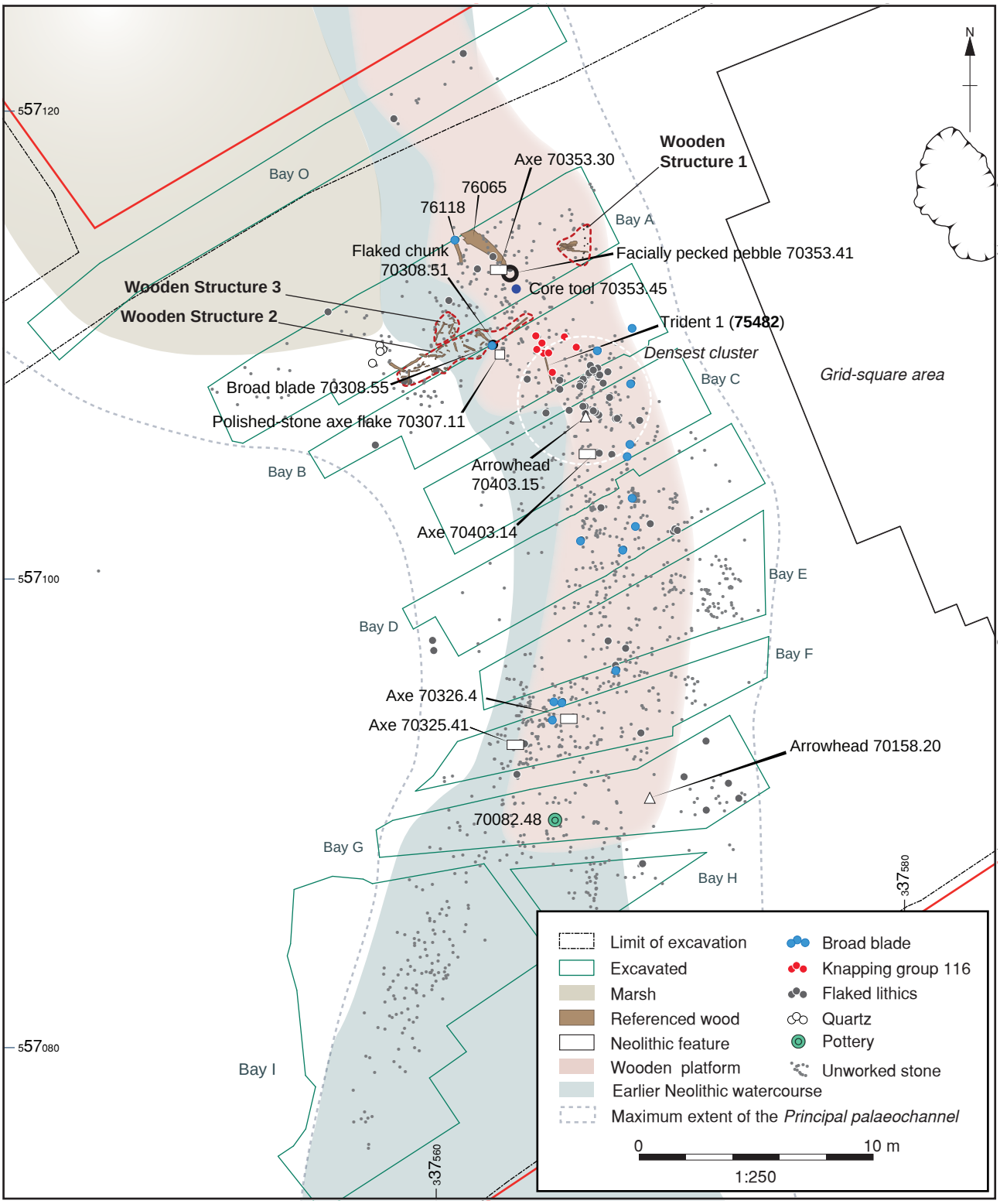


Figure 116: The distribution of polished-stone axeheads, flaked lithics, arrowheads, and pottery in the Principal palaeochannel, *possibly associated with* 'Early Neolithic I' *activity*

and flake tools, cores and core tools, and a range of cobble tools, including faceted examples. In the latter category, a pounder and a flaked cobble occurred on the eastern edge of this cluster, both probably associated with paddle **75706** (*p 250*). The cores and core tools increased in frequency in the southern part of the channel, and the regular flakes became much rarer.

This apparently significant patterning possibly related to the use of the tools, place of use, and deposition. For instance, at the point where the narrower, central part of the channel flared out, to both the north and south, there were diverse clusters of artefact types, potentially representing the widest range of activities (pecking, grinding, chopping, and fine cutting), this being slightly more obvious in the south. Both the northern ponded area and the channel in the south contained quantities of cores and core tools, and it is tempting to interpret them as deposited residues of woodworking activity undertaken elsewhere. Mainly only in the northern two-thirds of the channel, where the wooden platform occurred (*p 240*), there was a distribution of regular flakes along the central stream line, which might hint at butchery or dismemberment occurring in this part of the channel, if these were used as crude knives (*p 261*). Occasionally, the coarse-stone tools also had a very clear association with wooden objects, some care having been taken to emphasise this in their placement, for example, core 70327.10, propped on trunk **76014**, opposing paddle **75706** (*p 250*; Pl 109), and core 70308.93, placed with woodchip **75825** (*p 254*). The distribution pattern of the coarse-stone tools, and by inference the unworked stone, therefore seems to have been meaningful, probably deriving from several complex processes, but it ultimately shows that, in use and deposition, the organisation of space within the channel was graded and differentiated.

Polished-stone axeheads

Although roughouts and shaping-flakes were not present, two axeheads (70353.30 and 70325.41) were discovered within the *Earlier Neolithic organic deposit* (Fig 116). These were both made of central Lake District tuff, and they had been removed from their hafts and, otherwise, had the appearance of being deliberately deposited in the channel as part of the '*Early Neolithic I*' phase of activity.

Axehead 70353.30 was a near-pristine, complete example (Pl 115). It was 188 mm long, 63 mm wide, and 34 mm thick, conforming to a type known as a 'Cumbrian Club' (Fell 1964), having almost parallel sides near to the cutting edge and a pronounced waisting towards the butt. It was finished to a high standard, being ground and polished to remove all traces of the flaking used to rough out the blade. Various facets are perhaps indicative of such grinding along its long axis, a pattern seen on other Cumbrian Clubs (*ibid*). The cutting edge had been ground to a very fine and shallow, slightly asymmetrical, curve, possibly to mend damage sustained during use, a damage pattern consistent with the axe being used in downward strokes, as might be the case with lopping or carpentry. There was also a small chip on the edge of the blade that truncates the polish and must have occurred after the mend, but prior to its deposition.

The axehead was made from a light olive-grey epidotised tuff, with typical Group VI characteristics, the most likely source being within the geographical area bounded by Pike o'Stickle, Harrison Stickle, and Thunacar Knott, with a preference westwards (*Appendix 6*). In terms of its petrology, it was a very close match for two axes from Ehenside Tarn (Darbishire 1874), which might suggest that they originated from a similar source. It is also similar to the coarser bands within Axe 2 of the Belmont Hoard of three Cumbrian Clubs (Davis and Edmonds 2011, 179), but the match is not sufficiently

Plate 115: Axehead 70353.30

good to indicate that it was manufactured from the same outcrop(s) as any of the three Belmont axes, though it probably came from the same area (adjacent to Site 123; OA North 2004).

Axehead 70325.41 (Pl 116) measured 65 mm long, 48 mm wide, and was 24 mm thick, although the blade was broken, so the original length is unknown. The piece is effectively symmetrical, although there is a slightly more pronounced curve down and away from the cutting edge on one principal face. It was made from a medium-grained rock that was not conducive to really fine flaking, but the raw material does possess the property of conchoidal fracture (evidenced on both principal faces and on the cutting edge, where two small scars are consistent with the kinds of damage that blades often sustained during use). Flake scars can also be seen emanating from either lateral edge, some of them with partially smoothed edges consistent with their having been struck prior to the grinding of the blade surface, suggesting that it had been roughed out, by flaking, before being ground down to its final form.

Significant facets on both lateral edges of the blade indicate that it had evidently been modified, by both flaking and grinding, on at least one, and probably more, occasions during its use-life. The opposite end to the cutting edge was formed by an abrupt 'end-shock' fracture, typical of the kinds of snapping that often happened to blades during use (*Appendix 2*). The 'platform' caused by this transverse break has been struck on at least two occasions, which may have been done for many reasons, but could suggest the removal of flakes for rehafting after the original blade had snapped. It was made from a dark greenish-yellow medium-grained volcaniclastic rock, which does not match the published description for Group VI, but is consistent with the western area of axe-making sites, to the West of Stake Pass and around Scafell (*Appendix 4*).

Plate 116: Axehead 70325.41

Both of the axeheads were probably deliberately deposited in the channel and, spatially, 70353.30, from Bay A (Fig 116), had seemingly been placed there, being edge downwards, lying at the same level (at the top of the wood comprising the wooden platform) and just to the south of the pointed end of a large Mesolithic oak trunk (**76065**; *p 255*). Immediately adjacent to, and possibly associated with, the axehead was an oval facially pecked pebble (70353.41); a core tool (70353.45) lay less than 0.5 m further to the east, and various worked and unworked coarse stones, and several flaked lithics (*below*), were also recovered from this general area. It is possibly of significance that this axehead was found within the ponded area of the channel, enclosed by Wooden Structures 1-3 (*p 240*).

The other axehead (70325.41) was found at the western edge of Bay F and, although it was not obviously associated with anything else, a fairly tight cluster of worked coarse stones was just to the west and north. These were all at more or less the same level, but were recorded as being within a variety of deposits, when, actually, the likelihood is that they represent a contemporaneous associated group of objects (the stratigraphy there was rather vague and compressed, and the objects may either have eroded from higher up the bank at different times, or been subject to a small amount of post-depositional movement).

More generally, this part of the channel was also where the unworked cobbles of tuff tended to cluster in slightly higher densities than elsewhere, throughout the deposits in the middle part of the channel sequence. It is therefore possible that the coarse stones indicate an activity area in, or adjacent to, this part of the channel, or that this locale acted as a focus for deposition (in the Early Neolithic period). The axe may then have been contemporary with this, being placed in this part of the channel because it was a focus for activity or deposition. It is also possible that another axehead (70326.4) was associated with the '*Early Neolithic I*' phase of activity, given its close spatial association with axehead 70325.41, and the cluster of coarse stones. However, this came from within the *Later Neolithic organic deposit*, and it is equally possible that the practice of depositing axes into the palaeochannel continued during this later period (*Ch 10, p 359*).

Flaked lithics

In comparison to the worked and unworked coarse stone, a fairly small assemblage of 146 flaked-lithic pieces, possibly associated with '*Early Neolithic I*' activity (*p 258*), was recovered from the *Principal palaeochannel* (*p 256*; Table 22). This flaked-stone assemblage has technological affinities with Late Mesolithic stone-working traditions (*Appendix 10*), with the exception that microliths (apart from two examples) were conspicuously absent. This absence might be explained

Type	Brown flint	Grey flint	Pebble flint	Chert	Good-quality brown chert	Southern Scottish Uplands chert	Pitchstone	Quartz	Tuff	Cannot determine	Grand Total
Broad blades		7	2	1		1	1		3		**15**
Chunks		1		5					2	1	**9**
Core		1	3	6	1	2		4	1		**18**
Irregular flake		1	2	6		1		1	2		**13**
Microlith			1	1							**2**
Narrow blade		2	2	1			1				**6**
Pebble			1								**1**
Regular flake	1	7	16	4		2			6	4	**40**
Retouched blade		2	1								**3**
Retouched flake		3	1	2							**6**
Small flakes			20	6							**26**
Utilised blade		6									**6**
Utilised chunk			1								**1**
Grand Total	**1**	**30**	**50**	**32**	**1**	**6**	**2**	**5**	**14**	**5**	**146**
%	**<1**	**21**	**34**	**22**	**<1**	**4**	**1**	**3**	**10**	**3**	
% excluding small flakes	**<1**	**25**	**24**	**22**	**<1**	**5**	**2**	**4**	**12**	**4**	

Table 22: Raw materials and flaked-lithic artefacts from the Principal palaeochannel *(*Mesolithic/Neolithic alluvium; Earlier Neolithic organic deposit; Earlier Neolithic alluvium; Later Neolithic organic deposit; and Chalcolithic alluvium*)*

in part, but not wholly, by the recovery methods employed, as only a fraction of the channel deposits was sieved. Even so, had they been present in any quantities, it might be expected that a few more would have been recovered by the sieving that did take place, or, indeed, the painstaking hand-excavation of the entirety of this extensive deposit, since they were retrieved from both later and earlier channel deposits.

One microlith came from the *Earlier Neolithic organic deposit*, and it is perhaps significant that this is a trapezoid form, one of only two such from the many thousands of microliths from the site, so it is possibly a genuine Early Neolithic piece. The other was a fine point from the *Mesolithic/Neolithic alluvium*, and may either have been residual or contemporary with the formation of this deposit. Given the technical similarity between the apparently Early Neolithic material in the channel and the more-certainly Late Mesolithic material from the site in general, it is difficult to be sure whether some or all of the Neolithic channel flint was residual, or whether it represents the continuity of technological traditions. There are, however, certain instances where it is possible to be more sure that the material was genuinely contemporary with its host deposit, and a case can be made for at least a proportion of the material being Neolithic.

Knapping group 116 was most securely associated with the *Earlier Neolithic organic deposit* (*Appendix 3*). This comprised several flakes, chunks, and two cores of a blackish-brown chert, which probably represent the reduction of the same nodule (Pl 117). This had been smashed into a series of large flakes and irregular chunks, some of which were flaked further. No refits were identified, however, so the original nodule was not present in its entirety. The cortex was a thin brownish/greyish-white material, which had sharp, angular ridges, indicating that the nodule had been procured from, or near, the site. On one piece, the outer surface was heavily battered, either as a consequence of the knapping process or due to hammer marks caused by its utilisation. These pieces seem to have been intentionally dumped into the palaeochannel, probably all at the same time, as they had a close spatial grouping.

In Britain, broader and larger blades are generally recognised as a component of Early Neolithic assemblages (Butler 2005, 119-22), although they can also occur in assemblages from other periods. Some 15 broad blades were recovered from the Earlier Neolithic and later channel deposits (Table 23; Pl 118), and of these, ten (66%) were probably from the '*Early Neolithic I*' phase of activity, focusing on Bays B, C, and D. Broad blades dominated the blade component associated with this phase, which seems significant, and they could thus feasibly represent a technological marker of Early Neolithic stone working (or, at least, this may have been the case in the channel, as it can be argued (*Appendix 10*) that a narrow-blade technology may have persisted into the

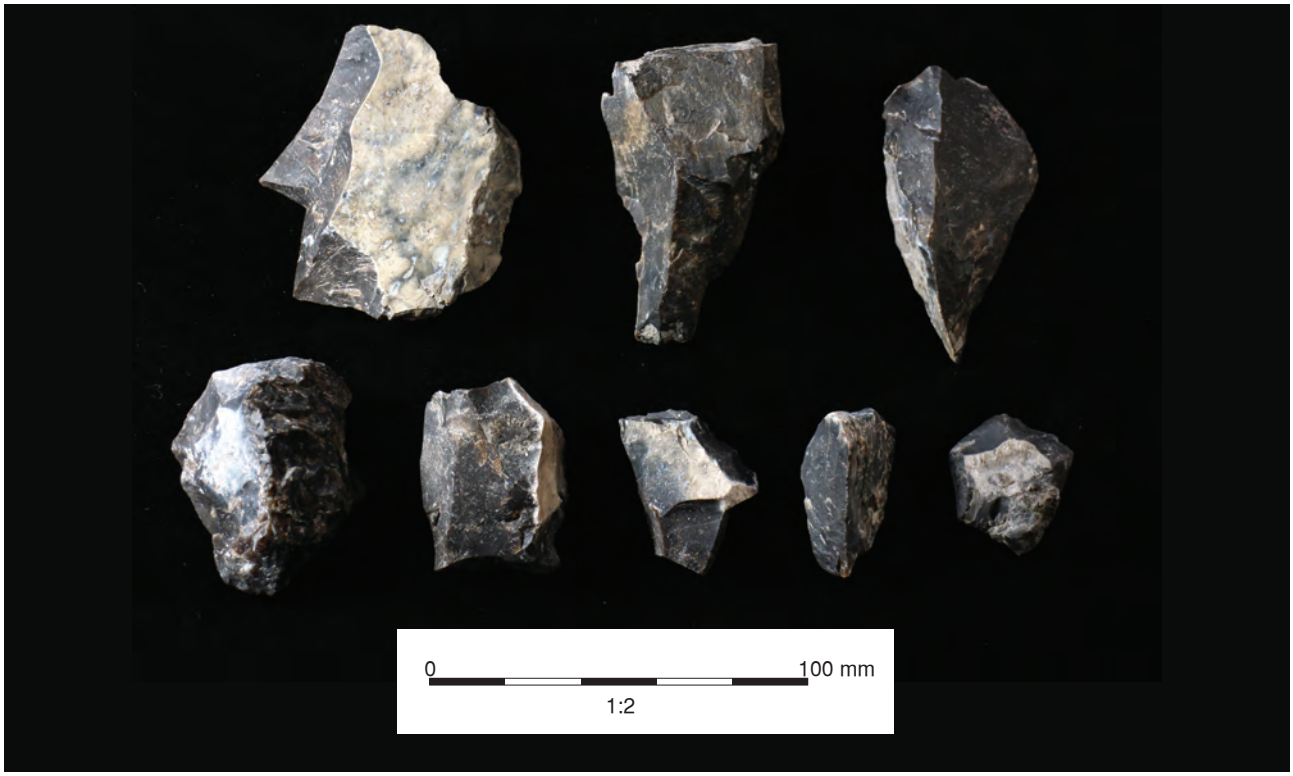


*Plate 117: Knapping group 116, comprising a quarried chert nodule, smashed and apparently discarded in association with Trident 1 (**75482**)*

Stratigraphic Unit	Number	Raw Material	Interpretation
Mesolithic/Neolithic alluvium	1 1	Grey flint Chert	Probably actually '*Early Neolithic I*' phase
Earlier Neolithic organic deposit/ Earlier Neolithic alluvium	3 3 1 1	Grey flint Tuff Scottish Southern Uplands chert Pebble flint	'*Early Neolithic I*' phase
Later Neolithic organic deposit	3 1	Grey flint Pitchstone	Could contain residual material from the '*Early Neolithic I*' phase
Chalcolithic alluvium	1	Pebble flint	Probably residual
Total	**15**		

Table 23: Quantification of broad blades in the later palaeochannel deposits

Neolithic period at Stainton West). As such, it is also possible that the other five broad blades, which have a wide spatial distribution, could represent residual Early Neolithic pieces, particularly those in the *Later Neolithic organic deposit*. It is also of interest that, of the 15 broad blades, seven were made from grey flint, not a particularly common material for the site as a whole, and, in contrast, only three were made from chert and pebble flint, which were generally by far the most common materials used. The other materials represented were also most commonly employed at Stainton West in the last stages of the later Mesolithic period (*Appendix 10*), so continuation of their use into the Early Neolithic period is a distinct possibility. That there was a lack of other types of debitage made from grey flint indicates that the broad blades were not the product of knapping activity within the palaeochannel, and that they were intentionally introduced, either for use in a particular task, or as a result of selection for deposition.

Plate 118: Broad blades from the Neolithic deposits in the Principal palaeochannel

If it is accepted that the broad blades in the channel generally date to the Early Neolithic period, and that grey flint, tuff, and other less-commonly utilised materials were usually selected for their manufacture, then it is worth considering the raw-material composition of the rest of the potential Early Neolithic flaked-lithic assemblage from the channel (Table 22). It is interesting to note that, as a proportion of the overall assemblage, the pebble flint and chert are under-represented (together 56%), compared to the Stainton West assemblage in general (chert 32%, pebble flint 52%). This is especially true when the spall (small flakes less than 10 mm long) is disregarded (together 46%). Grey flint, on the other hand, is grossly over-represented, forming 21% (25% excluding spall) of the Neolithic-deposit channel assemblage, when grey/brown flint (actually the same category; *Appendix 3*) comprises just 3.2% of the entire Stainton West assemblage. Similarly, tuff forms less than 1% of the Stainton West assemblage, so, proportionally, it is also massively over-represented.

When tool types are factored in, it is striking that all of the utilised blades, which are all of broad-blade dimensions, were made from grey flint, as were over half of the retouched pieces (including two arrowheads; *below*). So, within the various Neolithic-phase deposits in the channel, there is evidence (provided by a bias towards some raw-material types in relation to particular types of artefact) that, despite a background of residual Mesolithic flaked lithics, a significant number can be identified as being of probable Neolithic date.

Two arrowheads (70403.15 and 70158.20; Pl 119) were also found in the channel, of types commonly interpreted as diagnostic of the Neolithic period (*Appendix 5*). Arrowhead 70403.15 was found in the *Earlier Neolithic organic deposit* at the eastern side of Bay C, and was made from grey flint, being typically leaf-shaped, with curving edges, together forming a slightly truncated point and a flattened base. Some traces of birch-bark tar survived on the dorsal face of the base, used as glue to attach the arrowhead to its shaft. It is possible (rather like the stone axeheads; *p 265*) that it had been broken from its shaft prior to being deliberately deposited in this part of the channel. The other arrowhead (70158.20) was recorded as being within the *Earlier Neolithic alluvium* towards the eastern edge of Bay G, but it is possible that it was only later incorporated within this deposit, being already in the channel, adjacent to the active stream, and thus was actually contemporary with the *Earlier Neolithic organic deposit*. It was a transverse (chisel) form, being triangular in plan and made from grey flint, using a *Levallois* technique (Ballin 2011). It was not obviously associated with anything else, and was in good condition, and thus it is possible that it was deliberately deposited in the channel rather than simply being lost there.

The flaked lithics demonstrated some spatial patterning, which seems to indicate that they were restricted to the central part of the channel: in the south, there were a few pieces, including several made of grey flint, a brown-flint side scraper, and a pitchstone narrow blade (*Appendices 3* and *4*), while to the north was a loose cluster of lithics. Two retouched pieces of grey flint were found at the southern end of the cluster, and at its northern extent were four broad blades (three of grey flint and one of pitchstone), one of which had been utilised. There were fewer flaked lithics in the middle part of the channel, but a utilised blade did occur in the south-western part of Bay D. Elsewhere in Bay D, three grey-flint broad blades and another of chert occurred in the same area as the worked coarse stone (*p 260*).

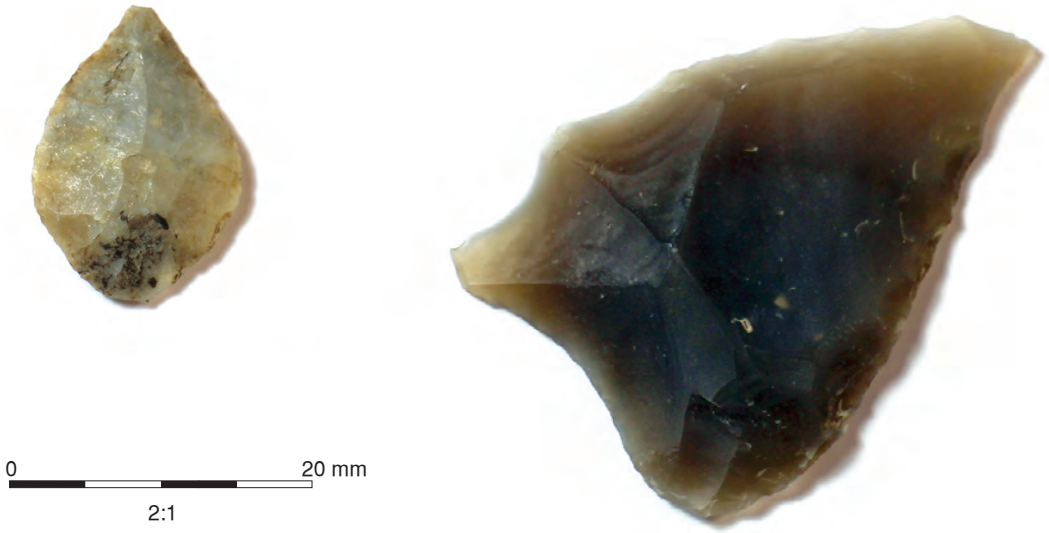


Plate 119: Arrowheads (70403.15 and 70158.20) from Neolithic deposits in the Principal palaeochannel

The flaked lithics formed the densest group within Bays B and C. A range of types, including the trapezoid microlith (*p 268*), was found within the wooden platform (*p 240*), along the base of the sloping bank. These, and a few other pieces in the area of the platform, may belong to this phase or may have been residual Mesolithic pieces dislodged and dragged into the channel when the platform was constructed. However, two utilised blades and a pebble flint, Scottish Southern Uplands chert, and a tuff broad blade were all part of the cluster. South of these, in the area of the platform in Bay C, were two grey-flint broad blades, one of which had been used, and two retouched pieces of grey flint (including leaf-shaped arrowhead 70403.15; *p 270*). Knapping group 116 was in close association with Trident 1 (*p 253*), in Bay B, and 2 m west of this was a tuff broad blade (70308.55). It is interesting to note, in regard of the latter, that two other pieces of tuff (a flake from a polished-stone axe (70307.11) and a flaked chunk (70308.51)) were found close to it, so that the three formed a distinct group within a larger cluster of coarse-stone tools, and could thus represent a discrete deposit.

There was a loose distribution of flaked lithics of various types in the ponded area of the channel in Bay A. On the western edge, these included a group of four quartz pieces, which looked to be *in situ* within the *Later Neolithic organic deposit* (*Ch 10*, *p 339*). There was also a grey-flint broad blade, seemingly lying below worked wooden plank **76118** (*p 256*). It may be significant that all three pieces of flaked lithics in Bay O were of grey flint, including two utilised blades.

Pottery

Generally, pottery was very rare at Stainton West, but several sherds from Early Neolithic traditional Carinated Bowl vessels were recovered from the *Principal palaeochannel* (*Appendix 11*). This style of pottery was widespread in Scotland and the north and east of England, coming into use during the early fourth millennium cal BC (Sheridan 2007a), and, significantly, a sherd from one such vessel could be confidently associated with the '*Early Neolithic I*' phase of activity. This was recovered from the *Earlier Neolithic organic deposit*, on the western side of Bay G (Fig 116), and is a small fragment of rim (70082.48; Fig 117). It may be significant that the sherd was within a loose cluster of worked and burnt wood, and thus it seems possible that this had been deliberately deposited into the channel, although it is not clear whether this individual sherd was singled out, or whether it originally formed a component of a more mixed assemblage of organic materials (for instance, from a midden) that has not survived.

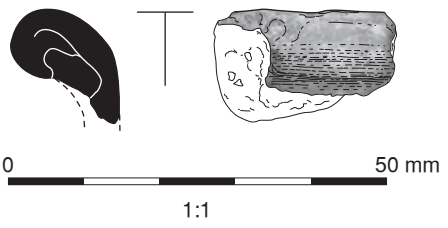


Figure 117: Rim (70082.48) from an Early Neolithic traditional Carinated Bowl vessel

'*Early Neolithic II*' Activity in the Channel

The evidence relating to the '*Early Neolithic II*' phase was confined to artefacts associated with the *Earlier Neolithic alluvium* (*p 235*), though these were much more limited in number when compared with those derived from the underlying *Earlier Neolithic organic deposit*. That said, some significant finds were recovered, suggesting that deposition was still taking place in the palaeochannel at this time. There is some sense that the patterns of deposition had shifted and that this was more limited than had been the case earlier, with the area covered by Bays D and E being the primary focus for deposition (Fig 118). The most spectacular find was a carved wooden artefact: Trident 2 (**75498/9**; Pl 120), which was more complete than the very similar fork-shaped object (Trident 1) found in the *Earlier Neolithic organic deposit* (*p 253*; *Appendix 13*). It had been expertly crafted, using stone tools, from a single radially split plank of oak, from a mature (*c* 300-year-old) tree. The finished object comprised a long shaft that tapered at one end, whilst the other widened into, at first, two projecting wings, or steps, and then three, long, tapering tines, one of which had broken off, but remained closely associated with the main object. The total length of the complete trident was 2.16 m, of which 0.56 m comprised the step and tines.

Based on its close similarities with Trident 1, presumably Trident 2 shared a similar function, perhaps associated with fishing (*p 254*), and, in a similar way to its earlier counterpart, it had also obviously been deliberately placed, at the eastern edge of the channel, though in this instance in Bay D. Moreover, it had been placed on a west/east alignment, directly above the unworked wood forming the platform within the *Earlier Neolithic organic deposit*, with its head pointing westwards into the channel. The tine (**75499**) had been broken and detached in antiquity, being tucked under the other, attached, tines in such a manner that it must have been placed there, which means that there is no possibility that this object was in a secondary context, for example, having been washed into this position. It has been radiocarbon dated, by surviving sapwood, to *3640-3370 cal BC*

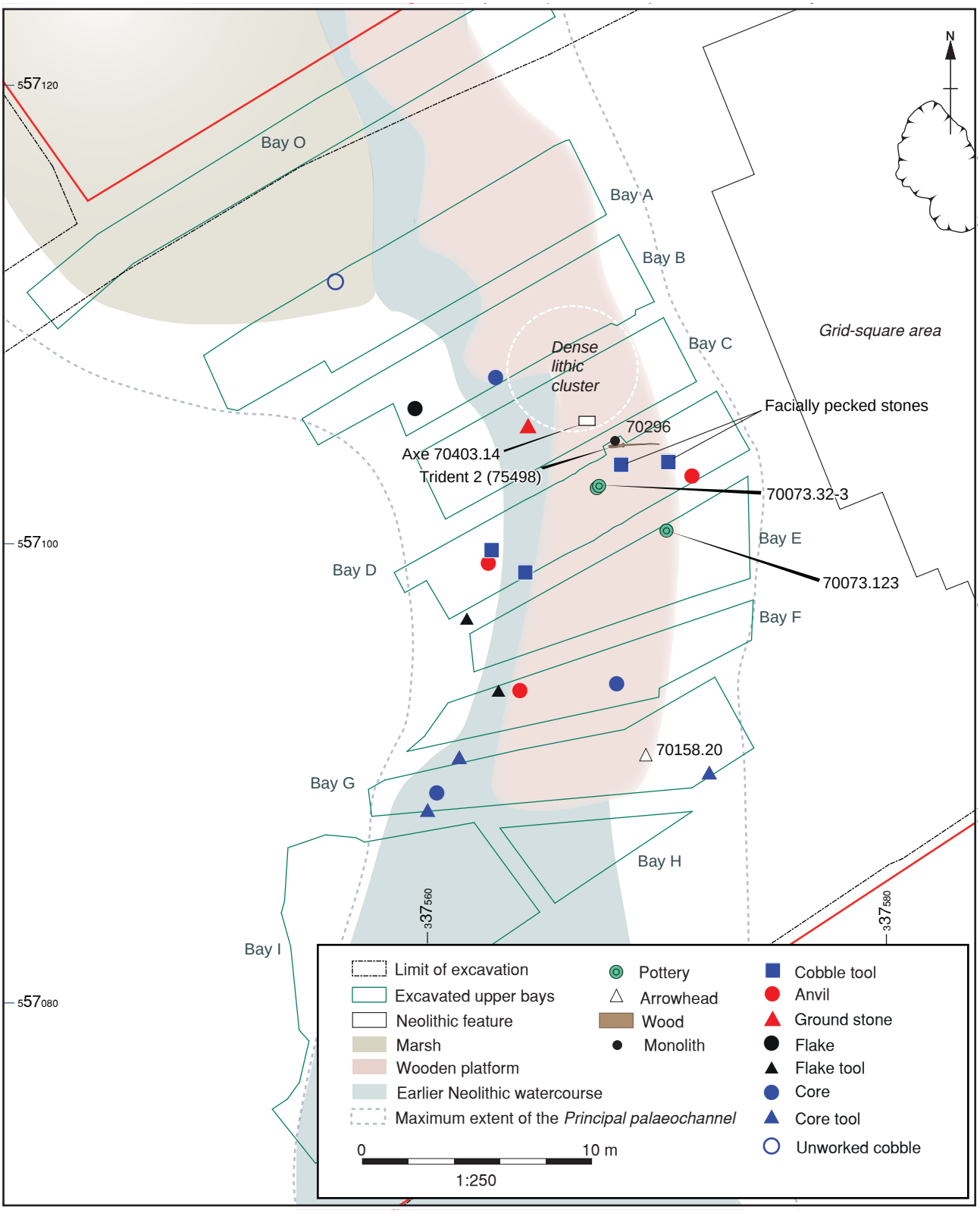


Figure 118: Artefacts in the Principal palaeochannel, *possibly associated with* 'Early Neolithic II' *activity*

(*SUERC-26660*), and other organic materials in a monolith (70296) sampling the sediment sequence adjacent to it confirm this date (*p 297*).

It is difficult to be certain whether the unworked tuff cobbles, worked coarse stones, and flakes from this stratigraphic unit were truly contemporary with it, or whether they were in secondary contexts. However, as they occurred in association with other finds, and because tuff cobbles and coarse-stone tools were also found in the subsequent *Later Neolithic organic deposit*, it seems likely that at least some of them

*Plate 120: Trident 2 (**75498/9**)*

were contemporaneous. This is particularly true of two facially pecked stones and an anvil, south of Trident 2, which, despite being recorded from both earlier and later deposits, may have related to activity contemporary with the accumulation of the *Earlier Neolithic alluvium*, as they were at the same level as the trident.

Other worked coarse stones, recorded as having derived from this deposit, had a predominant distribution along the western bank of the channel, which may mean that activity also continued to focus there at this time. An alternative explanation, perhaps borne out by patterns in the distribution which are most striking when all the coarse stone is considered

together, irrespective of its recorded stratigraphic unit, is that some of this material had eroded into it from its banks, over time (the distribution along the edge was thus due to taphonomy rather than temporality). The larger average sizes of the pieces recorded from the *Earlier Neolithic alluvium* (*Appendix 9*), as opposed to those from the *Earlier Neolithic organic deposit* and *Later Neolithic organic deposit*, may be explained in several ways, supporting either view. For example, this may be linked to their distribution along the western edge of the channel, with a higher proportion of larger, near-*in-situ*, pieces forming part of the set; they could have taken longer to erode into the channel due to their greater mass; because of their large size, some pieces could have been expeditiously reused by humans, time and again, or cached for reuse; or they could genuinely be contemporary with their host deposit.

An axehead (70403.14; Pl 121) was also found within the southern part of Bay C, at the same level and 1 m to the north-west of Trident 2. It had therefore probably been deposited in the channel at a similar time, or even as part of the same depositional event/practice. It was found on its side, in an organic-rich sediment matrix, and was not obviously in direct association with anything else in the channel; indeed, the nearest piece of contemporary wood to it, of any size, was the trident.

This small, distinctive, and largely complete stone-axe blade measures 126 mm long, 66 mm wide, and 30 mm thick. The cutting edge is characterised by a very shallow curve, while the overall form of the blade tapers down to a more or less pointed butt. Faceting is present to a very limited extent on the butt, and on both lateral edges. This is relatively irregular in character, and may indicate that the blade sustained a certain amount of reworking over the course of its active life. Other characteristics also suggest that the blade was refashioned or trimmed (*Appendix 2*). The rock is a pale olive colour and, microscopically, being a fine-grained epidotised tuff of andesitic composition, falls well within the range for Group VI tuff (*Appendix 6*).

The *Earlier Neolithic alluvium* also produced a small lithic assemblage (*Appendix 5*), though many of these items are suspected to relate to '*Early Neolithic I*' activity (*p 238*). It is possible, however, that some of the flaked lithics from the dense lithic cluster, which encompassed parts of Bay C (*p 258*), related to '*Early Neolithic II*' activity, given their proximity to Trident 2 and the adjacent axehead. Another noteworthy lithic artefact, potentially relating to this phase of activity, is the transverse arrowhead (70158.20), which came from the *Earlier Neolithic alluvium*, towards the eastern edge of Bay G (*p 270*). Typologically, it is more diagnostic of the middle to later Neolithic period (*cf* Manby 1988), so, given the date of the alluvium, and assuming that the arrowhead is contemporary with its host deposit, this is an early occurrence of this form.

Five small, burnished sherds of Early Neolithic traditional Carinated Bowl pottery (70073.32-3 and 70073.123; *Appendix 11*) were recorded from the *Earlier Neolithic organic deposit*, on the eastern side of Bays D and E, though at the same level as, and in fairly close proximity to, a concentration of worked and unworked coarse stone and Trident 2 (*p 271*). Given this provenance, and like the other objects, it is possible that the pottery was actually within the overlying *Earlier Neolithic alluvium*, the two deposits being difficult to distinguish in this part of the channel. The four sherds from Bay D derive from an open, shallow-bellied Carinated Bowl, with a diameter of at least 230 mm, which was deposited next to Trident 2.

Plate 121: Axehead 70403.14

The Character of Early Neolithic Deposition

When the distribution of Early Neolithic artefacts (worked wood and wooden objects; unworked tuff cobbles, coarse-stone objects, and axeheads; pottery; flaked lithics; and arrowheads) from the *Principal palaoechannel* is considered as a whole, it is possible to discern some patterning. The distribution of materials seems to have been structured and, as such, it does not suggest casual discard or natural accumulation: many of these artefacts appear to have been deliberately deposited in particular parts of the channel, or in relation to the wooden structures or other things within it.

The large oak trunks of dendrochronological Cluster 2 (*Ch 6*, *p 195*), already in the channel at the start of the Neolithic period, seem to have been referenced to, and may have inspired and formed the physical basis for the establishment of, the wooden platform (*p 240*). Some worked wooden items were incorporated into this platform, and the stake settings in the channel (*p 240*) also appear to have acted as foci, or were in areas where deposition, or activity, took place. However, this does not seem to have been the case for Wooden Structures 1-3 (*p 279*); on the whole, rather than being foci for deposition, these served to divide space within the channel. Whether they ever formed a fish weir is far from certain, but they did seem to have been specifically concerned with defining or enclosing the ponded area, and thus served to emphasise and distinguish between the zones in which deposition took place.

Where artefacts occurred in association with each other, this may not always have been intentional, rather being because depositional practices, or other activities, were repeated in, or adjacent to, the same parts of the channel. So, in the Early Neolithic period, deposition/activity associated with the channel was firstly structured by its morphology; then by the loose 'raft' of exposed ancient oak trunks; and then by the platform and other constructed structures. It is also likely that further structure will have been provided by the zoning of various different kinds of activity in or adjacent to the channel, and a tradition of depositing objects into it.

The activity in the *Principal palaeochannel* can be subdivided into six depositional zones (Fig 119; Table 24). These broadly reflect the spatial patterning of the material deposited, although they only loosely apply, as the wide distribution of the tuff cobbles merges them together, and the worked stone and wood distributions did not strictly follow each other. Most of the closely dated, and more significant, depositional acts took place at the time when the *Earlier Neolithic organic deposit* was forming ('*Early Neolithic I*' phase), although in the centre of the channel (Zone 3, and the south-eastern part of Zone 4), most depositional activity was later, associated with the formation of the *Earlier Neolithic alluvium* ('*Early Neolithic II*' phase). This suggests that, perhaps after an initially intensive, foundational, phase of construction/deposition in the channel, materials, perhaps coarse stone in particular, continued to be deposited in it over decades, or even centuries. Indeed, the latest acts of deposition seem to have taken place when the *Later Neolithic organic deposit* was forming (*Ch 10*, *p 339*).

Determining the past motivations for this depositional activity is highly problematic. However, the character of deposition does suggest that the channel was not viewed or used as a homogeneous space, but was differentiated in practice. Even if this spatial differentiation originated, primarily, from 'everyday' productive practices (*eg* fishing, tool manufacture, *etc*), rather than discursive ones (*eg* oblative or votive), it would almost certainly have been meaningful, and pragmatic/sacred dichotomies may not have been strictly upheld in the past. The subdivision, grading, and enrichment of space, resulting from the constructional and depositional activities in the channel, would have created fields for discourse, enabling this feature to have been used in ways that were analogous to purely built monuments (such as tombs and enclosures; Barrett 1994, 72-81), for example, by making the numinous present; excluding and including; exerting control over resources; and providing a different realm of experience in which communication and performance could take place. Indeed, the evidence suggests that explicitly discursive practices formed at least a part of the activity undertaken there, probably from the beginning of the Neolithic period.

The axeheads, paddle, and tridents, as well as perhaps the fragments of pottery and the arrowheads, may represent the most obvious examples of structured (oblative) deposition in the channel. This was particularly evident in the placement of the paddle (**75706**), propped up with selected pieces of tuff against oak trunk **76014** (*p 250*), and in the association between Trident 1 and the smashed chert nodule of knapping group 116 (*p 268*). Indeed, careful consideration often seems to have governed the placement of objects in relation to the channel and its architecture. The paddle, both tridents, and many of the larger pieces of worked timber were placed along the eastern edge of the active stream; they were carefully laid on, or were incorporated into, the wooden platform, and were in direct association with other pieces of altered wood, and/or the large oaks of Cluster 2. As such, many of the larger worked timbers in the channel

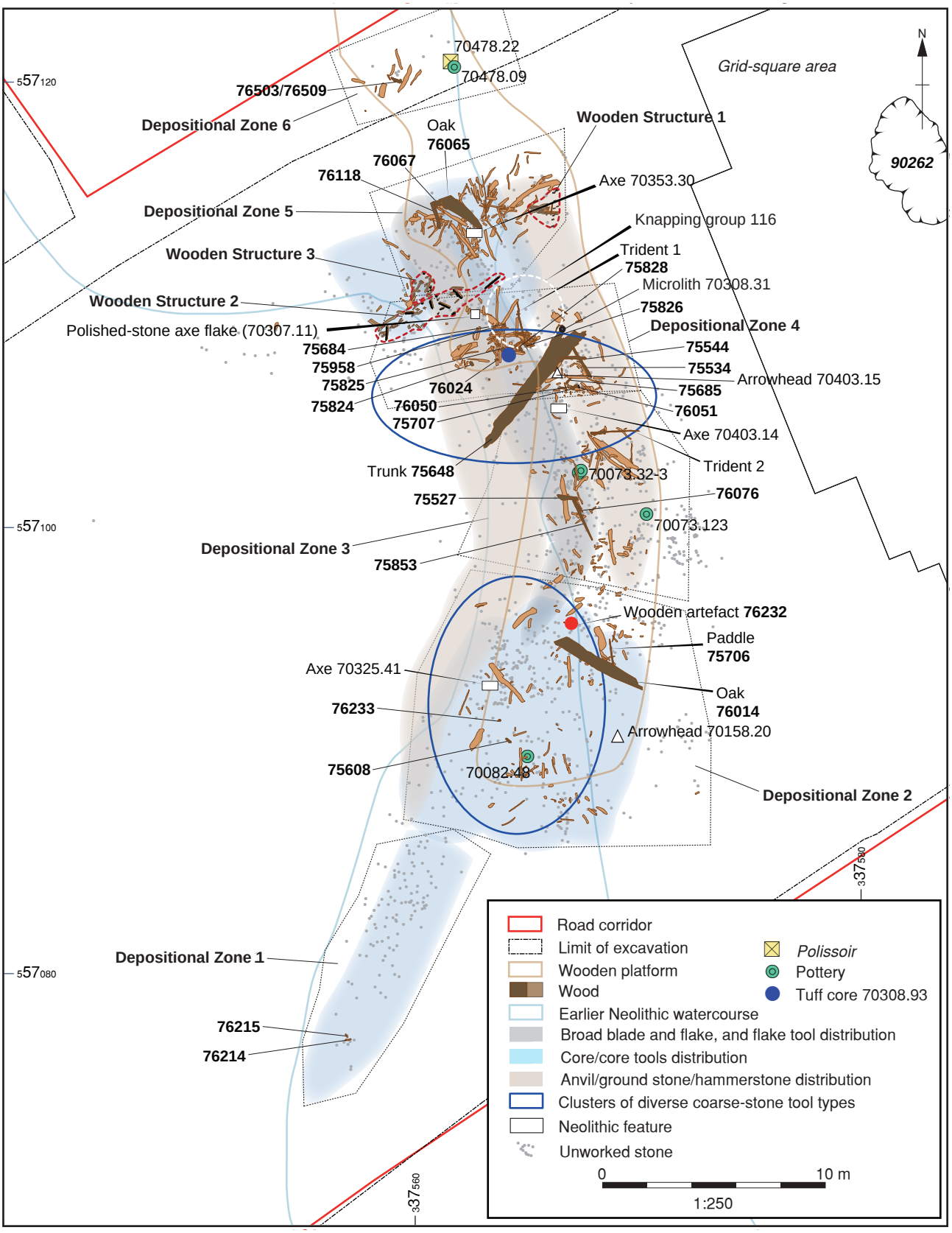


Figure 119: Suggested zones of Early Neolithic deposition within the Principal palaeochannel

(**76503/76509**, **76118/76067**, **75544/75534** (Pl 122), and **75527/75853/76076**) can also be considered to have been deposited in a structured way, or with regard to their significance in terms of the overall architectural scheme. These were incorporated into the wooden platform and, within Zones 2-5, if oak **76014** is included, they punctuated its length at approximately every 7 m. As these timbers were often

Depositional Zone (South to North)	Description
1	In the western branch at the south of the channel (Bays H and I). Broad zone comprising deposits of tuff cobbles and worked coarse stone (mainly cores and core tools); various flaked lithics; and a discrete deposit of altered wood, at the extreme south of this zone. Contemporary with the *Earlier Neolithic organic deposit*
2	Largely focused along the channel banks, at the western side of Bays F, G, and H. This included oak trunks from Cluster 2; *in-situ* stakes; other items of worked and burnt wood, amongst them, on the zone's eastern edge, wooden paddle **75706** and wooden artefact **76232**; tuff cobbles and a very diverse cluster of worked coarse stone; various flaked lithics; axehead 70325.41; arrowhead 70158.20; and Carinated Bowl pottery rim 70082.48. Contemporary with the *Earlier Neolithic organic deposit*
3	On the eastern banks of the channel, in the southern part of Bay C, and Bays D and E. Comprising: oak trunks from Cluster 2; Trident 2 (**75498**); tuff cobbles and various worked coarse stones; axehead 70403.14; various flaked lithics, in a southern and northern cluster; and pottery fragments 70073.32-3 and 70073.123. Contemporary with the *Earlier Neolithic alluvium*
4	On the eastern banks of the channel, in Bays B and C, south of *Wooden Structure 2*. Comprising oak trunk **75648** from Cluster 2; *in-situ* stakes; other items of worked wood, incorporated within or associated with the wooden platform, including artefact **75826** and Trident 1 (**75482**); tuff cobbles and various worked coarse stones; various flaked lithics in three clusters: southernmost includes arrowhead 70403.15; northernmost includes a trapezoidal microlith (70308.31); the third, associated with the trident, contains Knapping Group 116 – fragments from a reduced chert nodule. Contemporary with the *Earlier Neolithic organic deposit*
5	On the eastern bank of Bay A and extending into its centre; possibly a ponded area of the channel, north of *Wooden Structures 1-3*. Comprising oak trunks from Cluster 2; *in-situ* stakes; other items of worked wood, incorporated within or associated with the wooden platform; tuff cobbles and various worked coarse stones, possibly less densely concentrated than elsewhere; axehead 70353.30; and two flaked lithics. Contemporary with the *Earlier Neolithic organic deposit*
6	Within the centre of Bay O. Comprising oak trunks from Cluster 2; contemporary with the *Earlier Neolithic organic deposit*: *in-situ* stakes; other items of worked wood, possibly incorporated within or associated with the wooden platform; far fewer numbers of tuff cobbles and no worked coarse stone; a single blade core. Contemporary with the *Later Neolithic organic deposit*: *polissoir* 70478.02, burnt bone fragments, and Early Neolithic pottery 70478.09

Table 24: Depositional zones within the Early Neolithic phase of the Principal palaeochannel

*Plate 122: The timber platform in Bay C, looking north-west, also showing Mesolithic trunk **70658**, trimmed coppiced piece **75534**, and plank **75544***

in contact with the earlier Cluster 2 oaks that formed the platform's base, they can perhaps be considered foundational. The two tridents occurred at intervening points, and although they may not necessarily have been knowingly deposited in direct relation to the other large timber clusters (particularly in the case of the later Trident 2, *p 271*), the radiocarbon date and position in the sequence of Trident 1 (*p 253*) means that it might also have been a foundation deposit.

No further similar acts of timber deposition were identified south of the paddle and where the wooden platform seems to have ended, in Zone 2. However, where pieces of wooden debris occurred, for example **76214-15** in Zone 1, they seemed to have been deliberately placed in close association with each other. Asserting that even the smaller pieces of wood debris had been selected and placed in the channel may, for some, appear to be overstating the case for deliberate deposition *contra* incidental inclusion, but there were repeated examples of this. For instance, **75608** and **76233** were pieces of oak felling-debris that occurred within 1 m of each other, in Zone 2; **75707**, **76050**, **76051**, and **75685** (*pp 251-2*; Pl 101) were all pieces of debris, the first of which was charred, apparently placed adjacent to timber setting **75544/75534** in Zone 4; and, associated with Trident 1, also in Zone 4, were pieces of woodchip/slab debris (**75958**, **75684**, **76024**, **75825**, **75828**, and **75824**), several of which were also burnt, and **75825** had been placed in association with tuff core 70308.93 (*p 265*).

That many of these pieces were charred, as were quite a few of the other pieces of altered wood in the channel, may also be significant. It seems unlikely that this would have happened in the moist channel and there was no evidence there for *in-situ* burning. It may feasibly have happened accidently or indirectly during clearance activity adjacent to the channel, but there is also a possibility that it is indicative of treatment before deposition, or that the deposited material had been sub-selected from a partially burnt deposit. In contrast to the larger timber foundational clusters, and perhaps like some of the other lithic and ceramic artefacts, the deposition of much of this debris may have been secondary: it was placed with respect to the wooden platform and timber structures, further west into the channel.

Various of the deposits of other artefact types seemed to reference these wooden deposits, or at least occurred in the same parts of the channel. For example, in Zone 3, axehead 70403.14 was just to the north of Trident 2, and various pottery fragments were found just to the south and west of it; in Zone 4, flaked-lithic pieces occurred amongst the wooden debris associated with Trident 1, and arrowhead 70403.15 seemed to have been placed between the wooden debris and timber setting **75544/75534**; and in Zone 5, axehead 70353.30 appeared to reference oak **76065** and timber setting **76118/76067**.

More generally, the lithic items potentially associated with fine cutting work (the coarse-stone regular flakes (*p 265*) and the flaked-lithic broad blades; *p 268*) had a similar distribution, largely focused on the stream in the centre of the channel, adjacent and to the west of the wooden platform and worked-wooden clusters of, predominantly, Zones 3-5, but extending into the northern part of Zone 2. This contrasted with the distribution of other stone tools, such as hammerstones (one type of cobble tool; *p 261*), grinders, and anvils, that were found along the edges of the channel. These particularly clustered, as part of diverse coarse-stone tool assemblages within Zones 2, 3, and 4, at the point where the narrower channel started to widen into the northern pond.

The coarse-stone distribution did not extend into Zone 6, but in Zones 5 and 1, and the southern part of Zone 2, it was characterised by greater numbers of cores and core tools (*p 262*). These may have been choppers and wedges associated with woodworking (splitting up large trees), and the aborted attempts at making such tools. Although the debris and timbers that might have resulted from such activity occurred in the wooden clusters, it is interesting to note that these had an almost inverted distribution to the cores and core tools. The general dearth of wooden waste and debris in the channel, the structured nature of the wooden debris that did occur, and the fact that the debris and timber, although often associated with cores and core tools, did not always concentrate in the same parts of the channel, together strongly suggest that, if the cores and core tools were indeed used for heavy-duty woodworking, this took place elsewhere. It then follows that these artefacts had to have been deliberately deposited into the channel. Some support for this idea was provided by the lack of significant amounts of flaked debitage in the channel, which would have been created during the manufacture of these tools, although suitable raw materials (unworked tuff cobbles) were present.

The unworked coarse stone had a very general distribution in the channel, even extending into Zone 6. There were, however, some denser concentrations of it, which often corresponded to where the worked coarse stones clustered, for example along the eastern edge of Zone 2, or in association with the tools in Zones 3 and 4. Given that this material did not start to appear in the channel deposits until the Early Neolithic period, there seems to be no doubt that it was deliberately brought to the site and placed in the channel through human action, rather than being a result of the alluvial

erosion of the local geology. Indeed, it is tempting to see the deposition of this material as an oblative act, sacrificing a significant or valuable material that had been gathered up and brought to the site. In such a case, the distribution equally may represent the wide dispersal in the channel of a stockpiled cache, or the piecemeal deposition of smaller amounts of material over a longer time. In a way, it is the deposition of so much of this humble unworked stone, just as much as the other rarer and more magnificent finds, that most obviously singles the channel out as a special place.

The spatial distribution of materials, and the architectural elaboration of the *Principal palaeochannel* in the Earlier Neolithic period, bears testimony to the fact that it was a space that was subject to various overlapping modes of use. It was possibly a locus for production, for example of stone tools, possibly including the finishing of polished-stone axes. If Wooden Structures 1-3 formed a weir (*p 246*), or if the wooden tridents were fishing spears (*p 254*), it may also have been a favoured place for fishing. On the other hand, it is just as likely that the architecture was never associated with fishing, and was solely intended for the demarcation and subdivision of the channel. In any event, that it ultimately functioned in this way is demonstrated by the zoned nature of deposition in the channel, and the clustering of worked-wooden items within the fabric of the wooden platform.

The channel frequently acted as a receptacle for the deposition of used or spent items, the residues of activities undertaken elsewhere. One of the foremost activities represented (by stone axeheads, coarse-stone cores and core tools, wooden debris, and timbers) seems to have been wood procurement: the chopping down and splitting up into planks of mature oak and elm trees, the most accomplished exemplars of this split-plank technology being the paddle and tridents. It is also possible that some of the larger planks and timbers in the wooden platform had formerly been employed within other structures elsewhere, before their deposition in the channel. Other artefacts (the arrowheads, some of the flaked lithics, and the pottery) may have derived from, and embodied, other activities, such as those associated with hunting, domestic life, and feasting. Bone did not survive in the channel, which is highly unfortunate, for if it had, it may have elucidated the nature of the fine cutting, possibly butchery or dismemberment, apparently undertaken within the stream. Given the wide range of other materials deposited in the channel, and the fact that some things were put there at the end of their useful lives, it is possible to speculate that the butchery and dismemberment may have been associated with the breaking up and processing of dead animal carcasses, or even human corpses, for deposition in the channel.

The range of materials deposited was representative of the lives, activities, and perhaps significant events shared by a community of people (and, speculatively, the remains of the people themselves). The acts of deposition would have been meaningful, probably taking place in a performative context, and would have happened in a manner that took these materials out of circulation and made them synonymous with the channel as a place. This could have had the effect of changing how that place was thought of, not least by imbuing it with a sense of corporate ancestry, history, and identity. However, by also considering what was happening on the adjacent banks of the channel, in the *Grid-square area*, further clues are provided as to the potential significance of some of the woodworking deposits in the channel and of this part of the landscape more generally.

Early Neolithic Activity in the Grid-square Area

In the *Grid-square area*, the evidence for earlier Neolithic activity was notably slight in comparison to both the *Principal palaeochannel*, and also to that in the Late Mesolithic period (*Ch 4, p 103*). It comprised only a few artefacts and several tree-throws, and the general impression was that the channel was the primary focus for activity, or, at least, activity that left any archaeological trace. However, as the tree-throws were probably anthropogenic in nature, and could have resulted from deliberate felling for wood procurement, they may very possibly have been associated with the channel activity.

Some 15 m to the east of Bays A and B, at the northern end of the channel, was a very large tree-throw (***90262***; Fig 120), measuring 5.8 x 3.5 m and up to 1 m deep. This was oval in plan, with an irregular profile, and a deeper, U-shaped, depression almost completely circumscribed a flatter higher area in the middle of the feature's base (Pl 123). Two radiocarbon dates were obtained from material within it, and probably date its formation. One, from alder/hazel charcoal in a probable root hole (***90325***) at the base of the feature, has been dated to *3770-3640 cal BC* (*SUERC-41994*), and a second, confirmatory, date of *3770-3650 cal BC* (*SUERC-59307*; *p 297*) came from a basal fill (***87385***) of the main pit.

Two other radiocarbon dates showed that some of the charred organic material was residual, dating to various times in the Later Mesolithic period (*Ch 3, p 101*; *Ch 4, p 141*). The entirety of the fill was sieved by deposit and grid square, and a large assemblage of struck lithic artefacts was recovered. The diagnostic items were, however, entirely indicative of a technology that

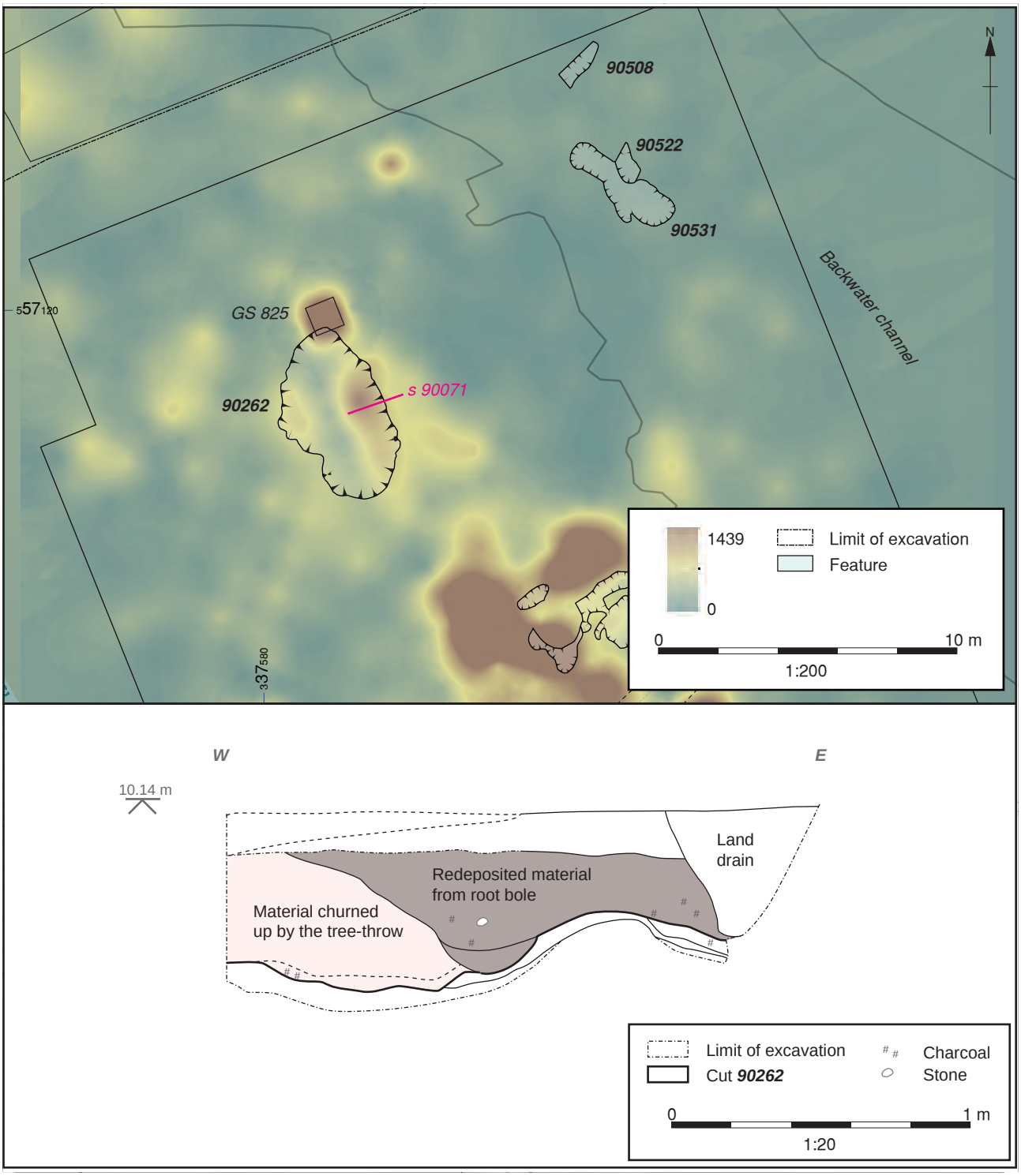


Figure 120: The burnt lithic distribution in the vicinity of tree-throw **90262**

would usually be ascribed to the Late Mesolithic period (*Appendix 9*), so, it is considered that these lithics, like a proportion of the charred materials, were residual. They would thus have related to activity focused in this area prior to the tree-throw forming (and maybe even before the tree that caused it had started to grow), the lithics probably entering the tree-throw when the tree came down, churning up and redepositing large blocks of sediment (Fig 121).

The greatest amount of flaked lithics, including all raw-material types, but mainly chert and pebble flint, and also knapping groups 44 and 45 (*Appendix 3*), was situated along the eastern, northern, and north-western edges of the tree-throw, whereas significantly less material was recovered from the centre of the feature (Fig 120). Filling this central area were redeposited natural sediments, largely devoid of finds, that had been kicked up when the tree went over.

Plate 123: Tree-throw **90262**

In contrast, the peripheral concentrations of lithics (denser than anything surrounding the tree-throw) were probably created by a stratigraphic inversion. The patterning can be explained if a large tree had sent down roots through flint-bearing sediments, which had formed in the Mesolithic period and contained similar numbers of lithics to those distributed in this part of the site in general (*Ch 4*). When the tree went over, some of this substrate, lying on the side in which it fell, was disrupted but remained largely *in situ*, whilst, in the other direction, large chunks of sediment, adhering to the root bole, was uplifted, at 90° from the horizontal, and then ultimately slumped back into the feature.

This had the effect of concentrating the lithic content of the sediment in certain parts within the tree-throw, relative to the general distribution in the area (*cf* Norman 2013, 85-90). A lesser concentration might be expected (as a result of the folding of sediment and other disturbance) on the side of the tree-throw towards which the tree fell, and an opposing, greater concentration (caused by material falling from the inverted bole) in the void created by the uprooted tree, on the far side of the root-kick. The recorded concentrations of lithics bore a good relation to the plan of the tree-throw, with a lesser concentration on the west and a greater concentration on the east, and they thus, according to the expected patterning, indicate that the tree fell to the west, towards the palaeochannel.

Furthermore, there was a dispersed concentration of burnt lithics associated with tree-throw ***90262***. These

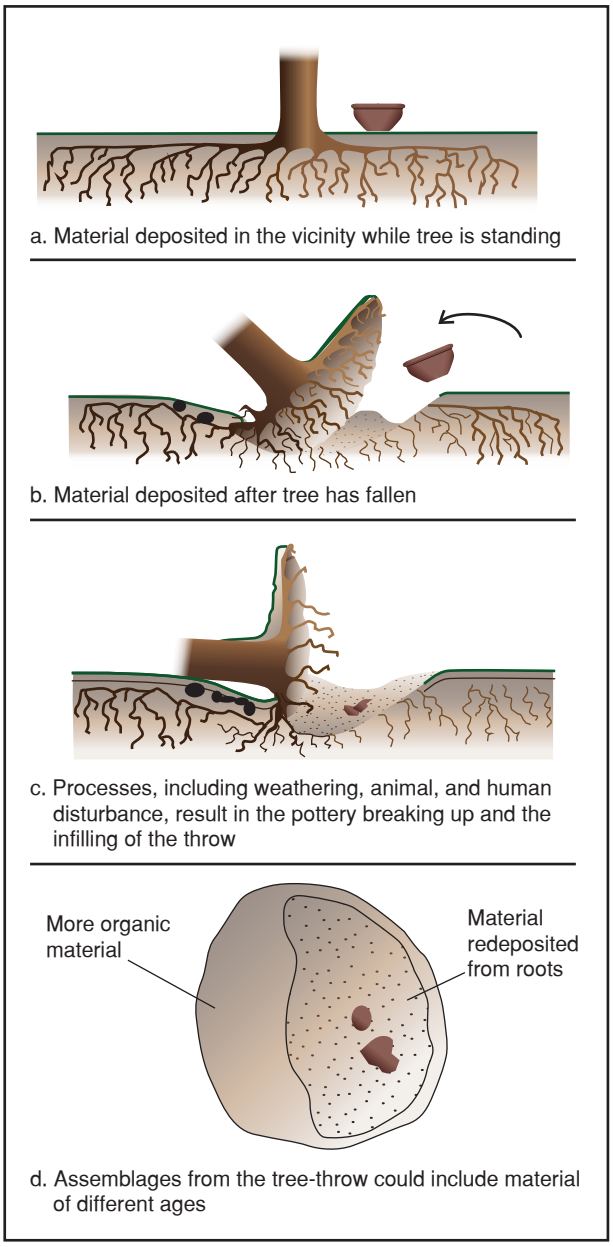


Figure 121: The formation of a tree-throw, with deposited material

surrounded the periphery of the feature, and were more concentrated on its eastern side, particularly in grid-square 825. Within the feature, burnt lithics were also concentrated on the east, probably, at least partially, as a consequence of their redeposition. The burnt lithics did not appear to focus on any of the Mesolithic-phase hearths or other features in this area (*Ch 4, p 127*), and, as such, it is feasible that they were burnt at a later date than these, yet before the tree-throw had become backfilled. It is therefore a distinct possibility that the burning relates to activities associated with tree felling, and thus provides good evidence that humans felled the tree. For example, it is possible that a fire was set around the felled tree, to help free the roots from the ground, disentangle it from any understorey, and generally clear the area.

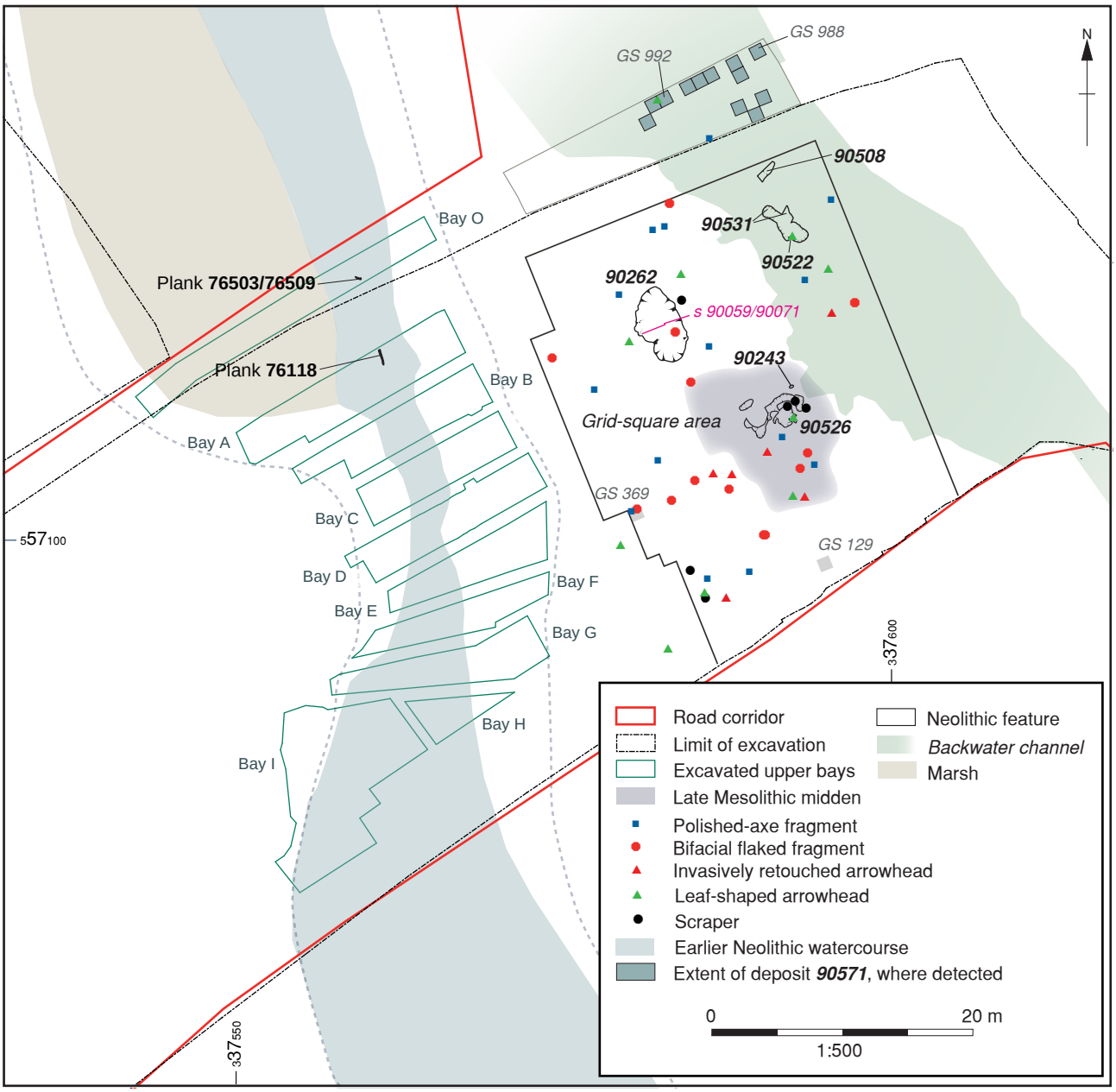


Figure 122: Earlier Neolithic activity in the Grid-square area

Firesetting would not preclude timber procurement, as it is highly unlikely that a controlled fire would consume a newly felled oak or elm tree (as a tree large enough to produce a pit of this size would probably be, based on the palaeoenvironmental evidence (*p 284*).

So, taken together, the radiocarbon and lithic evidence from tree-throw ***90262*** suggest that a large tree may have been deliberately felled in the Early Neolithic period. At about this time, palaeoenvironmental evidence points to some disturbance of the surrounding woodland (*p 285*), and wooden artefacts (including debris and woodchips of oak and elm; *p 249*) and lithic assemblages, which may have been associated with woodworking (*p 262*), were being deposited into the adjacent *Principal palaeochannel*. For example, two of the oak planks, **76118** and **76503** (*pp 256-7*; Fig 122), were part of dendrochronological Cluster 3 (*Appendix 20*), and thus potentially came from trees that died at the same time as the tree-throw formed. These were *c* 20 m to the west of it, in the *Principal palaeochannel*. This may all just be coincidental, but it seems unlikely to be so, and it is possible that some of the deposited materials in the palaeochannel were related to the felling of this particular tree.

Another smaller (2 x 0.8 m and 0.5 m deep) elongated tree-throw (***90531***) was cut through the sediments (***90181***) backfilling the *Backwater channel*, in the east of the site. This produced a single radiocarbon date (*3790-3640 cal BC*; *SUERC-32708*; *p 297*), from charcoal fragments from short-lived tree species of indeterminate

nature in fill ***90527***, and at its south-eastern end had also been destroyed by a Late Neolithic tree-throw (***90522***; *Ch 10, p 341*), providing further confirmation that it dated to the earlier Neolithic period. It is notable that dated material from tree-throw ***90531*** could be the same age as the radiocarbon dates from tree-throw ***90262***, and it is therefore possible that these two features related to the same episode of felling/clearance. The small lithic assemblage in ***90531*** could be mainly residual Late Mesolithic material that had eroded out of the underlying sediments, but includes a few pieces of tuff and brown flint, amongst them two broad blades, that hint at a Neolithic component. The flaked lithics in the surrounding grid squares contained only the vaguest of hints of any Neolithic activity, and seem more strongly representative of a Late Mesolithic presence (*Appendix 9*).

The only other grid-square feature to contain organic material that has been solely radiocarbon-dated to this phase of activity was also a tree-throw (***90508***), which also cut through the sediments (***90181***) backfilling the *Backwater channel*. This was 1.6 m long and 1.2 m wide, but only 0.07 m deep. Alder/hazel charcoal produced a date of *3710-3520 cal BC* (*SUERC-32707*; *p 297*), which might imply that it was slightly later than the other tree-throws of this phase, although this need not necessarily be the case. The only finds within it were a small assemblage of largely undiagnostic struck lithic pieces, which may have been residual, and, if they had eroded out of the channel sediments, could be Mesolithic in date.

In the south-west of the *Grid-square area*, other fragments of charcoal, from an indeterminate, short-lived tree species, were sampled from the Mesolithic *Stabilised land surface* (***90206***; grid-square 369), but it is probable that they were actually intrusive, and related to Early Neolithic activity. These fragments have been dated by radiocarbon assay to *3790-3650 cal BC* (*SUERC-32643*), and are therefore consistent with the radiocarbon dates from tree-throws ***90262*** and ***90531***. As such, they could suggest that clearance activity was more widespread along the zone adjacent to the channel. It may be significant that two leaf-shaped arrowheads of probable Early Neolithic date were found to the south-west, in an area sandwiched between the *Principal palaeochannel* and *Grid-square area*. Additionally, four small fragments of probable Early Neolithic pottery (*Appendix 11*) were retrieved, 15 m to the south-east, in grid-square 129, apparently from the *Stabilised land surface* (***90206***), although they are likely to have been intrusive.

In a similar way to the worked stone from the tree-throws, there was little convincing evidence across the wider *Grid-square area* for the presence of a distinct Neolithic, as opposed to Late Mesolithic, lithic technology. There were a few cores, including *Levallois*-type (Ballin 2011), which appeared to be technologically of a Neolithic character, and some of the debitage had larger than average length/breadth dimensions in comparison to most of the Late Mesolithic assemblage. However, these cores and the larger debitage did not have a distinctive co-presence, and usually occurred in areas that were foci for activity during the Mesolithic occupation of the site. As such, it is entirely possible that these ostensibly Neolithic-styled pieces may just have been anomalies or facets of the Late Mesolithic technology (*ibid*).

A few of the flaked lithics were from bifacially worked pieces and there was a thin scatter of polished-stone axe flakes over the *Grid-square area*. However, the former often occurred in areas where knapping had taken place during the Mesolithic occupation, and it cannot be ruled out that they derived from the reworking of tools at this time. Implements such as the polished-stone axes in the Earlier Neolithic deposits of the *Principal palaeochannel* (*p 265*) would probably have been used for tree felling in the *Grid-square area*, so some of the flakes could have been Neolithic in date. On the other hand, there was also convincing evidence for polished-stone axes being used, at the site, during the Late Mesolithic period (*Ch 5, p 153*).

An assemblage of both leaf-shaped and invasively retouched arrowheads was also recovered and may indicate hunting in this area during the Early Neolithic period. Finds of this class in the channel (*p 279*) demonstrate that they were certainly in use at the site at this time, but, again, as the chronology of this artefact type is not well established regionally (*Appendix 10*), it might be incautious to assume automatically, on the basis of typology alone, that all such arrowheads were Neolithic in date. Several of the scrapers were also in forms that might sit more comfortably in the Neolithic period (*Appendix 9*).

A small concentration of Neolithic-style flints adjacent to tree-throw ***90526*** (Fig 122) might indicate activity focused on the remnants of the midden that formerly lay at the heart of the Mesolithic encampment (*Ch 4, p 115*), suggesting that this was still visible. Tree-throw ***90526*** measured 4.7 x 3 m and was 0.85 m deep, and a small hollow (***90243***), just to the north-east, might also have been part of it. There was no suitable material for radiocarbon dating in the feature, but it seemed to have disturbed the flints in the midden and, as such, must have been later than it, so may have been contemporary with the Early Neolithic tree-throws in the area. However, most of the lithic material in the feature was Late Mesolithic in character and was probably residual. In this area, those artefacts that were diagnostically Neolithic (Lithic Entities 18 and 41; *Appendix 9*) included a variety of arrowheads, amongst

them transverse and leaf-shaped forms, and two pieces classified as indeterminate invasively retouched, which were probably arrowhead fragments; also a knife form, with edge-use gloss, suggesting it had been used in cutting fibrous materials such as grasses; a large awl/borer; three bifacially flaked fragments; and two side-and-end-form scrapers. However, there was very little in the way of cores and debitage that could have been associated, technologically and chronologically, with the implements, so prolonged occupation is not suggested.

Overall, the scant lithic evidence, and the lack of any settlement features, such as stakeholes, pits, or hearths, dating to this phase of the site, suggests that the *Grid-square area* was not used intensively. It is perhaps more likely that any settlement activity would have been sited further up the terrace, as this was more typically the setting favoured during this period (Davis 2009; Smyth 2014, 22).

Backwater channel

A dark organic deposit (***90571***) was detected only within several grid squares in the north-eastern corner of the site, being best preserved in grid-square 988 (Pl 124). This has not been radiocarbon dated, but it sealed ***90572***, which was stratigraphically equivalent to ***90181***, the backfill of the *Backwater channel* (*Ch 4, p 129*). The lithics in this latter deposit suggest a Mesolithic

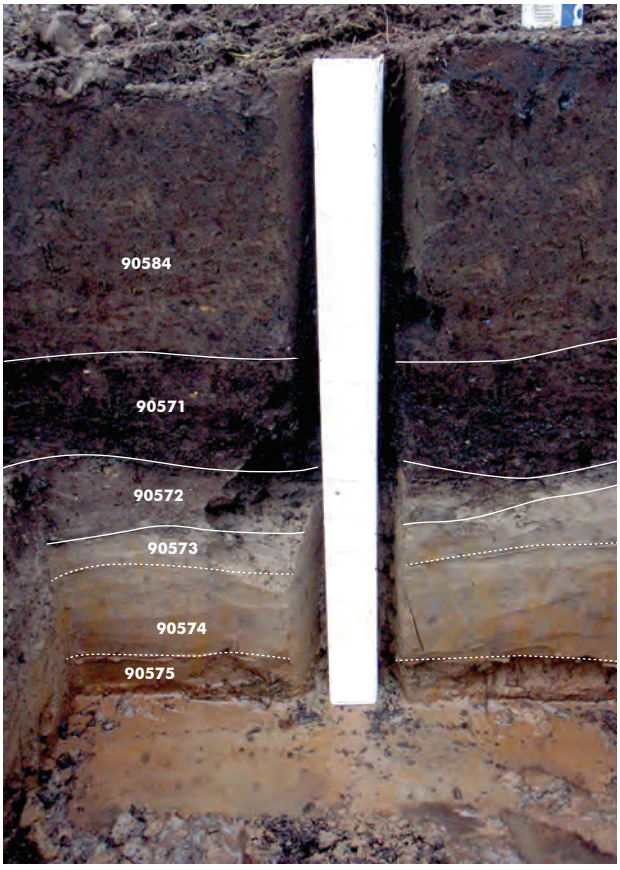


Plate 124: Deposit sequence within grid-square 988

date (*Appendix 9*), and it has been placed within the very late Mesolithic 'Hiatus' phase of alluviation at the site within the chronological model for Stainton West (*Ch 1, pp 30-1*). Deposit ***90571*** can therefore be interpreted as representing the slow development of a peaty-type deposit, within boggy ground that formed over the infilled channel, probably sometime after *3990-3880 cal BC* (*End Mesolithic/Neolithic alluvium II*; *Ch 6, p 203*). As ***90571*** formed in a cut-off channel, higher up the terrace than the *Principal palaeochannel*, it potentially escaped some of the erosional processes that had operated in the latter just prior to the accumulation of the *Earlier Neolithic organic deposit* (*p 235*). It may therefore slightly pre-date or be contemporaneous with the *Earlier Neolithic organic deposit*, the *Earlier Neolithic alluvium*, or the *Later Neolithic organic deposit* (*Ch 10, p 328*). On purely stratigraphic grounds, it could also be later than any of these.

The lithic assemblage (304 pieces) from ***90571***, which is not strongly microlithic (two microlith fragments and a backed bladelet), contained, amongst other things, a leaf-shaped arrowhead; an awl; a polished-axe fragment made from, geochemically confirmed, 'Group VI' tuff (*Appendix 6*); and two pieces of pitchstone. There were also more broad blades (12) than narrow blades (eight), and it may be of some significance that brown and grey flint was fairly well represented, at 6.25% of this assemblage. On the basis of these characteristics, these could either be of terminal Mesolithic/Early Neolithic date or comprise both Neolithic and, residual, Mesolithic material, and therefore could date to sometime in the latter period (*Appendix 9*).

The Local Environment: the Palaeoenvironmental Evidence

A wealth of palaeoenvironmental data survived, principally within the *Principal palaeochannel*, which recorded some significant changes to the earlier Neolithic environment, in comparison to earlier periods. In this respect, the evidence from the *Earlier Neolithic organic deposit*, which equated with '*Early Neolithic I*' activity, was particularly insightful, as might be expected from such an organic-rich deposit, though the *Earlier Neolithic alluvium*, associated with '*Early Neolithic II*' activity, also contained a well-preserved assemblage of palaeoenvironmental remains. Again, these provide some information regarding the contemporary conditions in the channel and its surrounding environment, though, in this case, this must be used cautiously because, as the remains were within alluvium, their taphonomy is somewhat uncertain. In addition, some limited palaeoenvironmental evidence was retrieved from

the *Grid-square area*, which complements the evidence from the channel.

Plant macrofossils, algae, and insects

***Earlier Neolithic organic deposit* ('*Early Neolithic I*' phase)**

No diatoms, forminifera, or ostracods were retrieved (*Appendix 15*), although dinocysts of algal taxa (*Mougeotia* (HdV-313), *Zygnema* (HdV-58), *Spirogyra* (HdV-130), and *Closterium* (HdV-60); *Appendix 16*) suggest that the channel environment during this phase was characteristic of a shallow, stagnant, freshwater habitat. There was no indication of any marine influence.

Quantities of unmodified wood, of all sizes, were present in this deposit, and these were extensively sampled to profile the species represented (*Appendix 13*), although it should be noted that, because of the sampling and excavation methodologies, an unknown but very minor proportion that would actually have been within the *Mesolithic/Neolithic alluvium* (*Ch 6, p 188*) was included within this sample. Hazel was the dominant species (Fig 123), with there being almost equal proportions of alder, elm, and oak; much less frequent were pieces of birch, hawthorn-/crab apple-type, blackthorn-type, and willow/poplar. The proportion of hazel was broadly the same in comparison to the *Mesolithic organic deposit* (*Ch 3, p 70*); the increase in alder and, to a lesser extent, elm was to the detriment of oak; scrubby taxa possibly decreased in abundance; and birch and willow/poplar were recorded for the first time. Hazel and alder were the most common species of roundwood, accompanied by a few larger limbs or trunks of oak and elm, and, unlike the *Mesolithic organic deposit*, hawthorn-type wood was confined to smaller roundwood.

In conjunction with an examination of the soils (*Appendix 19*), the large amount of timber strongly suggests woodland adjacent to, or even encroaching into, the channel. As in the Mesolithic period (*Ch 3, p 58*), this still predominantly comprised hazel, but there were signs that alder was becoming more prevalent locally, and this, alongside the relative increase in elm and decrease in oak, may be linked, tentatively, to slightly wetter conditions on the terrace than when the *Mesolithic organic deposit* was forming.

The other waterlogged plant remains in the *Earlier Neolithic organic deposit*, sampled widely from various parts of the *Principal palaeochannel* (*Appendix 17*), largely confirmed the impression given by the wood species and sediment analyses. They included frequent to abundant amorphous plant remains, anthers, bark, buds, and bud scales, and were dominated by woodland types, with hazelnuts being very frequent, although alder fruits, catkin scales, and catkin axes

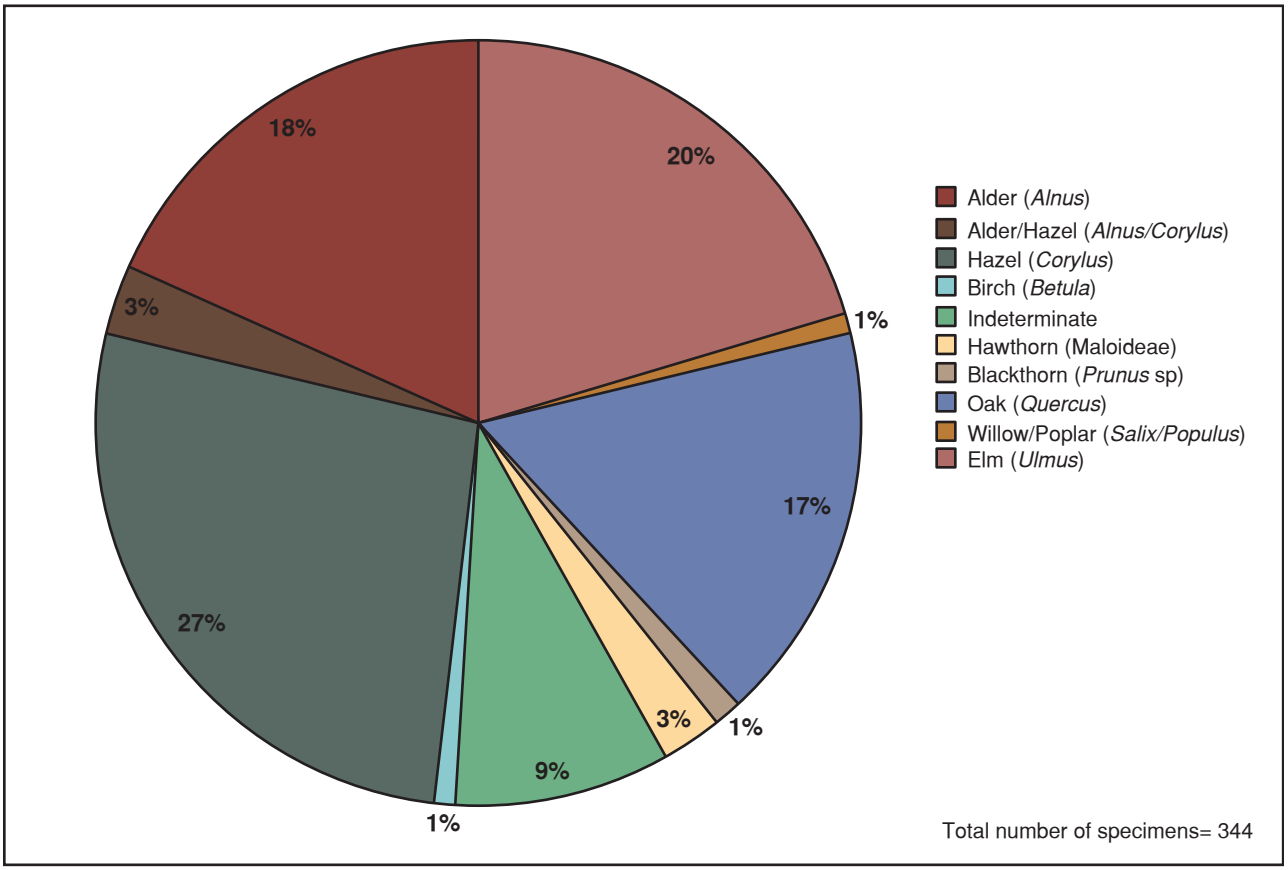


Figure 123: The composition of waterlogged wood from the Earlier Neolithic organic deposit

suggest the beginning of a transition to alder woodland, particularly in the northern part of the site. The fruiting bodies of the fungus, *Kretzschmaria deusta* (a wood-rot fungus), were also identified there.

The numbers of wetland plants and grasses indicate a fairly open, waterlogged woodland, perhaps more so than formerly, when the *Mesolithic organic deposit* was accumulating (*Ch 3, p 70*). There was also evidence for variation along the channel, as, in addition to the evidence for alder, the wetland plant remains (rushes, sedges, water plantain, and meadowsweet) were predominantly found in the northern part of the channel. In contrast, samples from Bay F, towards the south, contained fewer wetland species and, instead, were characterised by types suggesting some scrubby woodland (hazel, hawthorn, elder, and brambles) and grasses, indicative of open areas. On this basis, it can be concluded that the site was slightly drier in the south, perhaps with the flow restricted to a small stream, whereas, in the north, it was wetter and possibly ponded, although the rushes may mean that this ponded channel was starting to infill.

The insects (*Appendix 14*) were generally similar to those collected from the *Mesolithic organic deposit* (*Ch 3; p 87*). They included faunas dominated by a range of taxa associated with slow-flowing, or even stagnant, water, and the terrestrial faunas continued to be those predominantly associated with woodland. These latter included those indicative of deadwood and rotting trees, such as *Anobium punctatum, Grammoptera* spp, *Scolytus mali*, and *Xyleborus dispar*. Other taxa (of weevil) are today associated with tree leaves (*eg Rhynchites* spp and *Phyllobius* spp; Morris 1997; 2002; 2008).

The presence of both willow and alder in the local environment was demonstrated by taxa specific to these types of trees. The latter was indicated by the recovery of the now rare chrysomelid 'leaf beetle', *Agelastica alni* (Duff 2007). Deciduous woodland, that thrives in drier environments, was also indicated locally by *Stenostola ferra* and *Ernoporus caucasicus*, which are associated with the dead twigs and small branches of lime; *Hylesinus crenatus* and *Leperisinus varius*, that are associated with ash; and *Pteleobius vittatus*, which is associated with elm (*Appendix 14*).

One significant difference from the earlier deposits in the channel was the appearance in large numbers (in deposit ***70308***; Fig 124) of several taxa that suggest grazing animals may have been present in the area. A range of species, exclusively, or partially, associated with animal dung included the hydrophiliids *Cercyon lugubris* and *C analis*, the histerids, *Hister striola* and *Atholus*

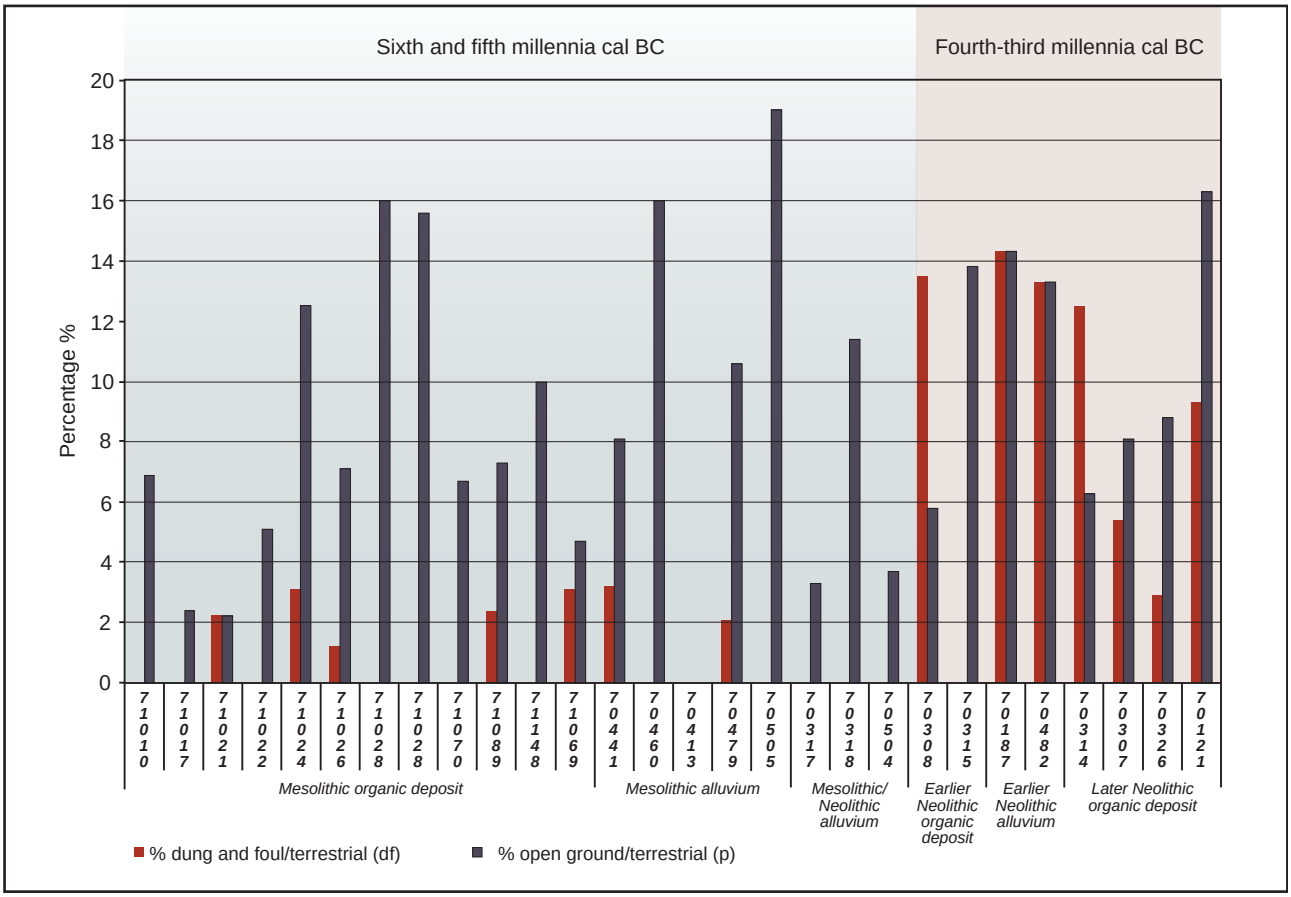


Figure 124: The relative increase of dung beetles in the Neolithic deposits, as compared to the Mesolithic deposits, within the Principal palaeochannel

bimaculatus, the staphylinid *Platystethus arenarius*, and the 'dung beetles', *Geotrupes* spp and *Aphodius fimetarius*. One explanation for this is that herds of domesticated woodland-grazing animals, such as cattle, existed in the locale. This is certainly plausible, as there does not seem to be any good reason to posit a dramatic rise in the numbers of other ungulates, such as deer, between the Mesolithic and Neolithic periods at Stainton West.

Fungal spores (*Appendix 16*) included slightly more coprophilic types than previously, such as *Podospora* (HdV-368), *Cercophora* (HdV-112), and *Sordaria* (HdV-55A/B), which may provide further evidence for locally grazing animals. Other fungal spore types, from species associated with rotting wood, such as *Kretzschmaria deusta* (HdV-44) and *Coniochaeta xylariispora* (HdV-6), may possibly indicate trees under stress from human practices, such as animal and woodland husbandry, although these were also commonly present in the earlier deposits in the channel.

***Earlier Neolithic alluvium* ('*Early Neolithic II*' phase)**
There was much less wood within the alluvial deposit than in the organic layers beneath and above it, although seeds/fruits from woodland species were common (*Appendix 17*), so trees were still likely to have been present close by, even if wood was not entering or becoming trapped in the channel to any great extent. The waterlogged plant remains included the seeds of aquatic and wet-ground plants, and smaller quantities of seeds and fruits derived from plants found in grassland, scrub, and waste ground, and those which can occupy a broad range of ecological habitats. Woodland species were predominantly represented by hazel and alder, although hawthorn fruits and elder pips were also present. Monocotyledonous and amorphous plant remains were abundant, along with small amounts of buds, bud scales, and anthers. The relatively larger proportions of wetland as opposed to woodland species may reflect a slightly more open and wetter environment, which may help to explain the lower amounts of wood in the channel. Some charcoal and microcharcoal (*Appendix 18*) was identified, but, as this had probably washed in, it could have been residual, from earlier periods. The identifiable charcoal was dominated by oak and alder/hazel, although field maple, spindle, *cf* elder, and *cf* rose were also identified.

There were no foraminifera or ostracods from this deposit (*Appendix 15*), but diatoms indicate that a freshwater environment prevailed (*Appendix 15*), and the presence of algal spores (*Closterium* (HdV-60) and *Spirogyra*; HdV-130) supports this. Insects were, however, preserved within the *Earlier Neolithic alluvium* (*Appendix 14*), although only in small numbers. Despite this, they included a similar range of taxa seen in the earlier stratigraphic units (*p 286*; *Ch 3*, *p 87*; *Ch 6*, *p 192*), with the exception that no indicators for woodland were recovered. This was probably a result of the small size of the faunas, rather than any wide-scale reduction in the surrounding woodland, although it does perhaps confirm the analysis of the waterlogged plant remains (*Appendix 17*). Dung beetles occurred in relatively high numbers (Fig 124), and if this was not a product of the low insect counts, perhaps shows that the grazing animals (possibly livestock) first identified in the *Earlier Neolithic organic deposit* (*p 235*) were still present locally. Possibly linked to this were numbers of coprophilic fungal spores (*Cercophora* (HdV-112), *Sporomiella* (HdV-113), and *Podospora* (HdV-368; *Appendix 16*). Other fungal spores identified included *Coniochaeta xylariispora* (HdV-6) and *Kretzschmaria deusta* (HdV-44), both of which are woodland types and are associated with its demise and decay, through any process that increased the number of injured or dying trees (*ibid*).

Pollen

The Elm Decline and the introduction/ intensification of agriculture

The results of the pollen analysis (*Appendix 16*) of the *Earlier Neolithic organic deposit* (*p 235*) and *Earlier Neolithic alluvium* (*p 235*) from the *Principal palaeochannel* were highly informative and demonstrated some significant changes in the vegetation in the vicinity of Stainton West and the wider landscape, which may be interpreted as, at least partially, anthropogenic in origin. The pollen from these deposits was primarily analysed in four monolith samples (Fig 125), to establish any variation that existed along the channel, and as part of the overall sampling strategy, which sought comprehensively to sample the channel sequence (*p 298*). These comprised samples 70250 and 70252, from Bay F, towards the south of the channel; sample 70296, from adjacent to Trident 2 (*p 271*) in Bay D, in the central part of the channel; and sample 70222, from Bay B, in the vicinity of Trident 1 (*p 253*) and Wooden Structures 1-3 (*p 240*). Additionally, some supplementary, fine-grained, pollen analysis was undertaken on part of monolith sample 70240, from Bay D.

It is evident from the respective pollen sequences, that the *Earlier Neolithic organic deposit*, along with the *Earlier Neolithic alluvium* (*p 235*), forms part of the CNDR 2 pollen superzone (*Appendix 16*). This zone was characterised by a two-phase elm decline: the Elm Decline (ED), which took place from an intermediate point during the accumulation of the *Earlier Neolithic organic deposit*, followed by the Elm Decline Demise (EDD), occurring while the *Earlier Neolithic alluvium* was accumulating.

The pollen data in sample 70222 (Fig 126), from Bay B, was the most complete and unproblematic, and, as it recorded a continuous sequence from the Mesolithic to the end of the Neolithic period, it probably provided the most reliable picture of what was generally happening; the other cores can be successfully correlated with this. Within this sample, prior to the commencement of the Elm Decline, there

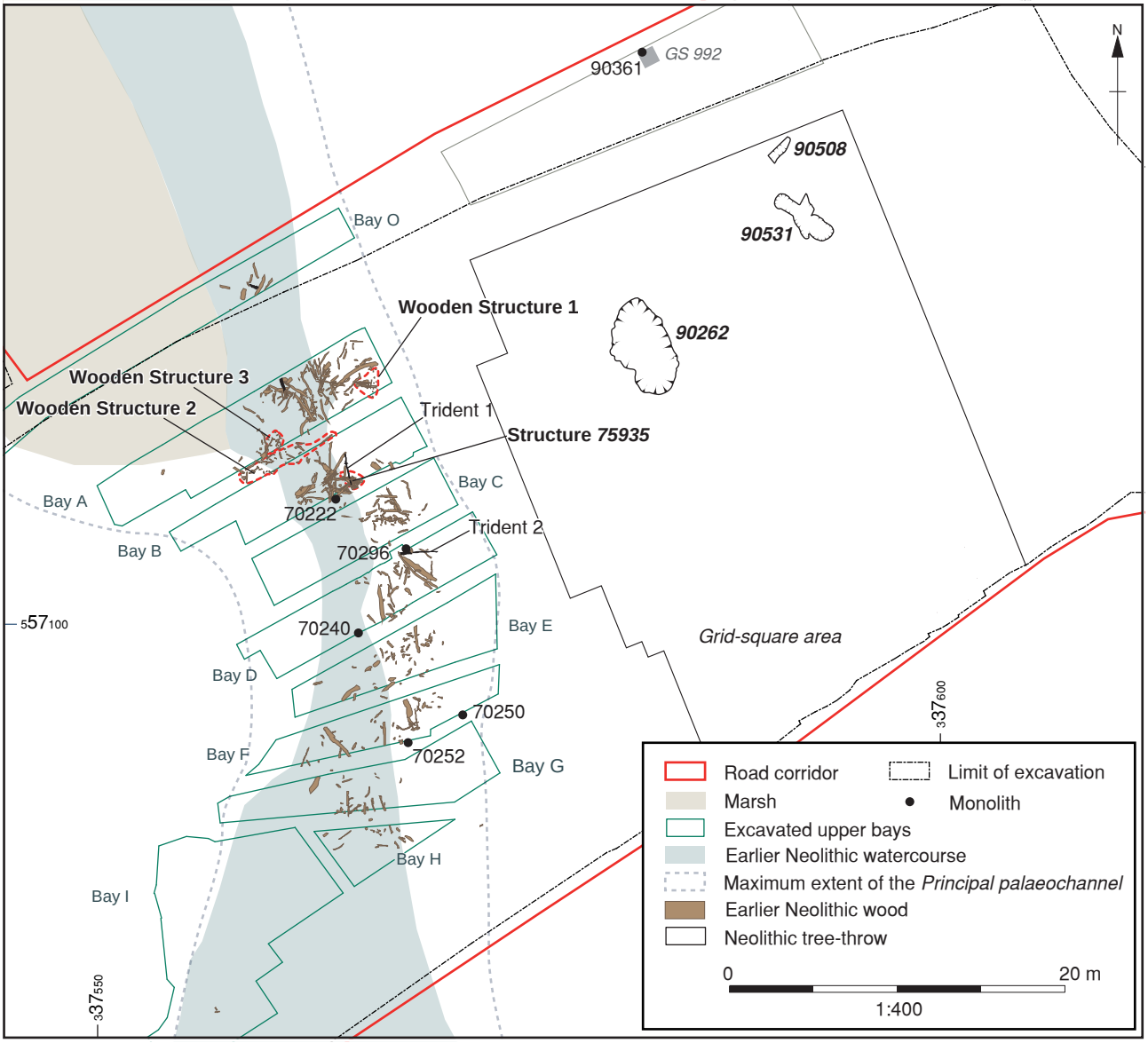


Figure 125: Pollen monoliths from the Principal palaeochannel *and* Grid-square area

was a rise in elm and a decline in oak within the upper part of the *Earlier Neolithic organic deposit*. This rise reached an apparent climax, with a dramatic spike at 8.39 m OD, which may represent a final flourishing, possibly symptomatic of an impending crisis, or may simply be an anomaly caused, for example, by an elm anther in the sample (*Appendix 16*). In either case, the Elm Decline commenced immediately after this, still within the *Earlier Neolithic organic deposit*. This was associated with both declining elm values and gradual increases in alder, although hazel was still well represented. A more dramatic rise in alder (to the detriment of hazel) then occurred higher up the sequence, in the overlying *Earlier Neolithic alluvium*, coincident with the Elm Decline Demise. Across this period, oak never recovered to its previously high Mesolithic levels, and the ratio of tree pollen to herb pollen decreased, as grass and cereal-type pollen rose between the Elm Decline and the Elm Decline Demise, therefore suggesting clearance and agriculture.

Similar sequences could also be discerned in the pollen data from Bays D and F, although interpreting this data was not an entirely straightforward process because of the complexity of the channel sequences in these respective areas. For instance, the Elm Decline was evident within sample 70240 from Bay D, but was not that clear in the much shorter sequence recorded from the same bay (sample 70296). However, within sample 70296 (Fig 127), the later Elm Decline Demise was detected, which was coincident with the point at which the second wooden trident (Trident 2; *p 271*) was recorded in the sequence, and also a time when cereal-type pollen and ribwort plantain were already present, grass numbers had risen, alder percentages were fairly high, and hazel appears to have been in decline (this is also true in sample 70240 (*Appendix 16*), although cereal-type pollen was not separated out there).

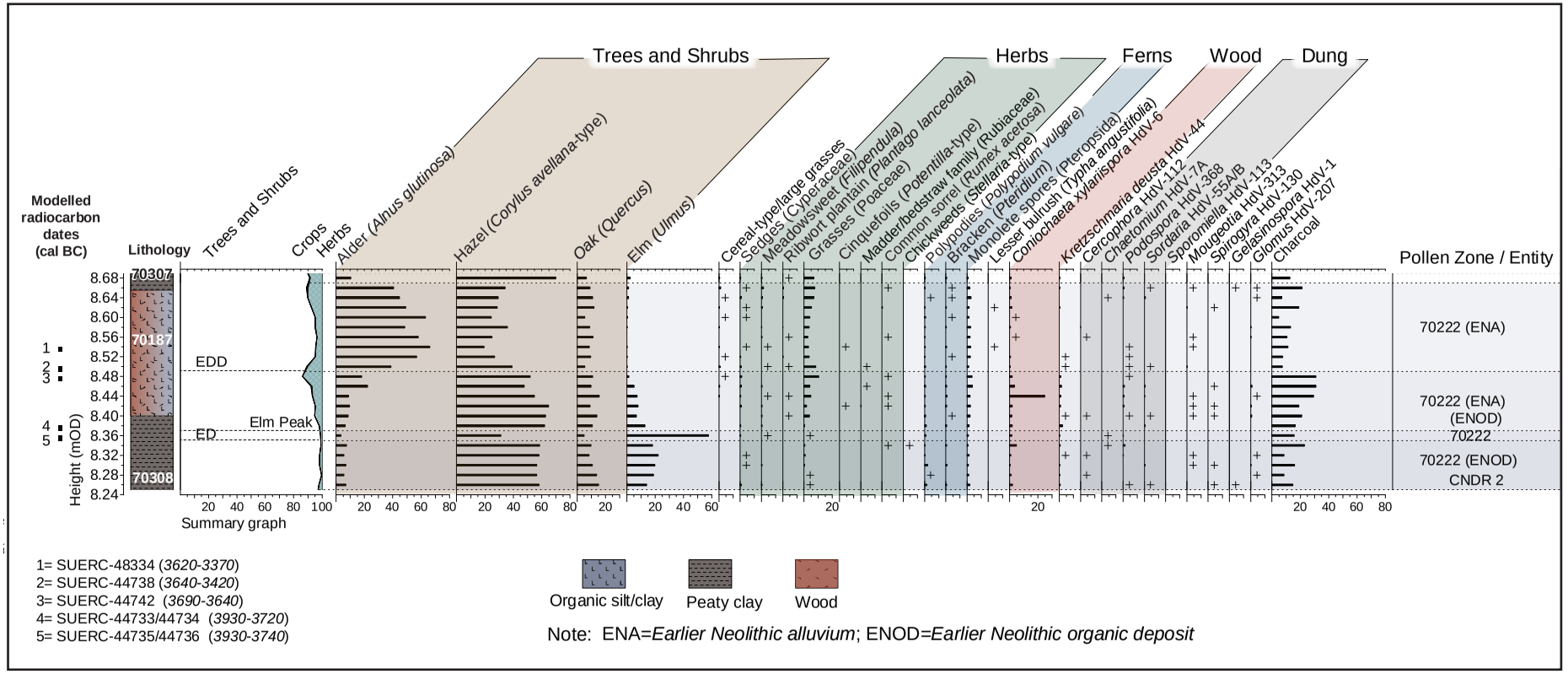


Figure 126: Pollen percentage diagram for the Neolithic and Chalcolithic deposits, monolith sample 70222, in Bay B of the Principal palaeochannel, *showing the Elm Decline (ED) and the Elm Decline Demise (EDD)*

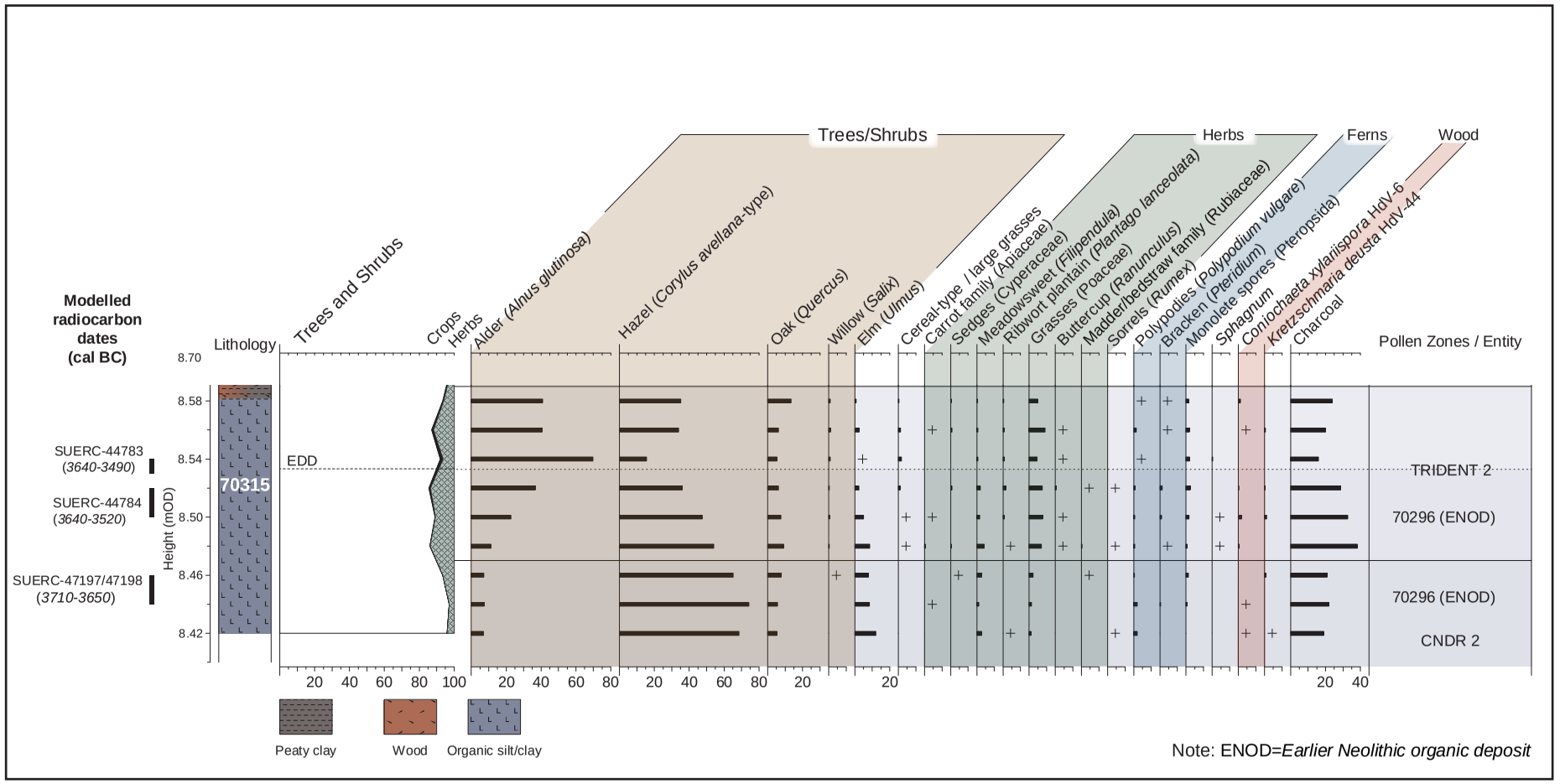


Figure 127: Pollen percentage diagram for the Neolithic deposits, monolith sample 70296, in Bay D of the Principal palaeochannel, *showing the Elm Decline Demise (EDD)*

Within Bay F, the *Principal palaeochannel* seems to have undergone several reactivations, and, consequently, the depositional sequence is rather anomalous. However, in one of the samples (70252), elm values started low, but oak increased up the profile and hazel remained dominant over alder. Therefore, this sample, which was probably equivalent to the *Earlier Neolithic organic deposit*, appears consistent with the Elm Decline recorded further to the north, in Bay B. Within the other Bay F sample (70250), elm values in the *Earlier Neolithic alluvium* started fairly high and declined up the profile, with alder, grass, and cereal-type pollen all increasing in frequency at the time of the Elm Decline Demise, whereas hazel dramatically decreased.

It is also interesting that the decline in elm at Stainton West should have occurred at a time when there was insect (*p 285*) and fungal spore (*p 287*) evidence for a possible rise in the number of grazing animals in the environment. If this was indeed due to the introduction of domesticated species, such as cattle or goats, then the browsing of elm trees (elm is a fodder species for cattle) may possibly have played a part in the decline of this species (Rasmussen and Christensen 1999). Along with other human activities, damage to the trees caused by browsing may have weakened them and made them more susceptible to disease. Monoliths 70222, 70296, and 70250 also recorded increases in the levels of microcharcoal and reworked carboniferous pollen grains between the Elm Decline and the Elm Decline Demise, which might indicate a local intensification of human activity, perhaps including woodland clearance.

The *Grid-square area*

On the dry land, a pollen monolith (90361) was extracted from grid-square 992 (Fig 125), to the north of earlier Neolithic tree-throws ***90262*** (*p 279*), ***90531*** (*p 282*), and ***90508*** (*p 283*). This produced significant results, although, in general, the material was not particularly well-preserved. It was suggestive of a mixed woodland environment, dominated by alder, with open grassy areas and evidence for cultivation, and, as such, resembles the assemblages recorded in the Neolithic deposits in the *Principal palaeochannel* (*above*).

The Earlier Neolithic Chronology at Stainton West

The chronological framework for the Earlier Neolithic phase is principally derived from the extensive programme of radiocarbon dating, accompanied by a dendrochronological wiggle-matched sequence (Table 25). These have, in turn, been used to date the two earlier Neolithic stratigraphic units within the *Principal palaeochannel*, and their associated cultural and environmental remains, and also the activity associated with the earlier Neolithic tree-throws on the adjacent dryland area (*Appendix 20*). However, to refine the dating of these elements and particular key parameters, this evidence was subsequently incorporated into the radiocarbon-dating model for the site (*Ch 1, pp 30-1*), which allows the nuances of the sequence and timings of Neolithic activity at Stainton West be comprehended to a much greater extent.

Human activity in the channel and on the dryland area

To understand the chronology of earlier Neolithic activity at Stainton West fully, it is necessary first to consider the terminal Mesolithic phases at the site. The last Mesolithic encampment was abandoned during the forty-fifth or forty-fourth century cal BC, followed by the Hiatus Phase (*Ch 6*). This characterised the marginalisation of the site, and was well-dated by a dendrochronological sequence (Cluster 2; *Appendix 20*), from large pieces of oak in the *Mesolithic/Neolithic alluvium* in the *Principal palaeochannel*. The earliest piece was apparently approximately contemporary with the abandonment of the last Mesolithic encampment (*Ch 4, p 147*), the latest dying in the winter of 4144 cal BC (*Ch 6, p 203*).

Various other organic materials associated with these oaks were potentially later still, and the overall modelled calculation for the final accumulation of the *Mesolithic/Neolithic alluvium*, and thus the end of the Hiatus Phase, was *3990-3880 cal BC* (*End Mesolithic/Neolithic alluvium II*; *Ch 6, p 203*). However, the upper parts of much of this wood protruded up into the *Earlier Neolithic organic deposit*, where there was direct contact between these oaks and objects that were seemingly part of a later phase of cultural activity, contemporary, and associated, with the *Earlier Neolithic organic deposit*. The most likely explanation for this is that the upper part of the *Mesolithic/Neolithic alluvium* was eroded by fluvial action, such as a flood pulse, exposing the tops of the oaks, and, if so, it is possible that the deposit had continued to form until a somewhat later date.

The earliest radiocarbon date (*3950-3870 cal BC*; *SUERC-42027*; '*Earliest Early Neolithic activity*'; Table 26) from the *Earlier Neolithic organic deposit*, which stratigraphically sealed and succeeded the *Mesolithic/Neolithic alluvium*, was from wooden structure ***75935***, perhaps a fish trap (*p 236*), which provides a secure date for the start of the formation of this deposit. The model calculates that this started to form in *3940-3820 cal BC* (*First Early Neolithic I*; Fig 128), so it is possible that the accumulation of the *Earlier Neolithic organic deposit* around the oaks of Cluster 2 happened directly after the erosion of the *Mesolithic/Neolithic alluvium*. However, it should be noted that although structure ***75935*** was probably anthropogenic in origin, indicating human activity in the channel, it is not culturally diagnostic of traditional Neolithic forms (*Ch 7, p 208*).

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) *cal BC*
Principal palaeochannel Bay B	Structure ***75935***; deposit ***70308***	Element of earliest *'Earliest early Neolithic activity'*	-	8.38	SUERC-42027	Hazel (*Corylus*) roundwood 76011	5037±26	-25.9	3950-3760	-	*3950-3870*
	Deposit ***70308***	Pollen superzone CNDR 2: elm peak (immediately prior to the Elm Decline (ED)) Element of *'Early Neolithic I'*	Monolith 70222	8.40	SUERC-44735	Hazelnut (*Corylus avellana*)	4976±35	-27.3	3930-3650	Statistically consistent with good agreement (T'= 1.35; $T'(5\%)$=3.8; v=1; A_{comb}= 80.4% (An= 50.0%))	*3930-3740*
					SUERC-44736	Alder (*Alnus glutinosa*) twig **77002**	5036±35	-30.0	3950-3710		
			Monolith 70222	8.42	SUERC-44733	Hazelnut (*Corylus avellana*)	4973±35	-25.9	3920-3650	Statistically consistent with good agreement (T'= 1.17; $T'(5\%)$=3.8; v=1; A_{comb}= 89.4% (An= 50.0%))	*3930-3720*
					SUERC-44734	Alder (*Alnus glutinosa*) twig **77000**	5028±35	-28.5	3950-3710		
Principal palaeochannel Bay C	Deposit ***70403***	Element of *'Early Neolithic I'*		8.42-8.53	SUERC-32946	Elm (*Ulmus* sp) roundwood **75639**	5000±35	-26.0	3950-3690	-	*3930-3690*
Principal palaeochannel Bay D	Deposit ***70315*** (lower fraction)	Element of *'Early Neolithic I'*	Monolith 70296	8.46	SUERC-47197	Hazelnut (*Corylus avellana*)	4801±39	-25.2	3660-3380	Statistically consistent with good agreement (T'= 3.54; $T'(5\%)$=3.8; v=1; A_{comb}= 52.9% (An= 50.0%))	*3710-3650*
					SUERC-47198	Elm (*Ulmus* sp) twig **77015**	4909±39	-26.6	3770-3640		

Table 25: Early Neolithic Phase radiocarbon dates from Stainton West

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) *cal BC*
Principal palaeochannel Bay F	Deposit ***70346***	Pollen signature suggests that these items date the period after the Elm Decline (ED) but before the Elm Decline Demise (EDD) Element of *'Early Neolithic I'*	Monolith 70252	8.23	SUERC-44766	Hazelnut (*Corylus avellana*)	4973±35	-27.7	3920-3650	-	*3900-3690*
				8.25	SUERC-44765	Hazelnut (*Corylus avellana*)	4972±35	-25.5	3920-3650	-	*3790-3660*
	Deposit ***70325***	Element of *'Early Neolithic I'*	Monolith 70254	8.25	SUERC-44775	Hazelnut (*Corylus avellana*)	5350±35	-26.7	4330-4050	Statistically inconsistent with poor agreement (T'= 23.77; $T'(5\%)$=3.8; ν=1; A_{comb}= 0.4% (An= 50.0%))	*4330-4050* (*Terminus post quem*)
					SUERC-44776	Elm (*Ulmus* sp) twig **77011**	5090±35	-26.2	3970-3790		*3930-3790*
	Deposit ***70325***	Bulk samples extracted from immediate vicinity of wooden paddle **75706** Element of *'Early Neolithic I'*	Bulk-sample 70124	8.31-8.52	SUERC-32634	Hazelnut (*Corylus avellana*)	4510±30	-30.7	3360-3090	-	-
					SUERC-44782	Hawthorn (*Crataegus monogyna*) seeds	4384±35	-28.7	3100-2900	-	-
			Bulk-sample 70115	8.42	SUERC-32632	Hazelnut (*Corylus avellana*)	4990±35	-25.0	3940-3660	-	*3920-3660*

Table 25: Early Neolithic Phase radiocarbon dates from Stainton West (cont'd)

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) *cal BC*
Principal palaeochannel Bay G	Deposit ***70424***	Element of *'Early Neolithic I'*		8.46	SUERC-32718	Elm (*Ulmus* sp) roundwood **75718**	5070±40	-26.1	3970-3770	-	*3940-3760*
Principal palaeochannel Bay B	Trident 1; deposit ***70308***	Element of *'Early Neolithic I'* Pollen superzone CNDR 2: Elm Decline (ED)		8.43	SUERC-26379	Oak (*Quercus* sp) sapwood?	4965±35	-28.0	3910-3650	-	*3900-3660*
	Trimmed wood **75778**; deposit ***70308***	Element of *'Early Neolithic I'*		8.53	SUERC-42028	Alder (*Alnus glutinosa*) roundwood	4956±26	-28.1	3790-3660	-	*3790-3660*
Principal palaeochannel Bay A	Deposit ***70353***	Sample extracted from adjacent to axehead 70353.30 Element of *'Early Neolithic I'*	Bulk-sample 70148	8.53	SUERC-32633	Hazelnut (*Corylus avellana*)	4440±35	-27.4	3340-2920	-	-
	Wooden Structure 1 (***70264***); deposit ***70353***	Element of *'Early Neolithic I'*	-	8.62	SUERC-42018	Hazel (*Corylus avellana*) roundwood stake **76028**	4995±26	-29.5	3930-3700	-	*3780-3690*
			-	8.65	SUERC-42029	Hazel (*Corylus avellana*) roundwood stake **76034**	4901±26	-26.1	3720-3640	-	*3760-3660*
			-	8.85	SUERC-42019	Hazel (*Corylus avellana*) trimmed roundwood **75913**	4963±26	-26.0	3800-3660	-	*3780-3670*

Table 25: Early Neolithic Phase radiocarbon dates from Stainton West (cont'd)

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) *cal BC*
Principal palaeochannel Bay A/B	*Wooden Structure 2* (***70467***); deposit ***70353***	Element of *'Early Neolithic I'*	-	8.34-8.44	SUERC-44792	Hazel (*Corylus avellana*) roundwood stake **76238**	4930±35	-27.9	3780-3640	-	*3770-3670*
			-	8.42	SUERC-42026	Elm (*Ulmus* sp) roundwood stake **76229**	4985±26	-25.8	3920-3690	-	*3780-3690*
			-	8.44	SUERC-42024	Hazel (*Corylus avellana*) roundwood stake **76228**	4928±23	-28.5	3770-3650	-	*3770-3670*
			-	8.52	SUERC-42020	Hazel (*Corylus avellana*) roundwood stake **76226**	4935±26	-22.7	3770-3650	-	*3770-3670*
	Woodchip 76223; deposit ***70353***	Intrusive item in *Earlier Neolithic organic deposit*	-	8.47	SUERC-42025	Alder (*Alnus glutinosa*)	4464±23	-28.1	3335-3025	-	-
Principal palaeochannel Bay O	Deposit ***70498***	Timber debris **76503** Element of *'Early Neolithic I'* Timber matched to Cluster 3 Dated by dendro-chronological wiggle-matching	Block M from timber **76503**	-	SUERC-44844	Oak (*Quercus* sp) heartwood, rings 1-10	5000±33	-28.7	3950-3690	-	*3740-3690* (final tree ring (184) in the sequence)
			Block N from timber **76503**	-	UBA-22280	Oak (*Quercus* sp) heartwood, rings 31-40	5064±38	-28.6	3970-3770	-	
			Block O from Timber **76503**	-	SUERC-44845	Oak (*Quercus* sp) heartwood, rings 71-80	5078±33	-28.1	3960-3790	-	
			Block P from timber **76503**	-	UBA-22281	Oak (*Quercus* sp) heartwood, rings 101-10	5040±47	-27.3	3960-3710	-	

Table 25: Early Neolithic Phase radiocarbon dates from Stainton West (cont'd)

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) *cal BC*
Principal palaeochannel Bay O (continued)	Deposit ***70498*** (continued)	(*see above*)	Block Q from timber **76503**	-	SUERC-44846	Oak (*Quercus* sp) heartwood, rings 141-50	4927±33	-26.5	3780-3640	-	*3740-3690* (final tree ring (184) in the sequence)
			Block R from timber **76503**	-	UBA-22282	Oak (*Quercus* sp) heartwood, rings 171-80	4957±44	-26.9	3930-3640	-	
Principal palaeochannel Bay B	Deposit ***70187***	Element of *'Early Neolithic II'* Constrains lower boundary of the Elm Decline Demise (EDD)	Monolith 70222	8.52	SUERC-44742	Alder (*Alnus glutinosa*) twig **77004**	4978±35	-31.7	3930-3660	-	*3690-3640*
		Pollen superzone CNDR 2: spread of alder Brackets the upper boundary of the Elm Decline Demise (EDD) Element of *'Early Neolithic II'*	Monolith 70222	8.54	SUERC-44737	Hazelnut (*Corylus avellana*)	4526±35	-24.2	3370-3090	Statistically inconsistent with poor agreement (T'= 9.76; $T'(5\%)$=3.8; ν=1; A_{comb}= 13% (An= 50.0%))	-
					SUERC-44738	Alder (*Alnus glutinosa*) twig **77003**	4688±35	-30.4	3630-3360		*3640-3420*
		Pollen superzone CNDR 2: spread of alder Element of *'Early Neolithic II'*		8.58	SUERC-48334	Hazelnut (*Corylus avellana*)	4730±34	-27.5	3640-3370	-	*3620-3370*

Table 25: Early Neolithic Phase radiocarbon dates from Stainton West (cont'd)

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) *cal BC*
Principal palaeochannel Bay D	Deposit ***70315*** (upper fraction)	Pollen superzone CNDR 2: Elm Decline Demise (EDD)	Monolith 70296	8.52	SUERC-44784	Alder (*Alnus glutinosa*) twig **77012**	4775±35	-30.8	3650-3380	-	*3640-3520*
				8.54	SUERC-44783	Alder (*Alnus glutinosa*) twig **77014**	4769±35	-30.6	3650-3380	-	*3640-3490*
					SUERC-32635	Sediment	4585±35	-29.6	3510-3110	-	-
	Trident 2; deposit ***70315*** (upper fraction)	Element of *'Early Neolithic II'*	-	8.61-8.66	SUERC-26660	Trident 2; oak (*Quercus* sp) sapwood	4745±35	-27.5	3640-3370	-	*3640-3370*
Principal palaeochannel Bay O	Deposit ***70482***	Element of *'Early Neolithic II'*	Monolith 70507	8.78	SUERC-32702	Sediment	4380±35	-27.4	3100-2910	-	-
Grid-square area	*Stabilised land surface* ***90206***	Intrusive material within this surface is an element of *'Early Neolithic activity in the Grid-square area'*	Bulk-sample 90151	-	SUERC-32643	Indeterminate short-lived charcoal	4940±35	-25.9	3790-3650	-	*3790-3650*
	Tree-throw ***90531*** (fill ***90527***)	Element of *'Early Neolithic activity in the Grid-square area'*	Bulk sample 90333	-	SUERC-32708	Indeterminate short-lived charcoal	4930±40	-26.8	3790-3640	-	*3790-3640*
	Tree-throw ***90262*** (fill ***87385***)	Element of *'Early Neolithic activity in the Grid-square area'*	Bulk sample 90115	-	SUERC-59307	Alder/hazel (*Alnus/Corylus*) charcoal	4925±26	-26.2	3770-3640	Statistically consistent with good agreement ($T'=0.02$; $T'(5\%)=3.8$; $\nu=1$; $A_{comb}=122.7\%$ ($An=50.0\%$))	*3770-3640*
	Tree-throw ***90262*** (fill ***90326***)	Element of *'Early Neolithic activity in the Grid-square area'*	Bulk sample 90123	-	SUERC-41994	Alder/hazel (*Alnus/Corylus*) charcoal	4917±23	-24.8	3765-3645		
	Tree-throw ***90508*** (fill ***90523***)	Element of *'Early Neolithic activity in the Grid-square area'*	Bulk sample 90314	-	SUERC-32707	Alder/hazel (*Alnus/Corylus*) charcoal	4840±40	-25.3	3710-3520	-	*3710-3520*

Table 25: Early Neolithic Phase radiocarbon dates from Stainton West (cont'd)

A great many radiocarbon dates were obtained from within the *Earlier Neolithic organic deposit* (equating to model phase '*Early Neolithic I*') and the *Earlier Neolithic alluvium* (equating to model phase '*Early Neolithic II*') that succeeded it. In the former, a dendrochronological sequence, provided by two oak planks (**76503** and **76118**; *p 256*) was dated by radiocarbon dating and wiggle matching (Cluster 3; *Appendix 20*). The chronology is robust and well-defined, comprising taphonomically secure radiocarbon dates from artefacts found *in situ* within their depositional context; *in-situ* man-made wooden structures (*p 240*); and short-lived seeds and twigs from monolith samples. The modelled chronological sequence (*Appendix 20*) suggests that the *Earlier Neolithic organic deposit* ('*Early Neolithic I*' phase) accumulated in *3940-3650 cal* BC, and the *Earlier Neolithic alluvium* in *3690-3370 cal* BC ('*Early Neolithic II*' phase); the outlying values of these ranges denote the longest probable duration of the Earlier Neolithic phase of activity at Stainton West, which is calculated as being *360-570 years* long (Table 26; *Appendix 20*). In terms of the individual phases, the '*Early Neolithic I*' phase has been calculated as lasting *150-270 years*, and the '*Early Neolithic II*' phase lasted for *110-300 years*. Additionally, there were several radiocarbon dates from well-stratified charred organic materials within tree-throws in the *Grid-square area*, which show that this activity was taking place in *3800-3520 cal* BC ('*Early Neolithic activity in the Grid-square area*').

Earliest Early Neolithic activity	*3950-3870*
Start Wooden structures	*3820-3700*
First Wooden Structure 1	*3790-3700*
Last Wooden Structure 1	*3750-3660*
First Wooden Structure 2	*3780-3700*
Last Wooden Structure 2	*3750-3660*
Duration Wooden Structures	*0-100 years*
End Wooden structures	*3750-3650*
First Early Neolithic I	*3940-3820*
Last Early Neolithic I	*3700-3650*
Duration Early Neolithic I	*150-270 years*
First Early Neolithic II	*3690-3640*
Last Early Neolithic II	*3550-3370*
Duration Early Neolithic II	*110-300 years*
Duration Early Neolithic	*360-570 years*
First Early Neolithic activity in the Grid-square area	*3800-3680*
Last Early Neolithic activity in the Grid-square area	*3690-3520*

Table 26: Key Early Neolithic Phase parameters

However, one of the problems with this kind of chronological modelling is that short-lived activity can be 'smeared' and made to look as if it was of longer duration. In crude terms, it is perhaps most likely that the archaeological activity (rather than the deposit) associated with the *Earlier Neolithic organic deposit* dated to *c* 3750-3650 cal BC and that associated with the *Earlier Neolithic alluvium* dated to *c* 3650-3500 cal BC. Moreover, it may be that, rather than representing continuous activity, this was actually a series of very short-lived episodes, perhaps of varying intensity, punctuating a more prolonged period. There was also a strong tendency for the radiocarbon dates for the activity in the *Grid-square area* to correspond more closely to the '*Early Neolithic I*' phase, suggesting that this was when tree clearance was taking place in this area (*p 288*).

To look at this in slightly more detail, all of the major wooden structures (Wooden Structures 1-3; *p 240*) were within the *Earlier Neolithic organic deposit* in Bay A, and within the baulk area separating Bays A and B, and fell within a relatively tight range (*3820-3700 cal BC; Start Wooden structures* to *3750-3650 cal BC; End Wooden structures*; Fig 128); their calculated duration (the time over which they were all probably constructed, based on the radiocarbon-dated age of all timber used) was *0-100 years*. This probable range corresponds well to the dendrochronological wiggle-matched date (*3750-3690 cal* BC) from the outer ring of oak plank **76503** (*above*; *Prior CNDR Cluster 3 ring_184*). It is worth noting that this is not an age of death, as no sapwood was included in the plank sequence, but the form of the plank suggests that the tree was unlikely to have been significantly younger than this.

The dating of both the plank and the structures also compares well with the date range (*3800-3680 cal* BC) for the tree-throws in the *Grid-square area* (*First Early Neolithic activity in the Grid-square area*). Indeed, using the Oxcal 'Order' function (*Appendix* 20) to analyse the model, the probability that *Start Wooden structures* occurred before *First Early Neolithic activity in the Grid-square area* is 57%, and it has a 59% probability that it occurred before the age of death (based on the radiocarbon date from sapwood; SUERC-26379; *p 254*) of the tree used to make one of the oak tridents (Trident 1; *p 253*), which was deposited in this part of the channel sequence, alongside associated lithic materials, in Bay B. In other words, this means it is possible that the tree-felling activity in the *Grid-square area* was contemporary with the construction of the structures in the *Principal palaeochannel* and the manufacture and deposition of the trident, and other materials, into it.

There were no wooden structures within the *Neolithic alluvium*, so human activity was primarily dated by

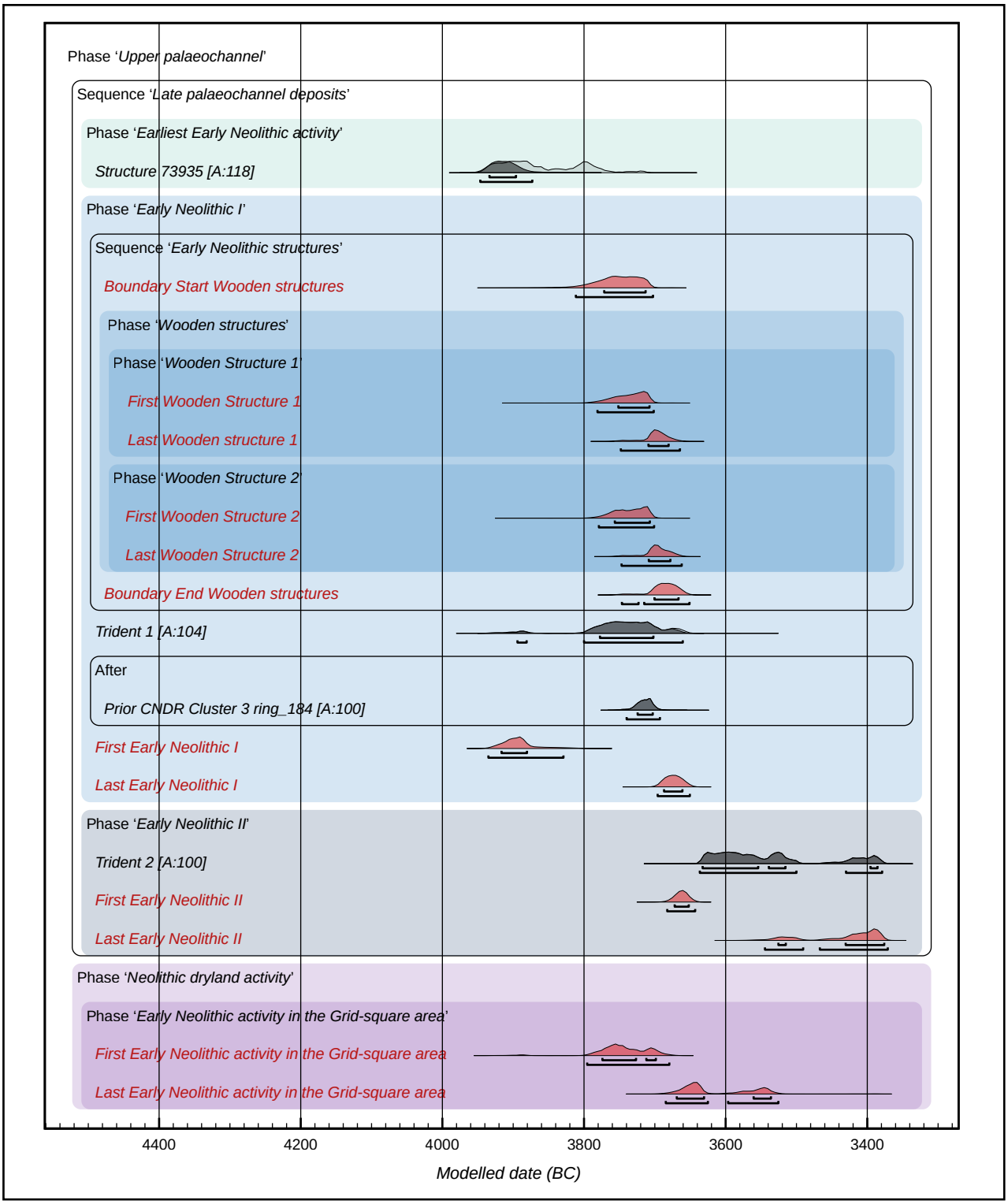


Figure 128: Radiocarbon modelling of key earlier Neolithic parameters

the other oak trident (Trident 2), in Bay D, the sapwood giving the age of death (*3640-3370 cal* BC; *SUERC-26660*; *p 272*) of the tree used to make it. Given that one of the trident's tines had broken off in prehistory, and the detached tine was deposited with the remainder of the implement, there can be no doubt that this object was *in situ* in its place of deposition (*p 271*). It is interesting to note that the interval between the relative ages of death of the oaks used to make Tridents 1 and 2 (and thus the difference in age of the tridents, as the oak must necessarily have been worked when green) can be calculated as being *30-350 years* (*95% probability*) or *70-210 years* (*68% probability*; *Appendix 20*). So, whilst it is possible that they could have been deposited within a few years of each other, if it

was the case that Trident 1 was already fairly old when this occurred, it seems more likely that the two depositional acts were separated by some time, and that this artefact class had a reasonably long currency. Several radiocarbon dates from short-lived organic materials in a nearby monolith (70296; *p 290*) confirmed the dating of the *Earlier Neolithic alluvium* suggested by Trident 2. Further confirmation was provided by a correlation with radiocarbon dates from another monolith (70222; *p 289*), in a similar part of the sequence, in Bay B.

Dating the Elm Decline

Radiocarbon dates were obtained from single-entity short-lived plant macrofossils from key horizons in the pollen record to establish a chronology for the Elm Decline and the Elm Decline Demise (*p 287*), from monoliths 70222, in Bay B; 70296, in Bay D; and 70252, in Bay F (*pp 289-91*). Seemingly the best dating for the Elm Decline is from monolith 70222, where there were two sets of statistically consistent radiocarbon dates (SUERC-44733-6; Fig 126), and the best dating for the Elm Decline Demise is from monolith 70296, where there was a single statistically consistent pair (SUERC-44783-4; Fig 127).

There were also close stratigraphical associations between these dated samples and the radiocarbon-dated artefactual evidence for human activity. For instance, the structure (**75935**; *p 236*) belonging to the '*Earliest Early Neolithic activity*' phase, the first wooden trident (Trident 1), and worked alder stake (**75778**), both belonging to the '*Early Neolithic I*' phase, all occurred adjacent to monolith 70222, within the *Earlier Neolithic organic deposit*, at the same level as the radiocarbon dates for the Elm Decline. Within Bay D, the second wooden trident (Trident 2), belonging to the '*Early Neolithic II*' phase, lay within the *Earlier Neolithic alluvium*, immediately adjacent to monolith 70296, and was at exactly the same height (8.53 m OD) at which the Elm Decline Demise was radiocarbon dated.

The dates were used to produce depth-depositional models for the sediments in each of the monoliths (*Appendix 20*), from which they could be interpolated for certain key palaeoenvironmental events (the Elm Declines, and the appearance of ribwort plantain and cereal-type pollen) from their positions in each monolith (Table 27). The results are not entirely straightforward, however, with some variation existing between the sampled horizons in different parts of the channel. This may be explicable in many ways, including taphonomy and the small number of available dates from which to interpolate, and also the flat gradient of the calibration curve at this point may have complicated matters. However, when taken together, a broadly consistent pattern was recorded, showing that the Elm Decline, woodland clearance, and a rise in cereal-type pollen were all coincident with the Earlier Neolithic anthropogenic activity in the channel, within the *Earlier Neolithic organic deposit* and the *Earlier Neolithic alluvium*, and that this most likely culminated in the thirty-eighth to thirty-sixth centuries cal BC (Fig 129).

Declining elm	
Prior Elm peak immediately before Elm Decline Bay B	*3940-3730*
Prior Elm Decline Demise Bay B	*3780-3520*
Prior Elm Decline Demise Bay D	*3640-3510*
Prior Abrupt drop in elm pollen Bay F	*4330-4040*
Prior Elm declining to presence Bay F	*3900-3670*
Cereal-type pollen	
Prior Cereal-type pollen Bay B	*3870-3670*
Prior Cereal-type pollen Bay D	*3690-3530*
Clearance indicators	
Prior Ribwort plantain Bay B	*3930-3710*
Prior Ribwort plantain Bay D	*3860-3540*
Prior Ribwort plantain Bay F	*3720-2870*

Table 27: Key Early Neolithic Phase environmental parameters

This strongly suggests that agriculture first began to have a detectable effect on the local environment at the same time that the first Neolithic cultural horizon appeared in the *Principal palaeochannel* and when trees were felled within the *Grid-square area*. As the elm decline did not start until the *Earlier Neolithic organic deposit* had been accumulating for some time, and because cereal-type pollen and ribwort plantain were not present, and grass pollen did not start to rise until this time or just slightly later, the probable truncation of the *Mesolithic/Neolithic alluvium* (*p 291*), and loss of pollen information that resulted, is unlikely to have concealed any similar earlier agricultural signatures. Furthermore, as the Elm Decline Demise was synchronous with the deposition of the second wooden trident in the channel, perhaps as much as a century or so later, the Early Neolithic activity and the elm decline appear to have been coterminous. Therefore, in this instance, it seems reasonable to conclude that the elm decline was caused, or exacerbated, by human activities and the local introduction of agriculture.

The elm decline forms a major, nationally widespread, pollen event that, at many sites, is coincident with the onset of agriculture (*cf* Whitehouse *et al* 2014), so it is highly significant that it should have occurred at the same time as other indicators for this at Stainton West. During this period, the forests may have been utilised to provide improved browsing conditions for animals, as well as the clearance of areas for potential cereal cultivation (Innes *et al* 2006; 2013), and the

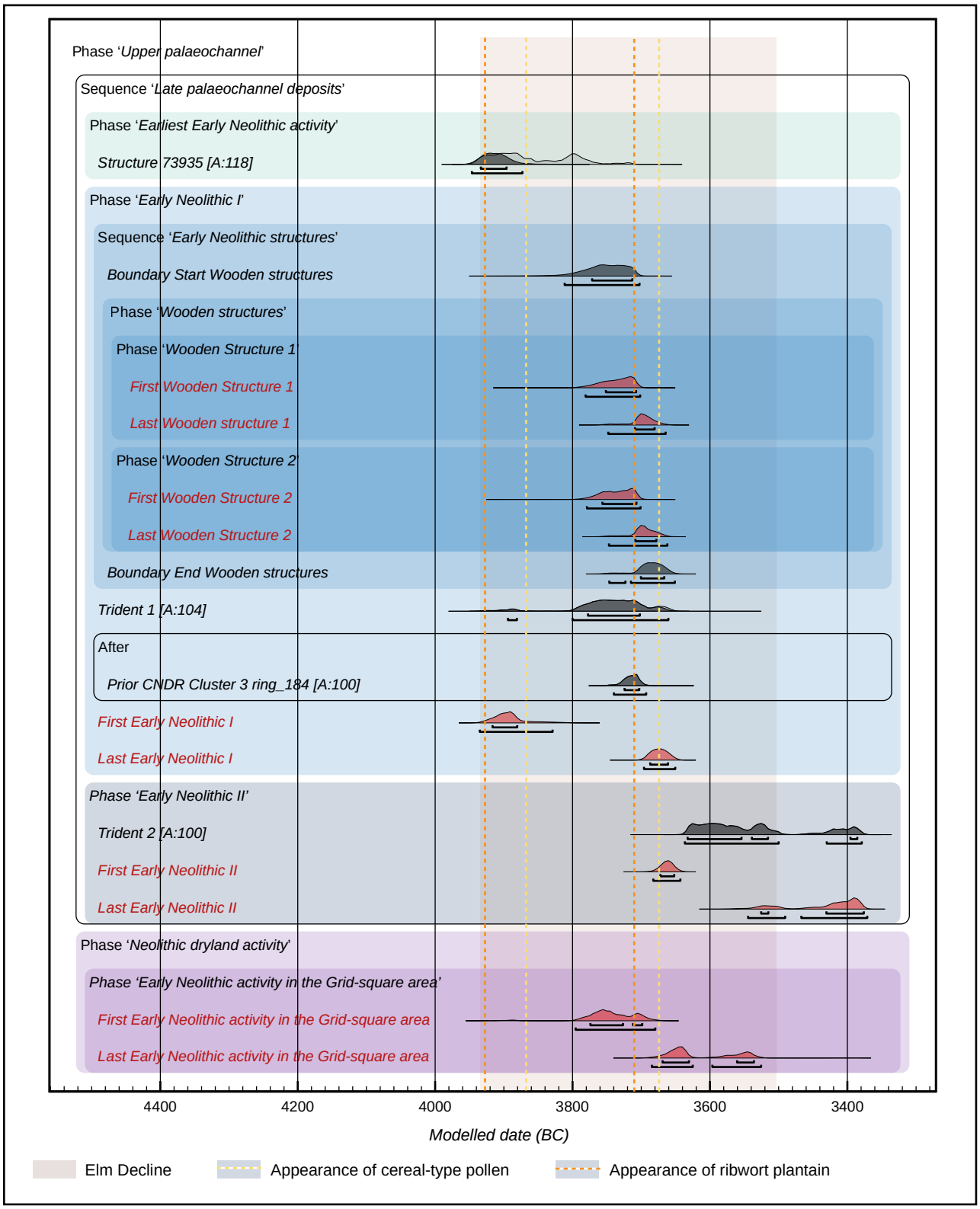


Figure 129: The radiocarbon dating of the Elm Decline and the appearance of cereal-type pollen and ribwort plantain, compared with other key Early Neolithic parameters

dramatic decline in elm may have been linked to the modification of the woodlands (for instance, through coppicing, pollarding, or girdling) to increase fodder production for domesticated animals (Rasmussen and Christensen 1999). Elm trees may also have been weakened by disease (as interpreted from high counts of wood-rot fungal spores), which might, variously, have been initially caused by animals, people, or through natural events, such as waterlogging, and this could have facilitated clearance by early farmers.

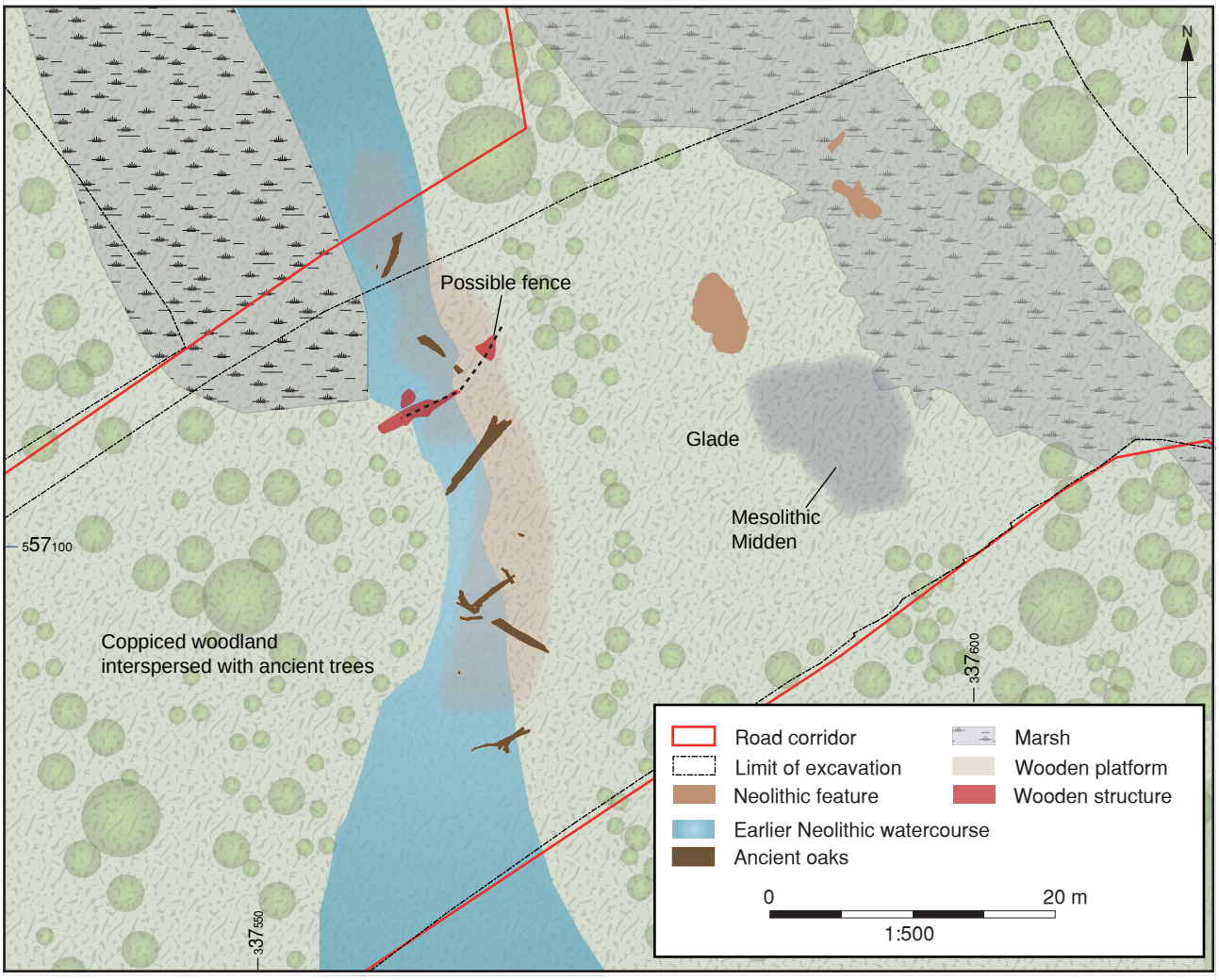


Figure 130: Earlier Neolithic wooden structures in the Principal palaeochannel *at Stainton West*

9

AN ANCESTRAL GLADE? INTERPRETING THE EARLY NEOLITHIC ACTIVITY IN STAINTON WEST

F Brown

A Drier Channel

In the second half of the fortieth to the earlier thirty-ninth century cal BC, alluvial deposition (the *Mesolithic/Neolithic alluvium*; *Ch 6*, *p 191*) in the *Principal palaeochannel* was superseded by the accumulation of an organic peaty deposit (the *Earlier Neolithic organic deposit*; *Ch 8, p 298*). In addition, at this time, possible fish trap ***75935*** was also established. Significantly, this represents the first convincing cultural evidence to have been identified within the channel for approximately half a millennium, although it is possible that fluvial action, in the less stable channel environment that had prevailed hitherto, might have eroded any evidence for activity prior to this. However, this structure was not culturally diagnostic, and despite providing evidence that this part of the floodplain was still frequented by humans, it does not necessarily imply anything other than unintensive use, and technologically, it is consistent with fishing strategies employed by both hunter-gatherer and farming societies (*inter alia*; Lozovski *et al* 2013a; Jecock 2011).

Activity in the Channel

Wooden structures

Somewhat later than this, but still associated with the *Earlier Neolithic organic deposit*, there was striking evidence that the *Principal palaeochannel* (then probably no more than a largely silted, stream-fed pond or small oxbow lake) had become the focus for much more intensive activity of a kind not witnessed at the site before. In the first instance, there seems to have been a phase of foundational activity, probably dating to the middle part of the thirty-eighth century cal BC (*'Early Neolithic I'*; *Ch 8*, *p 238*), involving the architectural elaboration of the channel, by laying down a rudimentary wooden platform and erecting wooden fences and post settings (Fig 130). The former comprised the consolidation of the more gently sloping, eastern river bank, by a loose lattice of coppiced poles and other brushwood, amongst which oak timbers and carved oak artefacts were regularly interspersed. This platform appeared to have taken as its basis the ancient boughs and trunks of Mesolithic oak trees that had been borne into the channel many centuries earlier by flood waters (*Ch 6*, *p 195*), and which had been exposed by much more recent episodes of erosion. That these were perhaps deemed auspicious, or otherwise significant, is hinted at by the fact that they were frequently referenced by worked timbers incorporated into the platform (*Ch 8, p 240*), and other deposited objects. It may also be significant that platforms of this type (and also the earlier fish trap; *above*) have a long history of use, being associated with several Mesolithic/hunter-gatherer sites in Britain and Ireland (such as Star Carr; Milner *et al* 2018a; *p 317*). Hence, the creation of such a structure at Stainton West in the earlier centuries of the fourth millennium cal BC may relate to a continuation of earlier hunter-gatherer practices.

A series of *in-situ* wooden structures (Wooden Structures 1-3; *Ch 8*, *p 240*) was also contemporary and associated with the platform, which, together, may once have comprised a single hurdle fence stretching across the channel, and a stake setting associated with this. It is possible that this fence acted as a fish weir, although this was not necessarily the case, and instead it may have simply served to define a ponded area where the channel widened out in the northern part of the site. In addition to this fence, there were several other places in the channel where stake settings survived *in situ*, and other displaced stakes suggested that additional structures had formerly existed. It seems likely that these structures were also intended to mark out and subdivide the channel space. The stakes were made from coppiced poles of hazel and alder, sharpened to points with stone axes, and along with the similar poles used in the platform suggest that coppiced stands fringed the channel, as indicated by the palaeoenvironmental evidence.

Deposition

Numerous dumps, and more highly structured deposits, of wood and lithic material were associated

with the wooden structures, and with particular parts of the channel. Additionally, other lithic objects seem to have been largely *in situ*, being discarded or left where they had been used. Much of the material was probably deposited in a foundational act (or acts), when the platform and fence were established, although the range and distribution of the artefacts suggest that, subsequently, the channel continued to be used in a variety of different ways. Radiocarbon evidence points to activity continuing for over a century and, conceivably, as late as the end of the thirty-sixth century cal BC (*'Early Neolithic II'*; *Ch 8, p 271*), by which time slightly wetter conditions in the channel had led to the formation of the *Earlier Neolithic alluvium*, sealing the *Earlier Neolithic organic deposit*. It is worth noting that there was no evidence, in the form of hearths, structures, or scatters of finds, for contemporary domestic activity in the *Grid-square area* adjacent to the channel. So, unlike the Mesolithic phase of encampment (*Ch 4*), the activity associated with the channel is not thought to have been domestic *per se*.

Wooden artefacts

Most of the artefacts deposited into the channel were made from either stone or wood, although there were also a few sherds of pottery. Bone may once have existed, but would not have survived, as the channel conditions were too acidic (pH 4 when tested during excavation); similarly, less-durable organic materials may also have perished. Occasionally, it appeared that stone and wooden objects had been placed with direct reference to each other, and they likewise clustered together, in more general association, in discrete parts of the channel. The overwhelming impression was that deposition was not casual and was, to a greater or lesser extent, structured. For example, artefacts seemed to have been placed with reference to the large Mesolithic oaks, and/or the clusters of timber and debris in the platform associated with them.

Perhaps the most obvious instances of such structured deposition (Fig 131) were several seemingly foundational acts of deposition, contemporary with the construction of the platform and structures,

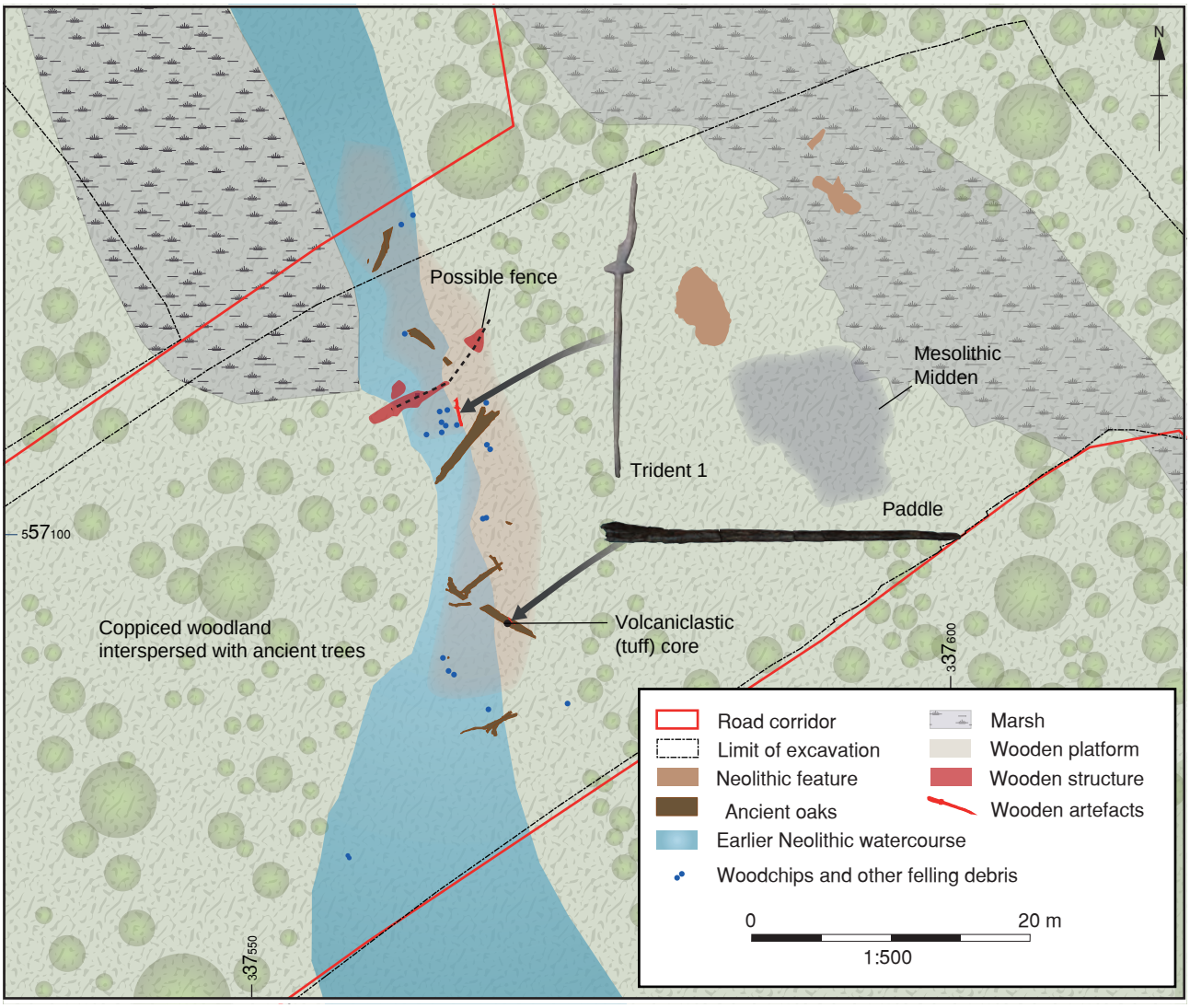


Figure 131: Possible foundational acts of deposition in the Principal palaeochannel *at Stainton West*

such as the paddle (**75706**) that was propped, on a Mesolithic oak, opposite a large tuff core; the earlier wooden trident (Trident 1), deposited with a large smashed and incomplete nodule of chert; and various clusters of large woodchips and other debris associated with the felling and splitting up of oak and elm trees. The latter items contrasted with the alder and hazel coppiced pieces used in the structures, as they seemed to represent the residues of woodworking activity undertaken elsewhere, especially considering that there was no evidence for *in-situ* felling or splitting in the channel, and that there were no oak or elm stumps preserved there (in any case, the channel would have been too wet for these tree species to grow there). The finely carved trident and paddle are exemplary of the planking and splitting technology.

It is also clear that, following these foundational acts of deposition, the channel continued to be a receptacle for structured deposition, suggesting a fairly long-lived tradition. This is most clearly evidenced by the deposition of the second trident (Trident 2), that was deposited some decades, or even centuries, after the platform and fences had been constructed, and the first trident had been placed in the channel (the gap in time between the ages of Tridents 1 and 2 has been calculated to be *30-350 years*; *Appendix 20*). This object had also been placed on the platform adjacent to the stream (Fig 132; *Ch 8, p 240*), with one of its broken tines tucked under it.

Stone tools

The stone artefacts in the channel, most spectacularly, included several polished-stone axeheads (*Ch 8, p 265*), all of which had been removed from their hafts prior to deposition. Each was of a slightly different character, one being in near pristine condition, whereas two others hinted at having had long biographies (one being battered and broken, and the other having been reshaped from what had originally been a much larger object). Similarly, there were several flint arrowheads, one of which still bore the traces of birch-bark glue (*Ch 8, p 270*), suggesting that it too had been removed from its shaft prior to deposition. Rather than being foundation deposits, it is possible that all or some of

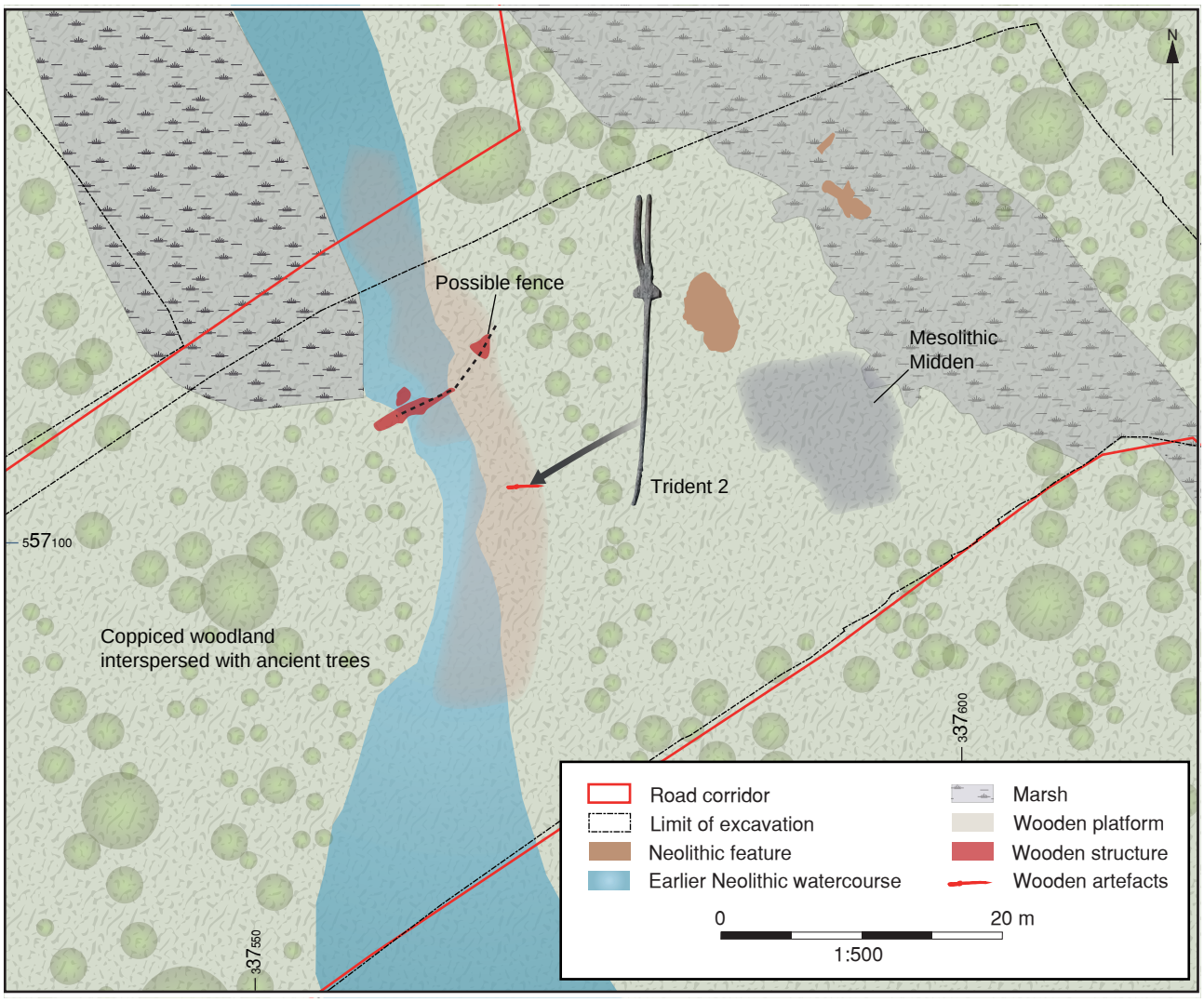


Figure 132: The deposition of Trident 2 in the Principal palaeochannel *at Stainton West*

these objects were placed in relation to the wooden platform, during secondary phases of deposition within the channel (Fig 133). Certainly, the reshaped axe was an example of this, as it was found in close proximity to sherds of pottery and Trident 2, which radiocarbon dating places at the end of this Earlier Neolithic activity phase (*p 305*).

The assemblage of broad blades contained a disproportionate number made in high-quality imported Yorkshire grey flint (*Ch 8, p 270*), while the assemblage of coarse-stone tools of various kinds was associated with large numbers of unworked cobbles (usually volcaniclastic stone, *ie* tuff; *Ch 8, p 258*). The distribution of flint and stone tools varied along the excavated length of the channel, and there were also differences between the patterns of their distribution between the central spine of the channel and along its banks. In the centre, cutting tools (such as the broad-blades, and also tuff flake knives, which resemble a type of knife recovered from Skaill in Orkney; *Ch 8, p 261*) were found in the area where the active stream would have flowed, and this distribution, rather than reflecting deposition, may instead relate to *in-situ* butchery or dismemberment activity, although this is hard to establish, given that bone did not survive. Along the banks of the channel, anvils, hammerstones, and grinders provided evidence for different kinds of activity, for example, stone working, or the crushing of pigments or other substances, and, hence, these might also have been left where they were used, rather than having been deposited into the channel. Additionally, many of the other coarse-stone tools seemed to have been used as wedges or choppers, employed for heavy-duty tasks, such as wood splitting. These, like the unworked tuff cobbles, had a more general distribution in the channel, but clustered in certain areas, giving the impression that they had been dumped rather than used there.

The unworked tuff cobbles are intriguing and seem to have been carried by people to the site in an untested state, and in some cases stones seemed to have been discarded as unsuitable for flaking after a few attempts.

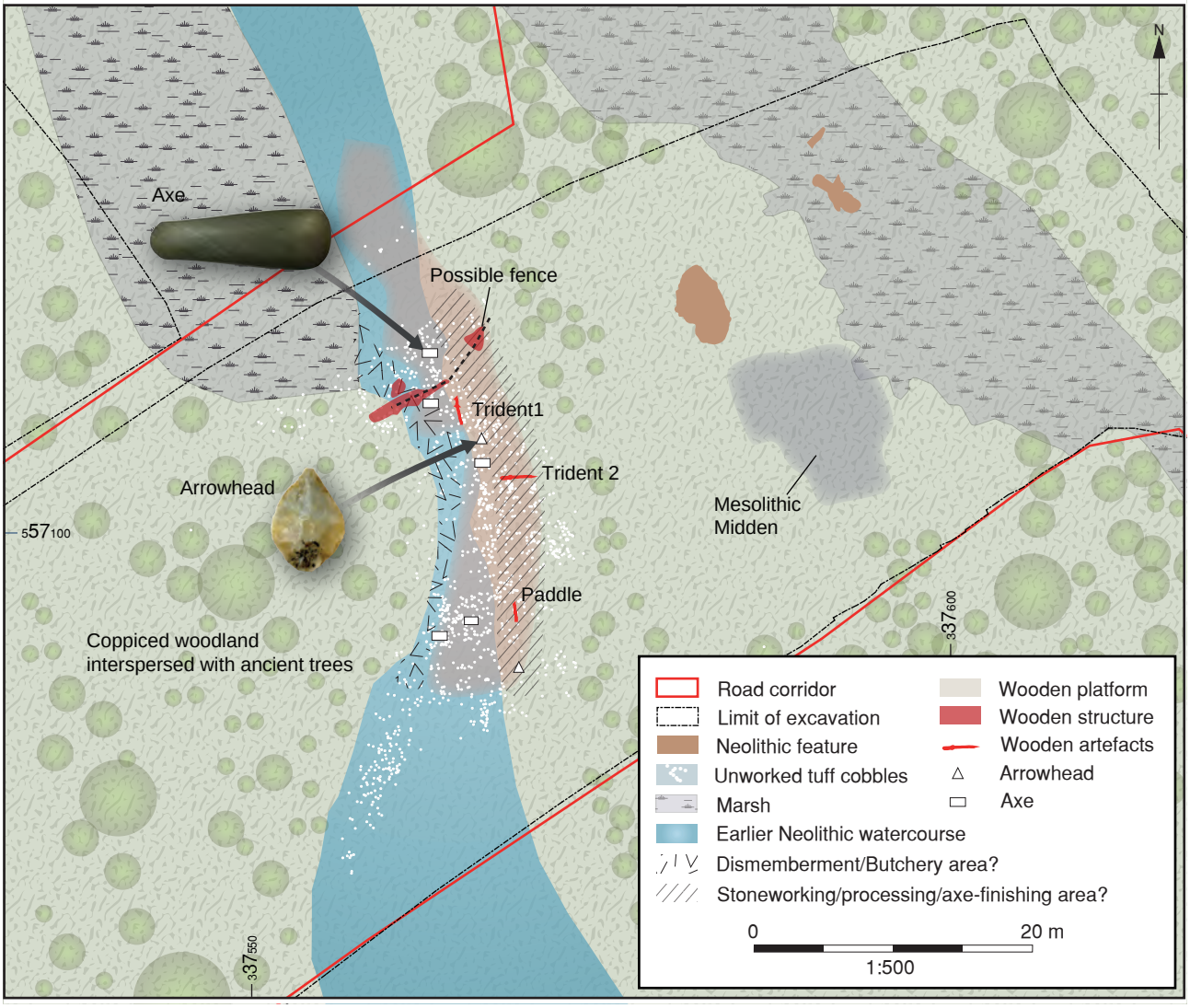


Figure 133: The deposition of stone tools and unworked cobbles in the Principal palaeochannel *at Stainton West*

Indeed, although some of the material was of poor quality, most of it would have been viable, which makes its discard seem odd, as stone working at the site, in the Mesolithic period, had been incredibly parsimonious when it came to utilising stone of widely varying qualities. Although, ultimately, these tuff cobbles derived from the central Lake District (*Appendix 2*), they were waterworn and, as such, had probably been transported to this part of the Eden Valley by fluvioglacial action. It is therefore possible that they had naturally accumulated in a pebble beach, or bar, on the river nearby to Stainton West, where they were then removed and deliberately deposited into the *Principal palaeochannel*.

Although these tuff cobbles are somewhat puzzling, it must be concluded that, in preference over other stone types, discrimination was employed in identifying, selecting, and collecting volcaniclastic stones, which, superficially, resembled each other, being grey, blue, or green in colour, but varied widely in terms of geological source and mechanical properties. Once brought to the site, the material might have been cached, although no such caches were identified, and could have been used to make some of the coarse-stone tools recovered, but most of it seems to have been deposited in the channel unworked. They were very thinly distributed, so this does not seem to have been done to construct anything or to consolidate soft ground. Given the effort required to collect the material, it was presumably valued, and it had the potential to be a viable resource for stone-tool manufacture, so its disposal smacks of donative or sacrificial activity, or structured, meaningful deposition in association with some other kind of discursive (*eg* oblative or votive) practice. This type of structured deposition, involving unworked stones, is not entirely novel, at least in the broader context of North-west Europe, as it also appears to have been a feature of Neolithic deposition in Sweden (R Bradley *pers comm*).

Axe finishing

The *polissoir* had been burnt, smashed up, and deposited in the channel during the Later Neolithic period (*Ch 8, p 262*; *Ch 10, p 339*), although one fragment was associated with Carinated-Bowl pottery (Fig 134), and it was most probably used at the site during the

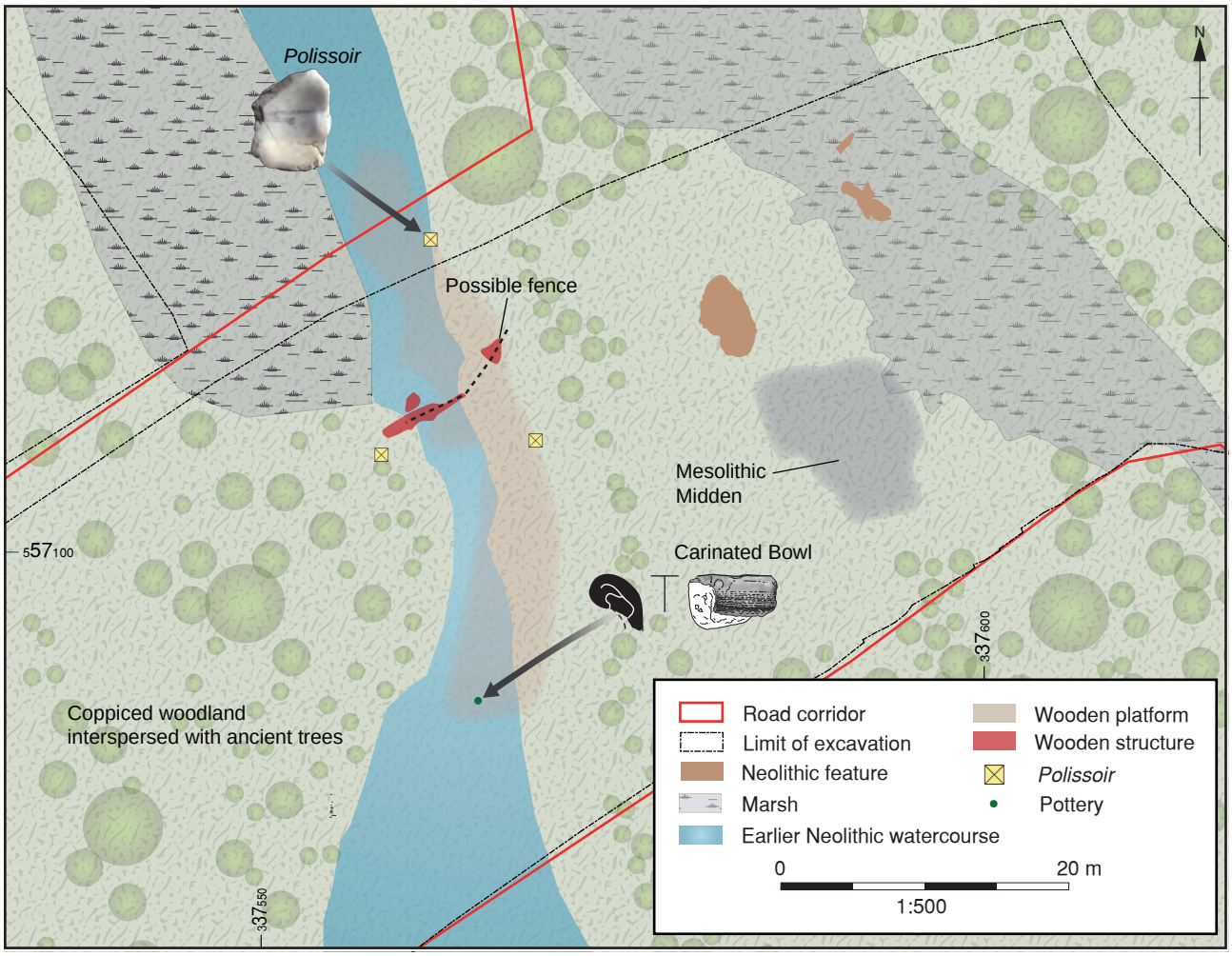


Figure 134: The deposition of the polissoir *fragments and Earlier Neolithic pottery in the* Principal palaeochannel *at Stainton West*

Earlier Neolithic phase of activity. If this was indeed the case, then, despite the lack of any roughouts, it would suggest that the final stages of polished-stone axehead manufacture or repair was undertaken at the site. Indeed, there may have been a tradition for this activity dating from the Mesolithic occupation (*Ch 4, p 133*).

Pottery

The few sherds of pottery, of traditional Carinated-Bowl style (*Ch 8, p 271*), from the *Earlier Neolithic organic deposits* within the channel suggest that this material was not commonly selected for deposition. Given its associations, rather than being foundational, the deposited sherds may, like the axeheads and arrowheads, have belonged to secondary episodes of deposition into the channel, and been placed in relation to the pre-existing platform. The scarcity of pottery is interesting, as it often occurs in Early Neolithic domestic deposits, such as middens, pits, and timber houses (Thomas 2013, 360-71), so its relative absence at Stainton West may indicate that the focus of the site was not domestic, and that the pottery was selected from assemblages used elsewhere.

An Ancestral Geography

What might have occasioned the various acts of deposition and the structural elaboration of the channel? These practices were obviously intended to mark out this place as being in some way special, and were probably also representative of other activities undertaken there. Some of these activities and materials may have lain beyond the realm of ordinary, routine practice, or at least were transported outside this during the performances that structured deposition. In this way they may have been laden with symbolic meaning.

It seems rather too coincidental that this intense phase of depositional/constructional activity in the channel should have occurred along the same stretch that was flanked by the Mesolithic encampment, even though the latter had ended many centuries earlier. It is possible that this can be explained by a certain logic to the landscape: that the site lay on the floodplain/terrace interface, where there was a slightly drier island between two silted channels, and that it might have been a good point of access into the floodplain and for fording the river. On the other hand, it may have also been that, despite undergoing a period of marginalisation, throughout this time the area retained its significance as a former site of an ancestral encampment, perhaps even coming to be viewed as sacred (*p 309*). The midden and lithic scatters may have acted as prompts for this, and, via the practices of coppicing and the maintenance of a pre-existing clearing (Edmonds 1999, 23-6, 33-4), this space may have been perennially revealed and reincorporated as a redolent place within the landscape (*sensu* Ingold 2000, 87, 146-50, 193, 198-9). Indeed, the 'practical logic' of the land can also be understood in ancestral terms (for instance, as the ford of a given ancestor), so the perspectives are not mutually exclusive.

It is therefore maintained that the concept of 'ancestry' is important for understanding why this place was distinct from similar places on the river bank: it was intimately associated with an ancestral presence. It is posited that ancestors were powerful agencies in both Mesolithic and Neolithic ontologies (the essence of things in the abstract), even though ideas concerning ancestry may have differed, depending on the time, place, and circumstances. Ethnography can provide examples of how ancestors may have been understood in the past (*op cit*, 140-2), and, although not comprehensive, four possible modes can be suggested: 'Ancestors can be ordinary human beings who lived in the past, or spirit inhabitants of the landscape, or mythic other-than-human characters, or original creator beings' (*op cit*, 140).

The second mode of ancestry is emphasised here, although not to the exclusion of the others, as they may shade into each other, and, indeed, for late Mesolithic hunter-gatherers and early farmers, the first and second modes may have been almost interchangeable. In this light, the acts of construction and deposition in the channel express the social relations, even transactions, between a community and the ancestors who dwelt in this place. Furthermore, the radiocarbon and dendrochronological wiggle-matched dating evidence from the channel allows for most of, but not all, the activity taking place within a short duration (*Ch 8, p 291*). Because of the nature of the materials selected for deposition, it is suggested that a foundation act was performed in commemoration of other associated activities, undertaken immediately adjacent to the channel. This seems to have been an act of some magnitude and may represent the transformation of this place, and perhaps not only in physical terms.

There was no convincing evidence for contemporary settlement activity in the *Grid-square area*. Indeed, the only activity seems to have been associated with the grubbing up of trees and the burning of vegetation (*Ch 8, p 281*), which radiocarbon dating suggests could have been contemporaneous with the construction of the wooden structures in the channel. The size of some of the tree-throws shows that several very large and ancient trees had stood along the river banks, which is supported by the palaeoenvironmental evidence (*Ch 8, p 283*), whereas the coppiced wood in the channel provides evidence that the woodland may

also have been thinned and managed. In addition, a small collection of lithic objects was focused on the area of the former midden of the Mesolithic encampment (*Ch 4, p 115*), and may have been associated with a tree-throw that had disturbed this feature (*Ch 8, p 283*). As such, the midden may still have been a recognisable feature, and the large numbers of microlithic flints that would have been uprooted during grubbing-out activities may have helped to signal and confirm this place as being of ancestral significance.

If this place remained strongly associated with ancestral presence and power, it might explain why the large and ancient oak trees in the channel were referenced in the construction of the wooden platform. Even during the archaeological excavation, these massive oaks, weighing several tonnes each, were impressive and were even given nick-names by the excavators; in other words, they were appropriated as landmarks within the channel dig. The fourth-millennium cal BC exposure of these oaks by erosion may, similarly, have made an impression on Neolithic (or proto-Neolithic) dwellers on the Eden. These mysterious and already ancient river trees may have been understood or recognised as having animacy, perhaps being synonymous with an auspicious ancestral event or action, and their revelation by a violent flooding event may have brought forth a significant resource, making it available for use, in this case, for reference and incorporation into the wooden platform. It is worth noting that existing trees were often used as a basis for the Sweet Track, in the Somerset Levels (Coles *et al* 1975, 11), with the incorporation of stumps from trees cut down along its line.

Sacred Groves: A Khanty Analogy

If the Stainton West island was a place of ancestral power, then it is worth briefly considering an example from ethnography to get some sense of how it may have been understood, experienced, and incorporated into the wider encultured landscape of the Eden's hunter-gatherers and earliest farmers. In Peter Jordan's (2003) anthropology of the boreal-forest-dwelling Siberian Khanty (Fig 135), he describes the symbolic and custom-based inhabitation of a riverside

Figure 135: The location of the Siberian Khanty

landscape by semi-mobile groups, engaged in hunting and herding, which as such may be, at least partly, analogous to the earlier Neolithic peoples that inhabited the riverside landscape at Stainton West. Conceptually, the Khanty subdivided the landscape into overlapping realms of ritualised and routine experience, variously defined by settlements of the living and the dead, and sacred places (*op cit*, 199). The latter included a lower category of 'earth-house' holy sites (*op cit*, 170-81) associated with the forest spirit. These are variously embodied by 'dense groves, particular trees, rocks or beautiful parts of the landscape…[but] more often than not they are island groves surrounded by a bog' (*op cit*, 171).

At certain times of the year, linked to hunting seasons and human mobility patterns, rites (including cooking and vodka consumption) were undertaken at the earth-houses, and sacrificial gifts (*eg* cloth and elk heads) left on trees 'for health, wealth and hunting success' (*op cit*, 172). Wooden household idols were cut from living cedar trees at the earth-houses, with some ceremony, for individual women when they married. These remain with them throughout their lives, accompanying them on their travels, and bestowing certain benefits. Periodically, they must be recharged with power at the earth-houses, and, on the woman's death, the idol would be returned there to rot, preferably at the foot of the tree from which it was cut (*op cit*, 174). Different clans and lineages were associated with particular earth-houses, usually depending on which stretch of the river they occupied and which was closest to a woman's birth yurt (*ibid*).

There were also other 'closed' sacred sites (*op cit*, 154-70). These comprised low huts or stilted wooden shrines (Pl 125) near to human settlements, considered to be divine settlements associated with local ancestral guardian spirits represented by idols stored in the shrines. These idols would again be cut from live cedar trees, at the sacred site, by a master who was not local. When the master died, they would be left to rot by the trees from which the new generation of idols was cut (*op cit*, 164). Behaviour in the vicinity of these sites was prescribed; for example, foraging in their vicinity was prohibited. The spirits must be treated with respect and the community's relationship with them was not always easy, being based on reciprocity (*op cit*, 169). Rites of propitiation would be required at certain times of the year, to ensure goodwill in the form of hunting success. These involved purification, using fire and smoke, gifts being offered, and blood sacrifices of domestic, rather than wild, animals made. Ritual feasting also took place and ceremonial middens accumulated, as waste must be left there.

The wider social function of these sacred sites has been interpreted as:

Plate 125: A Khanty community visiting the shrine of their local protector spirit (Peter Jordan, north-west Siberia, July 2004)

> …ritual activity during repeated visits [which] draws upon the symbolic resources of this structured space to maintain forms of social practice. Visits to local holy sites create and strengthen community identity and coincide with times in the seasonal round when the yurt community either regroups at the base yurt, or is about to 'break up' for summer fishing or hunting seasons. Above all elders stressed that these traditions, places and knowledges had been passed from one generation to the next, each showing the following generation the appropriate way to conduct their activity so as to maintain the support of the spirits (Jordan 2003, 170).

Obviously, the Khanty example is culturally specific, but the general interpretation of the social role of such holy places (including tenure, social differentiation, and the explicit reinforcement of routine practices); their moral and generative power; their distinct landscape character; their association with ancestry and lineage; and their integration into wider landscapes, where places

have different meanings, all has the potential to inform the interpretation of Stainton West as a place of ancestral power. The provision of idols, fashioned from flitches (planks) cut from living trees, specifically exemplifies how timber or wooden items, taken from trees in sacred places, can embody the power of that place, as well as other properties connoted to it, and represent all of this in routine discourses undertaken elsewhere. It further seems significant that such items were recharged and finally disposed of at the places from which they were sourced. These idols, in common with the other materials used during the rites and deposited at these sacred sites, can be understood as having animacy; 'the ability to exert an influence on other subjects and, in particular, on human persons' (*op cit*, 102-6). At Stainton West, it might be wondered whether similar ideas and practices lay behind the deposition of the felling residues, tridents, paddle, axes, and other objects by a community on the cusp of adopting the Neolithic way of life.

Tree Felling and Wood Procurement

Just as the ancestral oak trees in the channel may have been considered sacred, any ancient and living trees, perhaps oaks or elms standing in venerable isolation amongst the coppiced groves, may likewise have had powerful and imposing animacy (Evans *et al* 1999; Taylor 2010; Thomas 2013, 389-90; Noble 2017, 172, 182). This raises the question as to what it was that could have motivated a community, for whom these trees were highly likely to have been timeless and highly significant features of their landscape, to grub them up? Responses to this question that suggest it was simply to provide fuel or building material and to facilitate grazing seem lacking, to say the least.

The trees

The oak timbers in the *Earlier Neolithic organic deposit*, like those in the Mesolithic channel deposits (*Appendix 20*; *Ch 3*, *p 70*), had been, on the whole, exceptionally slow-growing, with closely spaced rings suggesting that the trees were under stress, perhaps, for example, that they had grown in closed-canopy woodland, where light was in short supply, or in a damp environment. Although a floodplain location might suggest the latter, the straight nature and lack of side branches on the oak trees within the *Mesolithic/Neolithic alluvium* (*Ch 6*, *p 188*) means that the former is also possible. Such trees had the potential to have been very old, without being as wide in girth as similarly old oaks found in parkland environments today (Taylor 2010). They would also have been well-suited to splitting, being straight-grained and relatively knot-free. Several of the pieces of timber from the *Earlier Neolithic organic deposit* had more than 100 rings, so were certainly from old trees (*Appendix 20*). None of the oak pieces, from any part of the channel, were in excess of 0.4 m in diameter, although some may have been boughs from trees that had achieved greater girth than this. This is potentially significant as it has been suggested (Taylor 2010) that trees less than 0.4 m in diameter were most suited, in terms of splitting down into useful timbers without undue waste, for use in domestic, as opposed to overtly monumental, constructions.

The practicalities of grubbing

Tree-throws and evidence for clearance were not common finds along the CNDR, and the large example from Stainton West (***90262***, *Ch 8*, *p 279*), dated to the Early Neolithic phase of activity, was, in terms of its scale, unique (Fig 136). Felling a tree of this size would also have been a major endeavour, requiring the labours of many people and, if available, even oxen. It would have to have been planned, possibly several years in advance. The most efficient technique would be to 'girdle' (or 'ringbark'; *Ch 3*, *p 92*) the trunk (Pl 126), and then kill off any new growth and wait for the roots to die off, thus destabilising the tree. It could then be felled, perhaps by first digging down and fire-setting to help undermine its roots further, and then toppling it, by pulling it over rather than cutting it down, so that the trunk acted as a lever to uproot the stump.

Once felled, in an intact state, the tree could not have been burned *in situ* and it would have been too heavy to move unless it was first broken up. This would have required further work, with axes and wedges, to lop off the branches and split up the trunk and any larger boughs. Of course, such activities would have produced the slab-shaped woodchips and debris that were found in the *Principal palaeochannel*, as well as large planks and timbers which could either have been carved down to make objects, such as the paddle and tridents, or used in architectural construction (assuming that timber structures were part of the cultural repertoire of those cutting down the trees).

In addition to the felling of large tress, the coppiced alder- and hazel-wood poles and stakes in the channel structures might reflect the expedient procurement of wood from stands along its banks. Alternatively, it could have meant the destruction, for reuse within the channel, of ancestral coppice, which had been maintained for generations, perhaps providing especially propitious shafts for hunting weapons, or tent poles for dwellings. If so, their removal may have been of similar significance to the grubbing up of the large trees.

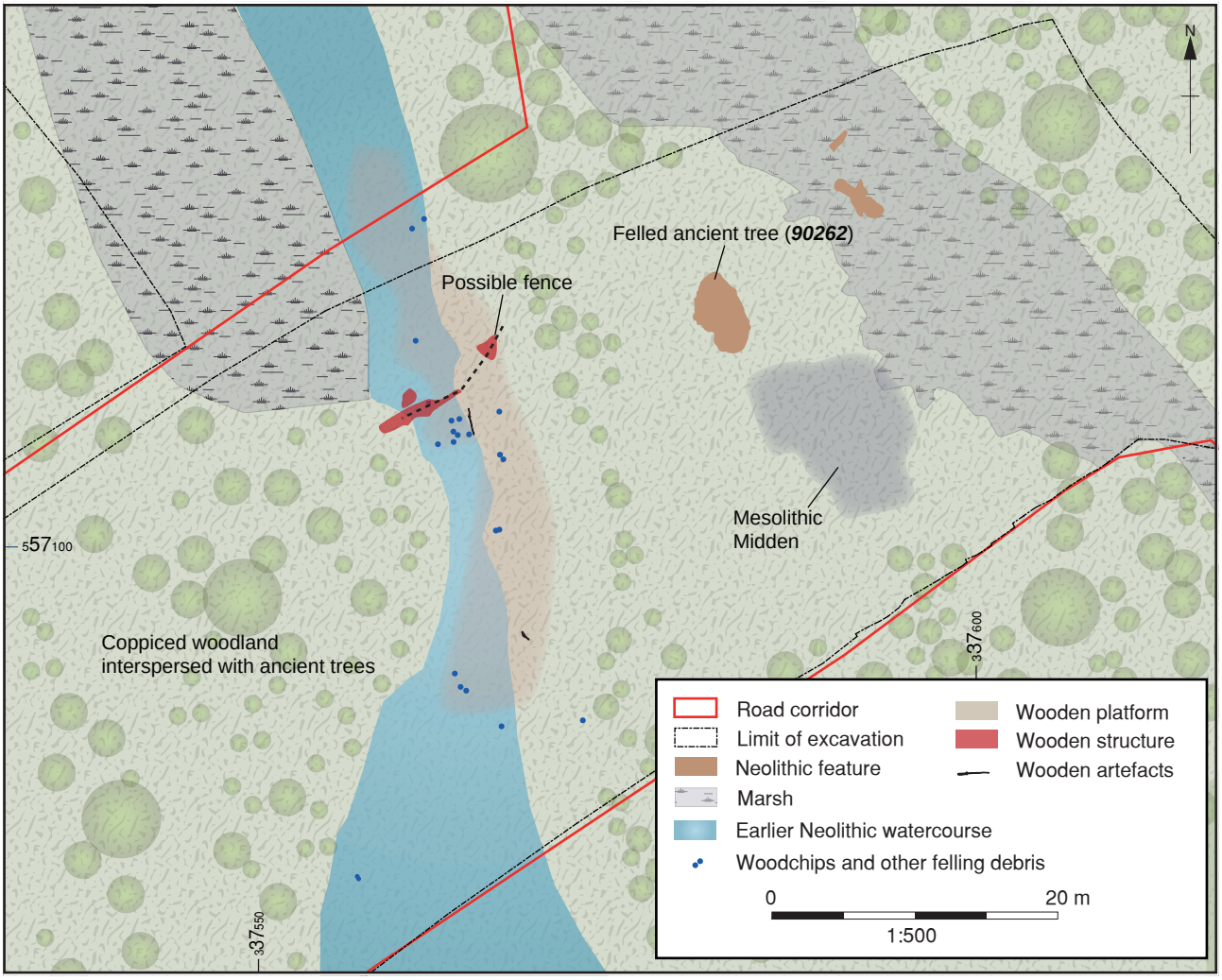


Figure 136: The site of the large tree-throw at Stainton West, indicating the position of a felled ancient tree

Plate 126: A girdled tree

Deposition of selected grubbing residues

It is postulated that the deposition of materials in the silted, ponded channel, the foundational act of deposition that accompanied its subdivision by wooden structures and the laying down of the platform, was intrinsically associated with, and commemorative of, the felling and grubbing out of ancient oaks and elms adjacent to the channel, represented by tree-throws and radiocarbon-dated charcoal. The deposited materials comprised selected residues of this practice, gathered up and redeposited into the channel. The woodchips, debris, and some of the large timbers incorporated in the platform (*p 304*) would have been generated when the felled trees were cut up and split. That some of these pieces were charred suggests fire-setting or bonfires, although timber could also have been taken away for use elsewhere. It is also possible that some of these timbers in the channel could previously have been used in other structures, although the dating evidence does not suggest antique timbers were deposited.

Many of the worked volcaniclastic stone tools, particularly those robust wedges that were dumped into the channel, could also have been employed in this

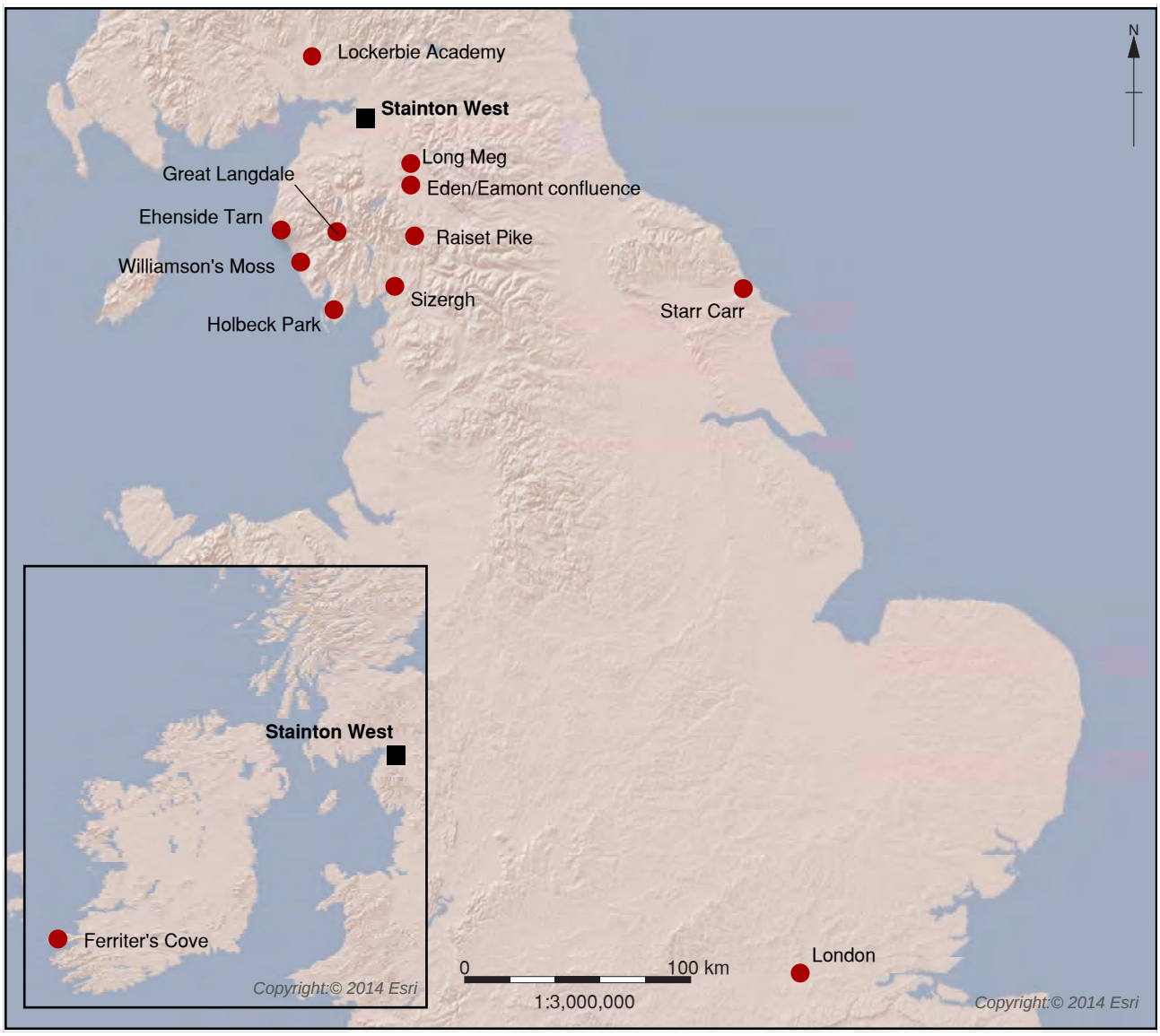


Figure 137: Mesolithic/Neolithic sites mentioned in the text

splitting process, although it must be acknowledged that the flakes from the manufacture of these tools were not discovered within the excavation. It is also possible that certain of the polished-stone axes found in the channel may have been utilised, but it is considered more likely that these belonged to later secondary acts of deposition (*p 320*).

The stone

The choice of volcaniclastic (mainly tuff) stone for the tools employed in the splitting up of trees may have been meaningful. It was paralleled in the selection, gathering up, and deposition in the channel of quantities of unworked river cobbles of this particular range of stone types, which, as they superficially resembled each other, may, in the past, have been considered as representing only a single category of stone. This latter practice may have taken place in one event, which happened in association with the felling of the trees, or it may have been a tradition that commenced with this. In either case, it seems that tuff was deemed particularly apt for use within the channel and for splitting up the trees. It is possible that it was chosen in order analogously to reference the procurement of similar rock, from the central Lake District (at sites such as Great Langdale; Fig 137), for the manufacture of polished-stone axes, also commonly associated with felling trees and wood-working (Bradley and Edmonds 1993). Indeed, the Lakeland origins of the stone may have been explicitly understood, its derivation being traceable by following rivers back into the uplands via their tributaries. Thus, river cobbles could, in one sense, have been thought of as embodying the mountains and making them present, whilst also being linked to the rivers (*Appendix 10*).

Wooden technology

Considering the finely carved oak objects that were deposited in the channel, the paddle, at

least, and probably also Trident 1, seem to have been foundational, being deposited alongside the construction of the wooden platform and the deposition of the tree-felling residues (*p 311*). Radiocarbon dating demonstrates that Trident 2, on the other hand, was deposited in a later, secondary act of deposition (*Ch 8*, *p 271*). The tridents had probably been made from ancient trees (*Appendix 13*) and, once again, it seems significant that objects that had been produced by felling large mature oak trees were selected for deposition, at least in the first instance, to commemorate tree felling.

The precise function of the tridents has elicited much speculation, but whatever they were for, there had to have been an easier way of making functionally similar objects than felling an ancient and massive oak tree and splitting its trunk up, radially, into eighths: the tridents seem 'over-engineered'. For example, the easiest way of making a fork is to use a forking branch (Urton 1997, 82-3) and there is a long-lived and globally widespread tradition of making effective fishing spears (harpoons, eel spears, and leisters) from a composite of light-weight and easy obtainable materials (*cf* Lozovskaya and Lozovski 2013; Woodman 2015, 159-64; Hurcombe 2014).

One way of explaining this is to see the tridents as a 'side effect' of a newly emergent 'Neolithic' attitude to trees and a related woodworking technology. If trees were now being felled, cut, and split up into planks for other reasons (clearance, and the construction of monuments and houses, *p 315*), then planks would also have been available for use in making artefacts. This kind of woodworking may have come to seem increasingly appropriate, and could have led to innovative new artefact forms and practices, the tridents, and perhaps the use to which they were put, being one such example. Indeed, it is conceivable that objects made from planks obtained in this way may have been imbued with certain (metaphysical) properties, derived from the parent tree. It is also possible that they may have been conceived as still being bound up together, in a kind of common sympathy between sundered parts, with sibling planks used for other purposes. As such, the recognition of a trident's status as an exemplar of a changing approach to trees, woodland, and woodworking is thus possibly more important, in terms of a wider understanding of the period and the processes of transformation at work, than determining what precisely the tridents were for.

This is not to say, however, that this was necessarily an entirely novel attitude towards woodlands; like most things it could have had, and developed from, earlier antecedents. For example, there was certainly good evidence for Mesolithic vegetational clearance and tree-felling activity at Stainton West, as well as for stone adze/axes (*Ch 4, p147; p 111*), so it is, emphatically, not the intention to suggest that hunter-gatherers had neither the desire nor the wit, on occasion, to fell trees or dramatically alter a woodland environment.

Indeed, the 'Neolithic' woodworking techniques evident at Stainton West can be directly paralleled with those employed by Early Mesolithic hunter-gatherers at Star Carr (Bamforth *et al* 2018a; Taylor *et al* 2018). Wooden platforms are known from numerous waterside Mesolithic contexts, such as Star Carr (Mellars and Dark 1998; Milner *et al* 2018a), Williamson's Moss (Bonsall 2007), and London (Milne *et al* 2010; Fig 137), and at several waterside sites in Ireland (*cf* Fredengren 2009; Little 2009; Mossop 2009). Furthermore, it is possible to split a plank, or a 'flitch', from a tree without felling it (Jordan 2003, 174-9, figs 6.12-14; Hurcombe 2014, 24-5, fig 4), and paddles carved from large timbers are known from Mesolithic contexts (Clark 1954, fig 77, pl xxi; Andersen 1986; Skriver and Borup 2012; Lozovski *et al* 2013b; Taylor *et al* 2018, 407, 416). Nonetheless, such a concerted effort at tree felling, and its explicit referencing in the deposition of the products and residues of felling and splitting in the channel, may suggest a ratcheting-up of such behaviour, perhaps as well as a shifting emphasis and worldview.

Timber Houses and Monuments

So, if valuable, ancestral trees were being felled and turned into planks, and if the primary motivation for this was not necessarily to make objects such as tridents and paddles, what could have been important enough to justify such an action? What were the planks for, and was procuring timber the only reason for clearance? One suggestion might be that the planks were intended to construct a formal trackway, such as the Sweet Track (Coles and Coles 1986). It is true that this cannot be entirely ruled out, although any such construction would surely have extended out into the wetlands of the floodplain, and no evidence for this was identified in the excavations, where it might have been expected to survive. Two other obvious architectural candidates for plank consumption also present themselves: large timber houses (*Ch 7, p 209*) and monuments, specifically tombs; or the timber shrines that seemingly acted as precursors to many of these (Taylor 2010; Thomas 2013, 285-353; Smyth 2014; Noble 2017, 138-77).

The timber houses that date to the earliest part of the Neolithic period in Britain were often of very similar form to each other, and there are numerous archaeological examples that demonstrate that vast numbers of oak planks would have been required for their construction. One very good example, relatively

near to Stainton West, is the large house at Lockerbie Academy (Kirby 2011; *Ch 7, p 209*). Similarly, many of the Earliest Neolithic barrows or cairns had timber mortuary structures at their hearts, some evidently being primary structures; a Cumbrian example being Raiset Pike, Crosby Garrett (Greenwell 1877; Evans 2008, 103). The timbers used were frequently of massive proportions, but had been split, and they were often positioned so that they closely framed or enclosed the human remains, creating a sense that they continued to embody the tree from which they were derived (Noble 2017, 159).

Furthermore, if they had ancestral connotations or had previously been used for human excarnation, individual trees, or trees in general, may have retained some association with transformation, death, and ancestry, making them especially apt for use in mortuary structures. On the other hand, it was also sometimes the case that human remains and a wooden framework were only later added to posts that had already been standing for some time (Noble 2006, 71). So, the primary function of such structures may not have been burial, but rather to commemorate, or otherwise make reference to, acts of clearance.

Timber houses and early Neolithic barrows/cairns have been interpreted as being two sides of the same coin: '…the most fundamental social roles of barrows and timber halls were identical' (Thomas 2013, 322), and that the free-standing timber structures under barrows were 'house shrines' (*op cit*, 327). The contention is that, in the case of both these shrines and the timber houses, the founding act of a community was the erection of the house posts: 'Through their construction, halls brought into being a bounded human group who claimed affiliation to the community and the building, corporate ownership of the body of wealth, and probably real or fictive descent from a group of house ancestors' (*op cit*, 322).

Julian Thomas goes on to suggest that the burial rites enacted at the early tombs were foundational and transformative (*op cit*, 328-53), and that, initially, the architectural structures (houses and shrines) served to reproduce the collective identities, memories, and wealth of the bounded social groups, which had budded out from more-inclusive, sharing, Mesolithic societies (*Ch 3, p 57*). They subsequently, however, as entombed monuments, assumed the role of 'vehicles of collective history' (*op cit*, 353). In other words, following Levi-Strauss (1983), he interprets the houses and monuments as evidence for the emergence of 'house societies'. Incidentally, he also sees the large, contemporary, post-defined cursus monuments of Dumfries and Galloway as operating in much the same way, rather like extensions of the houses, that could hold more people, and which also served to forge communal memories and identities (*ibid*). A different, although not entirely dissimilar view, of the role of houses and monumental structures has been presented by John Barrett (2005, 24),

> …the monumental form taken by the architecture of the developing early Neolithic, whether this was the emergent house architecture of Central Europe or the various mortuary-related structures that were established to the North and the West, would all have facilitated historical performance with reference to lineage, the dead, or indeed with other schemes of priority and origin'.

Woodland Clearance

The other possible motivation for felling trees is for woodland clearance, to create fields and garden plots, for animals to graze in and crops to be cultivated. Obviously, in clearing the woodlands for agriculture, timber for use in monuments and houses would have been created as a by-product, and *vice versa*, so garden creation and timber procurement could have been intimately related. There was certainly evidence in the pollen record that clearance was taking place in the wider environment around Stainton West, at the time that the platform was created in the channel (*Ch 8, p 288*), whereas cereal-type and herb pollen, and a notable increase in dung beetles, suggest cultivation and herding close to the site (*Ch 8, p 287*).

Assuming that wholesale deforestation did not take place in order to create pasture or gardens, it might be wondered why, specifically, one particular place was chosen for clearance over any other. It is likely that there would have been a great many agriculturally viable options available to the earliest farmers, far outstripping their needs. It seems likely, therefore, that this choice would have been influenced by all sorts of understandings of landscape, and that places which embodied benevolent and propitious forms of ancestral power might have been favoured over others for such a fraught endeavour as pioneer farming.

In an animistic worldview, particularly as concepts of death, life, and time (*eg* Jordan 2003, 105) may have been rather different, there may have been no sense of desecration in cutting down groves of ancestral trees, so long as this was done in a respectful manner that might ensure renewal. Just as killing a deer and disposing of the carcass in an appropriate way would have ensured that the deer spirit kept on giving itself to future hunters (Ingold 2000, 71, 143; Jordan 2003, 100-2), felling trees to make gardens could have been understood as being progenerative, of the woodlands

and the ancestors in the wider sense, just as much as of the fecundity of herds or the gardens. This may have been analogous to Mesolithic practices of clearance and fire-setting (*Ch 3*, *p 57*) and may have also resonated with the cyclical rhythms of cultivation and transhumance. So, whilst a 'Neolithic' attitude to trees, woodland, and the places in the landscape may have inspired and been reinforced by such practices as tree clearance, these can be seen as emerging from and not being antithetical to existing and long-lived 'Mesolithic' understandings.

An Ancestral Future

Therefore, the archaeological evidence for Earlier Neolithic activity ('*Early Neolithic I*') can be explained in this, hopefully plausible, although slightly imaginative, way:

> A glade at the edge of the floodplain, a place of ancestral power, was chosen as the site for a momentous act of great importance to the clan. As was half-remembered, in its name and the stories associated with it, this had once, long ago, been where the fisherfolk camped. The clearing was dominated by several huge and ancient oak trees, and tended coppices had provided spears and arrows for time beyond living memory. Water pooled in a silted channel, and the forebears of the great oaks that now grew along its banks lay semi-submerged in the mire, having been revealed recently by the river in spate. It had been decided that the oaks from this glade would provide timber for the great house that was to be constructed up on the higher terrace. Such powerful trees would surely ensure the success of this endeavour and the future of the community, so long as the ancestors were treated with respect and asked for their blessing.
>
> The preparations were made well in advance, with the first cuts killing the trees, sending them back to the spirit grove. When it was judged that the time was propitious, the dances and rituals were performed, and the right kind of stones were gathered from the river. These were fashioned into tools fit for the job. Then there followed many days of huge effort, coppices were cut down, trees were felled and split, and the bonfires smouldered without cease. The harvested coppices were used to form a platform at the channel's edge, and fences and stake-built shrines were erected in it, drawing power from the pool, the trees, and the ancestors. On the terrace, feasts were held and gradually, through the efforts of all the lineage, posts were set into the ground, and the walls and roof added to the hall. When it was complete, offerings to the ancestors were made in the pool, including wood from the felled trees; the tools used in the splitting; the gathered stones that had not been used; a cherished, but now spent, fishing spear; and a paddle. The words were said, as was right. The clan's herds browsed the clearing by the pond and grew fat, and the people prospered, as all was well with the ancestors.

To put this more prosaically, such a concerted act of tree felling, as was evidenced at Stainton West, and which had required commemoration by the acts of deposition in the channel, could only have been occasioned by the need to procure timber for a significant construction such as a house or a monument (for instance, a timber shrine). Such an endeavour was undertaken by a community with an especial affinity with this part of the valley, which explicitly intended to re-establish the collective identity there, and, in so doing, legitimise its place in what was perhaps an uncertain and changing world.

At the beginning of the fourth millennium cal BC, any such community would have been embedded in a tradition of animistic understanding of the landscape, which they shared with, and had inherited from, generations of their hunter-gatherer forebears. So, it is only to be expected that they would have drawn on redolent and powerful ancestral resources (*cf* Jordan 2003, 266-7), embodied by what was for them a particularly significant place in the landscape (a site once occupied by a Mesolithic encampment), for the materials to construct the house/monument. This was probably because the timber used to create such an important structure would have had to be carefully chosen in order to be propitious, and if a poor choice were made in selecting such a powerful substance, or if the ancestors were not respected, dire consequences could have been feared. As such, the house/monument would have been figuratively communal and ancestral, as it was built out of materials that embodied the ancestors of the community.

The acts of grubbing up and splitting the trees, and constructing the putative house/monument, would have taken a significant amount of time and involved the cooperation of a great many people, presumably all of those who would have ultimately looked to, or gravitated to, the house/monument. The routine interactions undertaken during this period, in the context of such a significant undertaking, as well as all the more-ritualised opportunities for discursive dialogues (for example founding rites undertaken at the house/monument), would have helped this community arrive at a new understanding of itself.

The material resources harvested from the floodplain would not only have provided the building materials for the structure, but additionally, the residues created as these were harvested would have provided a valuable, and perhaps somewhat dangerous, resource that seemingly had to be treated appropriately, by being deposited in the correct manner in the monumentalised channel. This was presumably in order to satisfy, placate, or reward the ancestral forces that occupied this place, and perhaps ensured their renewal.

The incorporation of this resource back into the landscape was an explicitly commemorative act that would have helped the community to reimagine themselves. As the channel had been implicated in the process of creating the house, in future, it would have continued to be understood in the light of this, whilst any timber house/monument would have provided an architectural context that structured the fields of social relations through which this new identity continued to be moulded (Barrett 2005, 24). So, while the house/monument would have served as a physical manifestation of the community in the landscape, the channel, and the clearing from which the trees had been harvested, would also have derived a new identity, as a foundational, and perhaps generative, place for this community. This may, correspondingly, have created (or perhaps reinforced if already pre-existing) a conceptual and experiential axis linking these two places (Jordan 2003, 228-9), presumably one strand within a web of interconnection between other such significant places in an encultured landscape (*op cit*, 94-6; Zvelebil 2003).

The fact that the channel had played this role, at such a critical time for a group of inter-related people, will have had the effect of reconstituting it as a place of '*history congealed*…kinship is geography, so the lives of persons and the history of their relationships can be traced out in the textures of the land' (Ingold 2000, 150). This helps to explain the evidence for other kinds of activity in the channel and the fact that it continued to be a place of deposition for some time after the initial foundational event. Certain of these acts may have been designed to draw on the same powerful ancestral forces associated with the place, and this may have been the intention when materials and objects, such as the axeheads, pottery, and the second trident, were deposited there. Indeed, the pottery may have been derived from activities undertaken at any house/monument. This may also have been what made it a suitable place for polishing axeheads; perhaps it was thought that axeheads, thus treated, took on some of the power of the place and would be more effective. It might likewise explain some of the other activities evidenced by the hammerstones, grinders, and anvils along the channel banks.

There may have been a cyclical pattern to this, with generative power being harnessed for the creation of artefacts, and then renewed, with spent objects being returned to the waters. This might also help to make sense of the evidence for butchery or dismemberment provided by the blades and flake knives in the stream. It might be supposed that these were not used for everyday butchery, although perhaps this was a fraught task that could be controlled at this place? An alternative interpretation, which does not entirely contradict the first suggestion, is that the cutting tools provided evidence for oblative processing, such as animal sacrifice, perhaps to propitiate or renew the ancestral forces latent there. The final, to modern eyes, somewhat gruesome, suggestion is that the powers of transformation and regeneration that the channel embodied made it a place for the processing of human remains, the respectful treatment required so that the dead could depart, perhaps so that they might return again, or so they could (re)join the ancestors. The surrounding groves may have continued to provide timber (if this was not prohibited), but the vegetation may also have been allowed to regenerate. So, after the initial episode of clearance, no concerted effort need necessarily have been made to keep this part of the riverbank open.

The acts of foundational deposition can be seen as being different in character from the subsequent acts of secondary deposition, although both may have been motivated by similar concerns. The former chime with instances of hunter-gatherer deposition at natural places, perhaps motivated by respect for ancestral beings and a concern for renewal. For example, the excavations at Star Carr (Bamforth *et al* 2018b, 89-97) have revealed, during of the earliest phases of the site (*c 9315-8915 cal BC*; Bayliss *et al* 2018, fig 17.20, table 17.4, 76-7), a 'detrital wood scatter' that seems to have accumulated, through acts of repeated deposition over approximately 200 years (*op cit*, 83), to construct a linear promontory extending from the lake shore, across boggy ground, providing access to deeper water. The material comprising this scatter included a jumble of roundwood, trees, split pieces, hewn pieces, and woodchips, which, although comprising different proportions of tree species, otherwise resembles the wood assemblage from the Stainton West platform.

Associated with the detrital scatter were dense votive deposits of animal remains, including skulls, probable fleshed and articulated limbs, and two antler frontlets. The excavators have also interpreted lithic objects recovered from the detrital scatter as evidence of purposeful deposition, including the possible dehafting of microliths (Conneller *et al* 2018, 196-8). It seems significant that the 'Neolithic' activity in the Stainton West channel, at a time when agriculture was emerging within the Eden Valley, superficially

at least, seems to bear similarity to acts undertaken by Mesolithic hunter-gatherers, at another watery place, over five millennia earlier.

The acts of secondary deposition in the Stainton West channel comprised objects (axes and arrowheads) and the residues of materials (such as pottery) used elsewhere, including, possibly, in monumental/domestic structures, and resembled the kinds of deposits found at such contexts during this period (as at Ehenside Tarn; Darbishire 1874). They can also perhaps be understood in a reciprocal sense: giving in the expectation of receiving something in return. Might this be a subtle hint that the community's relations with the ancestors, and how they thought of these ancestors, was now slightly different? In the, approximately, 1-200 years that these activities spanned, the landscape had been transformed; for example, many of the elm trees were now gone. It might be wondered, were these clearances, and the remaining groves and pools, now populated with the ghosts of the ancestral dead, the naiads and dryads of former times, or with a commingling of them both?

A Regional Comparator: Ehenside Tarn

In terms of considering the Early Neolithic activity in the Stainton West channel as a type of site, it seems directly analogous with Ehenside Tarn (Fig 137; *Ch 7, p 221*). If so, the vagaries veiling an understanding of that site can now be dispelled; like Stainton West, it is probably best seen as a place of ancestral significance, that was referenced by commemorative depositional events and drawn from as a source of power, for example, during axehead polishing. If the accounts of deer and cow bones being retrieved from the Tarn are true (although see Darbishire 1874, 292), then these may well have been structured deposits similar to those from Star Carr, and their existence might support the former presence of similar deposits in the Stainton West channel, which did not survive because conditions were too acidic. If the general analogy between the two sites is accepted, it brings with it the exciting prospect that other similar, well-preserved, and waterlogged Early Neolithic sites await discovery in Cumbria. For example, there is a promising location at the confluence of the rivers Eden and Eamont, near to Penrith (*Ch 7, p 216*).

Stainton West and Ehenside Tarn lie approximately 60 km from each other, so it is interesting from a regional perspective of the Neolithic period that they are so similar. For example, they both produced *polissoirs* and tridents, and were concerned with deposition at, and the enhancement of, bodies of water (Darbishire 1874). This hints at something of a shared Mesolithic/Neolithic culture (or perhaps more correctly, modality; *ie* a way of life/behaviour) in Cumbria. Petrological analysis of a polished stone axehead from Stainton West (70353.30; *Appendix 4*) demonstrates that it was very like samples of axeheads from Ehenside Tarn. It can be concluded that they all came from a similar part of the Great Langdale massif. This makes it possible that groups from all over the region met up in the highlands, which would have enabled all manner of interactions and cross-fertilisations. In this respect, the present distribution of the tridents is potentially also telling (*Appendix 13*), as, having been found, so far, only in Cumbria and Ireland, they provide further evidence for the continuation into the Neolithic period of good connections between the areas surrounding the Irish Sea (*Ch 5, p 182*).

Becoming 'Neolithic' on the Solway Firth

It has been suggested that one of the problems with dating neolithisation is that, as a process, it is difficult to pin down in time and space (*Ch 7, p 207*): put simply, does the Neolithic period start with its first material cultural expression or when there is evidence for a more consolidated Neolithic society in a region? This is still a problem, whether one understands Neolithic culture as being primarily introduced by colonising farmers or whether one allows more hunter-gatherer agency in the process (*Ch 5, p 176*). So, when a category of Neolithic material culture (*eg* pottery, domesticates, or monuments) is dated as being the earliest in a region, is this really dating the Mesolithic/Neolithic transition, and is it even clear what is meant by this? For example, the cattle bones at Ferriter's Cove, and other sites in Ireland (Woodman and McCarthy 2003; Sheridan 2010; Cummings 2017, 23), date to the fifth millennium cal BC, but do they really indicate the adoption of agriculture and a Neolithic lifestyle?

The interpretation of the evidence from Stainton West, closely following Julian Thomas' (2013, 427) view, is that, in the North West at least, the creation of a timber house or an early monumental timber shrine marked the point where a hunter-gatherer community, which already had the knowledge and material capabilities of farming at its disposal, very explicitly set out on a path that ultimately led to it becoming 'Neolithic' (from our point of view not theirs). This obviously presupposes that they were in contact with farming communities, possibly even migrants, and that establishing such a structure was a commitment to farming, and the lifestyle and value systems associated with it (Barrett 2011, 75-7), and perhaps also a practical necessity for such a lifestyle (Barrett 2005, 24).

It involved a set of cooperative, overtly discursive, actions that drew upon a communal past and reframed this as a means of going forward. In terms of many of the

practices, the conceptual and mythological framework that this took place within, and the material and landscape resources employed, there does not appear to have been any rupture with existing hunter-gatherer modes and traditions. It was the putative house/shrine, where it stood (on agriculturally productive land), and what it would come to stand for (communal tenure) that was different.

However, the foundational act of its construction was probably embedded within processes of near-simultaneous, much wider, regional change. These would have been political, in the sense that they accommodated a cascade of similar social transformations, including, significantly, the introduction of agriculture, that were rippling and refracting between intermingled communities, and authority groups within them, connected by long-distance communication networks of Mesolithic origin (*Ch 3, p 54*; *cf* Barrett 2011, 85).

It is maintained that the structures and deposits belonging to the '*Early Neolithic I*' phase in the *Principal palaeochannel* (*Ch 8, p 238*) were the material residues of foundational and commemorative activities undertaken by a community that was self-consciously reimagining itself (Fig 138). These residues and practices may plausibly

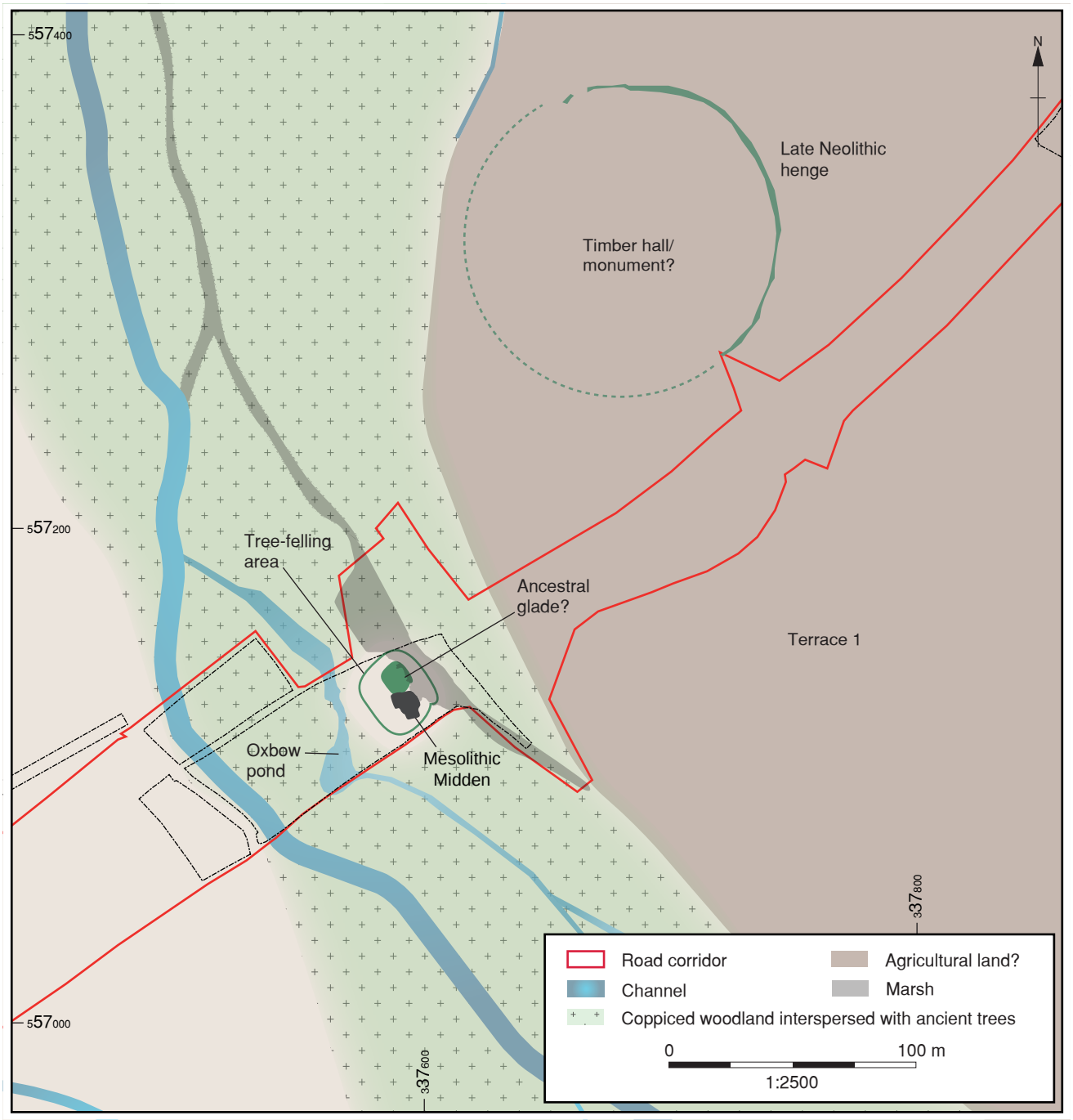


Figure 138: The possible form of the earlier Neolithic landscape at Stainton West

have been associated with timber procurement for the construction of a house or a monument. So, as part of this discourse, emphasis was being transferred from a former ancestral locus of production (the river and woodlands) to a new one: the presumed house/shrine, and its associated fields, on the terrace. This refocused and re-expressed the values of the community in relation to changes in the ecology, practices of land management, and mode of subsistence (*op cit*, 75-7). Incidentally, it might be noted that the period of intensive deposition in the channel, bracketed by Tridents 1 and 2, and lasting for perhaps a century or two (*p 308*), could feasibly correlate with the longevity of such a house/shrine (*cf* Smyth 2014, 41-50) and the duration of the initial 'experiment' with agriculture (Stevens and Fuller 2012; 2015).

From a modern-day archaeological perspective, this reimagining, and the material practices through which it was mediated, can be seen as a pivotal moment, from which there would be no going back, when a hunter-gatherer past was carried forward in a way that meant it would have rapidly morphed into something recognisably different. As far as it can be pinned down, this was the moment of transition, 'the jelly transfixed' (*Ch 7*, *p 208*), not least because, for each community, this kind of foundational event could only happen once. It would have been seared in their collective memory, and any subsequent acts of foundation or monumentalisation, being undertaken in its shadow, would necessarily have been referential. This perhaps helps to explain, regionally, the chronologically tightly bracketed nature of the Early Neolithic 'house horizon' (Thomas 2013, 285-313; Smyth 2014, 41-4; Griffiths 2011, 684, fig 9.23).

It might be argued that this is a rather bold interpretation when the physical footprint of a house or shrine was not revealed by the Stainton West excavation. The response to this is simply to contend that a house or other similarly scaled construction is the most convincing explanation for what the planks and other timbers were intended for. There are many analogous examples of very Early Neolithic monuments and houses known to British archaeology that can be adduced to support the contention that this was the intended use for the Stainton West timber, even if, presently, there are hardly any comparable sites known where the residues of timber procurement were deployed in a depositional, waterlogged context. The most likely location for any such house or monument would have been on the higher, drier terrace (Terrace 1), most of which lay beyond the CNDR footprint. It was there that a complex of monuments was constructed, known from aerial photographs (*Ch 1*, *p 30*), probably between a later point in the Neolithic period and the Bronze Age (*Ch 7*; *p 216*), but it is possible that this activity first commenced, in one form or another, during the Neolithic transition.

Furthermore, the structural elaboration of the channel, and the acts of deposition in it, defined an horizon at, and after, which the suite of fossil types (polished-stone axes, leaf-shaped arrowheads, and pottery) occurred that are normally seen as being diagnostic of Neolithic culture (Thomas 2013). At the same time as this, as far as the dating resolution presently allows, palaeoenvironmental evidence recorded the proxies associated with the transformation of the landscape by cultivation and herding (*Ch 8*, *p 284*), suggesting that domesticated plants and animals were being accommodated in the local ecologies.

In terms of the lithic technology, overall, if microliths were associated strongly with fishing and hunting game (*Ch 4*, *p 108*), such as aurochs and deer, it may be no coincidence that they apparently disappeared rapidly from tool repertoires (including at Stainton West) at a time when these resources were supplanted by domesticates. If fish and wild game were not actively prohibited by taboo (Thomas 2013, 415-16; Cummings 2017, 70-1), then leaf-shaped arrowheads and tridents (if the latter were for fishing) may reflect a shift in the social/cosmological value of these animals/foodstuffs in terms of the practices associated with their procurement, and possibly a change in the status of hunting (*cf* Hodder 2016, 55-6). On the other hand, many of the leaf-shaped arrowheads (and also broad blades) were made from the good-quality Yorkshire flint, indicating that the social networks providing access to the material from this distant source were maintained, and, possibly, that there was a new appreciation of its superior affordance (*ie* its potential for use in a given situation; *Ch 5*, *p 166*).

Regional Early Neolithic radiocarbon dates

When considering Stainton West regionally, there is, however, a problem. The radiocarbon dating of the '*Early Neolithic I*' phase of activity (and hence the recognisable commencement of the 'Neolithic' period) in the channel lies between *c* 3750 cal BC and 3650 cal BC (*Ch 8*, *p 298*). This is almost certainly several generations later than the tree-throw at Holbeck Park, on the Furness Peninsula (Fig 137), where a cereal grain and Carinated Bowl pottery have been dated to the thirty-ninth century cal BC (Evans 2018). Despite the presence of a microlith and a Mesolithic-style adze in the Holbeck Park tree-throw, this assemblage seemingly represents Neolithic activity or, at the very least, contact between local Mesolithic hunter-gatherers and pottery-making Neolithic farmers.

It is not felt that the geographical distance between the two sites can explain the discrepancy in their

dating, for they were in similar coastal situations, and the Mesolithic-period lithic evidence, at Stainton West, for long-distant contact (*Ch* 5, *pp 181-2*) does not suggest that the community there would have been more insulated from Neolithic influence than the people at Holbeck Park. Perhaps, then, those living at Stainton West in the early fourth millennium cal BC were at the heart of some kind of Mesolithic cultural core that more-trenchantly resisted neolithisation? Alternatively, maybe Holbeck Park, together with the similar dates from Site 98, at Great Langdale (Edinborough *et al* 2019; *Ch 7, p 223*), and the enclosure ditch and posthole at Long Meg (ASDU 2016; *Ch 7, p 217*), records the start of the regional process of neolithisation, whereas Stainton West records its fruition in one specific valley context? This could have taken place, over several generations, between communities distributed over a wide geography (corresponding to the extent of the Mesolithic lithic exchange networks), when they met up at the traditionally significant places of congregation (*Ch 5, p 174*). It was also very often these same places, such as Long Meg, that were monumentalised in the Neolithic period.

The radiocarbon dating of the '*Early Neolithic I*' phase, at Stainton West certainly agrees very closely with the dating of Sizergh 'Tumulus 2' (Evans 2008, 103-4), the timber house at Lockerbie Academy (Kirby 2011), and the post-defined south-western Scottish cursus monuments (Thomas 2007b), so would not be regionally anomalous in recording a transition horizon at this time. Indeed, it might be expected that social and economic change would have very rapidly cascaded throughout the long-distance exchange and communication networks (Barrett 2011, 85), so, as more radiocarbon dates are added to the corpus for northern Britain, it is possible that, inter-regionally, the chronological horizon for transition, depending on how this ultimately comes to be understood, might become more-tightly defined.

So, if neolithisation is a process, it can be conceived as having three phases (Zvelebil 1986): availability; substitution; and consolidation. The availability phase may have been drawn out, stretching back centuries into the fifth millennium cal BC (Garrow and Sturt 2011; Thomas 2013; Cummings 2017, 41; Olalde *et al* 2018). So too might the consolidation phase, which did not truly end until the Bronze Age, when sedentary farming communities emerged (Bradley 1984; 1998a; Barrett 1994) which were reliant on cereal crops (Stevens and Fuller 2012; 2015; Whitehouse *et al* 2014).

The substitution phase, however, may have been exceptionally rapid (Barrett 2005; 2011; Rowley-Conwy 2011), certainly as a localised collective commitment to an agricultural mode of subsistence. It may also have been rapid at a regional level because of the geographically extensive social-informational networks that connected Mesolithic communities, and authorities within them, enabling interactive discourse and exchange (*Ch 5, p 166*). If diverse forager and farmer identities were actually distributed along a spectrum, with the latter, through various idiosyncratic histories, emerging out of this process, then this goes some way to explaining why overloaded expectations of the 'Neolithic' have gone unfulfilled (*Ch 7, p 208*). In Cumbria then, might Holbeck Park and, perhaps, Long Meg, and the earliest phase of Site 98, lie in the domain of availability, perhaps towards its end, whereas Stainton West was at the fulcrum point of substitution for the Lower Eden Valley, just as the earliest monuments and timber houses were elsewhere?

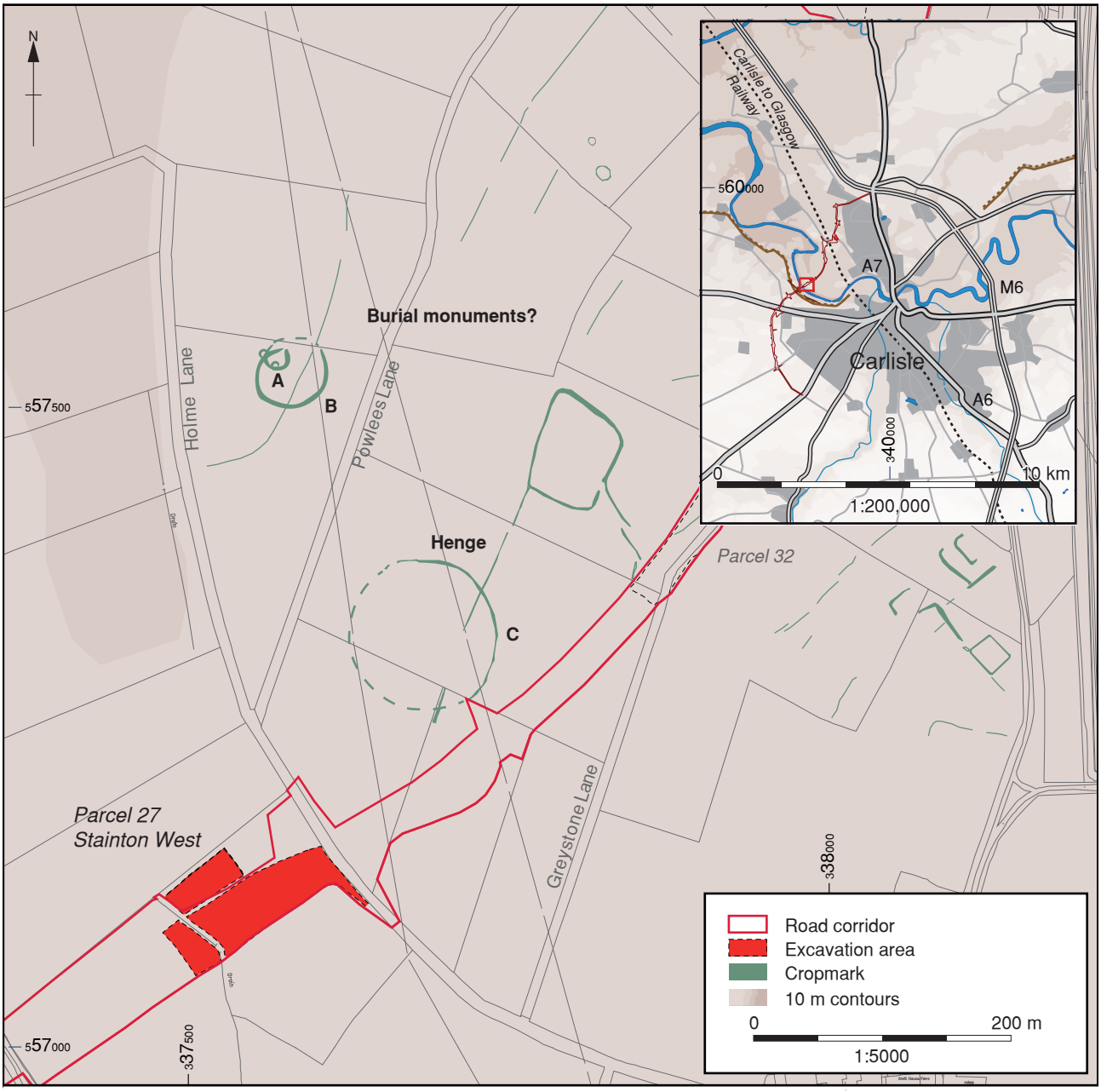


Figure 139: Monuments seen as cropmarks on Terrace 1 (Contains OS OpenData © Crown Copyright [and database right] (2022))

10

IN THE SHADOW OF THE HENGE: THE LATER NEOLITHIC PERIOD AT STAINTON WEST

F Brown

After the momentous events of the early fourth millennium cal BC, when Stainton West appears to have acted as a significant focal point in the landscape (*Chs 8-9*), the general impression gained is that during the later Neolithic period (*c* 3500-2450 cal BC), although the site was still important, it was peripheral to other powerful foci in the landscape, including, by the end of the period, a probable henge monument (*below*) on Terrace 1 (*Ch 3*, *p 63*). Therefore, in contrast to the Earlier Neolithic period, initially activity was episodic and of lower intensity. Nonetheless, the *Principal palaeochannel* continued to be used for the structured deposition of objects and materials, perhaps until it was ritually closed, with acts of deposition also marking this. The channel may have been little more than a boggy carr by then, choked with vegetation, water perhaps only flowing there during particularly wet episodes. Towards the latter part of the period (*c* 2800-2450 cal BC), the site became a focus for burnt-mound activity, a tradition that was to continue into the Chalcolithic period and Early Bronze Age (*Ch 11*, *p 382*).

Monuments on the Terrace

Interpretation of aerial photographic evidence for the Stainton West area (English Heritage 2014) has identified a complex of cropmarks on the Pleistocene terrace (Terrace 1, *Ch 1*, *p 16*), only 150 m to the north-east of the Stainton West site (Fig 139). These include linear, circular, and rectilinear features probably indicative of a palimpsest landscape, of prehistoric and later date. The circular cropmarks (A, B, and C) have the potential to be prehistoric monuments and may be of Neolithic date. The smaller circular ring features (A and B) have not been investigated by excavation, but may be burial monuments, whilst the larger, penannular feature (C) is most likely to be a circular Neolithic henge, only partially betrayed by the cropmark, and, indeed, the Cumbria Historic Environment Record records it as such (HER 41815). If a complete ring, the henge would have a diameter of *c* 100 m, which falls within the acceptable range for such monuments (Last 2011, 3; Evans 2008, 62).

During the construction of the CNDR, in the course of the removal of a hedge, a ditch (***200108***, Fig 140; Pl 127) was identified (within a 4 x 4 m sondage), corresponding to where a monumental ditch might have been anticipated, as a continuation of the cropmark defining the henge. From the excavated section, it was difficult to identify exactly where, in terms of depth from the ground surface, this feature survived. This was possibly a result of the bioturbation of the sediments by the hedge, or a build-up of soil around it, as a plough headland. The ditch probably survived to a depth of *c* 1 m, and was sealed below *c* 1.5 m of more mixed deposits (subsoil or redeposited subsoil (***200104***), sealed below probable hedge-bank material (***200103***)), so its base was at *c* 2.5 m below the present ground level. Where it could be clearly identified, it was 1.5 m wide, although this width almost certainly relates to a lower portion of the ditch, and, hence, originally it would have been much wider, perhaps in the region of 2.5 m based on its extrapolated profile.

However, given the depth and the restricted size of the excavation, there is also a strong possibility that it was larger still, if, for example, some of the gravels identified as being geological were actually redeposited ditch fills, though this could only be tested by a larger-scale excavation. If this were the case, this would certainly be in keeping with a henge, as these monuments were normally enclosed by a substantial ditch, measuring many metres wide (*cf* Harding 2003).

Its secondary fill (***200106***) was a yellow/orange sandy silt and was predominantly sterile, although it did contain some charred material. On the southern, external side, visible only in the south-west-facing section, was a reddish-brown sandy-gravel primary fill (***200107***), which seems to represent the primary erosion of a bank. This indicates that this bank was on the external edge of the ditch, providing further confirmation that the cropmark did indeed define a henge, as nearly all of these monuments were enclosed in a similar non-defensive fashion, with a ditch lying inside a bank (*ibid*). There was no evidence for any timber element to the monument within the trench, but such elements of its construction cannot be discounted.

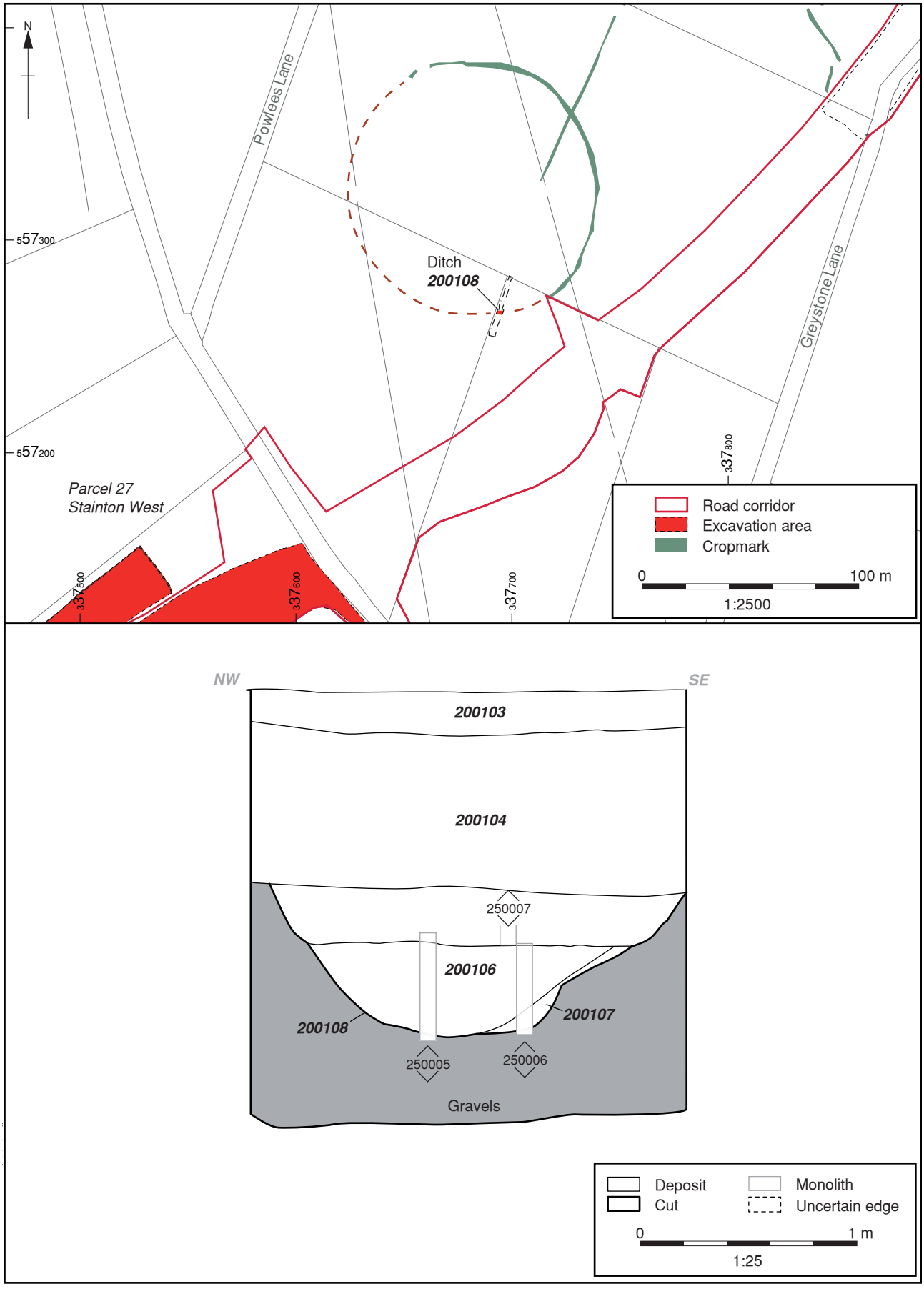


Figure 140: The trench exposing the ditch of the henge monument (Contains OS OpenData © Crown Copyright [and database right] (2022))

Plate 127: North-facing section through henge ditch **200108**

Some carbonised material was retrieved from soil samples (*Appendix 18*), dominated by oak, with one or two fragments of short-lived taxa, such as alder/hazel, hawthorn-type, and blackthorn-type, also being present. A piece of blackthorn-type charcoal, from ***200107***, has been dated by radiocarbon assay (*Appendix 20*) to the ninth millennium cal BC (8720-8450 cal BC; 9320±40 BP; SUERC-33917; *Ch 3*, *p 64*). This was almost certainly residual material, which had become included in the primary fill of the ditch, and can only provide a *terminus post quem* for the monument. Two other samples, hazel charcoal and a charred cereal grain from ***200106***, were respectively radiocarbon dated to the early medieval/medieval periods (cal AD 1030-1210; 905±35 BP; SUERC-37828; cal AD 1300-1440; 560±35 BP; SUERC-37827; *Ch 14*, *p 509*), and, as such seem too late to date the feature. A monolith sample (250007) did not contain pollen in high concentrations, but that which was present derived mainly from grasses, including cereals, and herbs rather than trees. This points to the presence of a highly cleared landscape with areas given over to the cultivation of cereals, alongside open and waste places. The pollen signature therefore would be more fitting for the Middle Ages than the Neolithic period; so, on balance, it seems most likely that the excavated ditch was receiving fills into the medieval period (*Ch 15*, *p 509*).

It cannot be entirely dismissed that the ditch was medieval in origin, and was actually a field boundary, or suchlike, which did not show up as a cropmark. However, its large size is more in keeping with what might be expected for a henge, and it seemed to relate to the penannular cropmark, so it is possible that it formed part of a Neolithic monument, which had become completely infilled around the fourteenth century cal AD. The sterile nature of fill ***200106***, and its composition, might suggest that it included significant amounts of redeposited material, and the thick subsoil (***200104***) may also have contained similar such material. If this was indeed so, it might then be the case that the pollen and radiocarbon-dated material had been incorporated into the ditch when a putative monumental bank was slighted and pushed into it during the medieval period, or was gradually eroded and destabilised by ploughing (*Ch 14*, *p 509*). This might have been associated with the enclosure of the land and been motivated by agricultural expediency. It is also worth remembering that Neolithic monuments can be notoriously difficult to date reliably using radiocarbon dating (Barclay and Bayliss 1999), and unexpected results such as this are not uncommon.

The Stainton West henge and Neolithic monumentality

If, indeed, a henge was present on the terrace, it most likely dated to the later Neolithic period (Last 2011, 6). Although stone circles are more common in Cumbria (*op cit*, 4; Evans 2008, 49-66; 2011), other henge monuments are known in the county, the most notable being those at Eamont Bridge, near to Penrith: the henges of Mayburgh; King Arthur's Round Table;

and Little Round Table (Topping 1992; Evans 2008, 49-66; Hodgson and Brennand 2006, 39); and other possible hengiform enclosures are known from aerial photographs at Gutterby and Summerhill on the Cumbrian coast (Evans 2008, fig 5.5, 51; Fig 141). Similarly, stone circles and henge monuments occur on the northern shore of the Solway Firth, particularly on the River Nith, near to Dumfries (RCAHMS 1997, fig 111, 115-16; Younger 2015, fig 1, 20). However, many of these are only known from aerial photographs of cropmarks, and the excavation and radiocarbon dating of Pict's Knowe (Thomas 2007b; Younger 2015, table 7, fig 28, 119-21) demonstrate that some may actually be of Chalcolithic or early Bronze Age date (*Ch 11, p 380*).

Whilst there are certainly differences in scale between the major Cumbrian/Scottish henges and stone circles (the former dwarfing the latter), it may be fallacious to draw too rigid a distinction between these types of monuments; in a broad sense, they may simply be variations on the same monumental theme. Nationally, there are many henges with stones forming part of their architecture (most famously: Stonehenge in Wiltshire; Darvill 2006), and some Cumbrian stone circles are associated with banks (Long Meg and Castlerigg; Burl 1976). The presence of such a monument near to Stainton West bears testimony that this part of the Eden Valley continued to be significant, and had ceremonial associations, probably in the later Neolithic period and into the Bronze Age.

There has been a great deal of discussion in the past regarding the style and typology of these circular monuments (*cf* Evans 2011), but without wishing to dismiss the value of this, it is also possible that variation arose due to locally specific requirements, the resources to hand, and individual monument histories. For example, the bigger rings (whether henges or stone circles) seem to have been sited where large congregations of people would have assembled (for instance, at estuaries, river confluences, on terraces, and floodplains), whereas the smaller rings, which tended to be sited on potential routeways between landscape zones, may have operated in different ways for smaller gatherings of people (*op cit*, 51). Furthermore, the distribution of distinct monument styles, which seem to cluster into sub-regional groups (*op cit*, 50-1, fig 6.9), might be seen as corresponding to the extents of different spheres of influence, inter-regional trends (*op cit*, 53), or even social territories.

However, this is not to suggest that monuments somehow defined bounded territories and areas

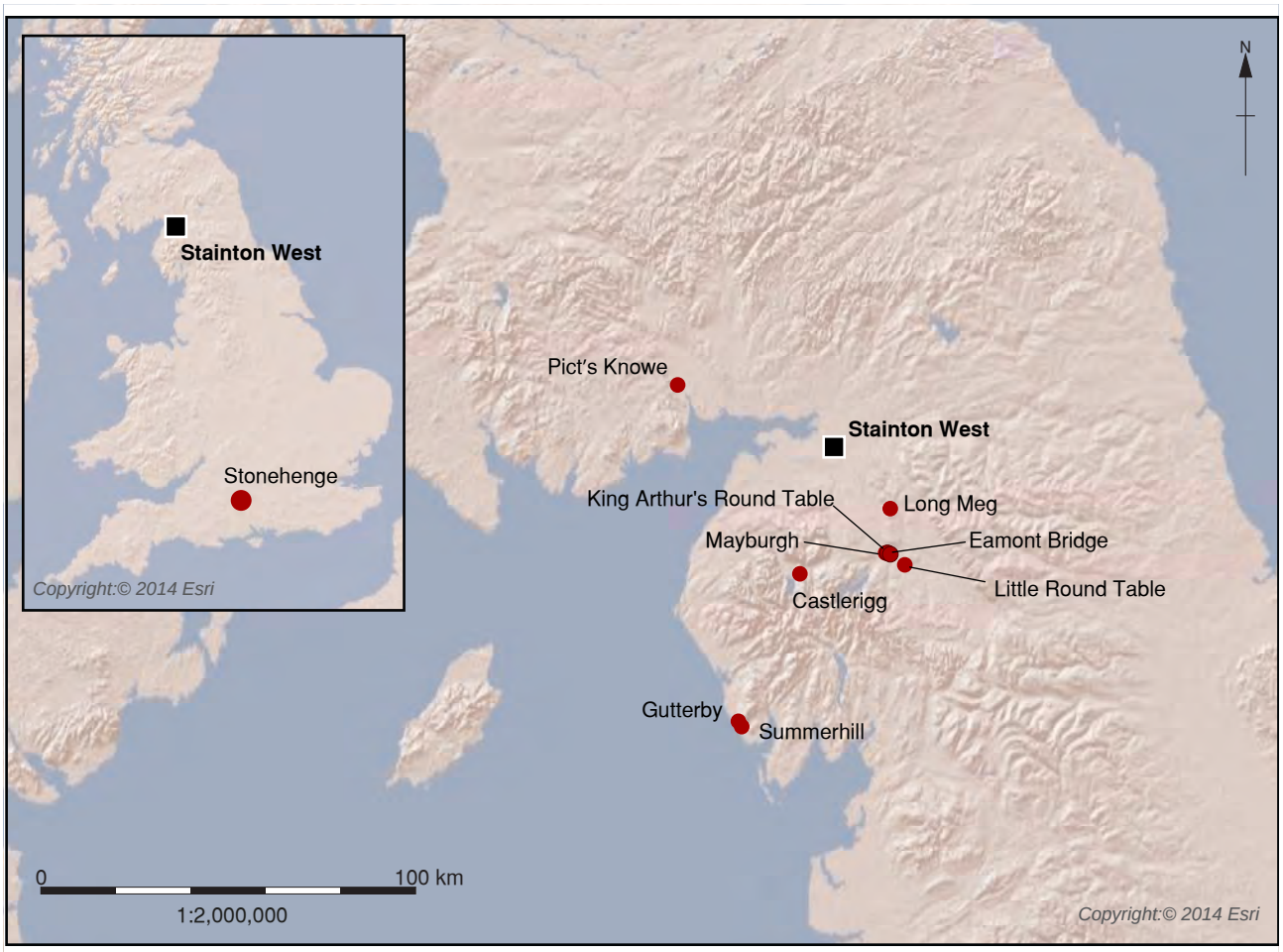


Figure 141: Henges/stone circles mentioned in the text

of land. Instead, in their construction, siting, and usage, they sought to legitimise, assert, and restrict rights of access to particular resources (*ie* tenure, *sensu* Ingold 1986, 130; Barrett 1994, 140-1), such as grazing and water, as well as paths, materials, and places. This was because farmers were invested in the control of these resources; things could now be owned, at least corporately, probably because there was competition between groups for contested resources. Hunter-gatherers had probably had similar concerns (*Ch 5*, *p 174*), but these were now structured by herding and farming and expressed in architecture. Ancestry (in the sense of relating to human dead; *Ch 7*, *p 223*) seems to have greatly preoccupied early British farmers (Bradley 1984, 15-16; 1998a, 50-1, 65; Edmonds 1999, 58-74), being one of the principles that structured social systems of storage, inheritance, and relations to land (Barrett 2011, 76). It was able to demonstrate that belonging to a bounded community (*Ch 7*, *p 228*) was important in mediating tenurial relations, and monuments seemed to have been central to such discourses.

Monuments sought to monopolise the ancestral power embedded at certain locales (*Ch 7*, *p 221*; Edmonds 1997, 107) by physically presencing and interweaving the genealogies/identities of particular groups into existing narratives, in such a way that they became mythologised and synonymous with that place. Both regionally and nationally, there is a wealth of evidence to suggest that some monuments played important funerary roles, mediating in the transformation of relatives into ancestors, for example, in the processing, distribution, and reincorporation of human remains (Cummings 2008, 136-42; Evans 2008, 116). They also provided locations at which the living could make present, and talk to, the dead by the enactment of ancestral rites (Barrett 1988), and not only during funerals, or when the physical remains of the dead were present (Barrett 1994, 50-4). Similarly, they may also have been places for communication with divinities, as well as a range of other practices that were not funerary in nature, and which could encapsulate the landscape as a whole and root communities in their past (Bradley 1998a, 81-2, 88-9, 117-29). It is noteworthy that similar concerns/practices may have been enacted at the monumentalised channel (a natural place), possibly by a hunter-gatherer community in the process of adopting Neolithic ways of being (*Ch 9*, *p 316*).

In addition to, and linked with, the control of resources directly embedded in the landscape, was differential access to, and control of, certain forms of socially significant wealth, such as prestige goods (including stone) and livestock, and also the networks by which these were exchanged and redistributed, sometimes over long distances (Bradley 1984, 38-67; Bradley and Edmonds 1993; Edmonds 1999, 126-9; Bradley *et al* 2016). All manner of different forms of identity and relationships could have been mediated through the possession and exchange of objects and animals; gifts may have been burdened with obligations, and different categories (for instance, axes for cows) may not have been mutually exchangeable (Thomas 1996, 184). This encouraged an increasingly heterogeneous society, and possibly a more hierarchical one, although the extent to which individuals or groups were able to maintain and entrench dominance is debatable (*op cit*, 148-9, 178-82).

Monuments would have been key venues at which exchanges and social negotiations could have taken place, and where identities could have been developed and established. It is probably no coincidence that, as at Stainton West, communal monuments were sited in the same parts of the landscape where hunter-gatherers had formerly congregated (*Ch 5*, *p 154*). It is also possible that monuments helped to promote social gradation and enabled elites to emerge and consolidate their status (Barrett 1994, 29). This could have happened in many ways, but it is likely to have originated in the coordination and assembly of the communal labour force required to construct the monuments, as well as during the determination of their initial form and design (*op cit*, 24-9; Richards 2004).

Once constructed, a monument would have architecturally structured experience (Barrett 1994, 14-19, 58). This could have been achieved by channelling, orientating, and sequencing movement, or by framing the landscape (by vista, reference, and encounter), thereby determining how it was perceived and making manipulation of this (and the knowledge it embodied) possible (Tilley 1994; 2010). Equally, monumental architecture (banks, post screens, *etc*) could have been used to include and exclude people, controlling who could and who could not participate in and witness those activities and performances undertaken within them (Barrett 1994, 15).

A monument's original form, figuratively speaking, need not have been set in stone. This may have exerted a strong influence on any subsequent architectural developments, but it could also have been subjected to fundamental redesign, for example, through total reconstruction or concealment. It would also have been possible to subvert the original design by means of less-radical physical additions, alterations, and reconfigurations, or simply through verbal or performative reinterpretation. Indeed, many monuments were constructed piecemeal, but from carefully selected and compiled assemblages of materials (McFadyen 2003). For example, it is interesting to imagine how, and over what timescale,

the cobble-built henge at Mayburgh, Penrith, might have been raised (Topping 1992). So, whilst monuments may have made the mythologies of places concrete and durable (Bradley 1998a, 70), this did not mean that they were no longer prone to redefinition. Society too could have been profoundly transformed by the ritual practices undertaken at monuments, because of the self-reflective, discursive nature of these (Barrett 1994, 79-82, 145-6). For example, these could have acted to legitimise the authority of those officiating, or served to reinforce (or undermine) the bonds that existed between different sectors of society, in ways that persisted and extended beyond the ritual time/space.

The Later Neolithic Period at Stainton West

Principal Palaeochannel: natural deposits and the local environment

At Stainton West, during the later Neolithic period, a drier, lower-energy phase within the *Principal palaeochannel* resulted in the formation of the *Later Neolithic organic deposit*. This sealed the *Earlier Neolithic alluvium* (*Ch 8, p 235*; Fig 142) and appeared to represent a return to slightly drier, lower-energy conditions in the channel. It was highly organic in nature, and wood and roots within it indicated the colonisation of

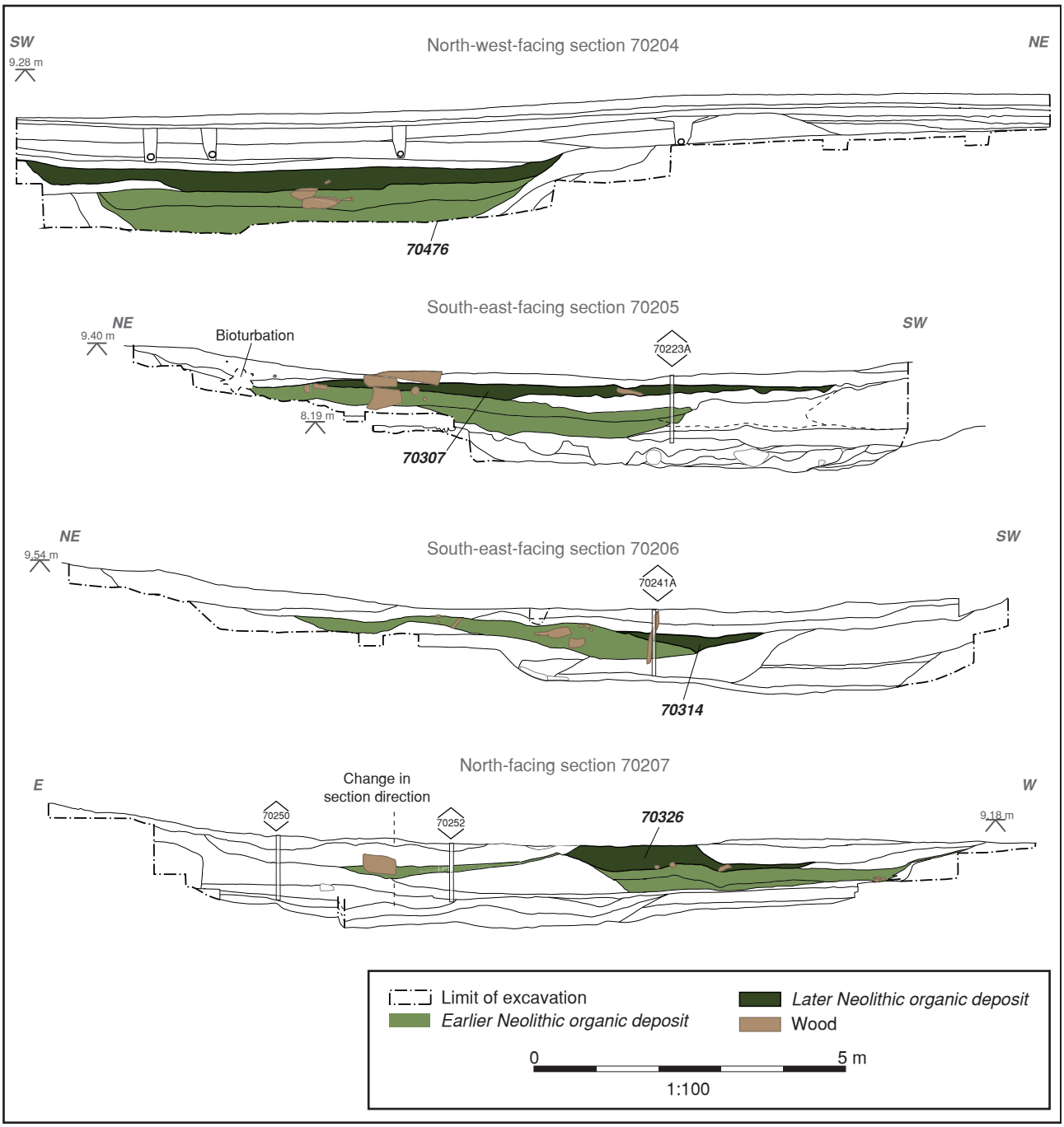


Figure 142: Sections through the Later Neolithic organic deposit *within the* Principal palaeochannel

the channel by trees and other forms of vegetation. It thus marked the stabilisation and infilling of the channel and its increasing terrestrialisation. A stream probably also trickled through the western side of the *Principal palaeochannel*, at least during wetter times, draining into a ponded area within Bays A and B (Fig 143), and possibly flowing slightly further over to the west. Indeed, the *Later Neolithic organic deposit* was more extensive at the northern end of the channel, in the area of this ponding. In contrast, on both the channel's western and the eastern edges, it was not always present, having been eroded by subsequent higher-energy episodes of fluvial activity (*Ch 11, p 373*). In the channel's centre, into which the *Earlier Neolithic alluvium* did not always extend, it often physically overlaid the, very similar, *Earlier Neolithic organic deposit* (*Ch 8, p 235*), making it very difficult practically to distinguish the two deposits during excavation.

Where characterised (*Appendix 19*) in monolith samples (70223A and 70241A), respectively from Bays B and D, the deposit comprised humic material containing fragments of organic matter, and humifying plant and tree roots, probable hazelnut shells, many wood fragments, and charred wood and plant matter, alongside rare traces of humifying leaves. It therefore reflects slowly accumulating wetland plant-vegetated peat, formed from very finely fragmented detrital organic matter and silt accumulating in a low-energy stream/pond. There was some bioturbation by roots and small mesofauna. Towards the top of the deposit, a change in sedimentation led to the peat becoming more minerogenic, with a silt and fine sand content. This probably marked a change in water flow, which had slightly increased.

Several radiocarbon dates and a dendrochronological radiocarbon-dated wiggle-matched sequence (Cluster 4; *Appendix 20*; Table 28; Fig 144) date the deposit.

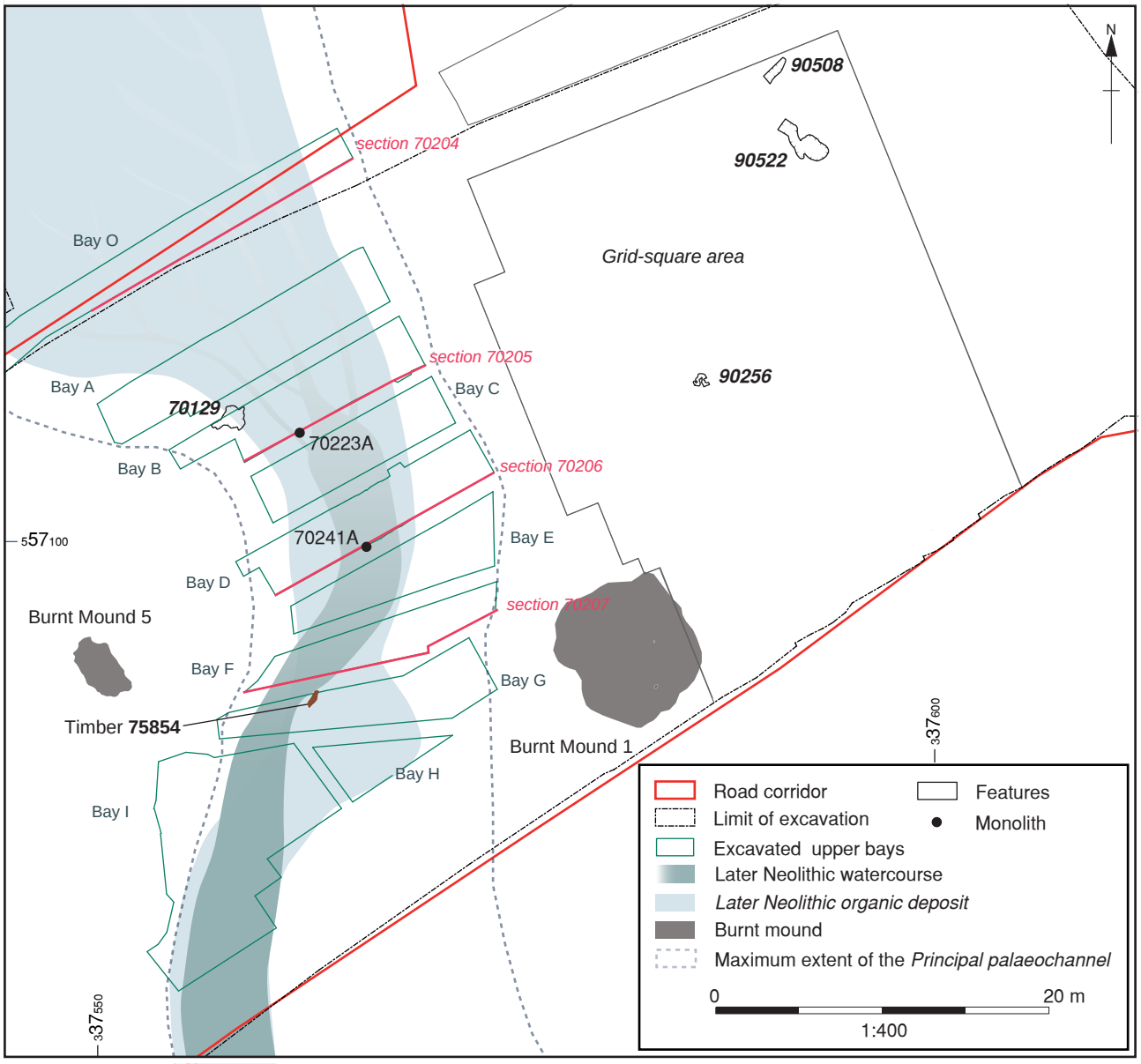


Figure 143: The Later Neolithic organic deposit *in the* Principal palaeochannel, *and Burnt Mounds 1 and 5*

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Principal palaeochannel Bay B	Tree-throw ***70129***	Element of *'Late Neolithic'*	Bulk-sample 70063	8.56-8.92	SUERC-32628	Hazelnut (*Corylus avellana*)	4675±35	-26.4	3630-3360	Statistically consistent with good agreement (T'= 1.18; $T'(5\%)$=3.8; v=1; A_{comb}= 92.8% (An= 50.0%))	*3630-3360 (Terminus post quem)*
					SUERC-44752	Alder (*Alnus glutinosa*) catkin axis	4380±35	-25.0	3100-2910		*3100-2910*
Principal palaeochannel Bay D	Deposit ***70314***	Part of *Later Neolithic organic deposit* Pollen superzone CNDR 3: alder carr	Monolith 70296	8.61	SUERC-44785	Hazelnut (*Corylus avellana*)	4534±35	-26.4	3370-3100		*3360-3170*
					SUERC-44786	Indeterminate twig **77013**	4478±35	-29.1	3350-3020		
Principal palaeochannel Bay E	Deposited Grooved Ware	Element of *'Late Neolithic'*	-	8.68	SUERC-32626	Organic residue on vessel	4145±35	-26.2	2880-2620	-	*2880-2610*
Principal palaeochannel Bay F	Deposit ***70326***	Part of *Later Neolithic organic deposit*	Monolith 70254	8.48	SUERC-44772	Hazelnut (*Corylus avellana*)	4596±35	-26.1	3520-3120	Statistically inconsistent with poor agreement (T'= 10.65; $T'(5\%)$=3.8; v=1; A_{comb}= 13% (An= 50.0%))	*3520-3110 (Terminus post quem)*
					SUERC-44773	Indeterminate twig **77010**	4423±35	-27.8	3330-2920		*3330-2920*
				8.66	SUERC-32695	Sediment	4180±35	-29.1	2890-2630	-	-
Principal palaeochannel Bay G	Timber ***75854***	Vertically driven timber Element of *'Late Neolithic'* Timber matched to Cluster 4 Dated by dendrochronological wiggle-matching	Block S from timber ***75854***	-	SUERC-44847	Oak (*Quercus* sp) heartwood, rings 1-10	4301±33	-28.0	3020-2880	-	*2870-2830* (outer sapwood ring)
			Block T from timber ***75854***	-	UBA-22283	Oak (*Quercus* sp) heartwood, rings 31-40	4373±49	-28.3	3320-2890	-	

Table 28: Late Neolithic Phase radiocarbon dates from the Principal palaeochannel *at Stainton West*

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Principal palaeochannel Bay G	Timber **75854**		Block U from timber **75854**	-	SUERC-44848	Oak (*Quercus* sp) heartwood, rings 61-70	4314±33	-26.3	3020-2880	-	*2870-2830* (outer sapwood ring)
			Block V from timber **75854**	-	UBA-22284	Oak (*Quercus* sp) heartwood, rings 91-100	4306±36	-27.2	3020-2880	-	
			Block W from timber **75854**	-	SUERC-44849	Oak (*Quercus* sp) heartwood, rings 116-25	4253±33	-27.0	2920-2700	-	
			Block X from timber **75854**	-	UBA-22285	Oak (*Quercus* sp) heartwood, rings 141-50	4112±37	-27.5	2880-2570	-	
			Outermost part of the unmeasurable band of sapwood from timber **75854**	-	UBA-22286	Oak (*Quercus* sp) sapwood	4119±37	-27.4	2880-2570	-	

Table 28: Late Neolithic Phase radiocarbon dates from the Principal palaeochannel *at Stainton West (cont'd)*

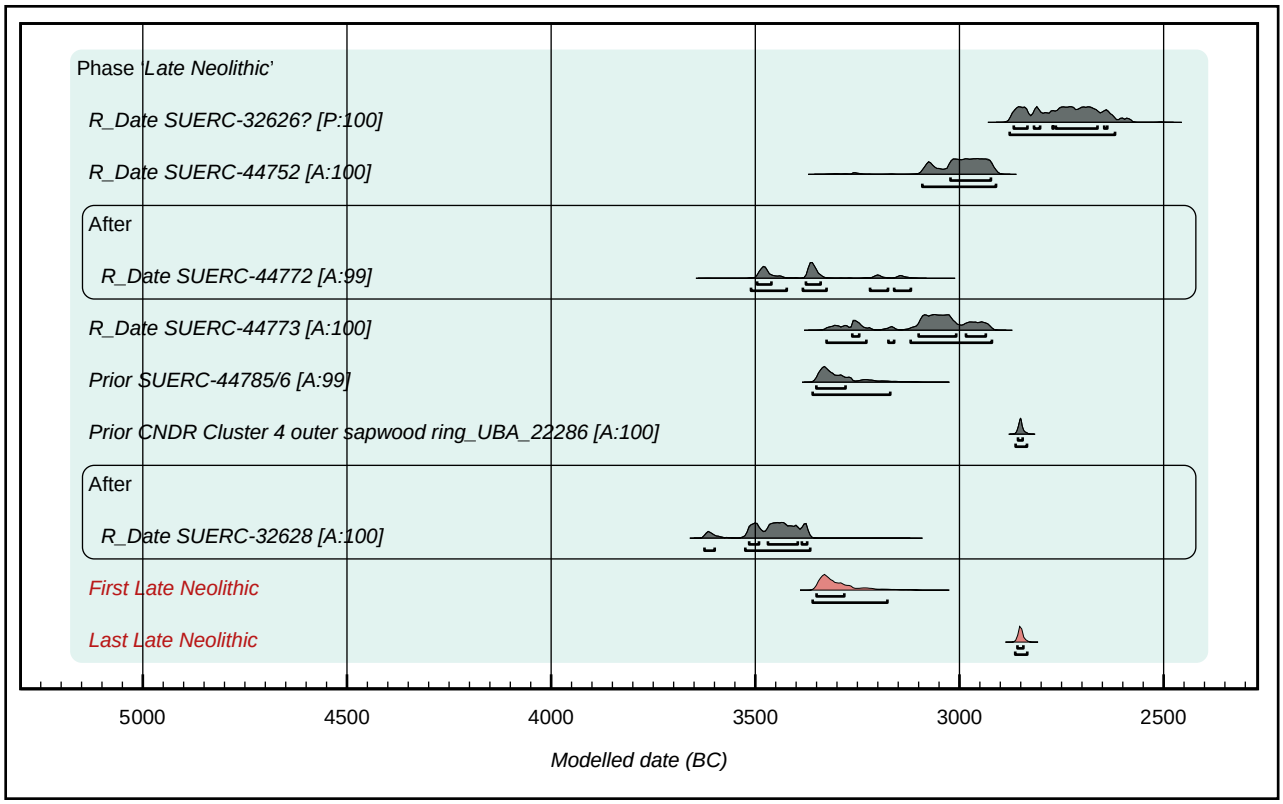


Figure 144: Radiocarbon dates and dendrochronological wiggle-match dates for the Later Neolithic organic deposit

These estimate that it accumulated ('*Late Neolithic*') between *3360-3170 cal BC* (*First*) and *2870-2830 cal BC* (*Last*).

Palaeoenvironmental remains

In general, the quality of the palaeoenvironmental evidence from the *Later Neolithic organic deposit* was good and provides a coherent picture of the ecology at that time. There was, however, scant evidence of foraminifera, ostracods, or diatoms (*Appendix 15*), but freshwater alga, *Mougeotia* (HdV-313; *Appendix 16*), was present, as were heterocysts of the cyanobacterium/blue-green alga, *Gloeotrichia* sp. These may provide evidence for excessive nutrient enrichment (eutrophication) within the channel (*Appendix 17*), again suggesting a low-energy stream/pond.

In addition to the fragments of wood, roots, and leaves within the sediment matrix, larger pieces of waterlogged wood were frequently present (Pl 128), and were widely distributed, except in Bay O (*Appendix 13*). Of this, alder was more frequent

Plate 128: Late Neolithic waterlogged wood, revealed during the excavation of the Later Neolithic organic deposit *in Bay A*

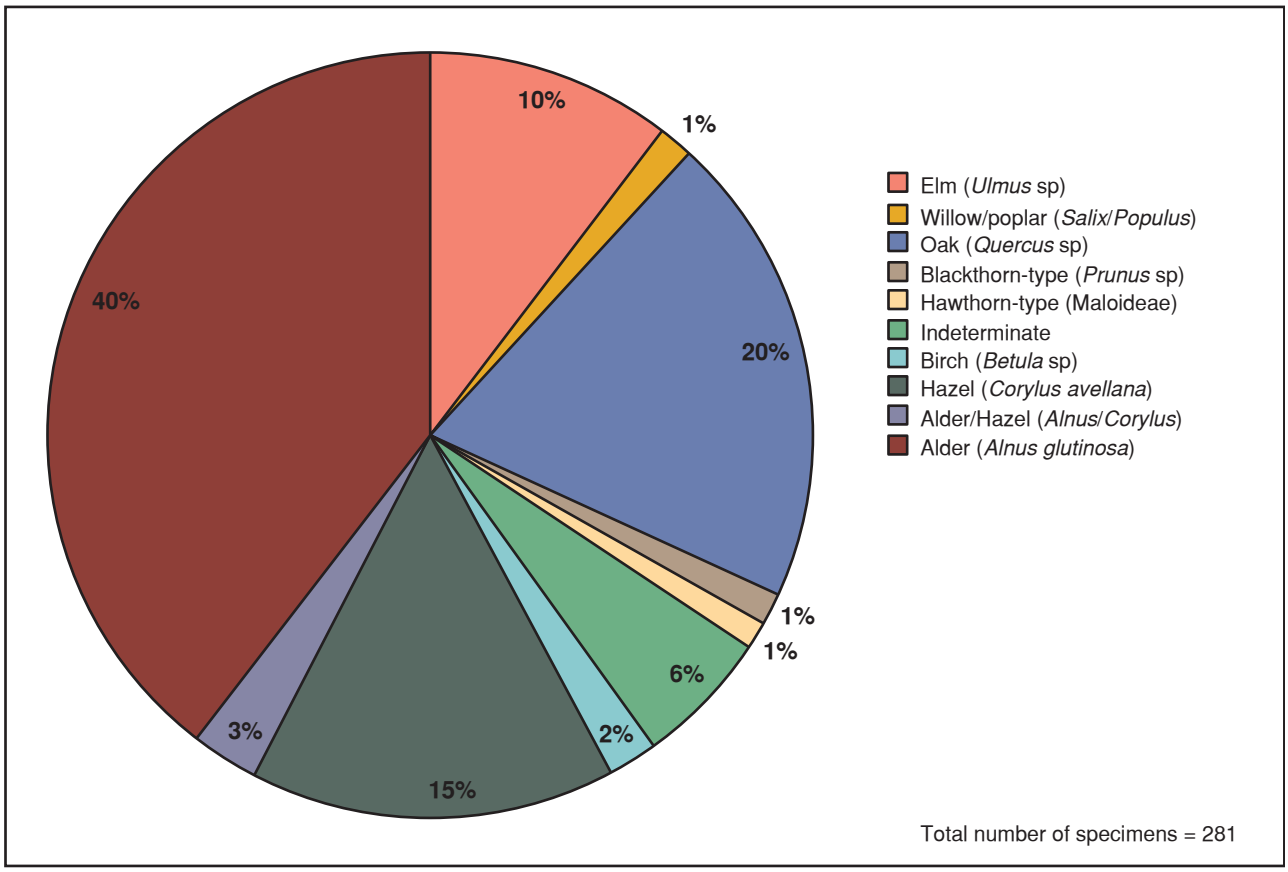


Figure 145: The composition of waterlogged wood from the Later Neolithic organic deposit

than it had been in earlier deposits and hazel was proportionately less so; otherwise, a similar range of species (Fig 145) to the *Earlier Neolithic organic deposit* (*Ch 8, p 298;*) was represented. Significantly, root wood was common, dominated by alder, and several trunks occurred, as did many larger branches, which were often crooked. The general impression was that much of the wood could have derived naturally from trees that had encroached upon the channel, and the higher proportion of alder could indicate a carr environment.

Other waterlogged plant remains (*Appendix 17*) were particularly numerous in this deposit and indicated considerable changes to the local environment from the earlier Neolithic period (Fig 146). Abundant alder fruits demonstrated that this tree had replaced hazel

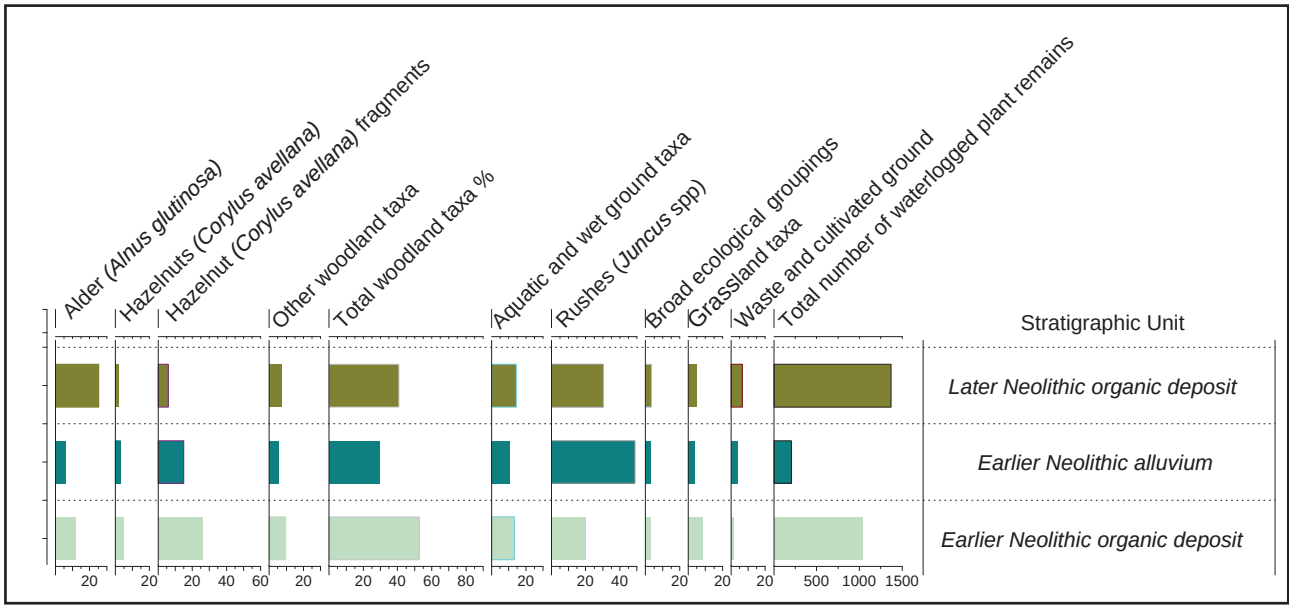


Figure 146: Relative proportions of waterlogged plant remains in the Neolithic deposits in the Principal palaeochannel

as the dominant taxon, though stands still existed, and the remains of brambles, elder, and cherries/sloes suggested that the woodland close to the channel was more open, and scrubby in character. Additionally, grasses were consistently identified, with creeping buttercup-type achenes in many of the samples providing further evidence for open ground. Rushes were present in all parts of the channel during this period, and taxa such as water-starwort, sedges (including Cyperous sedge, brown sedge, and bottle sedge), together with some meadowsweet and marsh woundwort, imply marsh and fen conditions. Charcoal of oak and alder/hazel (*Appendix 18*) could provide evidence for some local activity by humans.

The insect faunas were dominated by a range of taxa associated with slow-flowing or even stagnant waters (*Appendix 14*). In slight contrast to the waterlogged plant remains, there was limited evidence for the presence of stands of waterside vegetation in the area: a single small fragment of either a *Donacia* or a *Plateumaris* 'reed beetle', and two individuals of the weevil *Notaris acridulus*, which is associated with reed sweet-grass (Koch 1992). The relatively large proportion of insects associated with woodland suggested that this still dominated the immediate environment. Several species, such as *Rhizophagus nitidulus, Cerylon* spp, *Grynobius planus*, *Ptilinus pectinicornis*, *Lyctus linearis*, *Grammoptera* spp, *Dryocoetes villosus*, and *Phloeophagus lignarius*, are associated with a range of deadwood within established woodland (*ibid*). Other species included those associated with tree leaves, such as *Phyllobius calcaratus* (alder), and *Rhynchaenus quercus* (oak; *ibid*).

Interestingly, considerable numbers of insects were associated with animal dung lying in the open (Jessop 1986), which may provide evidence for the local husbandry of grazing animals. These primarily comprised scarabid 'dung beetles', including *Geotrupes* spp, *Aphodius coenosus*, and *A sphacelatus/prodromus.* As a larva, the 'garden chafer', *Phyllopertha horticola*, is associated with old grazing land and meadowland, and, as an adult, with trees by watersides (*ibid*). *Serica brunnea* is mainly associated with sandy ground in rough grassland (*ibid*).

Evidence from fungal spores goes some way to confirming the insect evidence for grazing (*Appendix 16*). The fungal spore *Glomus* (HdV-207) is linked to soil disturbance (van Geel 1978), which could have been created by animals or humans using the floodplain area for pasture, whilst *Sordaria* (HdV-55C) is commonly found in herbivore faeces (*ibid*). *Coniochaeta xylariispora* (HdV-6A), *Chaetomium* (HdV-7A), and *Cercophora* (HdV-112), although present in small numbers, also provide some evidence for potential animal grazing (Innes *et al* 2006). Species of *Chaetomium* (HdV-7A) have also been recorded from archaeological sites, including settlements, and have been associated with damp straw, cloths, leather, and other materials (van Geel and Aptroot 2006). In addition, *Kretzschmaria deusta* (HdV-44) was recorded, which is associated with dead and decaying wood (van Geel 1978).

The *Later Neolithic organic deposit* has been placed in pollen superzone CNDR 3 (*Appendix 16*), characterised by the consolidation of alder on the floodplain and the relatively consistent presence of hazel-type and oak pollen. The data (Fig 147) suggested a largely forested lowland area, in which alder and hazel were dominant, the lower oak-pollen values perhaps indicating that some clearance of oak woods had taken place, with evidence for the regeneration of this taxon higher up the sequence. Birch, hawthorn, ash, ivy, and elm were also recorded, and there were sporadic occurrences of heather, willow, pine, bramble, and blackthorn-type pollen. Herb pollen was much reduced from that recorded in the earlier Neolithic period (*Ch 8, p 288*), and only a few cereal-type grains were present, along with much lower values for grass.

In contrast, sedges and *Sphagnum*-moss spores were often recorded, which, together with the alder, point to alder-carr expansion. This was perhaps at the expense of pasture and/or the arable use of the floodplain, although some grassy areas existed, which may have been produced as a result of local herbivore grazing. Assuming that the cereal-type grains present were representative of cultivated types rather than wild grasses (Andersen 1979; Tweddle *et al* 2005; Joly *et al* 2007), there was evidence for small-scale cultivation. Microcharcoal was recorded, generally, in relatively small amounts, but could point to human activity in the locale.

In summary, the consistent impression given by the palaeoenvironmental remains was of a landscape that was largely still wooded, but with some scrubby clearings in it, possibly a result of farming. Agriculture may have taken place at a remove from the *Principal palaeochannel*, and an alder carr may have begun to replace the stands of hazel that had formerly dominated its banks. This carr may still have been browsed by livestock though. The channel environment remained wet, but it may have been an almost stagnant pond by this point, trees and rushes growing within it, promoting soil stabilisation, and a 'wood peat' may have started to form.

Human activity *c* 3350-2800 cal BC

There was some evidence that the infilling channel continued to be a focus of activity during the later Neolithic period, although this seemed to have been fairly sporadic and not at the same scale as it was during the earlier Neolithic period (*Chs 8-9*). In the earlier part of this period, this largely comprised artefactual evidence, perhaps continuing the Early Neolithic

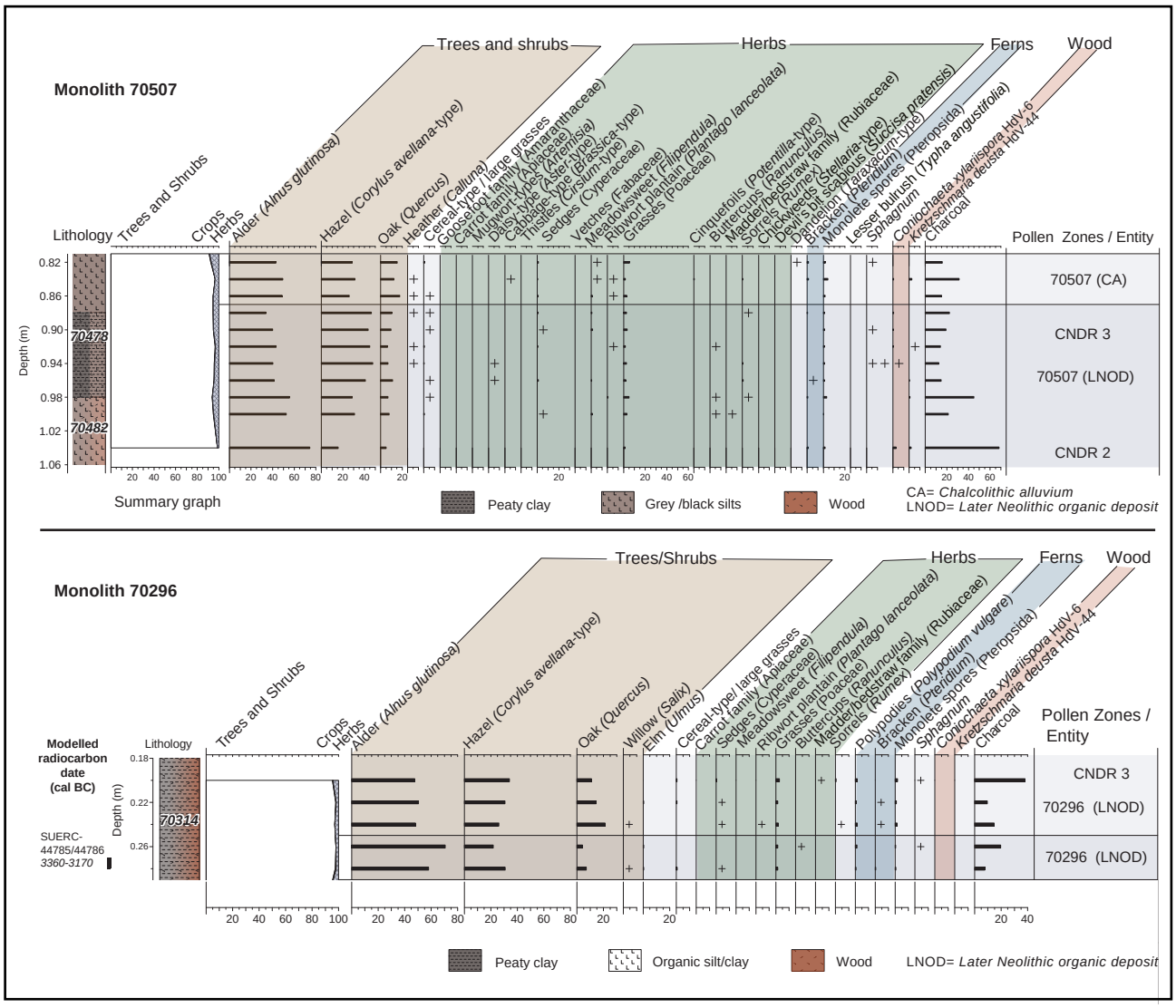


Figure 147: Pollen percentage diagrams for the Neolithic deposits, monolith samples 70707, in Bay O, and 70296, in Bay D

tradition of deposition in the channel (*Ch 8, p 275*). However, although the distribution of these finds at times coincided with the earlier depositional foci, this may not necessarily have been intentional, and it was not always possible to determine whether or not the finds were residual when this occurred. Wooden stakes also continued to be driven into the channel, but they did not form such obvious structures as earlier (*Ch 8, p 240*), and it is not clear whether this was part of the same tradition. It is also doubtful whether the wooden platform (*Ch 8, p 240*) remained visible and in use *per se*, although it would have continued to underlie, and help to consolidate, the eastern channel bank.

Wooden structures and other worked wood in the channel

The *in-situ* stakes in the channel suggested the presence of one or more light wooden settings or structures. These were probably insubstantial and were hard to interpret, as they did not seem to have been buildings, fences, jetties, or walkways. It is possible that they were markers of some kind, although other interpretations are possible. The stakes were often made from coppiced wood, indicating that the local stands of alder and hazel were probably managed to some extent, and other pieces of wood, found in the *Later Neolithic organic deposit*, if not residual, provided evidence for the splitting of larger oak and alder trees.

The later Neolithic worked wood was nowhere near as frequent as earlier, and, in contrast, was almost absent from its central bays, with a marked concentration on the western side of the channel (Fig 148). This western distribution may therefore reflect activity that was situated in, and referenced, the stream which, at this time, trickled along the western side of the *Principal palaeochannel* (*p 329*). However, because the later Neolithic wood was closely associated with the stream, any pieces that were not clearly *in situ* must be interpreted with a degree of caution, as they could have been residual, being redeposited by stream erosion.

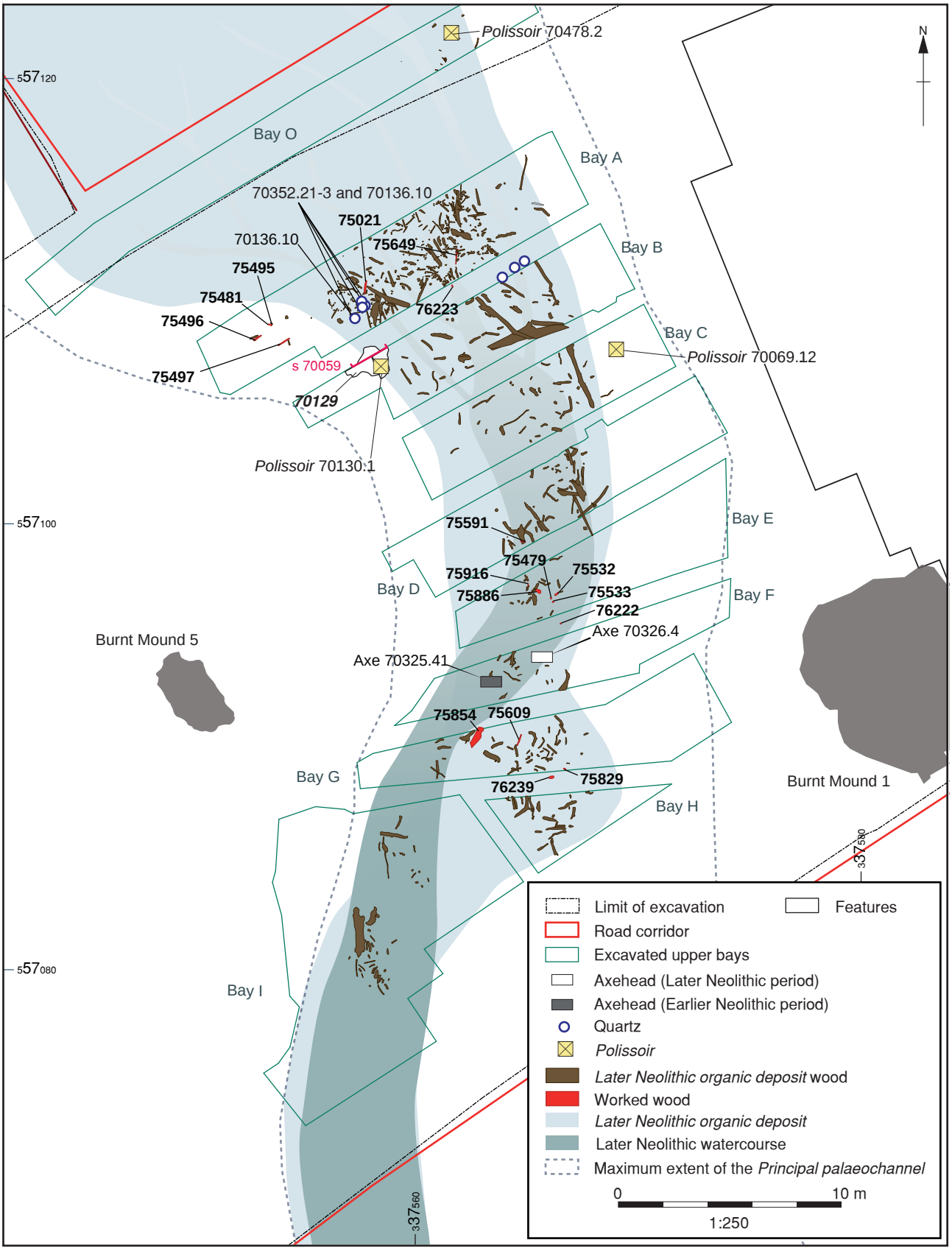


Figure 148: Deposits of wood, worked wood, and artefacts in the Later Neolithic organic deposit

Considering the worked wood in more detail, a single *in-situ* hazel stake (**75829**) and a piece of oak felling debris (**75609**) were both recorded as being associated with the *Later Neolithic organic deposit* towards the south of the site. However, the stake was more probably associated with earlier Neolithic structures in this

*Plate 129: Stake **75533**, and oak-debris **75532** and **75916***

part of the channel (*Ch 8, p 240*), and similarly the felling debris, based on the distribution of the earlier Neolithic material, was probably also a residual item within the *Later Neolithic organic deposit* (*Ch 8, p 239*).

Firmer evidence for later Neolithic worked wood was present further to the north, in Bay E and the Bay E/F baulk, where six worked-wooden pieces were clearly present in the *Later Neolithic organic deposit*. Of these, **76222** and **75533** (Pl 129) were *in-situ* hazel and alder/hazel trimmed roundwood stakes; **75479** and **75886** were displaced trimmed roundwood stakes of indeterminate species; and **75532** and **75916** were, respectively, tangential and radial pieces of oak felling debris, with the latter being very charred.

If the displaced stakes, as was likely, had moved only a short distance, they formed a slightly arcing line, *c* 2 m long, at an approximate perpendicular to the bank, which would have possibly stretched across any flowing stream. They may thus have been intended to dam or restrict the flow, for fishing or other purposes, but they would not have formed a substantial structure, and no trace of this was left in the upstream sediment formation. As there was no other evidence for woodworking or burning in this area, it might be assumed that the wood debris was in a secondary context, placed in association with the stake setting, or had become trapped against it. It also cannot be ruled out that the debris related to an earlier phase of activity, if it had eroded out of the *Earlier Neolithic organic deposit* and been displaced downstream, for example.

There were a few pieces of worked wood in this latter deposit, within Bay F (*Ch 8, p 250*), just to the south-east of this putative stake line, but they were clearly at lower depths, so seem unrelated. Likewise, there were no particular concentrations of worked or unworked coarse stone (within any deposit) in the area of the stake line, so it does not seem to have corresponded to an earlier depositional focus. However, a stone axehead (70326.4) was retrieved from the *Later Neolithic organic deposit*, a short distance to the south-west, and may therefore have been associated with the stake setting. Clearly within the *Later Neolithic organic deposit*, in Bay D, just over 2 m further north-west, was another piece of roundwood (**75591**), a possible coppice heel, with no other signs of working.

In stark contrast to the earlier Neolithic phase of activity, there was no worked wood surviving in Bays D-B. There were some pieces within Bay A, but these were mostly on the west of the channel. One piece of alder-bark debris, which was charred and had been tangentially split (**76223**; Pl 130), was associated with Wooden Structure 2 (*Ch 8, p 244*), in the *Earlier Neolithic organic deposit*. However, the debris was radiocarbon dated to *3340-3020 cal BC* (*SUERC-42025*; Table 28), so must have been intrusive, instead relating to the later Neolithic phase of activity. It does, therefore (possibly along with **75532** and **75916** to the south, as well as other pieces), point to some woodworking continuing in fairly close proximity to the channel at this time.

The six pieces that belong to this phase of activity in Bay A included both roundwood stakes and also splitting debris. Towards the centre of the bay, **75649** (Pl 131) was a piece of radially split alder debris, whilst a little over 4 m to the west of this, on the edge of the channel, was **75021**, a piece of radially split oak debris. Both pieces were firmly within the *Later Neolithic organic deposit*, although this cannot entirely preclude the possibility that they may have been residual, from the earlier Neolithic phase of activity. A further 4 m to the west, the cluster of the other four pieces were all at the same level in the channel. There was, however, some ambiguity in the stratigraphic interpretation, given the similarities in deposits, but on balance these were probably most likely to be associated with later Neolithic activity, rather than the earlier phase. They comprised a piece of tangentially

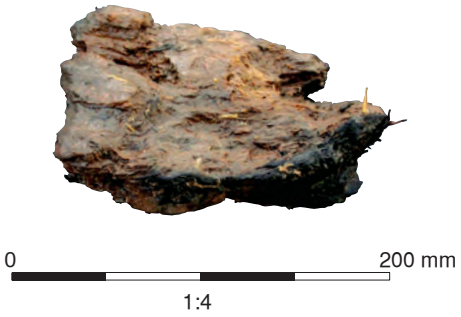


*Plate 130: Charred alder debris **76223***

*Plate 131: Alder debris **75649** (top), hazel stake **75495**, alder stake **75497**, and oak debris **75496***

split oak-felling debris (**75496**), a possible *in-situ* hazel stake (**75495**), and two displaced stakes (**75497** and **75481**), respectively made from alder and hazel. Taken together, it is possible that this group formed the remnants of a small decayed structure or setting.

Stone tools in the channel

A substantial assemblage of worked and unworked coarse stone was recovered from the *Later Neolithic organic deposit* (*Appendices 2* and *9*), and smaller numbers of flaked-lithic pieces were also retrieved (*Appendices 4* and *5*). However, the taphonomy of the channel being complex, at times it was difficult to be entirely sure of the correct stratigraphic provenance (despite careful excavation and the use of three-dimensional recording; *Ch 1, p 17*). As such, it is very often impossible to be certain whether the stone implements in the *Later Neolithic organic deposit* were residual or not. Whilst deposition almost certainly continued into the later Neolithic period, and an unknown, and therefore presumably under-estimated, proportion of the lithic assemblage would relate to this phase, it was not always possible to separate this from the earlier material.

This is highlighted by the fact that, during analysis, when the assemblages from the Neolithic channel layers (*Earlier Neolithic organic deposit*, *Earlier Neolithic alluvium*, and *Later Neolithic organic deposit*) were considered together, in aggregate, they were seen to form apparently spatially meaningful clusters and patterns, but these patterns broke down when the lithics were considered only within the stratigraphic unit to which they had been assigned during excavation. Furthermore, these patterns and clusters seemed to relate (as they coincided with them) to arrangements of wood contained by the deposits that had accumulated during the earlier Neolithic phases. Conversely, there was often no clear spatial association between the lithic items and wooden objects in the *Later Neolithic organic deposit*. There were a few exceptions to this but, on balance, it must be concluded that much of the lithic material in the channel related to the earlier Neolithic activity phases (*Ch 8, p 256*).

In Bay A, there were a few unworked and even less worked coarse stones near to the wooden objects (*p 337*) and, hence, it is possible that these were all related to

Plate 132: Axehead 70326.4

each other, although this was far from certain. More convincingly, a small group of four quartz pieces (70352.21-3 and 70136.10), all cores, looked to have been *in situ*, being closely associated with each other, within the *Later Neolithic organic deposit* (the latter piece was assigned to an earlier layer, but, as it was at the edge of the channel, where the deposits were similar to each other, this is likely to have been erroneous). The quartz pieces thus demonstrated some low-level activity in this part of the channel at this time, and it is also possible that some of the other lithic pieces in this area (coarse stone, pebble flint, and chert) were dropped or purposefully deposited in association with this activity.

The small and largely complete stone axehead (70326.4; Pl 132), measuring 93 mm long, 52 mm wide, and 29 mm thick, was recovered from within the *Later Neolithic organic deposit*, in Bay F, only 1.7 m to the south-west of a later Neolithic stake setting (*p 337*). It is, therefore, possible that it was deposited in association with this structure, though it was also within 2.20 m of another axehead (70325.41; in the *Earlier Neolithic organic deposit*; *Ch 8*, *p 266*), which was part of a cluster of worked coarse stones, distributed along the western channel edge. Given that the still-active stream was thought to flow through this part of the channel, it is a distinct possibility that the axe was also originally deposited in the earlier Neolithic period, as part of this cluster, and had been eroded by the stream, thus being a residual element within the *Later Neolithic organic deposit*.

Unlike the other axeheads in the channel, which were made of tuff (*Appendix 6*), macroscopic inspection suggests that the axe was a form of olive grey, coarse quartz dolerite, which falls within the description for Group XVIII (Bradley and Edmonds 1993, 41, fig 2.9). The blade comprised a cutting edge, which was effectively symmetrical in both plan and section, with a pronounced curve down each side; the butt was also curved, and more-or-less rounded. There was no significant faceting on either lateral edge, and it is debatable whether the very slight flattening of the tip of the butt can be regarded as a deliberate facet: it may equally have been a consequence of hammering/pecking. The axe may have been made from a small cobble or pebble obtained locally from the glacial drift, and was more likely to have been made from a glacial erratic rather than a bespoke quarried block.

Three *polissoir* fragments (70130.1, 70069.12, and 70478.2) were also retrieved from the palaeochannel (*Appendix 2*), which displayed grooves and striations consistent with the sharpening of tool edges, as might be expected if they had been used for polishing axeheads (Pl 133). Although it is considered, on typological grounds, that the objects themselves date to the Early Neolithic phase of activity (*Ch 8*, *p 262*), it appears that they had been deliberately deposited in the channel during the Later Neolithic period. Each fragment was made from a slab of heat-damaged quartzitic sandstone (*Appendix 2*), and it is likely that these all derived from a single object, which had been burnt and then smashed up, as they seemingly share the same fracture along a bedding plane, although the edges are too damaged to support refitting.

The *polissoir* fragments were all in the northern part of the channel; 70130.1 and 70069.12 were found opposite each other, the former on the western edge of Bay B, the latter on the eastern edge of Bay C, and 70478.2 was on the eastern edge of Bay O. *Polissoir* fragment 70478.2 was from the *Later Neolithic organic deposit*; it was, however, associated with what is probably earlier Neolithic pottery, and it cannot

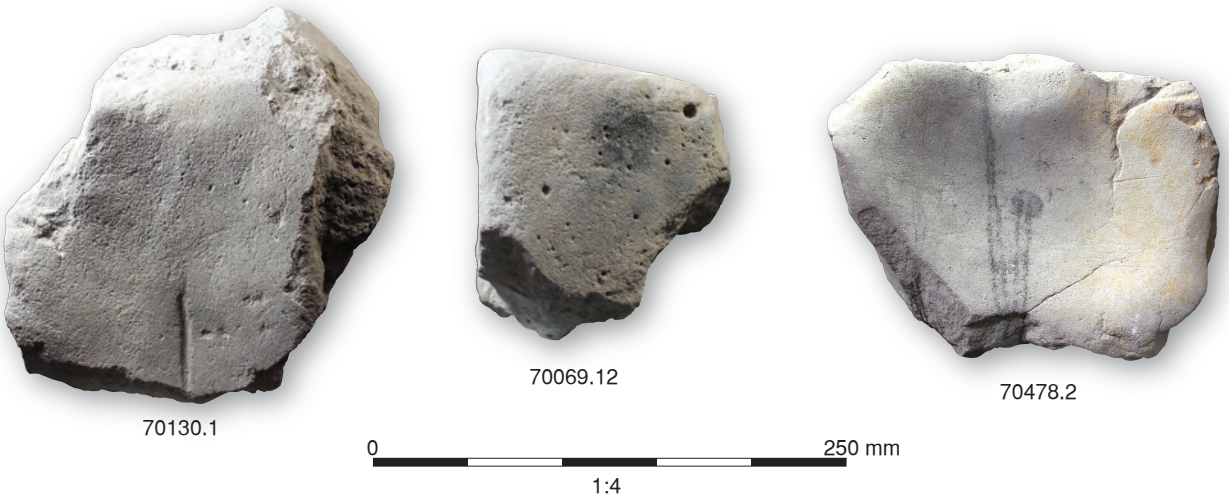


Plate 133: The three polissoir *fragments*

be ruled out that it had been curated for some time prior to deposition in the later Neolithic period, or redeposited then, if it was actually already within the channel or its environs.

Object 70130.1 was from tree-throw ***70129*** and was associated with waterlogged organic materials that have produced two contradictory radiocarbon dates. A hazelnut from fill ***70130*** (Fig 149) was dated to *3630-3360 cal BC* (*SUERC-32628*) and an alder-catkin axis to *3100-2910 cal BC* (*SUERC-44752*; Table 28). It is perhaps most likely that the hazelnut was residual and that the catkin axis provides a better date for the backfilling of the tree-throw, since, stratigraphically, fill ***70130*** seems most likely to equate to the *Later Neolithic organic deposit*. As such, it is possible that the *polissoir* dates to the later Neolithic period, although, once again, it might just have been collected up and deposited, or eroded from the channel banks into the tree-throw, at this time.

The third *polissoir* fragment (70069.12) was recorded as being from the *Bronze Age/Iron Age alluvium* (*Ch 11, pp 371-2*). Where it was found, this deposit physically sealed both the *Earlier Neolithic organic deposit* and the *Later Neolithic organic deposit* in the channel, and the *Basal sands and gravels* along its banks. Rather than being Bronze Age or Iron Age in date, however, the most likely scenario is that the object lay on top of the *Basal sands and gravels*, and became incorporated into the alluvial deposits as they formed.

That a *polissoir* was burnt, smashed up, and deposited in the palaeochannel during the later

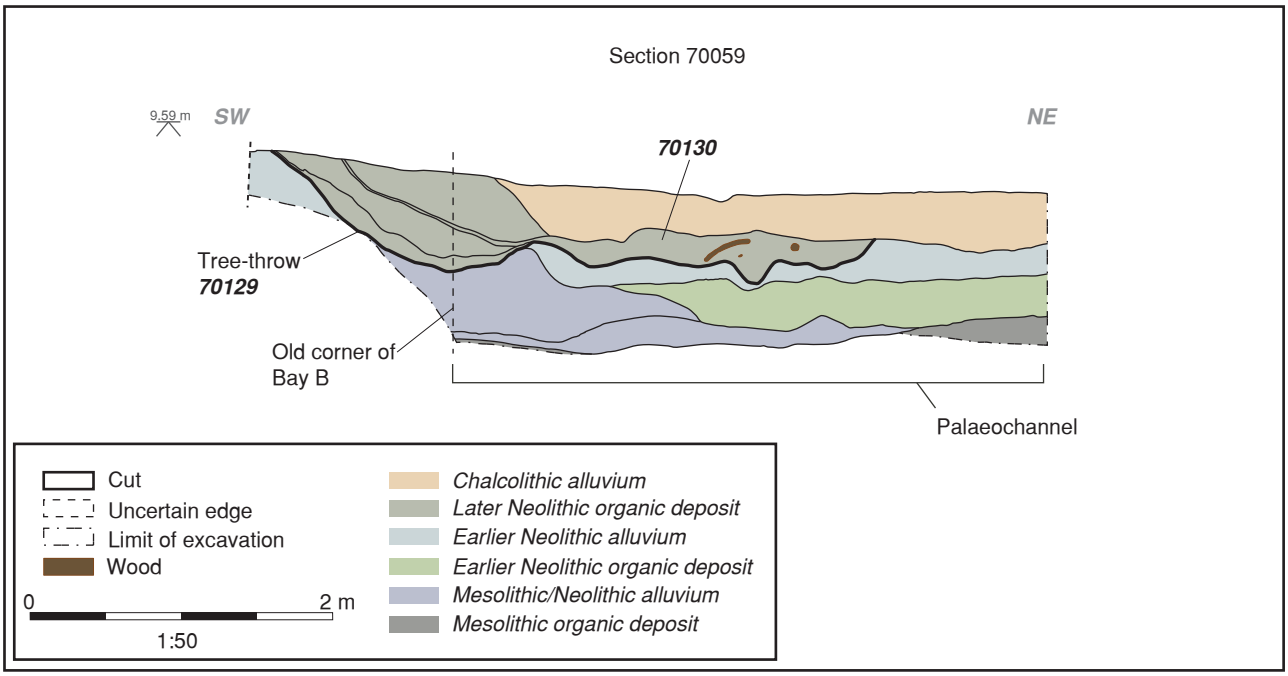


Figure 149: Section through tree-throw **70129**

Neolithic period seems significant. The act of destroying a *polissoir*, which had probably been there for centuries, and burying it in the channel, would have had the effect of removing it from the landscape, and thus has an air of violence and finality about it. One possible interpretation is that this act was intended to mark the end of an epoch in the history of the channel's use, perhaps closing it as a place where deposition could, or should, take place, and also signifying that it was no longer a place suitable for the finishing, by polishing, of axeheads. If so, the termination of this tradition could betray a wider-ranging phase of social transition, paving the way for the emergence of new institutions, such as that hinted at by the appearance of the henge monument (*p 323*) and, at Stainton West, structures and artefacts dating to the earlier part of the third millennium cal BC (*p 360*).

A tree-throw in the *Grid-square area*

Only one feature (tree-throw ***90522***; Fig 150) in the *Grid-square area* has been radiocarbon dated to this later Neolithic phase of activity, and the only other feature that might be assigned to this on the basis of artefactual and stratigraphical evidence is another tree-throw (***90256***). However, it is felt that this latter tree-throw, and a small assemblage of potentially Neolithic-style lithic pieces retrieved in a general distribution over the *Grid-square area*, are more likely to have been associated with the earlier Neolithic phases of activity (*Ch 8, p 283*).

Tree-throw ***90522***, in the north-eastern corner of the site, cut an earlier Neolithic tree-throw (***90531***; *Ch 8, p 282*), which itself cut the sediments (***90181***) filling the *Backwater channel*. Tree-throw ***90522*** was irregular in plan and had probably been formed by a relatively

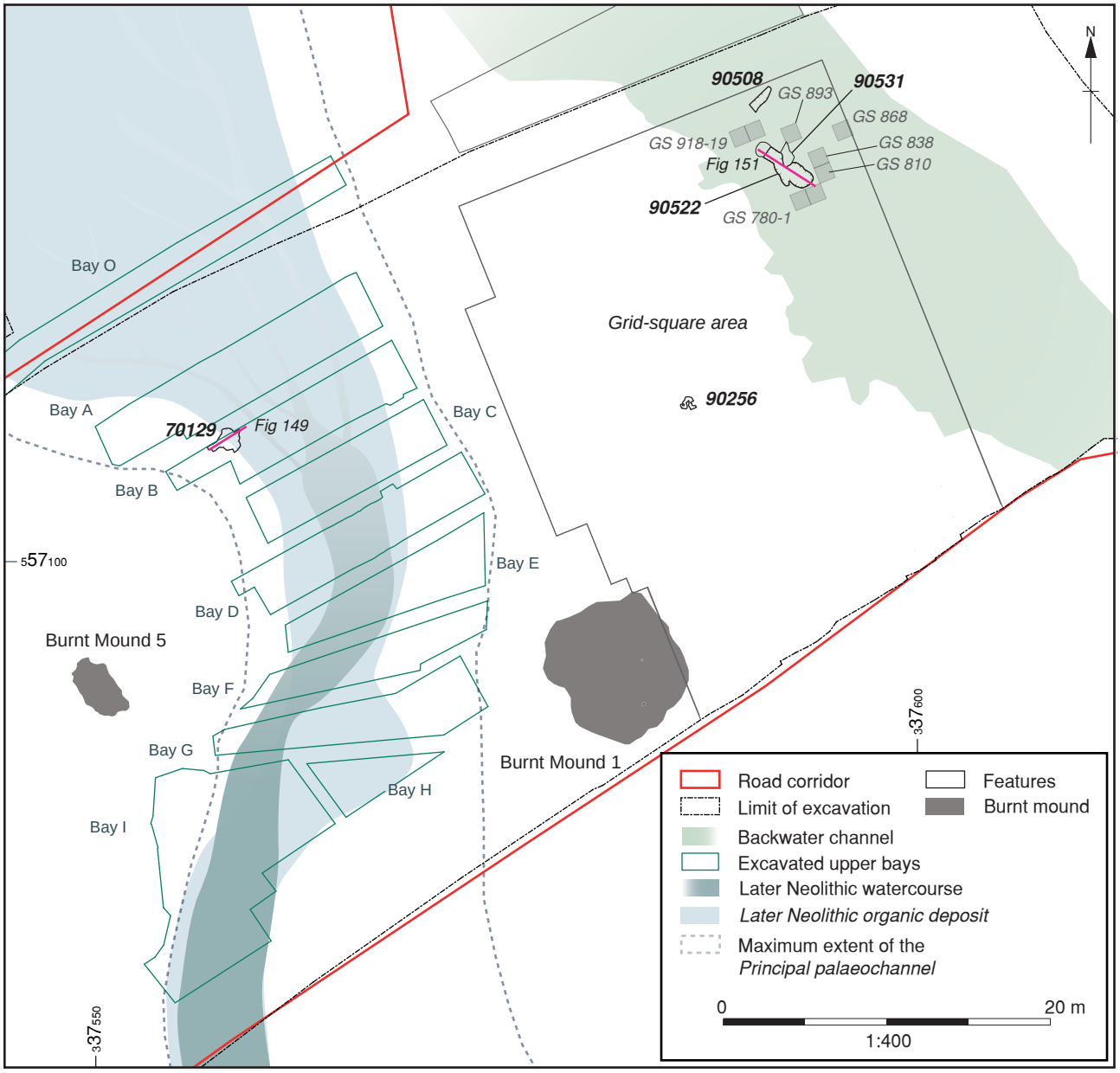


Figure 150: Later Neolithic activity in the Grid-square area

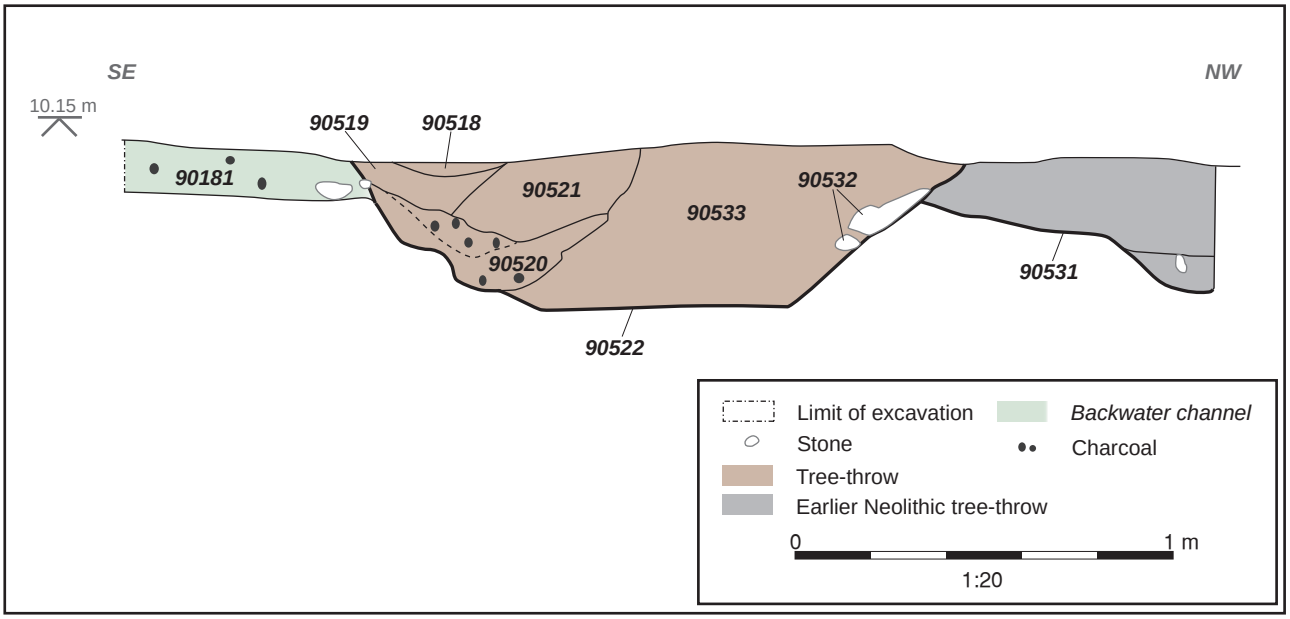


Figure 151: North-east-facing section showing the relationship between tree-throws **90531** *and* **90522**, *and* Backwater channel *sediment* **90181**

small tree, as it only measured 1.80 x 1.15 x 0.40 m deep. The stratigraphy seems to have been inverted when the feature formed, and the formation of the deposits suggested that the tree fell towards the south-east, into the *Backwater channel*. On the western side, deposit ***90532*** (Fig 151), being relatively organic, was probably topsoil that had fallen into the void created by the uprooted tree. This was sealed by redeposited alluvial material (***90533***) falling from the displaced root bole. There were few lithic finds from this deposit and it probably mainly derived from the *Basal sands and gravels*.

On the eastern side of the tree-throw, the basal fill was a charcoal-rich sediment (***90520***), which was similar and probably equivalent to ***90532***, and seems to have been material from the contemporary land surface that was dragged, or fell, into the pit created as the tree was uprooted. Layers of redeposited alluvial sediment (***90521*** and ***90519***) completely sealed ***90520***, with ***90519*** probably being stratigraphically later than ***90521***; both of these are likely to have comprised redeposited material derived from ***90181***. The uppermost fill of the feature (***90518***) was a siltier, more organic deposit, which had formed in a small depression in the top of ***90519***. The date of the tree-throw was established through the radiocarbon dating of hazel charcoal from basal-fill ***90532***, which places its formation at *3330-2920 cal BC; SUERC-59311*; Table 29), suggesting that it was broadly contemporary with the formation of the *Later Neolithic organic deposit* within the channel (Fig 152). A piece of charred alder from ***90521*** was also subjected to radiocarbon assay, though this yielded a Late Bronze Age date of 1220-1020 cal BC (2930±29 BP; SUERC-59312), and hence it is thought to be intrusive, being associated with later activity at the site (*Ch 11, p 420*).

An assemblage of 200 flaked lithics and coarse stones came from these deposits (*Appendix 3*), with the majority being from ***90521***. A range of raw-material types was represented, dominated by pebble flint and chert. The lithics mainly comprised undiagnostic unmodified blade and flake debitage, from the tertiary stage of the reduction sequence, much of this being small flakes. There were also two core fragments (one of pebble flint and one brown flint) and a single-platform core (pebble flint); an edge-retouched narrow blade (grey flint); four microliths (a fragment, a fine point, a crescent (all pebble flint), and a scalene triangle (tuff)); two awls (both made of brown flint); and a possible blank for a leaf-shaped arrowhead made from pebble flint. An unworn cobble, from ***90518***, was the only coarse stone. Given its character, and by virtue of the fact that it was within ***90521***, the majority of this assemblage is likely to be residual Late Mesolithic material, being displaced from channel fill ***90181***. The two awls are probably later Mesolithic/earlier Neolithic in date, but it is possible that they, like the leaf-shaped point, may actually date to the time that the tree-throw formed.

A review of the distribution of the flaked lithics in the grid squares surrounding tree-throw ***90522*** has identified relatively large concentrations of material in grid-squares 810 and 838, with significant, but smaller, amounts also recorded in grid-squares 780-1 (Fig 150). This suggests that the flaked lithics in the tree-throw derived from the area to the south-east of it, but establishing whether any of this material related to the tree-felling activity, or even dates to the Neolithic period, is problematic. This material included a large number of microliths and other pieces of later Mesolithic character, and only a small proportion might possibly be attributed to the Neolithic period

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Dryland area	Trough ***70456***	Part of *Burnt Mound 1*	Monolith 70462	-	SUERC-32827	Sediment	4925±30	-25.6	3770-3640	-	-
	Trough ***70456***		Bulk-sample 70456	-	SUERC-42008	Alder/hazel (*Alnus*/ *Corylus*) charcoal	4178±26	-25.1	2890-2670	Statistically consistent with good agreement (T'= 2.01; $T'(5\%)$=3.8; v=1; A_{comb}= 71.5% (An= 50.0%))	*2890-2660*
				-	SUERC-42009	Alder/hazel (*Alnus* / *Corylus*) charcoal	4124±23	-26.6	2870-2580		*2870-2580*
Dryland area	Pit ***70350***	Part of *Burnt Mound 5*	Bulk-sample 70261	-	SUERC-32717	Blackthorn-type (*Prunus* sp) charcoal	4110±35	-25.4	2870-2500	Statistically consistent with good agreement (T'= 2.79; $T'(5\%)$=3.8; v=1; A_{comb}= 63.1% (An= 50.0%))	*2870-2570*
				-	SUERC-42007	Alder/hazel (*Alnus*/ *Corylus*) charcoal	4035±26	-27.5	2630-2470		*2630-2470*
Grid-square area	Tree-throw ***90522***	-	Bulk-sample 90319	-	SUERC-59311	Hazel (*Corylus avellana*) charcoal	4428±26	-25.6	3330-2920	-	*3330-2920* (*Terminus post quem*)

Table 29: Late Neolithic Phase radiocarbon dates from the dryland area at Stainton West

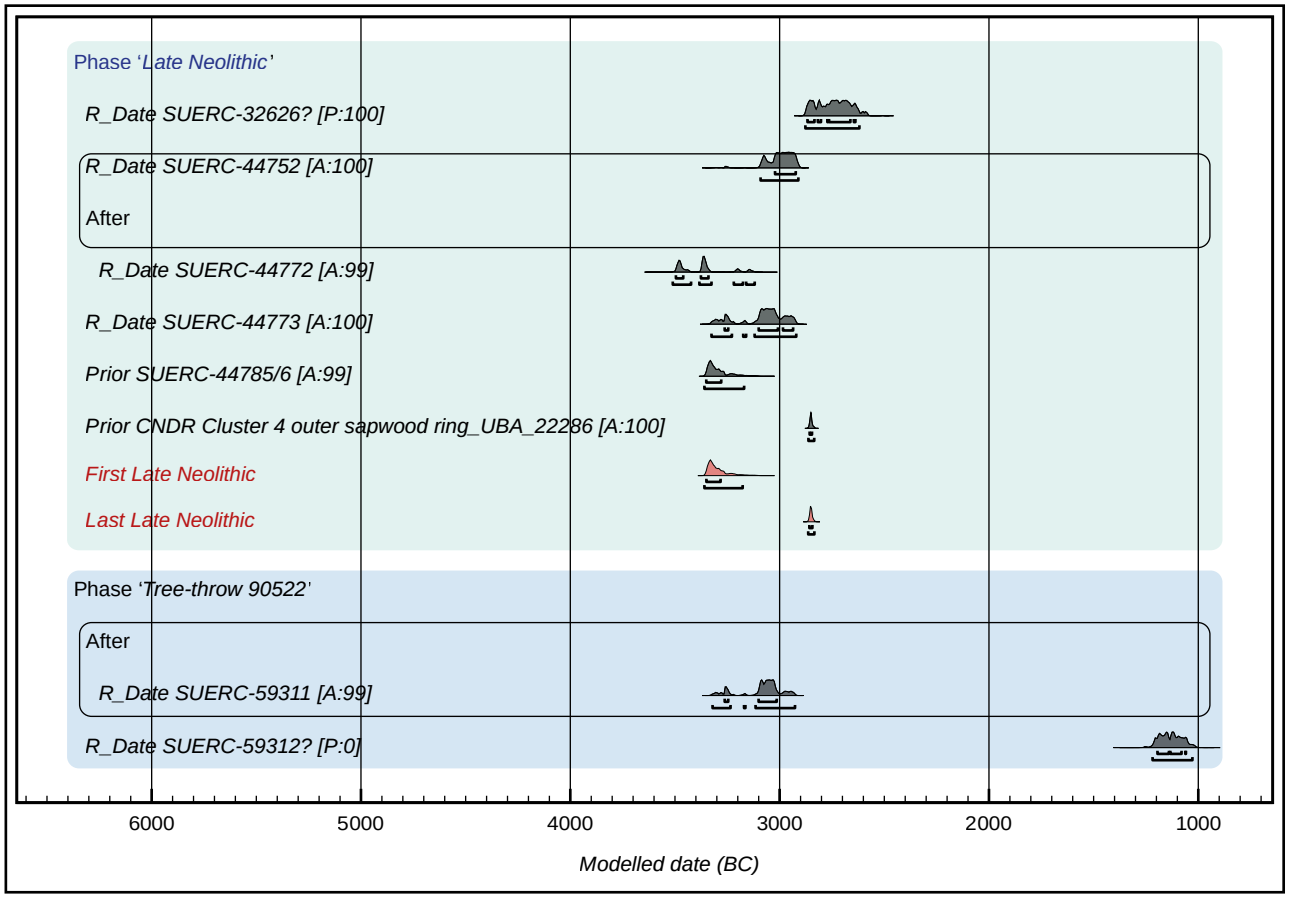


Figure 152: Radiocarbon dates for the Later Neolithic organic deposit *and tree-throw* **90522**

on the technical or stylistic information recorded. This includes several cores, which were of a larger size than the average calculated for those included in the detailed lithic analysis (*Appendix 9*), namely, an amorphous chert core from grid-square 918; a chert multi-platform core from grid-square 919; a tuff amorphous core from grid-square 810; and a good-quality brown chert disc core from grid-square 893. Several core fragments, particularly some chert examples, were also of a relatively large size and could be associated with a Neolithic stone-working technology, while the blade and flake debitage also contained some large pieces. A flake with a polished dorsal surface, struck from a ground-stone tool, came from grid-square 868. However, while ground-stone tools are conventionally associated with the Neolithic period (*eg* Bradley and Edmonds 1993), fragments have been recovered from Mesolithic contexts at Stainton West (*Appendix 9*), so it cannot be regarded as a reliable indicator of Neolithic occupation.

Human activity *c* 2800-2450 cal BC

In *c* 2800-2450 cal BC, activity apparently intensified again at Stainton West, or took on a new form, though this also referenced the ponded channel, suggesting that it continued to be a significant feature within the Neolithic landscape. This activity comprised three, possibly related and broadly contemporary, elements. The most obvious of these was the construction, or accumulation, of two burnt mounds (Topping 2011) adjacent to the channel (*below*). Additionally, timber stakes seem to have been driven deep into the channel deposits, in at least two places, and a distinctive type of late Neolithic pottery (Grooved Ware) was deposited in the channel. This activity may have heralded a change of use and, perhaps, perception of the channel, possibly also marked by the deposition of the burnt and smashed-up *polissoir* fragments (*p 339*), and was the start of a burnt-mound tradition that continued into the Chalcolithic period and Bronze Age (*Ch 11*).

The burnt mounds

Burnt mounds are well-documented in the British Isles (*eg* Buckley 1990), and are nearly always associated with water, usually natural features such as streams, rivers, mires, and ponds, but, occasionally, man-made waterholes (Lewis and Batt 2006, 146-7). They often date to the Chalcolithic period or Bronze Age (*Ch 11, p 365*), although Late Neolithic examples are known in Dumfries and Galloway, at Kirkhill and on the Dunragit Bypass (Pollard 1993; Bailie 2021), and early medieval examples have been excavated in Nether Wasdale, Cumbria (OA North 2016), and also at Holyrood, Anglesey, North Wales, during archaeological work along the A55 (Maynard 2012). Given their long currency and wide distribution, it is possible that they fulfilled a range of functions (Brown *et al* 2016), although shared

characteristics include a concern with warming water, by the indirect transmission of heat, often by the introduction of fired stones. A local source of water, and presumably fuel, is thus a prerequisite. Lined pits or wooden troughs for holding the heated water are frequently occurring features, as are hearths for heating the stones. Low mounds of discarded, thermally fractured, stones and charcoal, often in crescentic formations, are usually how these features can be identified, which can suggest repeated and prolonged periods of use. Burnt mounds may therefore denote, or, over time, have come to be, significant places in the landscape.

Burnt Mound 1

A large burnt mound (Burnt Mound 1) was identified on the eastern bank of the palaeochannel, at the southern end of the site (Fig 153). This was not exactly a mound *per se*, as it comprised a sub-circular, relatively

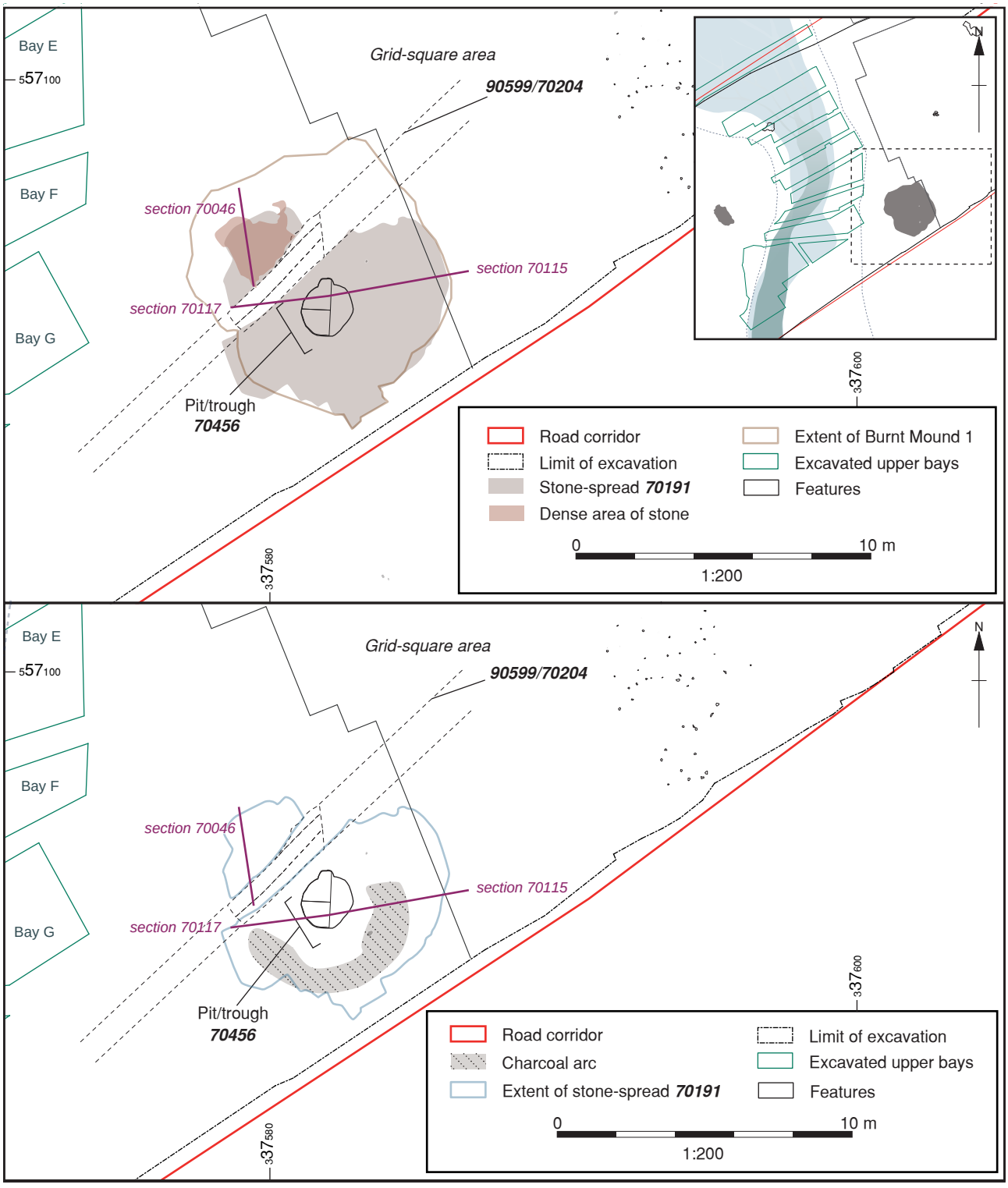


Figure 153: Burnt Mound 1, before and after the excavation of stone spread **70191**

Plate 134: Burnt Mound 1, following partial excavation, with the crescent of charcoal visible

flat, *c* 9 m-diameter spread (***70191***) of fire-cracked stone and charcoal. Stratigraphically, the earliest element was a patchy, crescentic arc of charcoal, which was revealed around the southern and western fringes of the feature (Pl 134), sealing an alluvial deposit (***70455***; part of the *Mesolithic overbank alluvium*; *Ch 6, p 198*). In contrast, the central part of the feature, which surrounded a sub-circular pit (***70456***) was relatively free from charcoal. It is thought that the pit was stratigraphically early, but continued in use over the lifetime of the feature. This was possibly the setting for a trough, associated with the mound, and was displaced slightly to the south-west of the centre of the monument. It measured 1.90 x 1.75 m and was 0.5 m deep, with steep sides and a flat base (Fig 154). There was, however, no surviving evidence for any trough, so either this had been organic (for example, planks or basketry) and had decayed without a trace, or the pit had never been lined.

The arrangement of this pit in relation to the arc of charcoal is intriguing, as it might be expected that charcoal would have been more frequent around the pit (if material had been periodically raked out from it), although crescent-shaped formations have been frequently noted at other sites (Topping 2011).

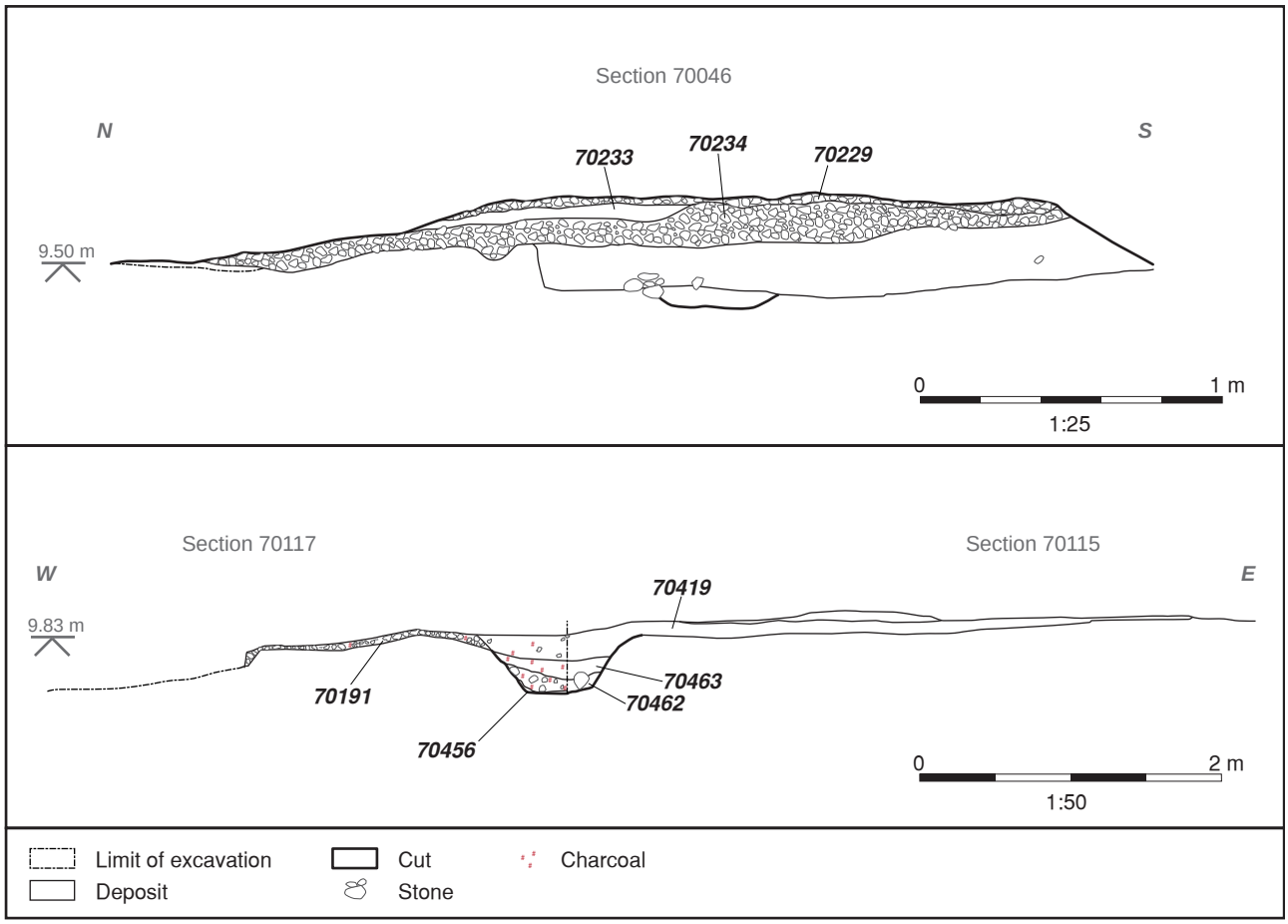


Figure 154: Sections through Burnt Mound 1

The shape might have formed as material from various hearths, set at approximately equal distances from the pit, but in slightly different locations on the periphery of the feature, merged together over repeated firings. Alternatively, it could have represented places where material had been emptied out from the central pit and been cleaned away to the edges of a central space, since there did seem to be relatively more stone concentrated there than elsewhere at this height.

The arc of charcoal was sealed by stone spread ***70191*** (Pl 135), comprising angular stones of various different types commonly found within the geological deposits at the site, which had probably been sourced very locally. The largest stones were 100 mm in size, but were frequently smaller. Evidently, they must once have been part of larger stones, the extent of their fragmentation suggesting that they had been highly fractured by repeated firings and dousing. The density of the stone spread varied, with patchy areas in both the south, west, and north being relatively denser, flanking a less-dense central zone. A particularly dense and well-defined rectangular area protruded north-west from the main spread of stones, and the deposits there were at their thickest, at 0.2 m. Although there were no features such as stakeholes associated with this, its regular shape suggested that the stones may once have been contained in some way. Overall, the general patchiness and variable density of the stones implies that they had been dumped in more than one episode, which was confirmed in this north-western area (Pl 136), where a lower layer of stones (***70234***) was separated, by a thin layer of alluvial sediment (***70233***), from an upper layer of stones (***70229***). It would seem, though, given the degree to which the stones were fractured, and the fact that the mound did not appear to have comprised many layers or been particularly thick, that, once collected together, the material had formed a handy resource to be manipulated and reused during each subsequent firing, rather than being repeatedly added to with fresh material, to form an accumulated mound.

In its final form, stone spread ***70191*** probably related to the ultimate use and abandonment of the burnt mound. It was sealed below the *Chalcolithic alluvium* (*Ch 11, pp 367-8*) and, just to the north of its centre, both the *Chalcolithic alluvium* and the mound had been disturbed by a post-medieval ditch (***90599***/***70204***; *Ch 14, p 522*), which passed through it on a south-west/north-east alignment.

The fills of pit ***70456*** probably also related to the final use of the feature, when hot stones had been added to

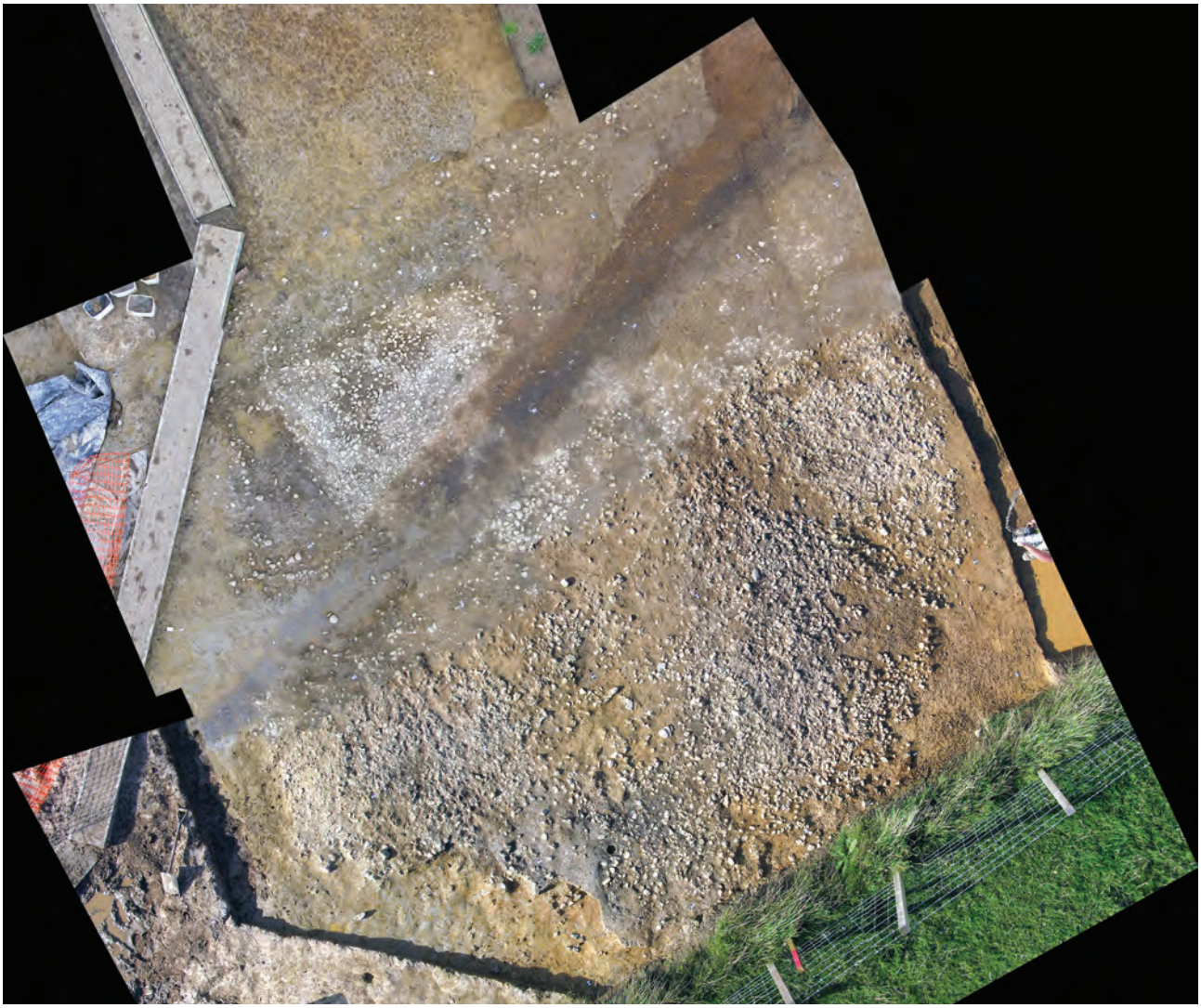


Plate 135: Burnt Mound 1, prior to excavation, with stone spread **70191**

Plate 136: The successive layers forming stone spread **70191**, *Burnt Mound 1*

Plate 137: Deposits backfilling pit **70456**

Plate 138: Chalcolithic alluvium *overlying stone spread* **70191**, *Burnt Mound 1*

it to heat the water it once contained. They suggested that it was at least periodically waterlogged, or inundated by alluvium, but anaerobic conditions had not consistently prevailed until modern times, and only charred organic materials survived. The basal fill of the pit (***70462***; Pl 137) comprised a clay-rich sediment, with frequent charcoal and angular stone inclusions. This was sealed by a sandy-silt deposit (***70463***), containing less-frequent burnt stones and charcoal inclusions, which probably represented the secondary silting of the pit, with material eroding from the surrounding land surface (*Appendix 19*), soon after its last use. The uppermost fill (***70419***) was an alluvial silt that filled a depression in its top. This deposit was either stratigraphically equivalent to the *Chalcolithic alluvium* (*Ch 11, pp 367-8*), which sealed the stone spread (***70191***; Pl 138), or might, alternatively, have represented a slightly earlier phase of alluviation that cannot be distinguished elsewhere.

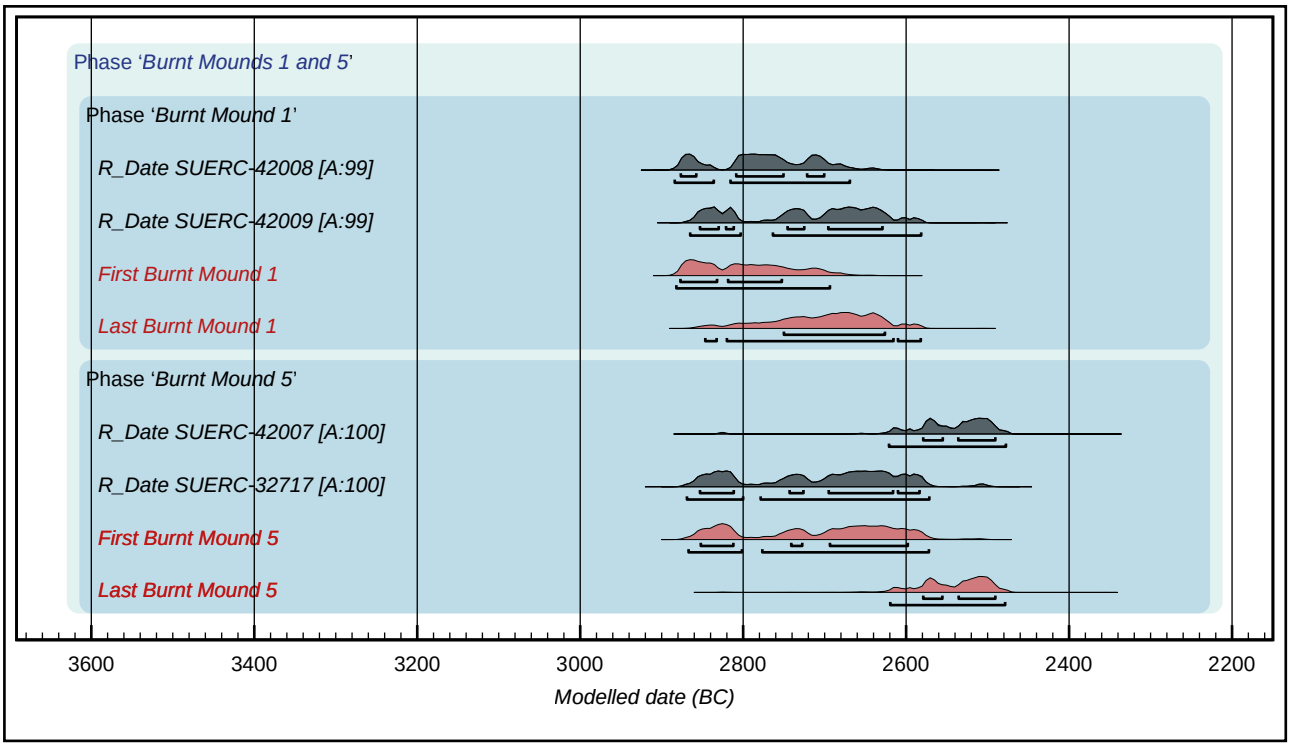


Figure 155: Radiocarbon dates for Burnt Mounds 1 and 5

The analysis of charcoal included samples from the stone spread (***70191***), and pit ***70456*** (*Appendix 18*). Abundant fragments were recovered, including pieces larger than 10 mm in size, which are likely to have been the remains of fuel wood. All samples contained very similar assemblages dominated by oak, including mature oak wood, with abundant alder/hazel, and a very minor component of blackthorn-type. The predominance of oak charcoal may indicate that this wood was preferred as a fuel for its even-burning properties. Three samples were radiocarbon dated from pit ***70456*** (Table 29): a bulk sediment sample from deposit ***70439*** (part of fill ***70463***; *p 349*) gave a date of 3770-3640 cal BC (4925±30 BP; SUERC-32827); whereas two statistically similar samples of alder/hazel charcoal (SUERC-42008/9), from deposit ***70430*** (also part of fill ***70463***), dated the burnt mound to *2890-2690 cal BC* (*First Burnt Mound 1*) and *2850-2580 cal BC* (*Last Burnt Mound 1*; Fig 155). The sediment sample has been rejected as being too early; it is not clear why it has produced such an early date, although it is assumed that the result has been affected by a residual, older carbon component.

Burnt Mound 5

Burnt Mound 5 was identified on the western side of the *Principal palaeochannel*, opposite Burnt Mound 1. It was not exactly a mound, however, although it did share sufficient characteristics with Burnt Mound 1 to suggest that they were similar categories of monument. Burnt Mound 5 firstly comprised an oval area of apparent burning (4.9 x 4 m), indicated by a darkened, charcoal-rich deposit (***70079***; Fig 156). The charcoal was particularly concentrated in a smaller 4 x 2 m area, slightly offset to the east of the larger burnt spread. This was associated with a sub-rectangular pit (***70350***), measuring 1.75 x 0.5 m by 0.2 m deep, in the south-eastern corner of the concentrated area (Pl 139). The pit had gently sloping sides and a concave base, and it probably formed the trough, although no trace of any lining survived. A deposit of charcoal and burnt stone (***70184***) along its western edge was continuous with ***70079***, and showed that the pit had been open when the latter formed. Also recorded as ***70184***, but clearly overlying the charcoal, was a densely packed dump of burnt river pebbles. These rounded stones (between *c* 50 mm and 150 mm) were similar to those found in the natural geology of the site, so were probably collected from the *Principal palaeochannel*. Some of them showed signs of thermal shock, but they were not shattered to the same high degree as those associated with Burnt Mound 1. The stones were slightly displaced over to the eastern side of the pit and they seemed to have been sorted to some casual extent, with smaller stones tending to lie at the centre of the deposit. Deposits ***70079*** and ***70184*** were sealed by an alluvial sediment, ***70053***, which filled a slight depression or undulation in the contemporary land surface, in which Burnt Mound 5 had been sited.

In both spread ***70079*** and pit ***70350***, the charcoal assemblage was dominated by alder/hazel and ash, with frequent occurrences of blackthorn-type and rare occurrences of oak charcoal (*Appendix 18*). This represented a similar range of fuel types as Burnt Mound 1 (*above*), but with a different emphasis, with

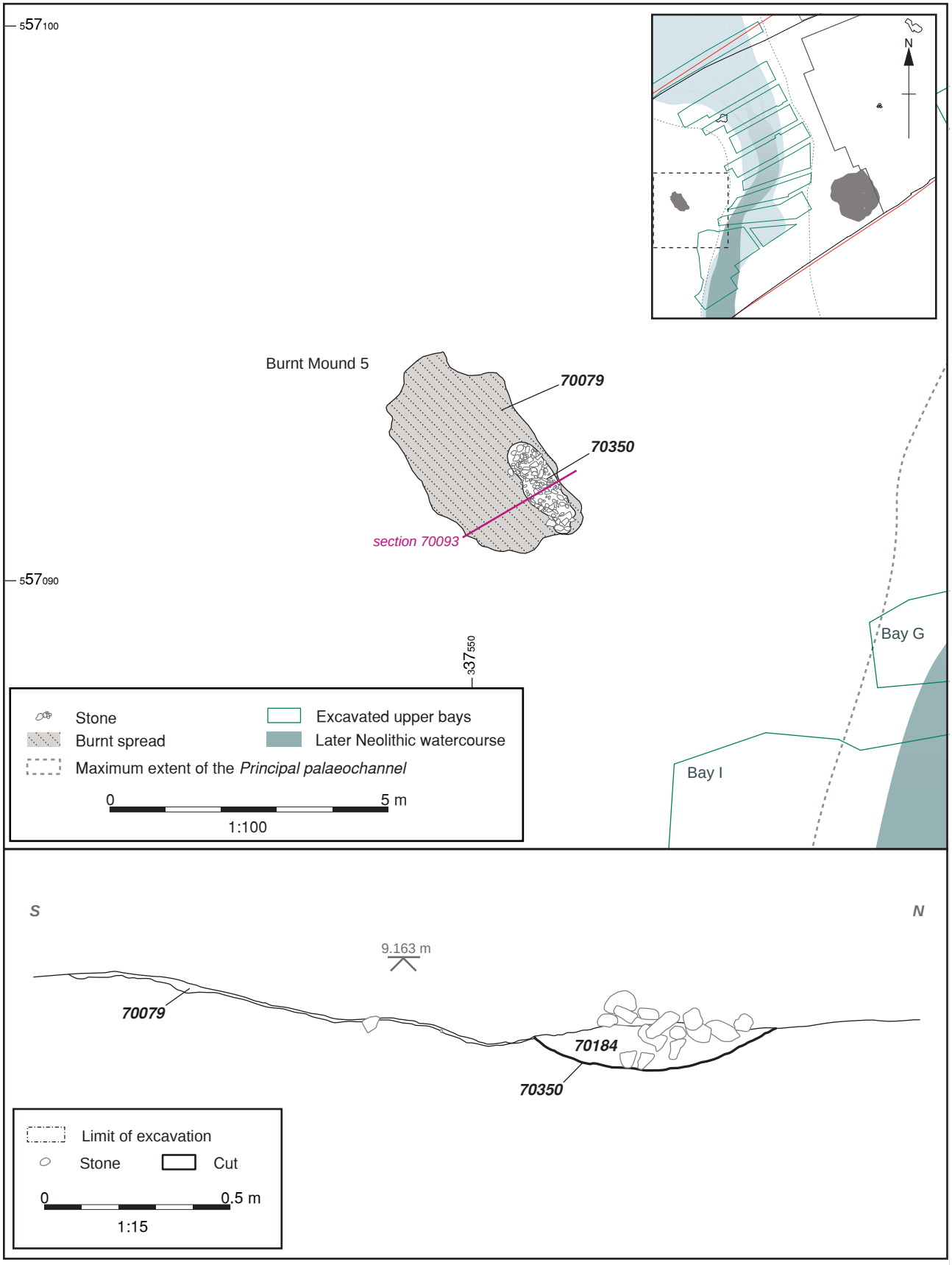


Figure 156: Burnt Mound 5, with the south-east-facing section through pit **70350**

oak appearing to have been only a minor fuel source. This could mean that oak was not locally available in large quantities at the time Burnt Mound 5 was fired, that this burnt mound had been put to a different

Plate 139: Burnt deposit **70079** *and pit* **70350**, *filled with charcoal and river-pebbles* **70184**, *forming Burnt Mound 5*

use, or, contrary to this, it may reflect the fact that oak was not important to the burnt-mound activity and was not particularly sought after. Two samples of alder/hazel charcoal were submitted for radiocarbon dating (SUERC-32717 and SUERC-42007), both from pit fill ***70184***. These returned statistically similar dates (Table 29) that were integrated into the Stainton West chronological model (*Ch 1, pp 30-1*). This dates the burnt mound to *2870-2570 cal BC* (*First Burnt Mound 5*) to *2620-2470 cal BC* (*Last Burnt Mound 5*), and suggests that Burnt Mound 5 was either the same age as Burnt Mound 1, or was fired shortly after it fell into disuse, potentially being its successor (Fig 155).

The genesis of the burnt-mound tradition

The later Neolithic burnt mounds at Stainton West represent the start of a tradition that was to result in the construction of burnt mounds at the site for many centuries, continuing into the Bronze Age (*Ch 11, pp 382-95*). Although ostensibly rather different from Burnt Mound 1, Burnt Mound 5 probably derived from similar activity, which, in both cases, involved heating stones and introducing them into a pit or trough of water. However, in the case of Burnt Mound 5, this activity may have only taken place once, as it did not demonstrate the prolonged and repeated use evidenced at Burnt Mound 1.

Burnt, charcoal-rich, deposit ***70079***, associated with Burnt Mound 5, may have been a setting/rake-out area for a hearth, or series of hearths. Although it was of a different shape, it may have been created through a similar set of processes to those responsible for the formation of the crescentic arc of charcoal (***70191***) underneath the stones of Burnt Mound 1 (*p 345*). Indeed, the crescentic deposit may have been shaped by the repeated cleaning out of material from the monument's centre, and, if so, this does not appear to have taken place in the case of Burnt Mound 5. This perhaps provides further support that the latter mound was only used once, as does the fact that the river pebbles of dump ***70184*** were not highly fractured, suggesting that they were not repeatedly heated and doused, when the opposite was true in the case of Burnt Mound 1. Rather than being left spread around, these pebbles had the appearance of being carefully placed back into the pit. This may have been an act of deliberate abandonment or it could have been to cache the pebbles for future reuse, which never ultimately happened.

It is puzzling why Burnt Mound 5 only appeared to have been fired once, unlike any of the other mounds at Stainton West (*Ch 11, pp 388-92*). It is possible that it reflects a particularly dry spell in the history of the floodplain, as if there had been no water flowing within the *Principal palaeochannel*, the use of a more westerly channel may have been necessitated, which would have caused the burnt mound to have been sited further into the floodplain. This is a reminder that the burnt-mound activity may have once extended further westwards than the surviving evidence suggested,

with river erosion having subsequently erased all trace of this.

The burnt mounds at Stainton West indicate the episodic use of this part of the riverside landscape for a particular activity, or suite of activities, but, although repeated, this was probably not an intensive routine and everyday use; indeed, quite the opposite, it may have been sporadic and infrequent. The mounds could, therefore, have been associated with a special event of some kind or, alternatively, a more frequently enacted activity that was not particularly bound to this specific part of the landscape, and, by inference, presumably also happened at other sites in the immediate locale. However, if the latter were the case, Stainton West would still seem to have been a favoured location, as it continued to act as a focus for burnt-mound activity for many hundreds of years after Burnt Mounds 1 and 5 fell into disuse (*Ch 11, p 382*). Indeed, the proximity of the burnt mounds to the putatively contemporary henge monument, only 150 m to the north-east (*p 323*), seems rather coincidental, and it might be postulated that the mounds were linked to ceremonial activities associated with the henge. If this was the case, then this may explain the sporadic and, possibly, special nature of their use.

What this use was precisely must remain speculative, given that no finds or palaeoenvironmental remains hint at what it might have been. This apparent lack of evidence might actually provide a clue in itself, however. It may have been the hot water and/or steam that was the main product of burnt-mound activity, and this may have been used for bathing, perhaps as part of ceremonial purification rites. It is noteworthy with regard to this that a structure interpreted as a sauna was found nearby, possibly associated with the Bronze Age burnt mounds (*Ch 11, p 382*). The henge monument, and the ceremonies undertaken there, may have provided the context for these rites. That the Stainton West burnt mounds (of all periods), although not overtly different from other known examples, may have been associated with such auspicious rites goes some way to explaining why they were so numerous and long-lived. Neolithic burnt mounds are, nationally, rare in comparison with Chalcolithic and Bronze Age examples, which have been recorded with some frequency (Topping 2011; *Ch 11, p 377*). So, one interpretation of the Stainton West mounds is that they provide evidence that the burnt-mound practice developed in a communal monumental setting, before becoming more widely propagated in the landscape, away from ceremonial cores.

However, it is possible that other unexcavated mounds may, if radiocarbon dated, actually prove to be of Neolithic date. It is interesting to note that several in Dumfries and Galloway have also been dated to the later Neolithic period, and, indeed, could have been contemporary with them (Fig 157). Two burnt mounds on the Dunragit Bypass (from Boreland Cottage Lower and Whitecrook Bridge) both produced identical dates of 2890-2620 cal BC (4172±32 BP; UBA-41501; 4172±32 BP; UBA-42824, respectively; Bailie 2021). Another later Neolithic burnt mound is closer to Stainton West, at Kirkhill, on the banks of the River Annan, near to Johnstonebridge (Pollard 1993). Mixed charcoal from this mound has yielded a suite of statistically similar radiocarbon dates, giving a combined date of 2910-2760 cal BC

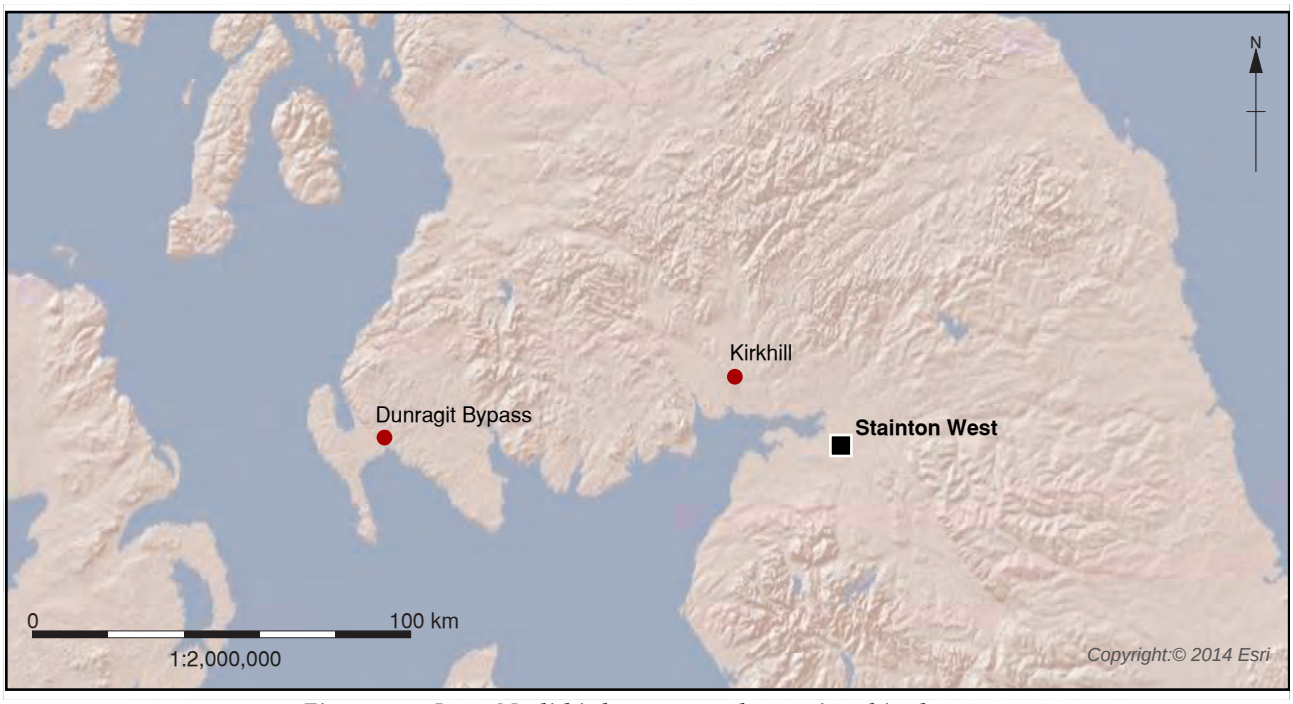


Figure 157: Later Neolithic burnt mounds mentioned in the text

Laboratory code	Uncalibrated date	Calibrated date	χ^2 test
GU-3859	4240±90 BP	3100-2500 cal BC	T′= 5.5; T′ (5%)= 11.1; ν= 5; A_{comb}= 117.4% (An= 28.9%)
GU-4189	4280±50 BP	3030-2690 cal BC	
GU-4191	4200±50 BP	2900-2600 cal BC	
GU-4192	4300±50 BP	3090- 2700 cal BC	
GU-4193	4150±50 BP	2880-2580 cal BC	
GU-4194	4240±80 BP	3030-2580 cal BC	

Table 30: Late Neolithic radiocarbon dates from the Kirkhill burnt mound (Scottish Radiocarbon Database)

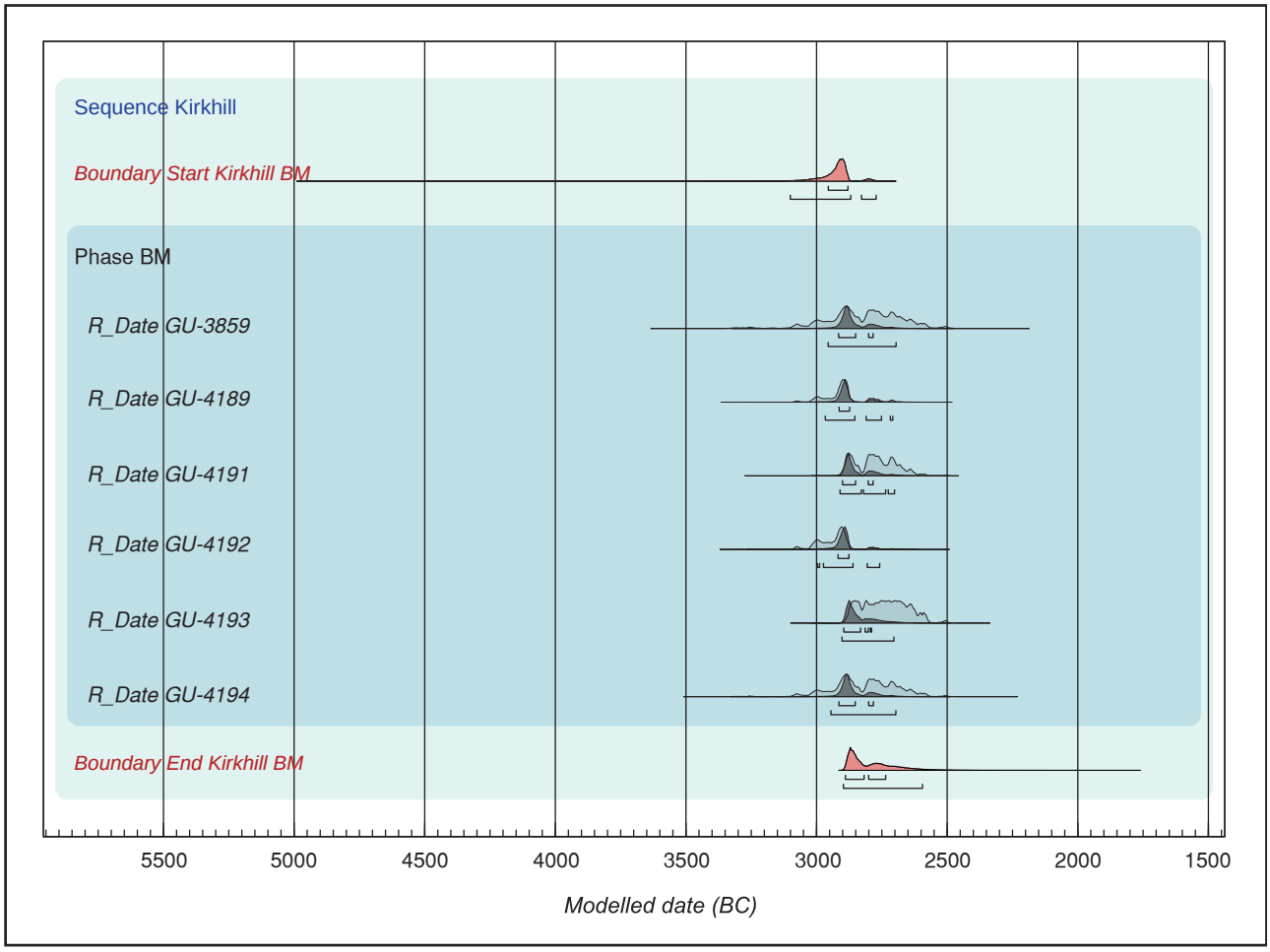


Figure 158: Radiocarbon dating of the Kirkhill burnt mound

(Table 30). If modelled as a phase in Oxcal (Fig 158), these dates have good agreement, being estimated to have started in *3100-2770 cal BC* (*Start Kirkhill BM*) and ended in *2900-2600 cal BC* (*End Kirkhill BM*), in effect contemporary with the mounds at Stainton West. This site, like Stainton West, was also associated with a Mesolithic flint assemblage, and Arran pitchstone (*Appendix 9*) has been recovered from the site. So, although the Stainton West burnt mounds may, given their probable association with the henge monument, be special in some way, and this status may be reflected in their early date, late Neolithic burnt mounds may have been a regional phenomenon. If this was indeed the case, then the putative bathing rites at Stainton West may have been an exaggerated, or particularly special, expression, for a gathered community, of rites that were practised more commonly and widely for other reasons. For example, ritual specialists may have been purified before undertaking rites at the henge, in a manner which echoed the purification rites undertaken, in other parts of the landscape, as part of significant, but more common or garden practices, such as giving birth or sowing crops.

Grooved Ware deposition

At approximately the same time that Burnt Mound 1 was in use, a distinctive kind of Late Neolithic pottery

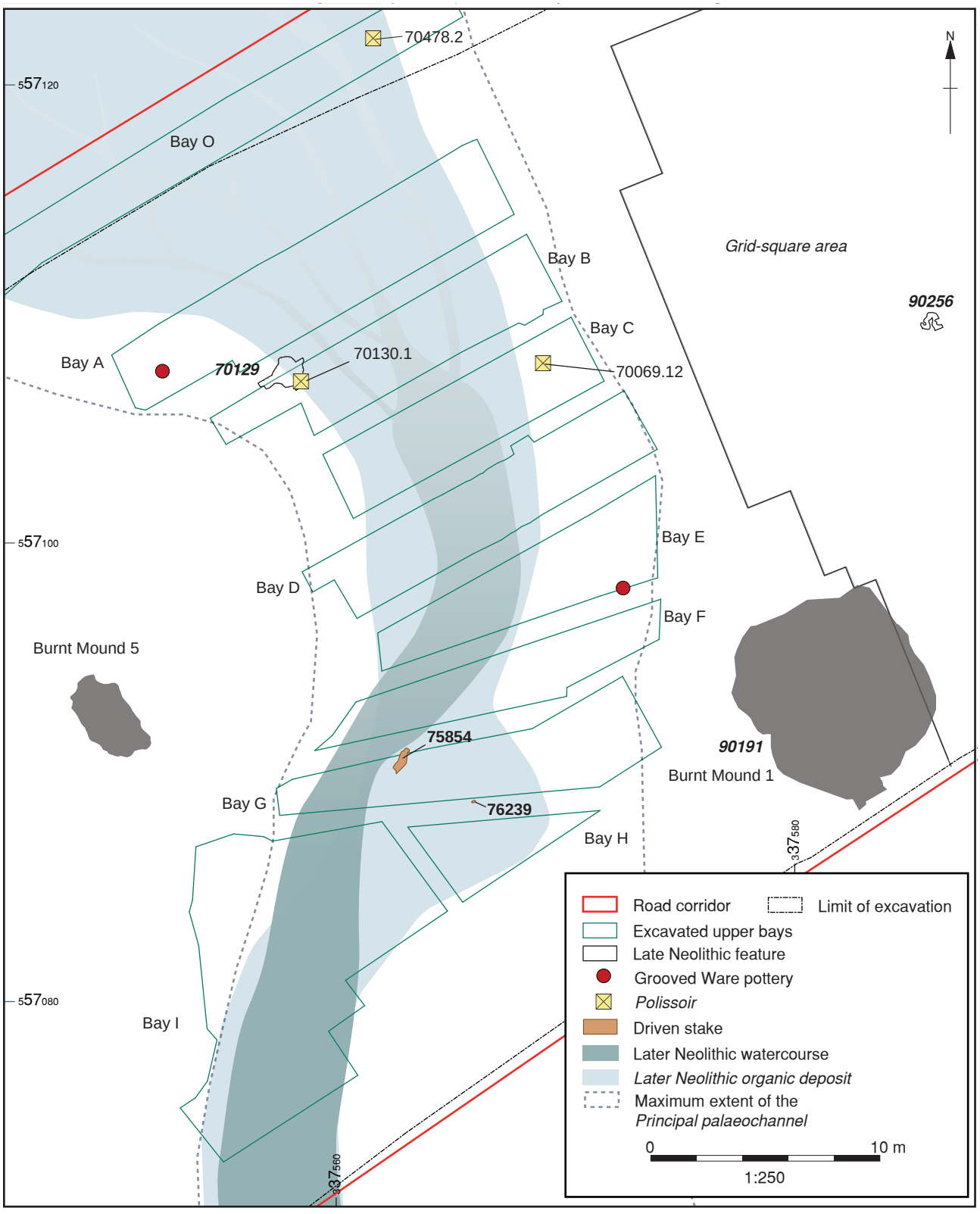


Figure 159: Later Neolithic Grooved Ware pottery, large driven stakes, and polissoir *fragments in the* Principal palaeochannel

was probably deliberately deposited in the channel. This was in the Grooved Ware tradition and some 51 sherds, all from the same vessel, were recovered (*Appendix 11*), in a discrete cluster, from the eastern edge of the *Principal palaeochannel*, in Bay E (Fig 159), perhaps having been placed in a depression or scoop. This was initially recorded as coming from layer ***70409***, which formed part of the *Earlier Neolithic organic deposit*, but, given the currency of this style of pottery (*p 357*) and because of a radiocarbon date associated with it

Plate 140: Grooved Ware vessel from the Principal palaeochannel

(*below*), it seems highly improbable that the pot was deposited at the same time as this stratigraphic unit. The stratigraphic sequence was compacted at the edge of the channel, and it was not particularly easy to distinguish the different layers, especially when they closely resembled each other, so it seems likely that the provenance of the pottery was misattributed. A reconsideration of the survey-recorded location of the pottery has concluded that it lay within deposit ***70408***, part of *the Late Neolithic organic deposit*.

The vessel seems to have broken, or been broken, prior to its deposition, and no rim sherds were present (although body sherds from just below the rim were; *Appendix 11*). It is therefore possible that the rim sherds were picked out, for some other purpose, prior to deposition. Parts of the base and sherds from various parts of the body were present, showing that it was probably bucket-shaped, with a flat bottom, and had been decorated (Pl 140). Its height may be estimated at approximately 338 mm, with the external diameter of the base being *c* 164 mm, and the rim predicted as being 262 mm, suggesting a capacity of *c* 10 litres. Fire-clouding on the walls of the pot imply that it was open-fired in a bonfire or pit, or else that it was otherwise subsequently used in such a context.

Although the lower 55-60 mm of the vessel was plain, the decoration appeared to cover most of the rest of the vessel, and comprised incised, irregularly spaced horizontal lines, which, in at least two places, supported panels of diagonal lines, or at least a fringe. Parallels for this decoration can be found amongst the Durrington Walls assemblage (*eg* Longworth 1971, pl 316), material from Mitchell Staithes Farm, Ossett, West Yorkshire (Manby 2010, GW3), fragments in the Durrington Walls style from Nosterfield (Vyner 1998, vessel 13), and Scotby Road, Carlisle (Vyner 2016), and Vessel 8 from Beckton Farm, Lockerbie, which also employed a mixture of incised horizontal lines and herringbone panels, and is of a similar overall form to the Stainton West vessel, if somewhat smaller in size (Pollard 1997). In overall style, however, the Stainton West vessel seems to belong to the 'Clacton style', as defined by Wainwright and Longworth (1971, 237), in which they included fragments of several vessels known from Walney Island, near Barrow in Furness (Barnes 1956, fig 6.21).

A burnt organic residue found on the interior of the vessel was probably the remains of its contents, which might suggest that it had been used for cooking, at some point, or, at least, that something had been heated up within it. A radiocarbon date from this residue suggests that the vessel dates to *2880-2610 cal BC* (*SUERC-32626*; Table 28), and, as such, is in keeping with other dates for this type of pottery in northern England (Darvill 2010, 139). This agrees closely with the date of Burnt Mounds 1 and 5 (*p 350*), suggesting that the Grooved Ware was approximately contemporary with these monuments, and probably belongs to the same phase of activity (Fig 160).

In addition to this vessel, three conjoining sherds (Pl 141), in a near-identical fabric, were retrieved from alluvial layer ***70120***, which sealed the *Later Neolithic organic deposit* on the western side of Bay A (Fig 159). These appear to derive from a near-vertical rim, with a vertical internal surface and an inwardly curving external surface, forming a slightly tapered and pointed edge. Given the small size of the surviving rim portion, an estimate of its diameter, and also the form of the original vessel, remains uncertain. It may have been a small closed bowl or cup, or, alternatively, and perhaps more likely, a large jar or tub-shaped vessel of the Grooved Ware tradition. A comparable form may be a vessel from North Deighton, Green Howe, or from Roecliffe, both in Yorkshire (Manby 1999, figs 6.4, 6.5). It is even possible that it was once part of the rim of the other Grooved Ware vessel from Stainton West, but, as it was found *c* 15 m away from the other sherds, it is also possible that it represented a second vessel.

The occurrence of Grooved Ware pottery in the channel at the same time that the burnt-mound activity was taking place is probably significant, although it may not have been that the Grooved Ware was necessarily directly associated with the burnt mounds, rather that

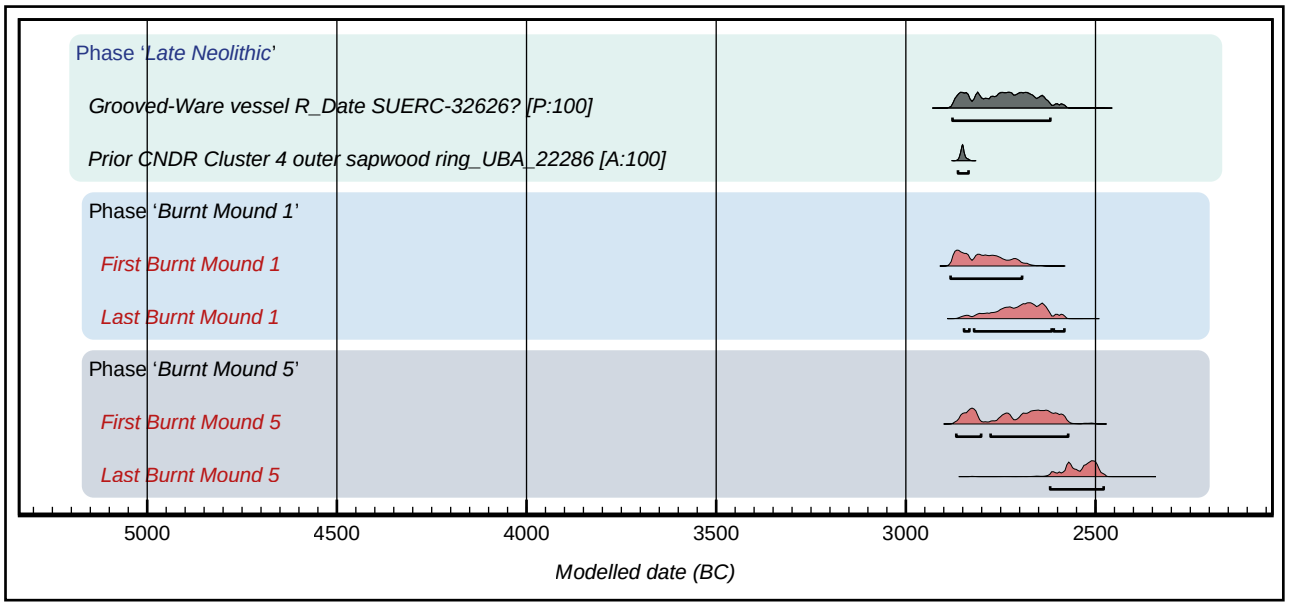


Figure 160: Radiocarbon dates for the burnt mounds, Grooved Ware, and driven stakes at Stainton West

Plate 141: Grooved Ware sherds from Bay A of the Principal palaeochannel

the mounds were constructed and the pottery deposited in reference to the channel. This type of pottery often occurs in association with ceremonial monuments (*Appendix 11*), henges and timber circles in particular (Bradley and Edmonds 1993, 56; Sheridan 2003a), and it has been suggested that it might have been linked to feasting. The capacious size of the more-complete Stainton West vessel certainly would have meant that it could have acted as a serving vessel. These ceremonial associations may have meant that Grooved Ware vessels had a particular status and that they were appropriate for formal deposition, as is often suggested by the nature of the contexts from which this type of pottery is recovered archaeologically (Bradley and Edmonds 1993, 56). The Stainton West pottery should probably be seen in this light, and it may have been deposited during peripheral, wetland, activities associated with the apparent henge (*p 358*).

Driven stakes

When the Grooved Ware was deposited, the *Principal palaeochannel* may have been no more than a boggy carr (*p 323*), although, in Bay G, two large wooden stakes (**75854** and **76239**) had been piled deep into it, and it is possible that they functioned as markers of some kind. The ends of both stakes were retrieved from the *Earlier Neolithic organic deposit*, but the stakes have been shown to be younger than the host deposit (*p 337*), so must have been driven deep down into this from higher up. They were more massive than others found in the channel, with **75854** (Pl 142) surviving to a length of 1.37 m and having a diameter of 0.24 m,

Plate 142: Driven stake **75854**, in situ

Plate 143: Driven stake **76239**, in situ

and **76239** (Pl 143) surviving to a length of 0.70 m and having a diameter of 0.18 m. It was unclear whether the lower end of each stake had been worked, but the upper ends, in both cases, were formed by their decay.

Both stakes were made of oak, apparently from trees of similar age, with **75854** having 150 rings and **76239** 149 rings (*Appendix 20*), although the former was faster-growing than the latter, accounting for its greater girth. These oaks also appeared to have been growing contemporaneously, and they have both been included in dendrochronological Cluster 4 and dated by the radiocarbon wiggle matching of **75854** (Table 28). This estimates the final ring of the sequence (ring 150) to have been formed in *2865-2835 cal BC* (or *2870-2825 cal BC*, at the Highest Posterior Density interval for this distribution, at *99% probability*). Timber **75854** has also been tentatively matched with prehistoric tree-ring data, with a last date for ring 150 being 2868 cal BC, agreeing with the wiggle matching. This suggests that the stakes were most probably driven into the channel from the approximate level at which the *Later Neolithic organic deposit* survived (rather than from the *Earlier Neolithic organic deposit* in which they were found) and means that they may have either just pre-dated Burnt Mounds 1 and 5 (*p 329*) and the deposition of the Grooved Ware vessel (*p 354*), or that these were all contemporary (Fig 160).

These stakes were set approximately 4 m from each other, perhaps straddling the western branch of the channel, and although they were not vertical when they were found, it seems likely that they may once have been so. If this was indeed the case, then they must also have been fairly large timbers, in order to have leveraged the down-pointing ends into their eventual angle of repose. They were not obviously associated with anything else in the channel, and were not necessarily related to each other, although it may be significant that they were set midway between Burnt Mounds 1 and 5.

A Liminal Landscape? Interpreting the Later Neolithic Activity

The later Neolithic (*c* 3500-2450 cal BC) evidence from Stainton West, and the adjacent river terraces, is at one level idiosyncratic, the occurrence of burnt mounds (*p 344*), for example, being early for this monument class. However, in other ways, namely in the construction of what is probably a henge monument (*p 323*) and the appearance of Grooved Ware pottery (*p 354*), it is typical of the period both regionally and nationally (*Ch 7, p 230*). After its initial appearance in this part of the Eden Valley (*Ch 9, p 317*), farming seems to have established a foothold, but there is no evidence for a rapid expansion of clearance or an agricultural explosion. Pollen spectra (*p 334*) suggested some possibly localised arable cultivation and evidence for grazed pasture, which is also supported by other proxies, such as fungal spores and beetle fauna (*p 384*), and also that alder established itself on the floodplain. However, there is no sense that the landscape was any more intensively farmed than it had been in the earlier Neolithic period, and it is possible that this part of the valley was just one part of an extensive range travelled by a transhumant, or semi-mobile, population, which may also have managed small-scale cereal plantations and/or garden plots.

The henge on the Pleistocene terrace (Terrace 1), apparently measuring *c* 100 m in diameter, would have been one of the largest, and, presumably, the most important, in the Solway area (Evans 2008). It follows then that this meander in the Eden (*Ch 2, p 41*) remained a significant place, where different groups/communities could interact. This is in keeping with its role in both the earlier Neolithic period, presupposing the existence of an ancestral house and/or other monuments (*Ch 7, p 230*) there, and also the later Mesolithic period, given that it was a perennial site for a large-scale encampment (*Chs 3-4*). In this sense, then, it had acted as a major landscape focus for something like 3-4000 years, and other evidence (*Ch 11*) suggests that it continued to do so for at least another millennium. Although this is highly significant for an understanding of the Solway Firth's place in the wider scheme of things, it is by no means atypical, as both regionally (*eg* ASDU 2016) and nationally (*eg* Leivers

and Powell 2016) it is becoming increasingly clear that monumental landscapes can have very deep roots.

Lost Significance?

At this time, the Stainton West site was evidently still an important place within the floodplain/terrace system and was probably articulated, in practice, with the monumental landscape of the terrace. This relationship may have derived from, and been analogous to, the postulated axis between the elaborated *Principal palaeochannel* and any house/shrine during the earlier Neolithic period (*Ch 8*, *p 238*). This was despite the fact that the ponded channel had by now become even more silted, with a low-energy, peaty organic deposit accumulating in it (the *Later Neolithic organic deposit*; *p 328*), and was choked with vegetation, including alder trees. It was evidently still a wet environment, but most of the time, only a small stream trickled through it (*p 329*).

At the beginning of the period (probably *c 3360-2830 cal BC*; '*Late Neolithic*' phase), it seems that slight stake settings or structures may still have been established in the channel, possibly referencing the stream, but these did not appear to constitute a similar level of activity to that of the earlier Neolithic period (*Ch 8*, *p 240*), and it is by no means certain that the wooden platform was still even visible. Deposition also continued to take place in the channel, probably including volcaniclastic stone, flaked lithics, woodworking debris, and, possibly, a polished-stone axe (*Ch 9, pp 303-7*). However, because of issues of taphonomy and residuality, it is difficult to be certain whether all of the material in the *Later Neolithic organic deposit* had actually been deposited during this period, or whether much of it had been displaced from the earlier Neolithic sediments. Yet, even so, given the timespan involved, any deposition would have to have been very intermittent, and the material was not of an equivalent quantity to the earlier Neolithic foundational deposits (*Ch 8, p 271*).

It is also interesting to note what was not recovered from this phase of sedimentation. Bone was absent, although this probably reflects the acid soil conditions and cannot be used to rule out its former presence. It is not certain that polished-stone axes were still deposited (*p 337*), or whether the channel remained a focus for butchery/dismemberment activity (*Ch 8*, *p 265*), or polishing, grinding, and stone-working (*Ch 8*, *p 268*). Wooden artefacts comprised only axe-sharpened stakes or debris, rather than the finely finished wooden artefacts, such as the planks and tridents, that had formerly been deposited, and no pottery diagnostic of the earlier part of the period was recovered. It is possible that some of the few potentially diagnostic Neolithic flaked-lithics within the *Grid-square area* (*p 342*), particularly those that appeared to have been focused on the erstwhile site of the Mesolithic midden (*Ch 4*, *p 115*), dated to this time, but this is uncertain, and they too might have been earlier or later.

The overall sense was that the site had become somewhat marginal, but nevertheless retained the vestiges of its former distinction, its liminality at the edge of the floodplain perhaps contributing to this. It is possible that it no longer hosted all of the activities it had previously, and had lost some of its putative foundational and generative significance (*Ch 8*, *p 233*). This could have been because these practices, and also this significance, had been dependent on the same set of values that inspired any plank-built house/shrine in the area, and that, as such a structure lost its relevance, was abandoned, and was possibly replaced with something else, so did the practices and values that signified the channel as an important and complementary locus.

What remained was, possibly, a shadow of this, perhaps a vaguer conception that this was a place of ancestral power and meaning? Even subsistence activity in the floodplain, such as fishing or canoeing, might now have been associated with the more active channels of the Eden, which would have flowed further to the west. Of course, this might be overstating the case, and the lack of archaeological material may simply reflect that any activity undertaken just did not result in a material trace. However, the fact remains that the construction, production, processing, and depositional activities undertaken at the channel in the earlier Neolithic period no longer seem to have been practised to the same degree of intensity.

A Place of Purification?

At some point in the later Neolithic phase, although it is not known precisely when, the *polissoir* (*p 339*), used for sharpening or polishing stone axes and which may have lain adjacent to the *Principal palaeochannel* for centuries, was burnt and smashed (a 'ritual killing'; Jensen 1951), and the fragments deposited around the flaring northern part of the exposed channel. This act seems final, since it was obviously designed to remove from circulation what had probably been viewed as a highly potent, possibly dangerous, artefact, confining it to memory by incorporating it into the channel. It is tempting to see this as relating to a changing role for the channel, a way of moving away from past traditions and practices by explicitly bringing them to a close, and thereby opening up the possibility of doing things differently. It may be read literally, as ending the tradition of axe finishing or manufacture at this place, or it may have had rather wider connotations and resonances, perhaps being linked to the diminution of Great Langdale itself as a pivotal place in the landscape, mythology, and ideology. This perhaps coincided with the end of the major phase of stone quarrying for axe production on the central Lakeland massif.

The direct radiocarbon dating of the quarry sites in Langdale suggests that, although Loft Crag may have been in use during the second millennium cal BC, most of the quarrying appears to have taken place during the first half of the fourth millennium cal BC (Edinborough *et al* 2019; *Ch 7, p 223*) and does not seem to have continued into the third millennium cal BC (*cf* Griffiths 2011, 243-8). Another national analysis of the dating evidence (Whittle *et al* 2011, 779-94) has concluded that the long-distance transport of stone axes, including those made of Langdale tuff, declined during the earlier Neolithic period, probably in the thirty-fifth century cal BC. This is supported by the recorded associations (Clare 2009) of Lake District tuff axes with earlier Neolithic Carinated Bowl Ware pottery (Sheridan 2007a). Lake District tuff axes certainly do occur in archaeological contexts dating to later periods (*eg* Manby 1979), but the possibility of curation and redeposition of axes and tuff fragments needs to be considered, as this could have had the effect of artificially extending their currency.

So, as the main phase of axe quarrying seems to have taken place in the first half of the fourth millennium cal BC, and it is possible that the *Later Neolithic organic deposit* was accumulating in the thirty-fourth century cal BC, it is not impossible that the destruction and deposition of the *polissoir* was associated with the decline of Langdale. Alternatively, though, this may have taken place at a slightly later date, perhaps being associated with a resurgence of activity in association with the channel at Stainton West, between the twenty-ninth and the twenty-fifth centuries cal BC (Table 28; *p 344*), when the henge was possibly also created.

Possibly the first element in this latter phase was the erection in the channel of the two (or more) upstanding oak posts (**75854** and **76239**; *p 357*), both driven deep into the channel sediments. It is uncertain what these were used for, but **75854** was more massive than any of the earlier structural stakes from any phase of the channel, so could have been an imposing marker, or even a totem pole.

Two later Neolithic burnt mounds (Burnt Mounds 1 and 5, *p 354*) apparently referenced the part of the channel where the posts stood, suggesting that it was focal, although they were possibly slightly later in date. These were the earliest manifestation of a burnt-mound tradition that continued at Stainton West, without apparent interruption, until the mid-second millennium cal BC (*Ch 11, p 392*), which resulted in monuments of formal, and possibly functional, similarity. There was no evidence that they had been connected with cooking or food preparation, one of the interpretations often suggested for such mounds (O'Kelly 1954). While the lack of animal bone could be explained by the acidic soil conditions, it might have been expected that charred cereal grains or fruit pips would have been recovered if this had been their function. However, a clue regarding their possible use for bathing and purification was suggested by a feature interpreted as a sauna associated with the Bronze Age burnt mounds at the site (*Ch 12, pp 435-6*).

The only convincing evidence for deposition in the channel at this time, apart, perhaps, from the *polissoir*, was a collection of sherds from a Grooved Ware vessel (*p 354*), deposited on its eastern edge, in the general vicinity of the burnt mounds and driven posts, and also a single rim sherd of Grooved Ware pottery from the western side of the channel (*p 356*). The Grooved Ware vessel was highly decorated with incised grooves, as is commonly the case with pottery of this style (Cleal and MacSween 1999), and which many authors have suggested may be loaded with symbolic meaning (*eg* Renfrew 1986, 8-9; Thomas 1996, 156-9; 2010; Cleal 1999, 2). Because of its archaeological associations and shared stylistic repertoire, Grooved Ware can be linked to a range of other types of portable later Neolithic artefact types, such as carved-stone balls, maceheads, and plaques, and also monuments, such as stone circles and henges (Bradley 1982; Cowie *et al* 1985, 51-6; Thomas 1996, 156-9; Ashmore 1998, 139-40).

It would probably be mistaken to identify these objects as equating with the existence of an elite group or culture of people; instead, their British-wide distribution might be due to extensive networks connecting groups and enabling the cross-fertilisation, recontextualisation, and reinterpretation of beliefs, ideas, and ideologies, which were bound up with, and perhaps overtly referenced by, the various materialities and symbolism (Thomas 2010). It is also the case that these may have had very different meanings and associations in different settings (Thomas 1996, 164-8). For example, Grooved Ware in Orkney, where it originated (Brindley 1999), often occurs in domestic or funerary contexts (Thomas 1996, 159), whereas elsewhere it can occur in a 'more rarefied set of locations' (*op cit*, 159-60, fig 6.9) and may show a stronger affinity with ceremony and feasting (Mukherjee *et al* 2008), but less so with burial (Thomas 2010).

At Stainton West, the appearance of the Grooved Ware and the burnt mounds, as far can be determined at the same time (*p 344*), seems significant, and it is likely that these were related phenomena. It is also probable that these were deliberately sited/deposited with reference to the same part of the silted channel that had, relatively recently, been marked by the erection of large posts. This suggests that if the channel had, in the preceding centuries, been a

more marginal space, then its significance had never been completely forgotten, and that it had once again become the focus for activity, although this was now of a different character. It is also entirely possible that this activity related to the henge to the north-east of the channel, on Terrace 1, and, if so, the burnt mounds could have been used for bathing or purification rites associated with any ceremonies undertaken there.

Although there had been a resurgence of activity at the channel, and Stainton West seemed to have regained some of its status as an important place, it is likely that it was peripheral to the henge, and the terrace in general, which probably remained the primary focus for ceremonial activity, including depositional acts, and also, possibly, short-term or longer-lived settlement. It has been suggested that this site on the floodplain edge had variously, over the millennia, firstly been a place of settlement (*Chs 3-5*), and, latterly, for foundational commemorative acts and practices associated with material processing and production (*Chs 8-9*). By the later part of the Neolithic period, it seems to have lost all of these associations, presumably because they were focused instead on the henge, or any settlement in its vicinity on the terrace.

In its positioning, the henge may have referenced, and been commemorative of, any earlier Neolithic monuments, tombs, or communal structures, including dwellings, that had previously been constructed there (Younger 2015, 149-60). It may have been the site for ceremonies such as ancestor rites or for funerary processes (*Ch 7, p 223*), and been generative, in the sense that it provided an arena for all manner of negotiations, exchanges, and activities that were socially reproductive. In terms of the symbolism expressed by its architectural form and in its use, and in the use of objects such as Grooved Ware pottery at it, it may have been explicitly communal, and activities undertaken there may have been intended to perpetuate that sense of community, including perhaps by making reference to and dramatising 'the domestic' (Thomas 2010). In contrast, the edge of the floodplain was no longer the site for settlement, or domestic and production activities, and instead it may have been viewed as liminal, lying on the threshold of a riverside realm of experience. The ready provision of water for bathing and purification would have been one obvious and practical reason for siting the burnt mounds there, rather than at the henge, but it may also have been the River Eden, in a more general sense, that was being referenced. This may have been why the Grooved Ware pottery was selected for formal deposition there.

The construction of a henge monument and the use of Grooved Ware indicates that this part of the Eden Valley continued to have been integrated into much larger-scale social networks and ideological frameworks, as it seems to have been since the Mesolithic period (*Ch 5, p 169; Ch 9, p 319*). It also marked a new epoch in the history of the site and the community that continued to be drawn to it. Stainton West, as a place within this, now ceremonial, landscape, retained a distinct identity, with contrasting associations to those of the terrace, that were reinforced by the practice of burnt-mound activity, which was to continue for another millennium at least. Why this silted, overgrown channel remained important is somewhat mysterious. It may have retained physical features, subtle landmarks, that singled it out, and also perhaps vaguely remembered, in myth, as a place of ancestral power. However, in the shadow of the henge, and all that this stood for, it may by then have been comprehended in a different way than it had been in the past, perhaps having a figurative (metonymic) quality, whereby it was conceived as channelling the purifying or sanctifying powers of the River Eden into the ceremonial discourse.

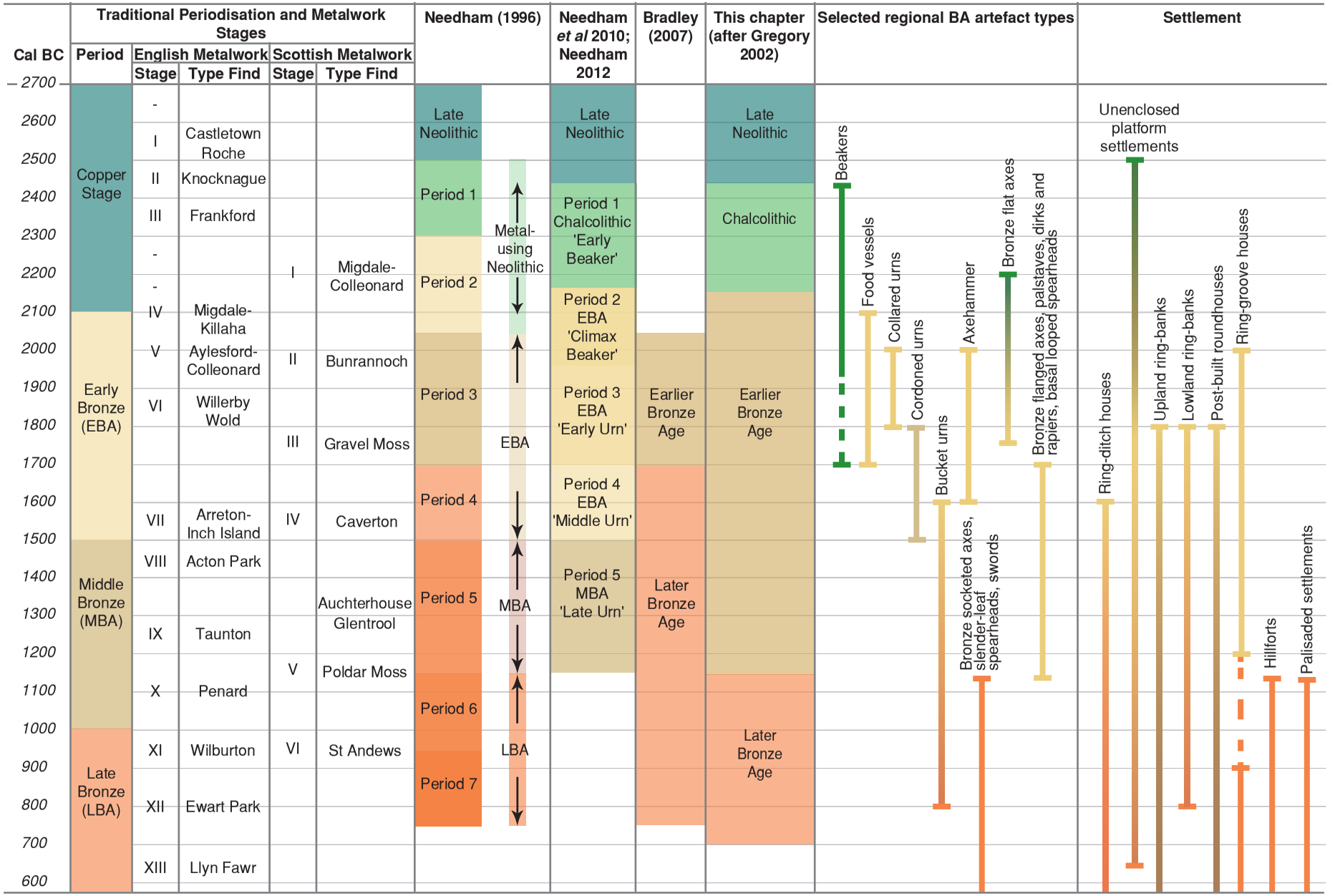


Table 31: Chalcolithic and Bronze Age chronologies, terminology, and the dating of select artefact and settlement types

11

THE CHALCOLITHIC AND BRONZE AGE LANDSCAPE

R A Gregory

Chalcolithic and Bronze Age Chronologies

Across Britain, the period extending between approximately 2500 cal BC and 800 cal BC is complex and dynamic, and is characterised by significant and ongoing changes in technology, settlement, and land allotment, burial and ritual practice, and social organisation (*cf* Bradley 2019). Fortunately, since the 1990s, the study of this period has been revolutionised, largely through several ambitious programmes of high-precision radiocarbon dating, and also the reassessment of older radiocarbon determinations (Kinnes *et al* 1991; Needham 1996; 2005; Needham *et al* 1997; Sheridan 2002; 2003b; 2004; 2005; 2007b; 2007c; Sheridan *et al* 2006; 2007). Together, this work has allowed the chronological spans of specific types of metalwork, pottery, and body adornments, as well as settlement and burial sites, to be discerned with a greater degree of confidence and this, in turn, has fed into wider debates on the nature and structure of society throughout the late third, second, and early first millennia BC. The period is also well served by a rich body of proxy climatic data and palaeoenvironmental information, allowing the environment to be discerned in some detail across most areas of Britain (*cf* Brown 2008; ScARF 2012c, 35-48). Finally, a growing body of evidence relating to Bronze Age activity has been produced through research-orientated excavation and developer-funded archaeology, such as that completed along the CNDR, which form an extremely valuable source of information (*cf* Bradley 2019).

The ordering and compartmentalising of the evidence has been the subject of much debate and revision (Table 31). The more traditional chronological schemes were based on metalwork typologies, and these suggested that the period could be divided into the Copper Stage (2700-2100 cal BC), Early Bronze Age (2100-1500 cal BC), Middle Bronze Age (1500-1000 cal BC), and Late Bronze Age (1000-600 cal BC), which together embodied 13 main stages of metalworking traditions in England (*cf* Needham *et al* 1997, illus 1). A separate sequence of Bronze Age metalworking traditions was also proposed for Scotland (Coles 1960; 1964; 1969).

A revised scheme was, however, produced by Stuart Needham, following a programme of high-precision radiocarbon dating, together with a review of the existing radiocarbon evidence, which suggested that seven chronological periods spanning the era 2500-750 cal BC could be identified (Needham 1996). More specifically, these periods embodied both artefacts and archaeological sites and were hence defined on the basis of 'prevailing cultural characteristics' (*op cit*, 123). The periods spanned an initial Metal-using Neolithic (2500-2050 cal BC; Periods 1-2), the Early Bronze Age (2050-1500 cal BC; Periods 3-4), Middle Bronze Age (1500-1150 cal BC; Period 5), and Late Bronze Age (1150-750 cal BC; Periods 6-7).

Subsequently, the dating of certain classes of artefacts has been refined though the National Museums of Scotland dating programme (*cf* Sheridan 2008) and the Beaker People Project (Sheridan *et al* 2006; 2007), and revisions have also been made to Stuart Needham's 1996 chronological scheme (Needham *et al* 2010). Further debate has led to the refinement of the early part of this period, and has suggested that defining part of the late third millennium BC as the 'Chalcolithic' period is wholly appropriate, though this British 'Chalcolithic' was different from the 'Chalcolithic' of Continental Europe (*cf* Needham 2012; Sheridan 2012). In chronological terms, the British Chalcolithic period can therefore be regarded as spanning the period 2450-2150 cal BC (Needham 2012, table 1.2).

In addition to the artefact-based studies, broader chronological approaches, incorporating Needham's (1996; Needham *et al* 1997) revised scheme, have also been used to produce over-arching narratives for the period. This has been applied at both a national level (Bradley 2019) and also at a regional level, specifically in relation to the evidence from Dumfries and Galloway (Gregory 2002), an area which covers the northern Solway Plain, close to the northern end of the CNDR. In both cases, the evidence was divided into an earlier and later Bronze Age, and given its proximity to the CNDR, the chronological scheme used to discuss the remains from the northern Solway is largely adhered to here, with some minor modifications. In this scheme, the late Neolithic-early Bronze Age transition was suggested as beginning in *c* 2600 cal BC, with the earlier Bronze Age envisaged

as extending between 2300 cal BC and 1150 cal BC (*ibid*). In the light of more recent chronological data, the earlier part of this scheme can now be modified, and it seems more applicable, following Needham (2012), to define the period 2450-2150 cal BC as Chalcolithic. The earlier Bronze Age would therefore fall between 2150 cal BC and 1150 cal BC, and would encompass the more traditional Early and Middle Bronze Ages (Needham's (Needham *et al* 2010) Periods 2-5). In contrast, the later Bronze Age was envisaged as occurring in 1150-750 cal BC (Needhams's (1996) Periods 6 and 7) and was viewed as a period typified by a dramatic decrease in the volume of available archaeological evidence across south-west Scotland, along with the appearance of specific types of enclosed settlements/sites (Gregory 2002).

The archaeological investigations along the CNDR produced a good spread of evidence relating to Chalcolithic/earlier Bronze Age activity. This included the remains of a house in Parcel 21 North, dating to the late third millennium, providing evidence for a settlement, and slightly later settlements in Parcels 9 and 42, along with earlier Bronze Age boundary ditches and other evidence for settlement in Parcels 21 North and 41 (Fig 161). In addition, clear evidence for Chalcolithic/earlier Bronze Age activity was present at Stainton West, in the form of four burnt mounds and associated features. The radiocarbon assays, and the modelled radiocarbon dates (*Appendix 20*), indicate that this activity spanned the last quarter of the third millennium BC, and the early and mid-second millennium BC. Significantly, along the CNDR, there was also evidence for activity dating to the late second and early first millennia BC, a period that equates to the beginning of the later Bronze Age, a time that is generally under-represented in the archaeological record of the region. This evidence included small-scale activity at Stainton West and, more significantly, the remains of a probable settlement in Parcel 32 (*p 421*).

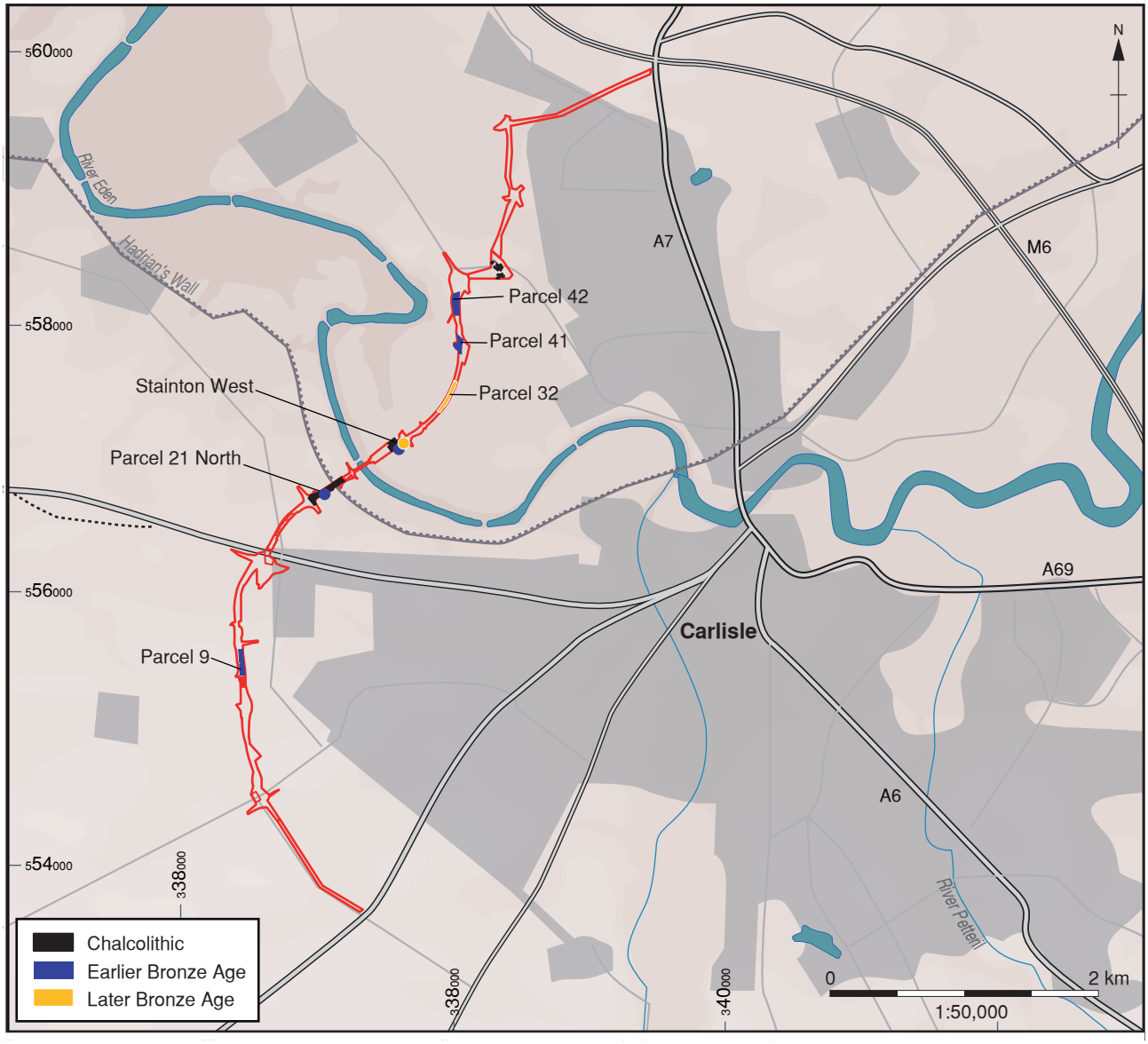


Figure 161: Chalcolithic and Bronze Age sites on the CNDR (Contains OS OpenData © Crown Copyright [and database right] (2022))

The Chalcolithic and Earlier Bronze Age of the Inner Solway Firth (*c* 2450-1150 cal BC)

The environment

Several significant changes can be recognised in the course of the Chalcolithic period and earlier Bronze Age, which influenced both the natural and cultural environment of the inner Solway Firth, and its immediate environs. For the natural environment, the period is characterised by several climatic shifts, which are detectable within the proxy-climatic data, particularly humification levels within raised mires (*cf* Brown 2008). Indeed, one of the more important, and ground-breaking, studies associated with the creation of a bog-surface wetness curve was undertaken at Bolton Fell Moss, to the north-east of the CNDR (*cf* Barber 1981), and in more recent years, studies of bog-surface wetness have increased and been allied with other sources of proxy-climatic data in an attempt to reconstruct the changing Bronze Age climate (*cf* Brown 2008; Tipping *et al* 2012).

Although there are problems in interpreting the results of these various studies in relation to former climatic regimes, some broad conclusions may be made (Brown 2008, table 2). It appears, for example, that initially, between 2300 cal BC and 2000 cal BC, there was a general deterioration in the climate (termed the 4.2 ka event), which resulted in a cool/wet phase in northern Britain (*ibid*), with the period between 2500 cal BC and 2200 cal BC being much wetter than average (*cf* Tipping *et al* 2012, 12; Fitzpatrick 2015). This was followed by a reduction in bog-surface wetness, perhaps suggestive of drier conditions, until approximately 1650 cal BC. This latter date appears to be associated with increased bog-surface wetness, which lasted until *c* 1200 cal BC (Brown 2008, table 2), indicating that there was a probable increase in rainfall. Moreover, it has been suggested that during this period there was a strengthening of the 'gulf stream', which resulted in milder winters and reduced seasonal contrasts, and that this may have been beneficial to agricultural productivity (*cf* Tipping *et al* 2012, 12; ScARF 2012c, 36).

Significantly, the wet/cool climatic phase dating to the late third millennium BC appears to have had little effect on early settlement and clearance across the Solway coastal plains, as reflected in the available pollen data. These suggest that a renewed phase of clearance began in *c* 2300 cal BC (Tipping 1995a; Barber *et al* 1994b; 1994c; Hodgkinson *et al* 2000, 112), which was 'the prelude to a prolonged period of agricultural activity, sustained over many hundreds of years, during which cereal pollen is consistently recorded, particularly after *c* 1800 cal BC' (Tipping 1997a, 20). Although the extent and intensity of Bronze Age clearance is unclear, it is possible, on palynological grounds, that the lowland landscape was characterised by small patches of open ground surrounded by fairly substantial areas of woodland, and that there was no great increase in clearance after 1800 cal BC (*ibid*; Rutherford and Gregory forthcoming).

Within the upland areas, specifically those to the north of the Solway, it has been suggested that, although clearance may have been initially more transient, it seemingly relates to an expansion in settlement in the latter part of the third millennium BC, which again was little affected by the climatic deterioration dating to this period (RCAHMS 1997, 98). Indeed, it has been postulated that farmers first moved into these upland areas in the centuries after *c* 2550 cal BC (Tipping 1997a, 10), and this date also equates with the earliest evidence for settlement in these upland areas (*pp 377-80*). This occupation appears to have intensified and it was characterised by the use of certain house types, cairnfields, specific types of burial monuments, and burnt mounds, all of which probably largely date to the first half of the second millennium BC (RCAHMS 1997, 43). An essentially similar pattern of clearance has also been postulated for the upland areas of the Lake District, where many of the cairnfields are attributed to Bronze Age clearance, specifically that dating to the second millennium BC, and may have been a product of the expansion of settlement from the coastal plain (Quartermaine and Leech 2012, 320, 336-7).

During the Bronze Age, rising sea levels would also have created a differing coastal environment from that of today. On the northern shore of the inner Solway Firth, at the beginning of this period, relative sea level was probably *c* 2.7 m higher than present-day levels and gradually began to fall, whilst, in contrast, on the southern shore, sea levels may have remained fairly high and static throughout the period (Lloyd *et al* 1999; *Ch 2, p 39*). These differences can probably be explained by differing levels of isostatic rebound, as south-west Scotland lay closer to a major glacial ice sheet which, following its disappearance at the end of the last glacial period, caused the land across this area to uplift to a greater degree (*ibid*).

Chalcolithic and earlier Bronze Age flood events at Stainton West

Geomorphological mapping (*Ch 2, p 41*), coupled with the archaeological evidence, indicates that during the Bronze Age the mid-Holocene river terrace (Terrace 3) continued to form the focus for activity at Stainton West, as it had done during the Mesolithic (*Chs 3-5*) and Neolithic periods (*Chs 8-10*). At an earlier date, this terrace had been bisected by multiple river channels, which by the late third millennium BC had been nearly completely filled with organic material and alluvium. Within the *Principal palaeochannel*, the uppermost deposits comprised the *Later Neolithic organic deposit* (*Ch 10, p 328*), with earlier deposits associated with the *Mesolithic alluvium* (*Ch 6, pp 188-9*) and the *Earlier*

Neolithic organic deposit (*Ch 8, p 235*) largely confined to the edges of the channel.

It is likely, however, that throughout the Chalcolithic period and Bronze Age, as a result of the process of isostatic rebound, the mid-Holocene river terrace (Terrace 3) became raised and another terrace formed to its west (Terrace 4), along which the main course of the River Eden flowed (Fig 162). Terrace 4 is now 4 m above the current level of the River Eden and geomorphological

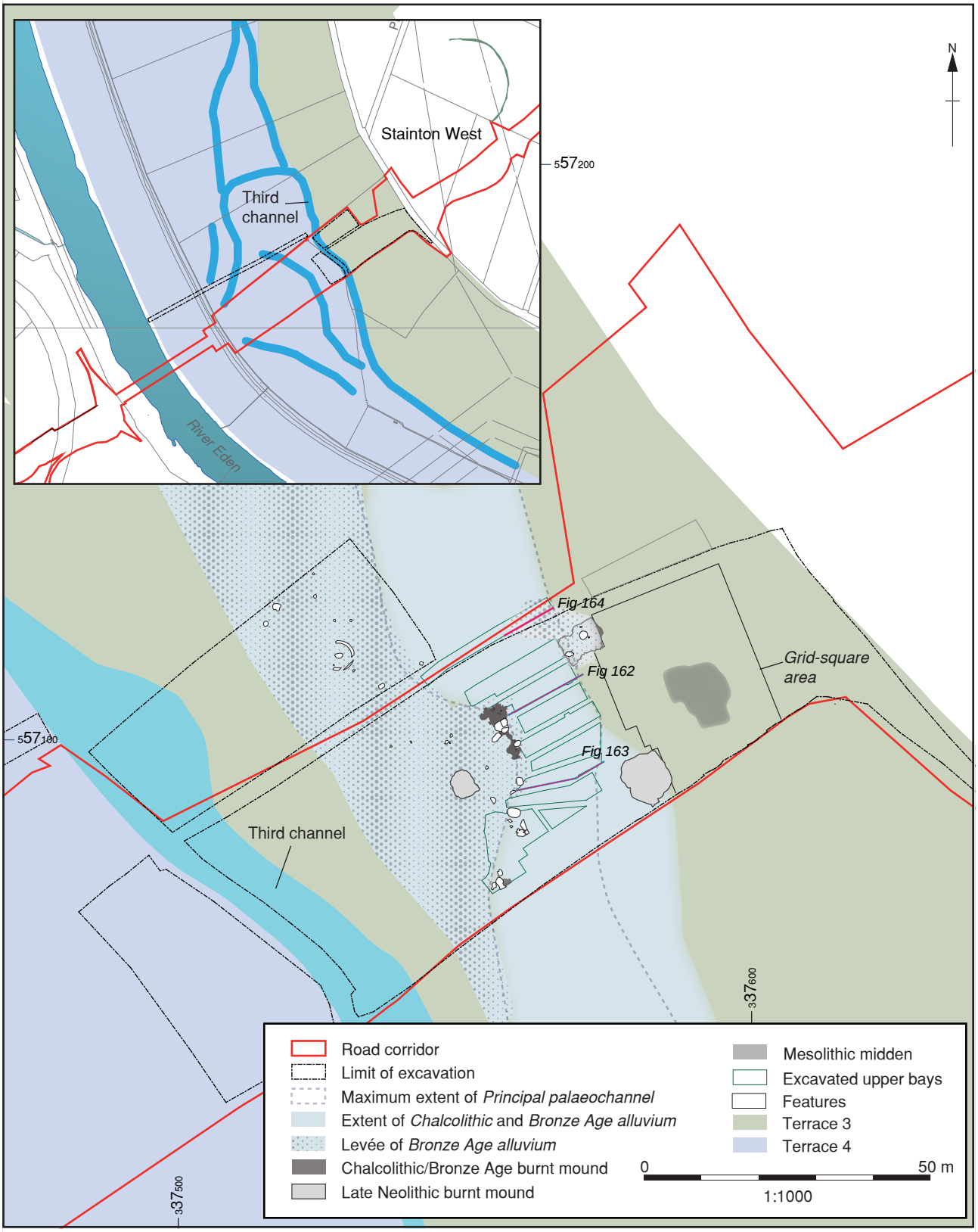


Figure 162: Terraces 3 and 4 at Stainton West, with Chalcolithic and Bronze Age deposits, and earlier features which may have been visible at that time (Contains OS OpenData © Crown Copyright [and database right] (2022))

mapping (*Ch 2, p 40*) indicates that during this period, and also in the Iron Age and Roman period, the river occupied multiple positions across it, with the channels displaying a dominant meandering planform.

The channel evolution on this terrace was more dynamic than that associated with Terrace 3, as it was characterised by scrollbar levées and chute-channel meander migration (Nanson and Croke 1992), which may reflect a combination of increased sediment supply and reduced riverbank vegetation cover. It also seems likely that an unexcavated palaeochannel at the south-western edge of the Stainton West excavation area (termed the 'third channel'; *Ch 2, p 44*) was active during this period. This lay along the break in slope between Terraces 3 and 4, and it is quite possible that, during extreme flood events, water from this channel resulted in the deposition of alluvium within the various palaeochannels and adjacent areas on Terrace 3. Such extreme events might also, at times, have led to the partial reactivation of the palaeochannels on this terrace.

Direct evidence for both the flooding of Terrace 3 and the reactivation of its palaeochannels was evident. This took the form of a single layer of alluvium (*Chalcolithic alluvium*) that appears to have been deposited at the end of the third millennium BC, and which in most areas extended across the width of the main palaeochannel (*eg* deposits ***70306*** in Bay B; Fig 163). This also seems to have been largely contained in the northern half of the *Principal palaeochannel*. Pedological analysis indicates that it was composed of strongly bioworked humic sediments that were rich in woody debris (*Appendix 19*). In addition, the horizon also contained the possible remnants of herbivore dung, from animals that had a bark-based diet. This may suggest that beavers were still active in the immediate vicinity of the *Principal palaeochannel* (K Viklund and R Engelmark *pers comm*).

Stratigraphically (Table 32), the *Chalcolithic alluvium* directly underlay deposits associated with late third-

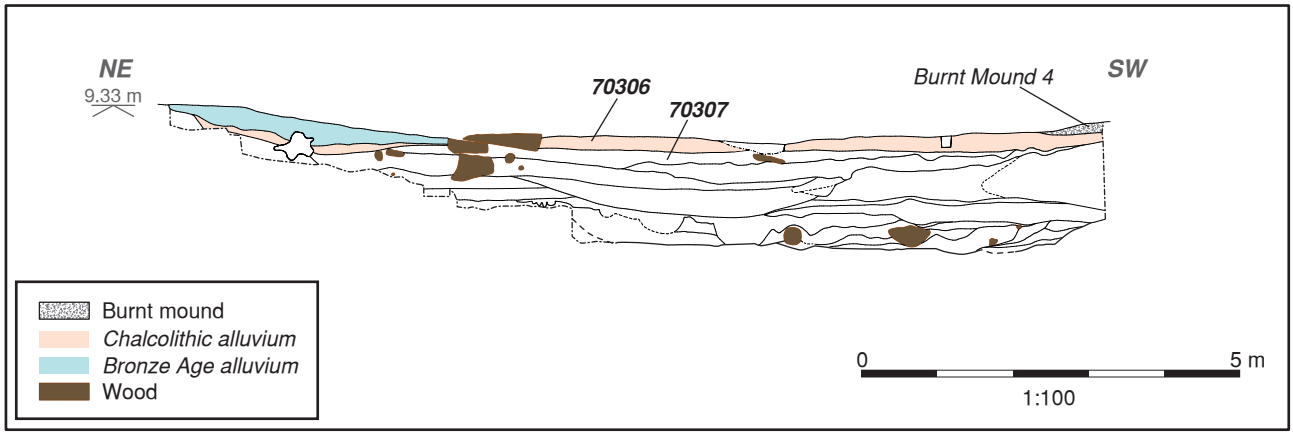


Figure 163: Cross-section through Bay B, showing the Chalcolithic and Bronze Age deposits

Principal deposits/features								**Period (OxCal Phase)**
Burnt Mound *6*								Chalcolithic (*'Burnt Mound 6'; 'Chalcolithic alluvium and reactivation channels'*)
Chalcolithic alluvium					Reactivation channels			
Burnt Mound 2								Earlier Bronze Age (*'Burnt Mound 2'; 'Bronze Age activity (post-Bronze Age alluvium)'*)
Bronze Age alluvium								
Burnt Mound 3	Burnt Mound 4	Ring-gully ***100031***	Pit ***100026***	Posthole ***100033***	Hearths ***100016***, ***100003***, ***100014***, ***100042***, and ***100050***	Pits ***70046***, ***70039***, ***70037***, ***70052***, ***70049***, ***70041***, ***70007***, ***70155***, and ***70278***	Land surface ***70486***	
Bronze Age/Iron Age alluvium								Earlier Bronze Age-Iron Age?

Table 32: The Chalcolithic and earlier Bronze Age stratigraphic sequence at Stainton West (shaded features/deposits have been radiocarbon dated)

millennium BC activity (Burnt Mound 2; *p 387*), close to the channel edge, and was also beneath alluvium that had probably been deposited in the earlier Bronze Age (*ie Bronze Age alluvium*; *below*), and, perhaps more significantly, sealed a Chalcolithic-age burnt mound (Burnt Mound 6; *p 383*). More direct evidence for its date of deposition was provided by specific palaeoenvironmental remains from deposit ***70306***, which formed part of this stratigraphic unit. These included a fragment of hazel charcoal, which returned a date of *2220-2060 cal BC* (*SUERC-44746*; Table 33), apparently confirming the Chalcolithic age of this deposit. In addition, a hazelnut dates to the late fourth millennium BC (*3370-3100 cal BC*; *SUERC-44745*), though this was clearly a residual ecofact and thus provides a *terminus post quem* for the formation of the *Chalcolithic alluvium*, whilst a sediment date was obtained from peaty clay contained within ***70306***. Although there are inherent problems connected with the dating of sediments at Stainton West (*Appendix 20*), it is perhaps significant that this calibrated radiocarbon assay (2490-2290 cal BC; 3915±35 BP; SUERC-32703) also falls within the Chalcolithic period.

Further evidence was provided by a hazelnut and fragment of hazel charcoal from the interface between the *Chalcolithic alluvium* (***70306***) and the underlying *Later Neolithic organic deposit* (***70307***), which returned statistically consistent dates of *2290-2110 cal BC* (*SUERC-47188/9*). These dates are clearly anomalous with the available dating evidence for the *Later Neolithic organic deposit* (*Ch 10, p 328*), but tally well with the date (*SUERC-44746*; *above*) derived from ***70306***. A final radiocarbon date (SUERC-32636) relating to the *Chalcolithic alluvium* came from sediment derived from deposit ***70313*** (Bay D), though this is considered unreliable, particularly as it returned a Late Neolithic date. Therefore, when taken together, the stratigraphic relationships and dating evidence suggest that this *Chalcolithic alluvium* was deposited in the late third millennium BC.

In one section of the palaeochannel (Bay F; Fig 164), there was also evidence of two shallow channels that probably relate to the temporary reactivation of the *Principal palaeochannel* during extreme flooding events. The channels appear to have been contemporary and, as such, probably defined a watercourse that was split by a small eyot. One of these appears to have scoured out deposits of Neolithic date, specifically the *Earlier Neolithic organic deposit* and the *Later Neolithic organic deposits* (*Ch 8, p 235; Ch 10, p 328*), and contained a layer of alluvium (***70327***), which was sealed by another deposit of alluvium (***70077***). This latter deposit extended beyond the channel and probably relates to a separate phase of Bronze Age flooding (*Bronze Age alluvium*; *below*). Two fragments of alder were recovered from the top of a deposit (*Earlier Neolithic organic deposit* ***70346***; *Ch 8, p 235*) directly beneath alluvium ***70327***, and these probably originally lay at the base of the reactivation channel. One returned a date of *2410-2190 cal BC* (*SUERC-44768*), whilst the other was dated to 1500-1310 cal BC (3142±35 BP; SUERC-44767). Given that this channel was sealed by a layer of *Bronze Age alluvium* (*below*), which was probably deposited during the initial centuries of the Bronze Age, it is considered that the late third millennium BC date may well represent the period when the reactivation channel was active. This channel may therefore have preceded, or been contemporary with, the *Chalcolithic alluvium*. Indeed, one possibility is that the floodwaters from this, and the adjacent channel (*below*), were responsible for the deposition of the *Chalcolithic alluvium* to the north, and also in that part of the *Principal palaeochannel* to the east.

The second reactivation channel was to the west and also cut through both earlier and later Neolithic deposits, probably also dating to the late third millennium BC. It contained a deposit of alluvium (***70336***), which was sampled and subjected to pedological analysis (*Appendix 19*). This suggests that, once deposited, the laminated sediments were mixed by burrowing, as a result of lowering watertables. This deposit also contained blackened root-material, possibly associated with the slow charring of roots, perhaps as a result of nearby burnt-mound activity (*p 382*). A deposit of alluvium (***70468***) also sealed this reactivation channel, and was probably the same deposit of *Bronze Age alluvium* (***70077***) that sealed the other reactivation channel to the east. Sediment from this alluvium provided a date of 2120-1880 cal BC (3605±35 BP; SUERC-32697), tentatively suggesting that it was also formed during the initial centuries of the Bronze Age.

Further insights into the chronology of this flooding can be gained by the integration of all of the reliable dates from the *Chalcolithic alluvium* and reactivation channels into the Stainton West chronological model (*Ch 1, pp 30-1*). From this, these flood events can be estimated to have occurred between *2470-2240 cal BC* (*Start Chalcolithic alluvium and reactivation channels*) and *2180-2040 cal BC* (*End Chalcolithic alluvium and reactivation channels*; *Appendix 20*).

Apart from the *Chalcolithic alluvium* and reactivation channels, deposits of Overbank alluvium (*Ch 2, p 51*) were present at Stainton West which were probably laid down during several extreme flood events dating to the Bronze Age and, perhaps, also the Iron Age. It is clear from deposits within the *Principal palaoechannel* that several layers of alluvium (collectively grouped as *Bronze Age alluvium*) post-dated the late third millennium BC, as these were observed to seal the *Chalcolithic alluvium* and also the two Chalcolithic reactivation channels in Bay F (*above*).

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Principal palaeochannel Bay B	Deposit ***70307/ 70306***	Material at the interface between the *Later Neolithic organic deposit* (***70307***) and *Chalcolithic alluvium* (***70306***) Dates the formation of the *Chalcolithic alluvium* Element of *'Chalcolithic alluvium and reactivation channels'*	Monolith 70222	8.70	SUERC-47188	Hazelnut (*Corylus avellana*)	3693±39	-24.3	2200-1960	Statistically consistent with a good agreement (T'=1.34; $T'(5\%)$=3.8; v=1; A_{comb}= 91.0% (An= 50.0%))	*2290-2110*
					SUERC-47189	Hazel (*Corylus avellana*) roundwood charcoal	3758±39	-26.4	2300-2030		
	Deposit ***70306***	Part of *Chalcolithic alluvium* Part of *'Chalcolithic alluvium and reactivation channels'*		8.82	SUERC-44745	Hazelnut (*Corylus avellana*)	4530±35	-24.2	3370-3100	Failed	*3370-3100* (*Terminus post quem*)
					SUERC-44746	Hazel (*Corylus avellana*) charcoal	3750±35	-25.9	2290-2030		*2220-2060*
				8.89	SUERC-32703	Sediment	3915±35	-28.9	2490-2290	-	-
Principal palaeochannel Bay D	Deposit ***70313***	Part of *Chalcolithic alluvium* Element of *'Chalcolithic alluvium and reactivation channels'*	Monolith 70240	8.78	SUERC-32636	Sediment	4150±35	-25.5	2880-2620	-	-

Table 33: Chalcolithic and earlier Bronze Age radiocarbon dates from Stainton West

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Principal palaeochannel Bay F	Deposit ***70346/ 70327***	Material at the interface between deposits ***70346*** and ***70327*** Material probably deriving from the base of a Chalcolithic reactivation channel, which was sealed by *Bronze Age Alluvium* Element of *'Chalcolithic alluvium and reactivation channels'*	Monolith 70252	8.39	SUERC-44768	Alder (*Alnus glutinosa*) twig **77009**	3867±35	-29.5	2470-2200	-	*2410-2190*
				8.41	SUERC-44767	Alder (*Alnus glutinosa*) twig **77008**	3142±35	-28.2	1500-1300	-	-
Principal palaeochannel Bay F	Deposit ***70468***	Part of *Bronze Age Alluvium* Partly sealed a Chalcolithic reactivation channel	Monolith 70256	8.73	SUERC-32697	Sediment	3605±35	-29.0	2120-1880	-	-
Principal palaeochannel Bay O	Deposit ***70481***	Part of *Bronze Age Alluvium* Partly sealed *Chalcolithic alluvium*	Monolith 70507	9.07	SUERC-44757	Sediment; humic acid	4149±35	-28.5	2880-2620	-	-
					SUERC-44758	Sediment; humin acid	4536±35	-29.2	3370-3100	-	-
				9.09	SUERC-44755	Sediment; humic acid	4275±35	-29.1	3020-2760	-	-
					SUERC-44756	Sediment; humin acid	4694±35	-29.8	3630-3370	-	-
	Deposit ***70476***	Part of *Bronze Age Alluvium* Partly sealed *Chalcolithic alluvium*		9.34	SUERC-32698	Sediment	2725±35	-29.7	970-800	-	-

Table 33: Chalcolithic and earlier Bronze Age radiocarbon dates from Stainton West (cont'd)

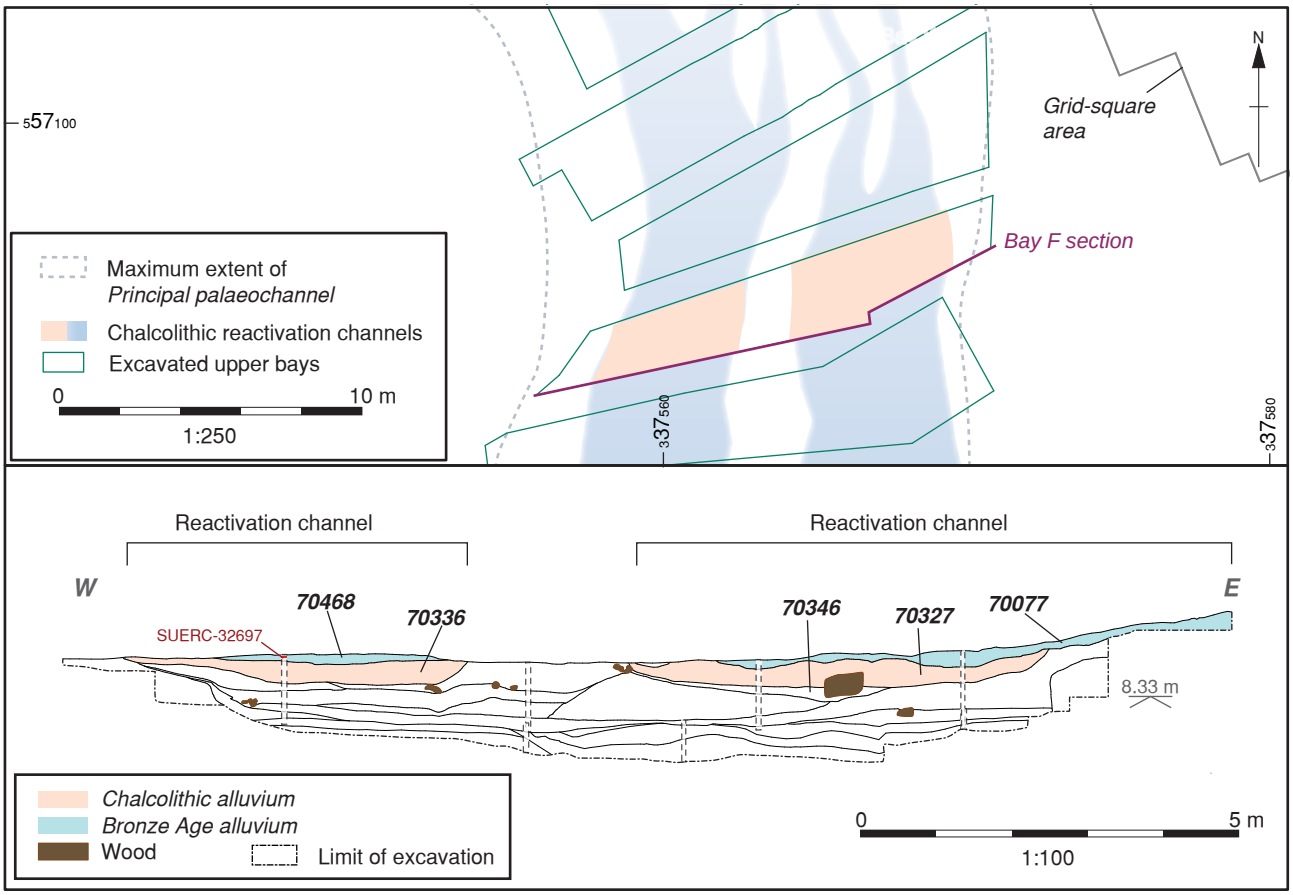


Figure 164: Cross-section of Bay F, showing the Bronze Age reactivation channels

Therefore, given these stratigraphic relationships, the accumulation of this *Bronze Age alluvium* probably dates to the beginning of the second millennium BC, which would equate with the radiocarbon date obtained from the deposit of *Bronze Age alluvium* (***70468***) in Bay F (SUERC-32697; *p 368*). However, it appears that this alluvium only survived, or perhaps accumulated, in certain parts of the channel. For instance, it was largely absent from the main part of the *Principal palaeochannel* between Bays B and D, only occurring on the eastern edge of the channel in this area (*eg* deposits ***70067***, Bay D, and ***70075***, Bay B).

However, Bay O, at the northern end of the *Principal palaeochannel*, did contain several deposits which provided some insights into the possible sequence of flooding and deposition during the Bronze Age, four successive deposits being present in this part of the *Principal palaeochannel*. The two earliest (collectively grouped as the *Bronze Age alluvium*) were a thin layer of alluvial clay (***70481***; Fig 165) and an overlying thick layer of alluvium (***70476***), which both partly sealed the underlying *Chalcolithic alluvium*. Deposit ***70476*** also contained diatoms typical of turbid environments with silty water, or possibly muddy substrates (*Appendix 15*). A monolith (70507) was extracted from these two alluvial deposits, and four sediment samples from deposit ***70481***, and a single sediment sample from ***70476***, were subjected to radiocarbon assay. The dates from deposit ***70481*** spanned the fourth and late third millennia BC and are therefore considered unreliable. The remaining sediment sample from ***70476*** returned a date of 970-800 cal BC (2725±35 BP; SUERC-32698), but due to the problems associated with dating alluvial sediments from the site (*Appendix 20*), this again is not considered particularly reliable.

The other alluvial deposits in Bay O were present at the eastern edge of the *Principal palaeochannel*, including a mound, or levée, composed of deposits ***70484*** and ***70488*** (collectively grouped as the *Bronze Age alluvium*), which was probably originally deposited on the edge of the channel, perhaps broadly contemporary with the thick deposit (***70476***; *above*) within the channel to the west. However, at a later date, this mound had eroded into the channel and had slumped over deposit ***70476***, giving the false impression that it was a stratigraphically later deposit. Further details relating to deposit ***70484*** were provided by the analysis of the soil micromorphology, which indicated that it contained a concentration of burnt monocotyledonous plant fragments that were likely to reflect burning of adjacent wetland areas (*Appendix 19*). Following the deposition of this bank, a land surface (***70486***) developed on its eastern edge, and the area was then once again subjected to flooding, resulting in the

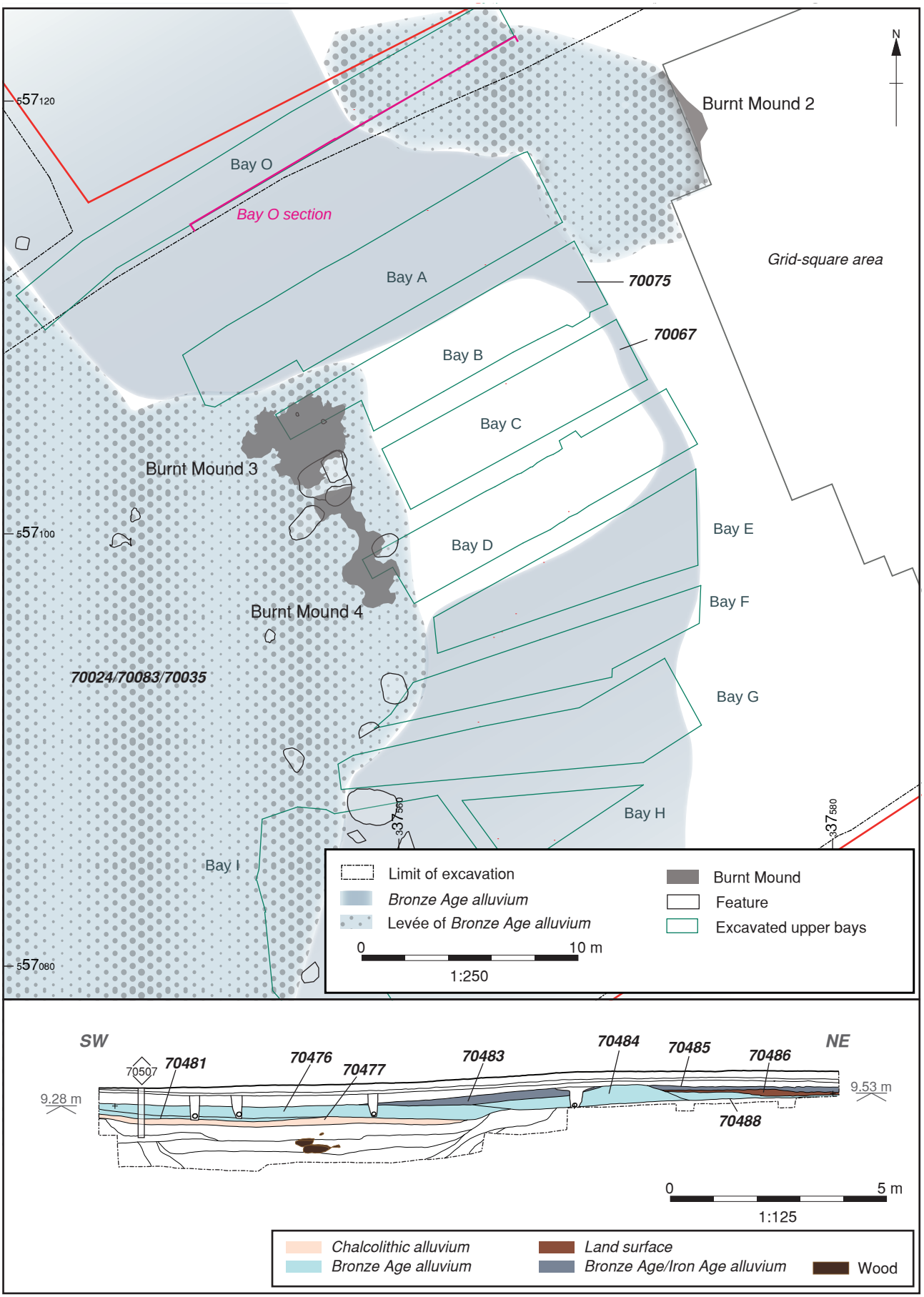


Figure 165: The extent of Bronze Age alluvium *and section across Bay O*

creation of another deposit of alluvium (***70483***/***70485***; grouped as *Bronze Age/Iron Age alluvium*), which sealed mound ***70484*** and extended into the *Principal palaeochannel*; based on its relationships with dated archaeological features, this must post-date the mid-second millennium BC.

Additional deposits of *Bronze Age alluvium* were identified beyond the *Principal palaeochannel*. One of these, forming a continuation of alluvial deposit ***70484***/***70488*** (*above*), was mounded on the eastern side of the channel, in the area of Bay O, where it also covered a Bronze Age burnt mound (Table 32; Burnt Mound 2; *p 387*), indicating that it had been deposited around the transition between the third and second millennia cal BC. Immediately west of the *Principal palaeochannel* was another contemporary mound of *Bronze Age alluvium* (***70024***/***70083***/***70035***), lying above the *Chalcolithic alluvium*, and below two Bronze Age burnt mounds (Burnt Mounds 3 and 4; *pp 390-2*). This deposit continued into the retention pond area, where it was truncated by various Bronze Age features. Pedological analysis of layer ***70024*** indicated that it was a poorly humic, layered alluvium, with root channels and burrows, and traces of charcoal (*Appendix 19*).

Aside from providing details about the local sequence of Chalcolithic and Bronze Age flooding at Stainton West, the flood events also hold great significance for understanding the wider environment within the catchment of the River Eden. For instance, there is probably a correlation between these flood events and climate change, and/or anthropogenic clearance/deforestation/agriculture within the river catchment, particularly as cleared/farmed areas would allow for a greater input of sediment into local fluvial systems. As Tony Brown (2008, 13) succinctly comments, during a review of Bronze Age climate and the environment, 'whilst climate supplied the "power" it was Bronze Age agriculture that supplied the sediment'.

Given this, it may be significant that the dating of the *Chalcolithic alluvium* at Stainton West is similar to both the presumed wetter climatic phase, dating to the late third millennium BC (4.2 ka event; *p 365*), and episodes of sustained clearance in both the uplands and lowlands. As such, the existence of the *Chalcolithic alluvium* and the reactivation channels at Stainton West may provide an indication that both climatic change and increases in agriculture/clearance were having marked effects on those lowland areas adjacent to the River Eden. In contrast, the deposition of the *Bronze Age alluvium*, probably in the early part of the second millennium BC, does not seemingly relate to a climatic downturn, but instead to a period which may have been associated with a drier climate (*p 365*). Therefore, its presence may be related more to greater clearance, resulting in increased fluvial sediment input and, tellingly, its early second millennium BC date correlates well with apparent increases in agricultural activity in both the lowlands and uplands of the Solway area, as indicated by the pollen record (*p 365*).

The settled landscape

It was against this environmental backdrop that the Chalcolithic and Bronze Age communities of the inner Solway Firth inhabited a social landscape, which was conditioned by specific ideas, beliefs, and also advances and changes in technology. From an archaeological point of view, across the wider Solway area, the period began with the introduction of early Beaker pottery and also copper artefacts (Gregory 2002). The evidence for these early features, which form key components of 'Chalcolithic' culture (*c* 2450-2150 cal BC), is, however, fairly limited in the inner Solway Firth.

On the southern side of the Solway, this evidence includes a fair-sized collection of Chalcolithic pottery from New Cowper Quarry (Churchill 2017; Young 2017; Fig 166). This is classified as All-Over-Cord (AOC) Beaker ware, and, in northern Britain, it has been suggested that it probably dates to between the twenty-fifth and twenty-second century BC (Sheridan 2007c), overlapping with the end of the Late Neolithic Grooved Ware tradition (*Appendix 11*). It is also quite possible, based on stylistic affinities and recent DNA work, that some of these pots may have been associated with continental immigrants from the Lower Rhine area, with a Steppe-related ancestry (*cf* Olalde *et al* 2018; Booth 2019).

Interestingly, the vessels from New Cowper Quarry had been deposited within a cluster of pits, as well as an isolated pit, reminiscent of those from Cumbria and south-west Scotland containing Neolithic 'domestic' cultural material (*Ch 7, pp 210-11*). This seems to suggest that, in this instance, these new types of Chalcolithic pottery were incorporated into pre-existing depositional traditions (by indigenous Solway people?), which is confirmed, in some measure, by a fragment of Late Neolithic Grooved Ware vessel within one of the Beaker pits within the pit cluster. Significantly, this site also contained another cluster of pits associated with a slightly later style of Beaker pottery (classified as 'Clarke's (1970) Northern Series'; Young 2017). In this instance, however, they appear to have defined a Chalcolithic structure (*Ch 12, pp 439-40*).

In contrast, on the northern side of the inner Solway Firth, the evidence for Chalcolithic settlement is even more limited, being confined to a single fragment of AOC Beaker, which was discovered as a stray find at Newby Hill, Annan (Gregory 2002, 46). Although the context of this find is not clear, similar fragments of Beaker pottery have been retrieved during the excavation of a possible habitation site at Kirkburn, also in Annandale (Cormack 1963; Gregory 2002,

Figure 166: Chalcolithic-period find spots around the inner Solway Firth (Contains OS OpenData © Crown Copyright [and database right] (2022))

47), and so it is possible that it relates to a Chalcolithic settlement close to the mouth of the Annan. Indeed, the evidence from Kirkburn and Newby Hill may suggest that Annandale formed an important focus for settlement in the later third millennium BC, particularly as a copper flat axe was discovered in its upper reaches, which may date to *c* 2300 cal BC (Burgess and Schimdt 1981; Gregory 2002). This axe, or the copper it was made from, probably derived from Ireland (Burgess and Schimdt 1981), which may have been the main source area for copper used around the Solway during this period (*cf* ScARF 2012c, 96). This, along with the potential pottery derived from or inspired by the Lower Rhine area (*p 373*), appears to highlight that, during the

Chalcolithic period, the Solway was embedded within a wide exchange network, linking communities from the North Sea with those from the Irish Sea zone.

Following the initial introduction of these artefact-types, it is quite possible that, genetically, the population of the region was radically altered and, as such, the earlier Bronze Age was associated with a different 'type' of people. For example, DNA studies suggest that, following the arrival of the migrants from the Lower Rhine, around 90% of the British gene pool, originally dominated by Neolithic individuals with an Iberian ancestry, was replaced within a few hundred years by a population with a Steppe-related ancestry, who had skin and eye pigmentation similar to the majority of Britons today (Olalde *et al* 2018).

It may, therefore, be significant that following this possible genetic 'transformation' in the earlier Bronze Age, there is a notable increase in the volume of archaeological evidence within the inner Solway Firth. This evidence comprises recognisable sites and monuments, alongside datable types of bronze, ceramic, and stone. One noteworthy feature relates to the treatment and disposal of the dead, which forms a readily identifiable component of the archaeological record, particularly across the wider area of Cumbria and south-west Scotland (*cf* RCAHMS 1997; Gregory 2002; Barrowclough 2010). Within this region, the evidence includes various types of funerary sites and their associated artefacts, mainly comprising ceramic vessels that either accompanied the dead, or contained their cremated remains, and, in some instances, other associated items placed with these vessels, such as flint and bone artefacts, and bronze razors.

The funerary vessels initially used in the earlier Bronze Age included those that had been introduced in the Chalcolithic period, specifically Beakers, and these became increasingly popular between *c* 2150 cal BC and 1950 cal BC, before finally tailing off and disappearing in about 1700/1600 cal BC (Table 31). When used in a funerary context, these vessels were normally associated with inhumation burials, though some examples associated with cremations are known from Scotland (Needham 2005; Sheridan 2004). Food Vessels were another type of funerary vessel which had strong ties to the Beaker tradition, and their currency overlapped with the Beaker pottery. They appear to have been in use in approximately 2100-1500 cal BC, and might be associated with either inhumation or cremation burials (Needham 1996; Sheridan 2004).

The other major vessel types that were used to hold, or accompany, cremated remains are classified as Collared and Cordoned Urns, and these were often used in conjunction with smaller accessory vessels ('pygmy cups'), which were also sometimes placed within earlier Food Vessel burials (*cf* Sheridan 2004). Throughout northern Britain, Collared Urns were probably in use between *c* 2000 cal BC and 1600 cal BC, whilst the use of Cordoned Urns as funerary vessels appears to have been confined to the period 1800-1500 cal BC (Sheridan 2007b), after which time they seem to have been used primarily as domestic pottery by certain Bronze Age communities occupying Britain's western seaboard (*cf* Gregory and Brown forthcoming). 'Bucket Urns' form another later funerary ceramic type utilised in northern Britain, which were also used in domestic contexts, although prior to the excavations along the CNDR, none of these vessels were known from the inner Solway area (the nearest example being recovered from a Bronze Age barrow at Kerricks Farm, just north of Dumfries; Parry 2005; Fig 167). There are also problems with their identification and classification, although they were seemingly used between 1600 cal BC and 800 cal BC (Sheridan 2007b). Therefore, in terms of traditional chronological schemes, they form a component of the Middle and Late Bronze Ages (*ibid*). Nationally, these bucket-shaped vessels roughly correspond to the Deverel-Rimbury and post-Deverel-Rimbury pottery traditions of southern Britain (Needham 1996, 133).

Generally, earlier Bronze Age burials, and any associated artefacts, were either placed in pre-established monuments, such as Neolithic tombs, henges, and stone circles; within unenclosed (flat) and enclosed (ring-ditch and ring-bank) cemeteries; or were placed beneath round mounds composed of stone or earth (*cf* RCAHMS 1997; Barrowclough 2010; Quartermaine and Leech 2012). Evidence for earlier Bronze Age burial sites is present on both sides of the Solway, on the northern Solway coastal plain the known funerary sites being confined to round cairns/mounds, which survive as extant features, a single ring-ditch, visible as a cropmark, and also cist burials, and cinerary urn 'find spots' (Collared and Cordoned Urns; RCAHMS 1997; Gregory 2002). These latter urns may have originally been situated beneath a round cairn/mound, or were perhaps situated within an enclosed or unenclosed cemetery.

For instance, slightly further inland, in Annandale, two cemeteries associated with Bronze Age ceramics have been excavated, one of which, at Lockerbie Academy, was probably enclosed, whilst another at Kirkburn was unenclosed. That at Lockerbie Academy (Kirby 2011), dating to between *c* 2100 cal BC and 1700 cal BC, was probably enclosed by a ring cairn, surrounding a small knoll, and comprised one seemingly high-status central inhumation burial, a secondary inhumation burial, a possible cist, and three cremation burials, one of which was associated with a Collared Urn. Similarly, the unenclosed cemetery at Kirkburn was associated with a series of cremation burials, arranged around a central cist burial, which may have contained an inhumation (Cormack 1963). This cemetery site also produced

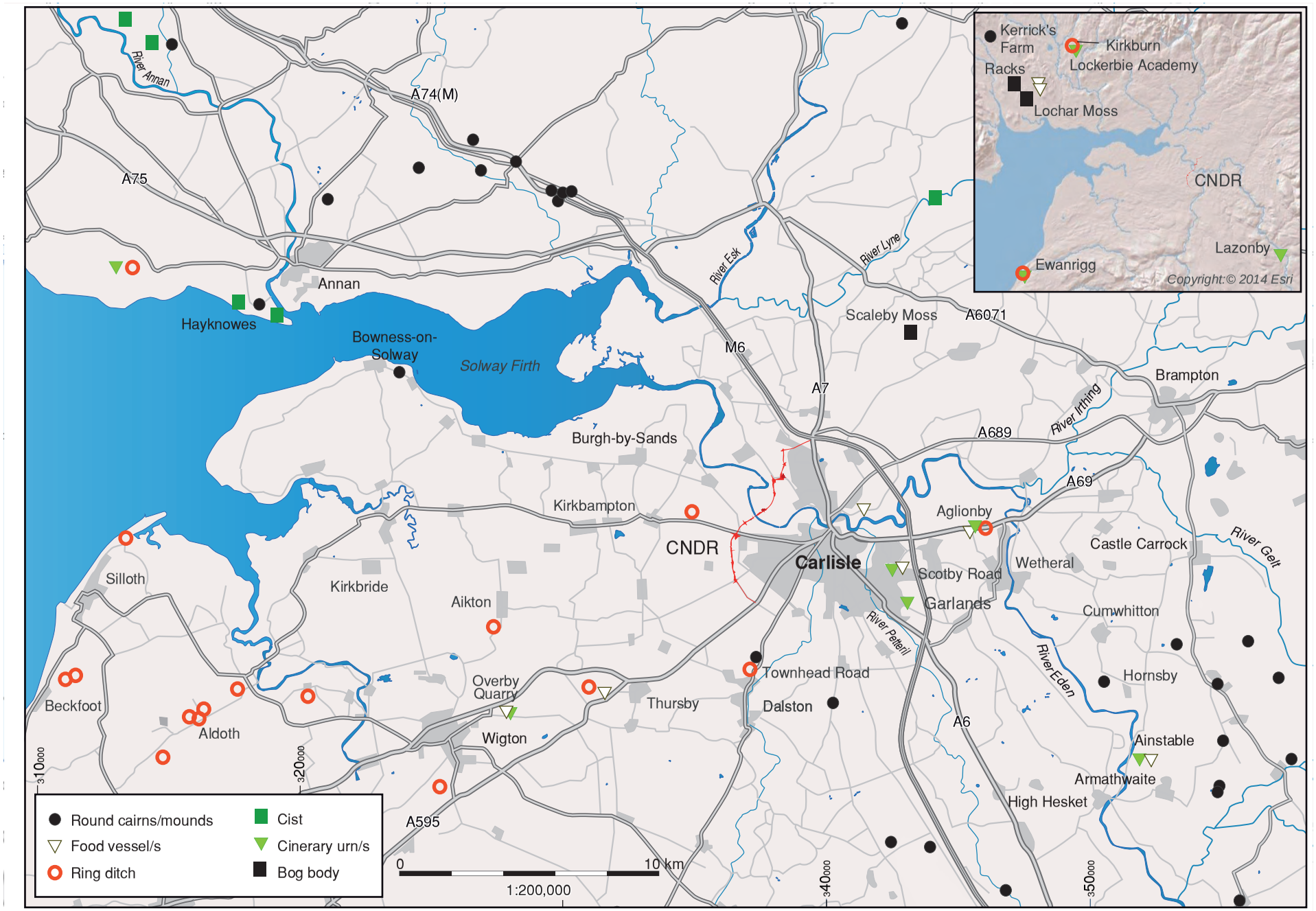


Figure 167: Earlier Bronze Age burial sites around the inner Solway Firth (Contains OS OpenData © Crown Copyright [and database right] (2022))

Food Vessels, as well as Collared and Cordoned Urns, and it shows strong similarities, in both the range of vessels and burial types, to the unenclosed Cumbrian cremation cemetery excavated at Ewanrigg, close to Maryport (Bewley *et al* 1992).

On the southern coastal plain, the evidence includes two possible round mounds and a scattering of ring-ditch sites, detected as cropmarks, largely along the Abbeytown ridge, which may again represent barrows or enclosed cemeteries (Higham and Jones 1975; Bewley 1994). Other round mounds/ring ditches have been identified in the lower reaches of the Eden Valley (Deegan 2017). Although some caution is required when interpreting these sites on their morphology alone, as they could relate to later periods of activity (for instance, at Hayknowes Farm, Annan, where a suspected prehistoric ring-ditch was discovered to be late medieval in date; Gregory 2001b; or those that represent Roman signal stations; *cf* Higham and Jones 1985, 44-51), a proportion were presumably earlier Bronze Age funerary sites. Indeed, excavation of one of the ring-ditches, at Aldoth, produced a central, cremation burial, contained in a Collared Urn (Bewley 1994, 62; 2001, 262).

In addition to the enclosed cemeteries, an unenclosed earlier Bronze Age example has been excavated on the Abbeytown ridge, at Overby Quarry, comprising eight partial or near-complete funerary vessels (including a Food Vessel Urn, Collared Urns, and a miniature Collared Urn), placed in pits, four of which were associated with cremated human remains (Jackson 2017b). A fifth cremation burial was associated with a smashed funerary vessel. It has been suggested that the vessels were deposited over two or three lifetimes and that the site was probably marked by one or more timber posts. A series of radiocarbon dates indicates that this cemetery was in use in the latter part of the third and early centuries of the second millennia cal BC (*ibid*).

Another earlier Bronze Age cemetery site on the southern side of the Solway was found at Garlands, close to Carlisle (Hodgson 1956). Although it is not clear whether this was enclosed or unenclosed, it was associated with a large collection of Collared Urns, accessory vessels, and Beaker ceramics, suggesting that it was established during the first quarter of the second millennium BC. Nearby, a pit excavated at Scotby Road also produced three earlier Bronze Age 'funerary' vessels, though there was no evidence for cremated human remains. These vessels were a Collared Urn or Food Vessel, a Food Vessel, and a small accessory vessel (Young 2016). In addition to these sites, two enlarged Food Vessels, one associated with cremated remains, were identified at Thursby, whilst Bronze Age ceramics, again associated with cremated remains, have been discovered within the lower reaches of the Eden and Gelt Valleys. These include a Food Vessel from Ainstable, and another, with five Collared Urns, from Aglionby (*cf* Fell 1967; Cowie 1978; Longworth 1984), and, slightly further up the Eden Valley, two probable Collared Urn cremation burials from Low Plains, Lazonby, which were associated with two unurned cremation burials (OA North 2005a; Fig 168). Significantly, these sites form elements of a wider concentration of Food Vessels, Beaker pottery, and earlier Bronze Age metalwork within the Eden Valley, suggesting that the area was fairly heavily settled during the earlier Bronze Age (Fell 1967; Clough 1968; 1969).

Reference should perhaps also be made to the Scaleby Moss bog body, which has been tentatively dated to the Bronze Age, 'based on the description of "dark peats" in which the body was found' (Hodgkinson *et al* 2000, 114; Turner 1988). Comparable bodies have been recovered from Lochar Moss and Racks Moss, to the south-east of Dumfries, at the far western end of the inner Solway Firth (Pickin 2004). Although the dates of these bodies are unknown, they at least suggest that this practice may have been relatively widespread, a theory confirmed by the discovery of numerous other bog bodies from south-west Scotland and Cumbria (*ibid*; Hodgkinson *et al* 2000).

Aside from burials, the other earlier Bronze Age sites known from the wider region include burnt mounds and settlements, which are often associated with houses (*p 380*), clearance cairns, and banked boundaries (*cf* RCAHMS 1997; Quartermaine and Leech 2012). However, in the inner Solway Firth area, small clearance cairns and associated boundaries are unknown, undoubtedly a result of later agricultural activity, which has decimated any upstanding remains. Indeed, it is only in the uplands fringing the Solway that these features survive, many of which date to the second millennium BC (RCAHMS 1997, 98-102; Quartermaine and Leech 2012). Similarly, prior to the work on the CNDR, burnt mounds were largely unknown in the coastal lowlands (Fig 169). Indeed, before 2008, only one definitive lowland burnt mound was known from the inner Solway area, at Garlands Hospital, close to Carlisle (Neighbour and Johnson 2005), which excavation indicates dated to the first half of the second millennium BC (*ibid*; *Ch 12*, *p 433*), whilst evidence for burnt-mound-related activity appears to be present at Cocklakes, to the south-east of Carlisle, dating to the later third and early second millennia BC (Giecco *et al* 2001; Johnson *et al* nd; *Ch 12*, *p 432*).

Prior to the CNDR, earlier Bronze Age settlement at the head of the Solway Firth was rather elusive, with only a small handful of sites being identified by excavation. In Cumbria, these included two possible open settlements at Carlisle Airport and the

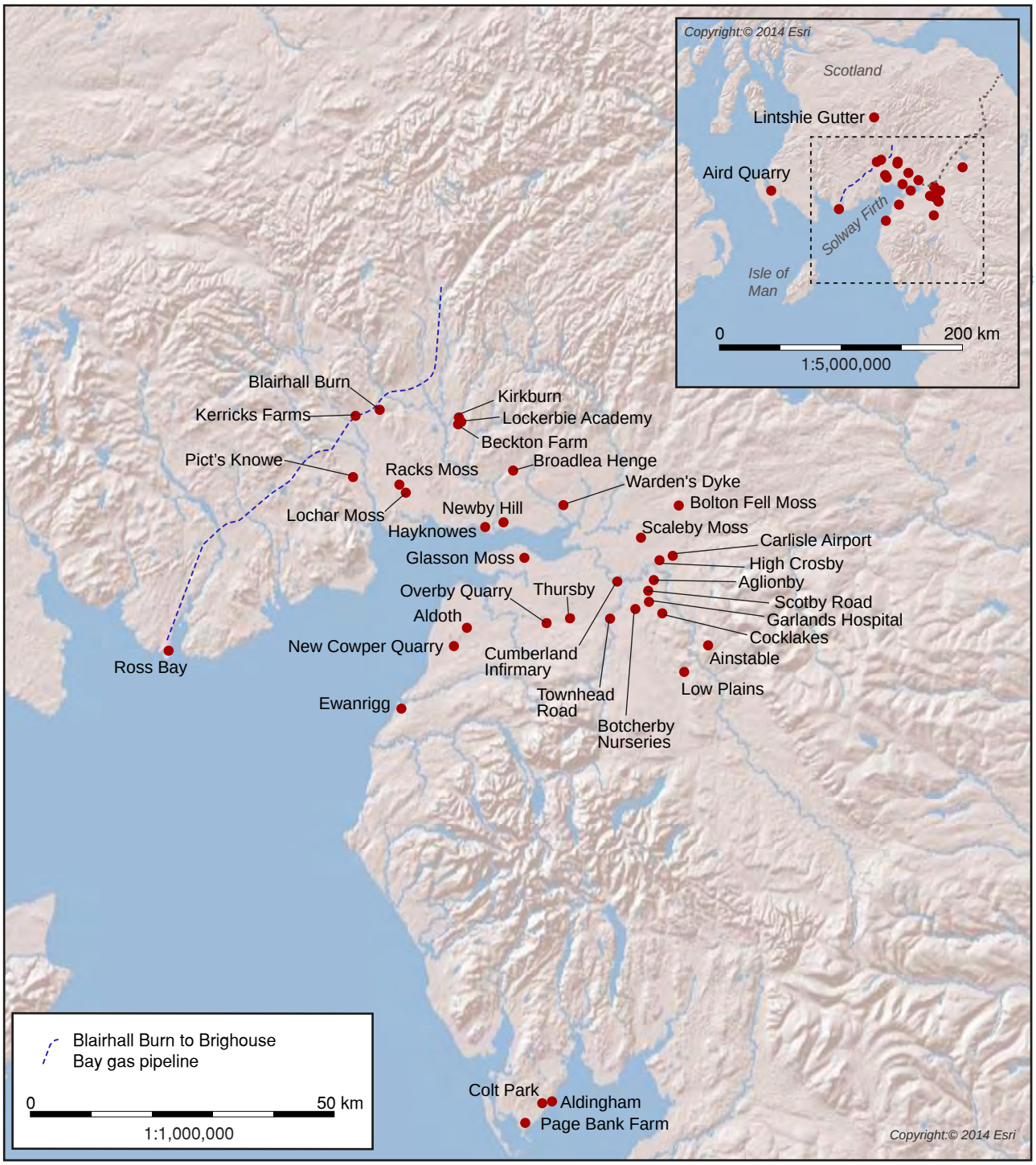


Figure 168: Chalcolithic and Bronze Age archaeological and pollen sites mentioned in the text

Cumberland Infirmary in Carlisle, which were both associated with earlier Bronze Age artefacts and timber structures, though at both sites the date of these remains has not been established (Flynn 1998; Reeves and Zant 2001) Another settlement may have been at Townhead Road, where a cluster of four pits was excavated, one of which was dated to the mid/late second millennium cal BC (Robinson and Town 2015). On the northern side of the Solway, the evidence is similarly limited, being confined to a scatter of pits, postholes, and stakeholes, potentially associated with a late third and early second millennia cal BC settlement area, at Warden's Dyke, close to Gretna (Banks 2004).

Little can therefore be concluded about earlier Bronze Age settlement in the inner Solway, though presumably its general character followed trends identified across the wider area of northern Britain (Pope 2015). If this was case, it is likely that, in the upland areas fringing the coastal plain, and also in some lowland areas, the earliest settlement types were 'unenclosed platform settlements', which, on

Figure 169: Earlier Bronze Age settlements and burnt mounds, and potential circular ceremonial sites, within the inner Solway Firth area (Contains OS OpenData © Crown Copyright [and database right] (2022))

the basis of an excavated example at Lintshie Gutter, Crawford, Lanarkshire, may have first appeared during the period 2500-2300 cal BC (Terry 1995), and continued to be created until the early eighth century BC (Pope 2015). These settlements are characterised by a terraced platform on which a circular or oval house was constructed, often using a stake-groove foundation trench in its design (*cf* Terry 1995), one such house being discovered at Blairhall Burn, north of Dumfries, which has been dated to 1700-1390 cal BC (3260±80 BP; Beta-73549; Strachan *et al* 1998).

Unenclosed 'ring-bank' structures formed another early house type, known from both the uplands and lowlands, which on current dating evidence appeared around 1800 cal BC and continued to be constructed until the Early Iron Age (Pope 2015). This is characterised by the use of a low, wide outer wall, which was built of stone and/or turf.

Other earlier Bronze Age unenclosed house types, 'post-built' and 'ring-groove' roundhouses, probably existed on both the Solway Plain and the adjacent uplands. It seems that the former first appeared after *c* 1800 cal BC, and was occupied throughout the Bronze Age; its superstructure was supported by either a single or double post-ring (*ibid*). In the Solway area, examples of this have been excavated at Blairhall Burn (Strachan *et al* 1998). In contrast, the ring-groove house type is characterised by a circular or oval foundation trench, supporting the outer wall. This may date from *c* 2000 cal BC and, on current evidence, was used up until *c* 1300 cal BC, though it reappeared as a house type during the later Bronze Age (*c* 900 cal BC; Pope 2015). In the Solway area, an example was excavated at Ross Bay, Kirkcudbright, which dates to *c* 1530-1250 cal BC (Ronan and Higgins 2005).

A further unenclosed house type, which has been identified during survey work in the uplands of Eastern Dumfriesshire (*cf* RCAHMS 1997, 119), is known as a 'ring-ditch' house (*cf* Hill 1982; 1984). These probably had turf walls, and the 'ring-ditch' was apparently formed by the stalling of animals inside the house. In chronological terms, these probably first appeared just after 1600 cal BC and continued until the Early Iron Age (Pope 2015).

It is also worth noting that particular classes of ritual monuments in northern Britain were probably constructed in the Chalcolithic period or earlier Bronze Age (*cf* Sheridan 2008). These seem to have included some of the Class II henges and other smaller circular or oval ceremonial enclosures, some of which may have been constructed in the late third or earlier second millennia BC (*ibid*; Last 2011; *Ch 7, pp 230-1*). In this context, it may be significant that a small (Class II) henge is known at Broadlea, on the northern Solway plain (Fig 169), which may have acted as an important ritual site during this time. Similarly, the small (Class I) henge at Pict's Knowe was perhaps constructed during this period, as radiocarbon dates spanning the latter part of the third millennium cal BC have been obtained from peat beneath the monument's bank, which provide a *terminus post quem* for the henge's construction (Thomas 2007b, 145).

Furthermore, it appears that some of the smaller stone and timber circles were constructed during the earlier Bronze Age (*ibid*), several in stone being known from the northern Solway Plain. In addition, one potential earlier Bronze Age timber circle has been excavated at Botcherby Nurseries, immediately east of Carlisle. This was defined by 21 post-pits, two of which contained flint flakes and possible Bronze Age pottery. It had a diameter of 9 m and contained a central pit that might have been associated with burnt human bone (Barkle 1998). Other ritual sites established in the Neolithic period probably continued to hold significance to the Chalcolithic and earlier Bronze Age communities of the Solway area. These included many of the Neolithic chambered tombs, the forecourts of which appear to have been blocked during this period, a process that was linked to the deposition of Beaker ceramics, and certain Neolithic circular ceremonial enclosures became the focus for later acts of ritual deposition (Gregory 2002). Given this, it is quite possible that the henge close to Stainton West (*Ch 10, p 323*) continued to exert a ritual influence during later periods. Indeed, its presence may partly explain the concentration of Chalcolithic and earlier Bronze Age features at the Stainton West site.

The other body of evidence relating to the earlier Bronze Age activity within the inner Solway Firth area comprises isolated artefacts, discovered either through programmes of fieldwalking, principally that associated with the English Heritage-funded North West Wetlands Survey (Hodgkinson *et al* 2000), or by chance, largely during agricultural operations or building work. These include both stone and bronze artefacts (Fig 170). The stone artefacts comprise various flint and chert tools, of recognisable Bronze Age forms, and also axe hammers. These latter objects were probably in use at a similar time to stone battle axes and, as such, may date to between 2000 cal BC and 1600 cal BC (Gregory 2002; Sheridan 2007b; Table 31). Significantly, they are fairly widely scattered across the inner Solway Firth area and may indicate that this was extensively occupied during the earlier Bronze Age.

The bronze artefacts indicate that the communities of the Solway area adopted this new technology from a fairly early date. This is evidenced through the presence of bronze flat axes, which, once introduced around 2200 cal BC, appear to have remained the

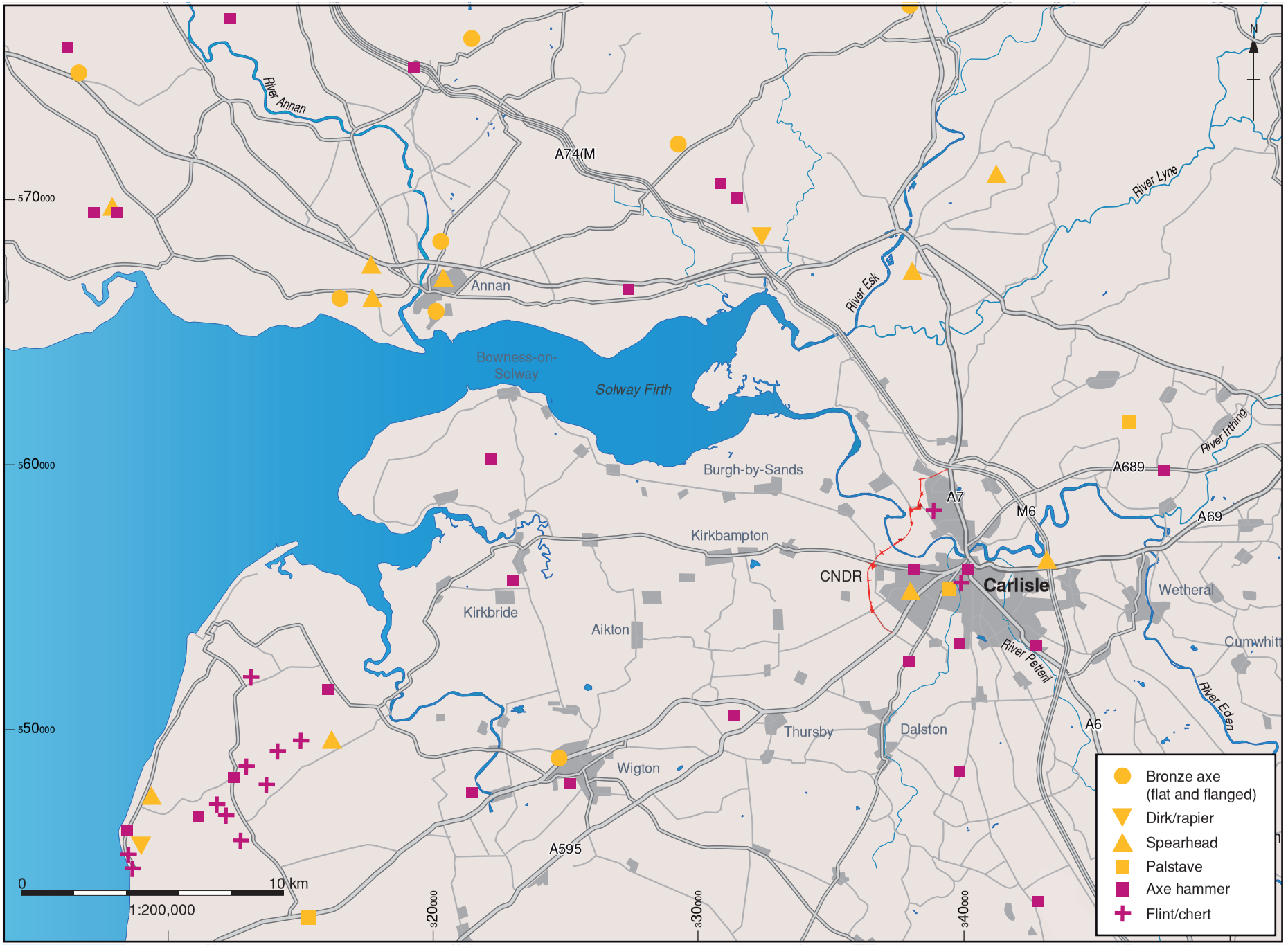


Figure 170: Earlier Bronze Age stone and bronze artefacts around the inner Solway Firth (Contains OS OpenData © Crown Copyright [and database right] (2022))

standard type of artefact in the area until about 1700 cal BC (Needham 1996; Gregory 2002). These axe types were used concurrently with bronze razors, normally associated with cremation burials, and were eventually superseded by flanged axes, which were used until the end of the earlier Bronze Age (Clough 1969; Gregory 2002). The adoption of this latter type of axe also broadly corresponds to a general increase, after 1700 cal BC, in other types of bronze tools and weapons throughout the region, including palstaves, halberds, dirks, and rapiers, spearheads, and some specific types of bronze daggers (Gregory 2002). Hoards of metalwork, deliberately deposited, often in wet environments, are another significant feature after *c* 1500 cal BC (*cf* Bradley 1998b). It is likely that these were ritually deposited (*ibid*), and it is also possible that many of the single bronze tools or weapons, as well as a proportion of the stone artefacts, were deliberately deposited with similar intentions in mind.

The various styles of earlier Bronze Age metalwork are slightly more numerous to the north of the Firth. For instance, the individual finds on the northern coastal plain consist of six bronze axes, seven spearheads, and one dirk/rapier, with a minor concentration of bronzes at the mouth of the River Annan. This contrasts somewhat with the quantities recovered from the southern Solway coastal plain, which include a single palstave, an axe, four spearheads, and a rapier (Bewley 1994).

Chalcolithic and Earlier Bronze Age Activity on the CNDR

Given the general absence of Chalcolithic and earlier Bronze Age settlement/activity within the inner Solway Firth area, the evidence from the CNDR is highly significant, in terms both of its presence and form. It can be broadly divided into two main groups. The first consists of an important sequence of burnt mounds, an associated structure, and a scattering of pits at Stainton West, whilst the second comprises direct evidence for settlement, in the form of Chalcolithic/earlier Bronze Age houses from other sections of the route. There are also several other features, which may also relate to earlier Bronze Age settlement activity and the early division of the landscape.

Burnt mounds and related activity at Stainton West

At Stainton West, there was clear evidence for Chalcolithic and earlier Bronze Age activity, which created several burnt mounds close to, and within, the palaeochannel on River Terrace 3 (Fig 162). It is quite possible that these features were established in this area because of the henge, which was *c* 150 m to the north-east, and they continued the tradition of burnt-mound activity that had been initiated close to this ceremonial monument in the Late Neolithic period (Burnt Mounds 1 and 5; *Ch 10*). In addition, although the palaeochannel had become largely filled with alluvium by this time, Terrace 3 appears to have been periodically flooded, as evidenced by the deposition of the *Chalcolithic alluvium* and the reactivation channels (*pp 367-8*), and later deposits of *Bronze Age alluvium* (*p 368*). Given this, the infilled channel probably still periodically contained water, which would have provided an ideal environment for activity leading to the creation of burnt mounds.

For instance, this water could have been easily removed and then poured into a trough, such as those regularly found within burnt mounds, which was either unlined, or lined with clay, timber planks, stone slabs, or hurdle panels (*cf* Cressey and Strachan 2003, 201-2). The water could then be boiled, by dropping heated stones into the trough, and once this process had been completed, the stones could be removed and dumped around the trough, along with other residues derived from the heating process. Repeated flooding of the terrace probably also meant that this location could only be visited at certain times of the year, when water levels had subsided, and that it was therefore only suited to more transient forms of occupation.

The direct evidence for burnt mound activity included several pits, presumably the remains of troughs, which were either covered by, or associated with, thin spreads of burnt material. Four burnt mounds (Burnt Mounds 2-4, and 6; Fig 171) were recognised on either side of the palaeochannel, in addition to the two earlier mounds (*Ch 10, p 344*), radiocarbon dating (Table 34; *Appendix 20*) indicating that they spanned the period *c* 2500-1500 cal BC. It also appears that these four burnt mounds were used consecutively, whilst individually they probably reflect short-lived activity, which involved periodically revisiting this locale. In addition, once created, burnt mounds might themselves become significant places in the landscape, which encouraged further activity (*Ch 10, p 345*).

The stratigraphic relationships of the layers of alluvium are highly significant, as these imply that Burnt Mound 2 was earlier than Burnt Mounds 3 and 4 (Table 32), which was confirmed by radiocarbon dating. They also suggest that the *Bronze Age alluvium* was deposited in the period between the last use of Burnt Mound 2 and the first use of Burnt Mound 4, the earliest to be established on this levée. Based on the results of the chronological modelling, this therefore places its deposition at some point between *2140-1980 cal BC* (*Last Burnt Mound 2*) and *1880-1630 cal BC* (*'Burnt Mound 4'*). Burnt Mounds 3 and 4 were also covered by alluvial deposits, which, given the date of these features, must post-date the mid-second

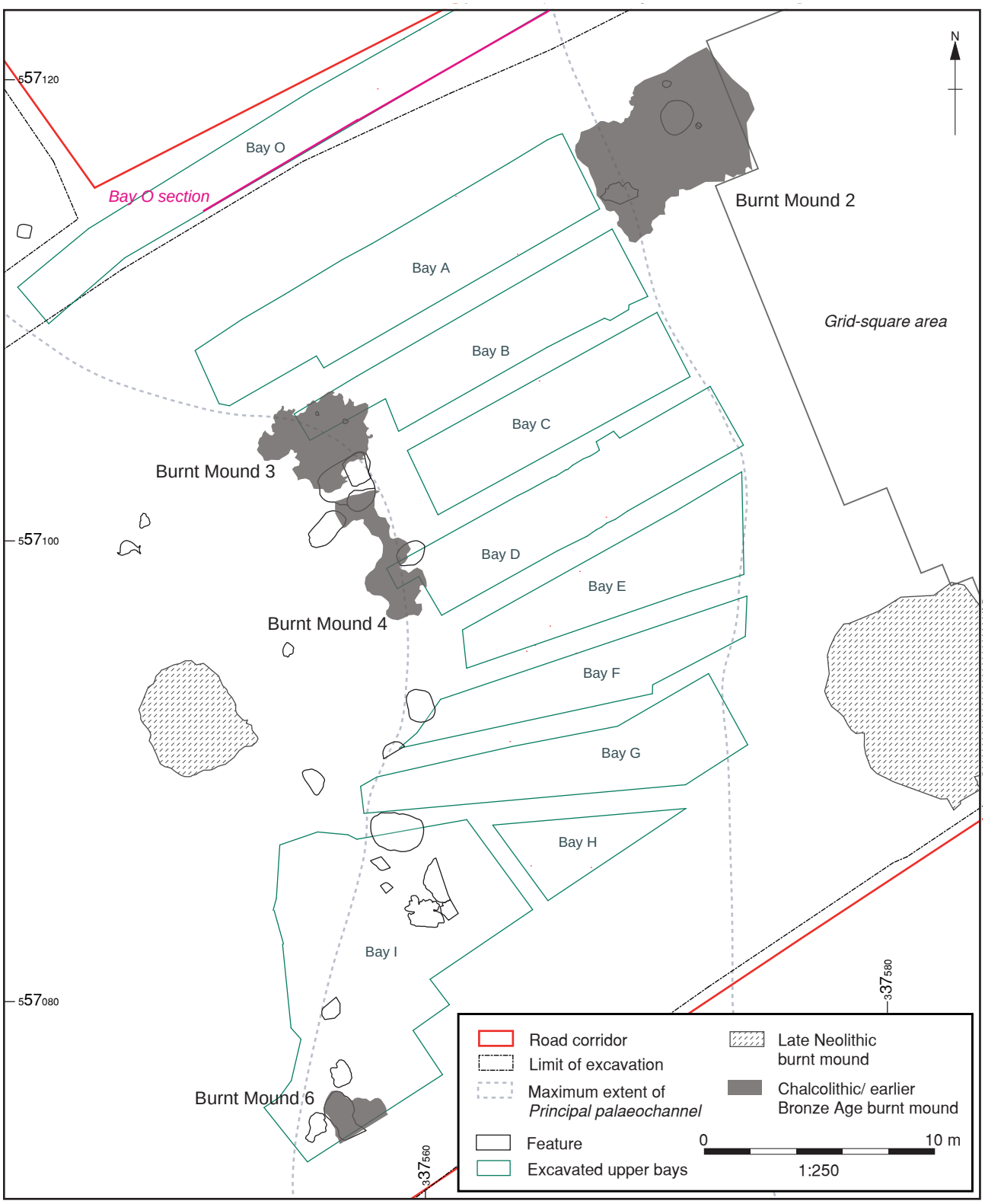


Figure 171: Chalcolithic and earlier Bronze Age burnt mounds at Stainton West

millennium BC. Indeed, it is possible that these were broadly contemporary with those later deposits of alluvium present on the eastern side of the channel in the area of Bay O (*Bronze Age/Iron Age alluvium; p 373*). If so, this would also indicate that land surface ***70486*** (*p 371*) was contemporary with Burnt Mounds 3 and 4.

The earliest of the Chalcolithic/earlier Bronze Age features (Fig 172), Burnt Mound 6, was at the southern end of the site (in Bay I) and was contained within the *Principal palaeochannel* (Pl 144) created by the later Neolithic watercourse, which presumably did not contain standing water when this burnt mound was created.

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Principal palaeochannel Bay I	Trough ***70250*** (fill ***70398***)	Part of Burnt Mound *6* Burnt mound lies above *Late Neolithic organic deposit* and sealed by *Chalcolithic alluvium*	Monolith 70303	8.55-6	SUERC-42017	Charred hazelnut (*Corylus avellana*)	3891±26	-29.3	2470-2290	Statistically consistent with a good agreement (T'=1.25; $T'(5\%)$=3.8; v=1; A_{comb}= 99.7% (An= 50.0%))	*2480-2340*
					SUERC-42016	Sediment	3935±26	-29.7	2560-2330		-
Dryland area east of palaeochannel	Trough ***70282*** (fill ***70284***)	Part of Burnt Mound 2 Element of earlier Bronze Age activity Sealed by *Bronze Age alluvium*	Bulk-sample 70199		SUERC-32714	Alder/hazel (*Alnus*/*Corylus*) charcoal	3720±35	-27.1	2280-1980	Statistically consistent with a good agreement (T'=0.15; $T'(5\%)$=3.8; v=1; A_{comb}= 97.2% (An= 50.0%))	*2150-2020*
					SUERC-42015	Blackthorn-type (*Prunus* sp) charcoal	3703±23	-24.1	2200-2025		*2140-2020*
Dryland area west of palaeochannel	Trough ***70348*** (fill ***70377***)	Part of Burnt Mound 4 Element of earlier Bronze Age activity	Bulk-sample 70455		SUERC-32716	Alder/hazel (*Alnus*/*Corylus*) charcoal	3430±35	-28.1	1880-1640	-	*1880-1630*

Table 34: Bronze Age radiocarbon dates from Stainton West

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Dryland area west of palaeochannel	Trough ***70348*** (fill ***70377***)	Burnt mound 4 established on a levée of *Bronze Age alluvium*. Associated deposits sealed the *Chalcolithic alluvium* Burnt mound sealed by *Bronze Age/Iron Age alluvium*	Bulk-sample 70455		SUERC-32716	Alder/hazel (*Alnus/ Corylus*) charcoal	3430±35	-28.1	1880-1640	-	*1880-1630*
	Trough ***70280*** (fill ***70289***)	Part of Burnt Mound 3 Element of earlier Bronze Age activity Burnt mound partly established on a levée of alluvium (*Bronze Age alluvium*) and above the *Chalcolithic alluvium* Burnt mound sealed by *Bronze Age/Iron Age alluvium*	Bulk-sample 70206		SUERC-32715	Alder/hazel (*Alnus/ Corylus*) charcoal	3270±35	-26.8	1630-1450	Statistically consistent with a good agreement (T'=4.89; $T'(5\%)$=7.8; ν=3; A_{comb}= 66.3% (An= 50.0%))	*1620-1500*
					SUERC-42006	Alder/hazel (*Alnus/ Corylus*) charcoal	3324±26	-27.1	1690-1520		*1640-1510*
	Trough ***70028*** (fill ***70332***)		Bulk-sample 70248		SUERC-42010	Alder (*Alnus glutinosa*) charcoal	3297±26	-28.1	1640-1500		*1620-1510*
					SUERC-42014	Hawthorn-type (Maloideae) charcoal	3240±26	-25.6	1610-1440		*1620-1460*

Table 34: Bronze Age radiocarbon dates from Stainton West (cont'd)

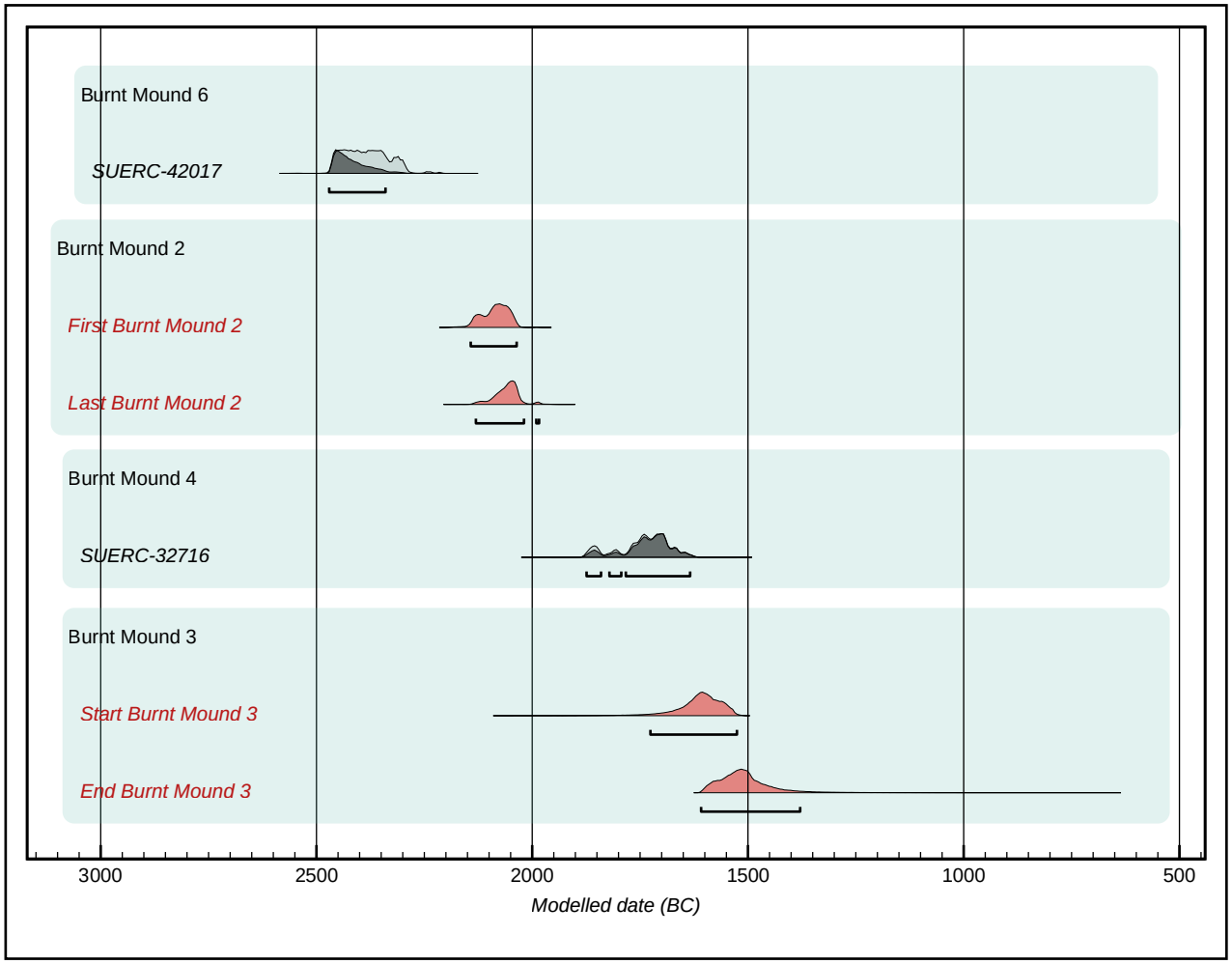


Figure 172: Posterior density estimates for the Chalcolithic and Bronze Age burnt mounds at Stainton West

It had been established directly above deposits (***70349*** and ***70397***) dated to the Neolithic period, and, although its complete extent was not exposed, it appeared to have been defined by a shallow hollow (***70250***; Fig 173), *c* 2 x 1.3 m, presumably the base of a trough. Significantly, in one small area, the remains of *in-situ* wattling were present, suggesting that it had originally been lined with hurdle panelling.

Following its final use, a deposit of rounded and fire-cracked stone (***70247***), set within a dark silty-clay (***70398***), entered the trough. This material also produced a grey flint all-round scraper, which was probably contemporary with the use of the burnt mound (*Appendix 5*). Soil ***70398*** also contained numerous insect and waterlogged plant remains, and presumably some of the wood had originally formed part of its hurdle lining. Overlying this was a thin and discrete layer of the *Chalcolithic alluvium* (***70395***), also present in other parts of the *Principal palaeochannel*, which again contained frequent insect and waterlogged plant remains. The flood event associated with its deposition may have directly resulted in the abandonment of this burnt mound.

Plate 144: Burnt Mound 6, looking south-west

Sediment and a charred hazelnut from deposit ***70398*** returned two statistically consistent dates of 2570-2310

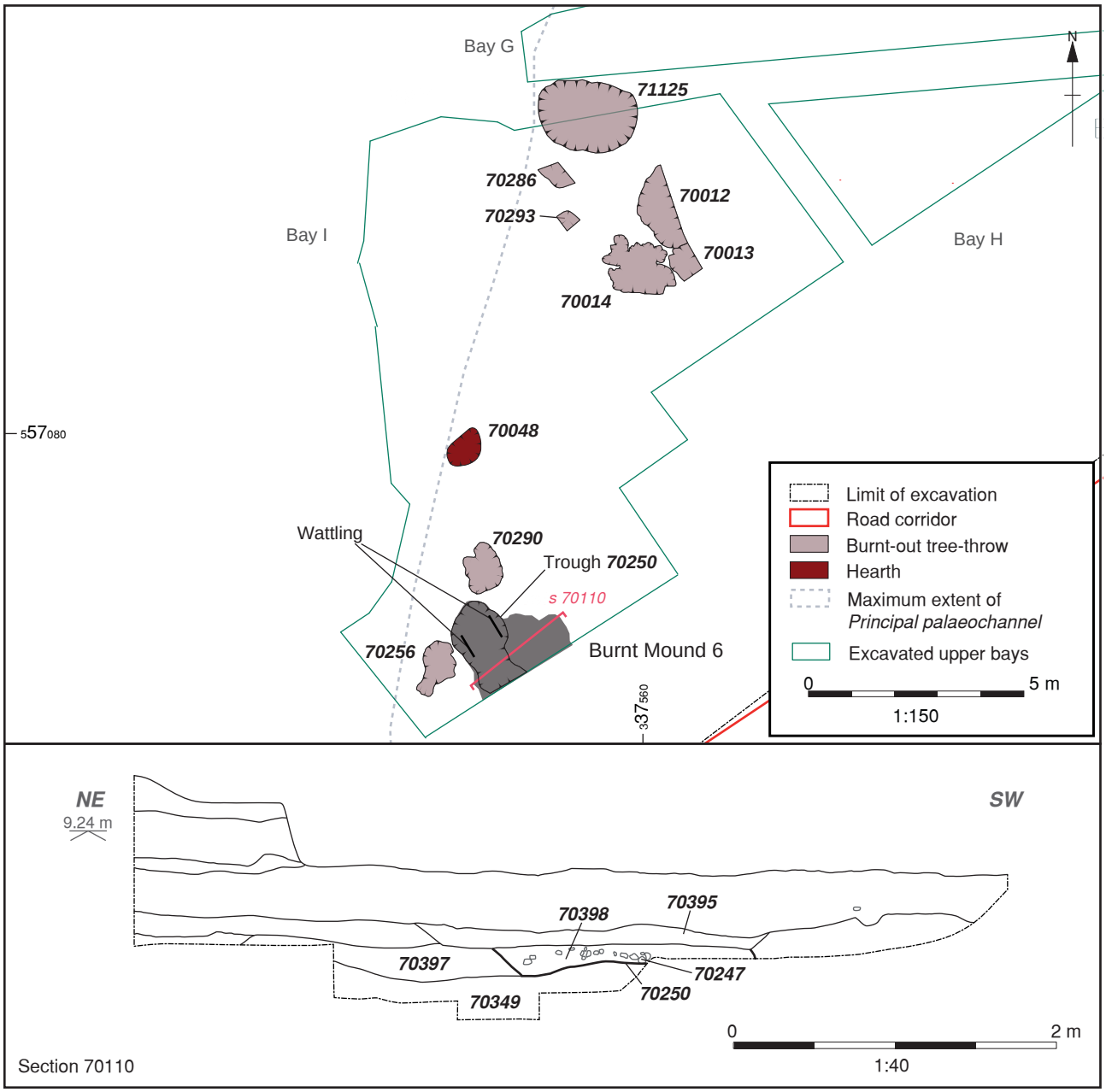


Figure 173: Burnt Mound 6 and contemporary burnt-out tree-throws and hearth

cal BC (3935±26 BP; SUERC-42016) and 2470-2290 cal BC (3891±26 BP; SUERC-42017) respectively. The chronological model (*Ch 1, pp 30-1*) suggests that Burnt Mound 6 was in use in *2480-2340 cal BC* (Fig 172).

Several other features within the *Principal palaeochannel* might have been contemporary with Burnt Mound 6 on stratigraphical grounds. These included two burnt features (***70256*** and ***70290***), immediately next to the mound, which may have contained trees that had been felled or uprooted as part of the activities associated with the creation of the feature. Immediately to the north was a small hearth (***70048***), that may have been used to heat the stones for the trough. To the north-east was a group of burnt-out tree-throws (***70012-14***, ***71125***, ***70286***, and ***70293***) which may, again, have contained trees that were removed when Burnt Mound 6 was in use.

The next mound to be established was Burnt Mound 2, at the northern end of the site, immediately east of the palaeochannel (Fig 171); its western edge partly sealed deposits of *Chalcolithic alluvium* contained within the channel. The mound also lay above another alluvial deposit forming an element of the *Mesolithic overbank alluvium*, to the east of the palaeochannel, and also a tree bole (***70287***; Fig 174), which intruded into the underlying alluvium. The mound itself was defined by a thin spread of small- to medium-sized fractured burnt stone, set within a charcoal-rich soil (***70192***; Pl 145). This covered a rectangular area of some 8.3 x 5.6 m and was associated with a small

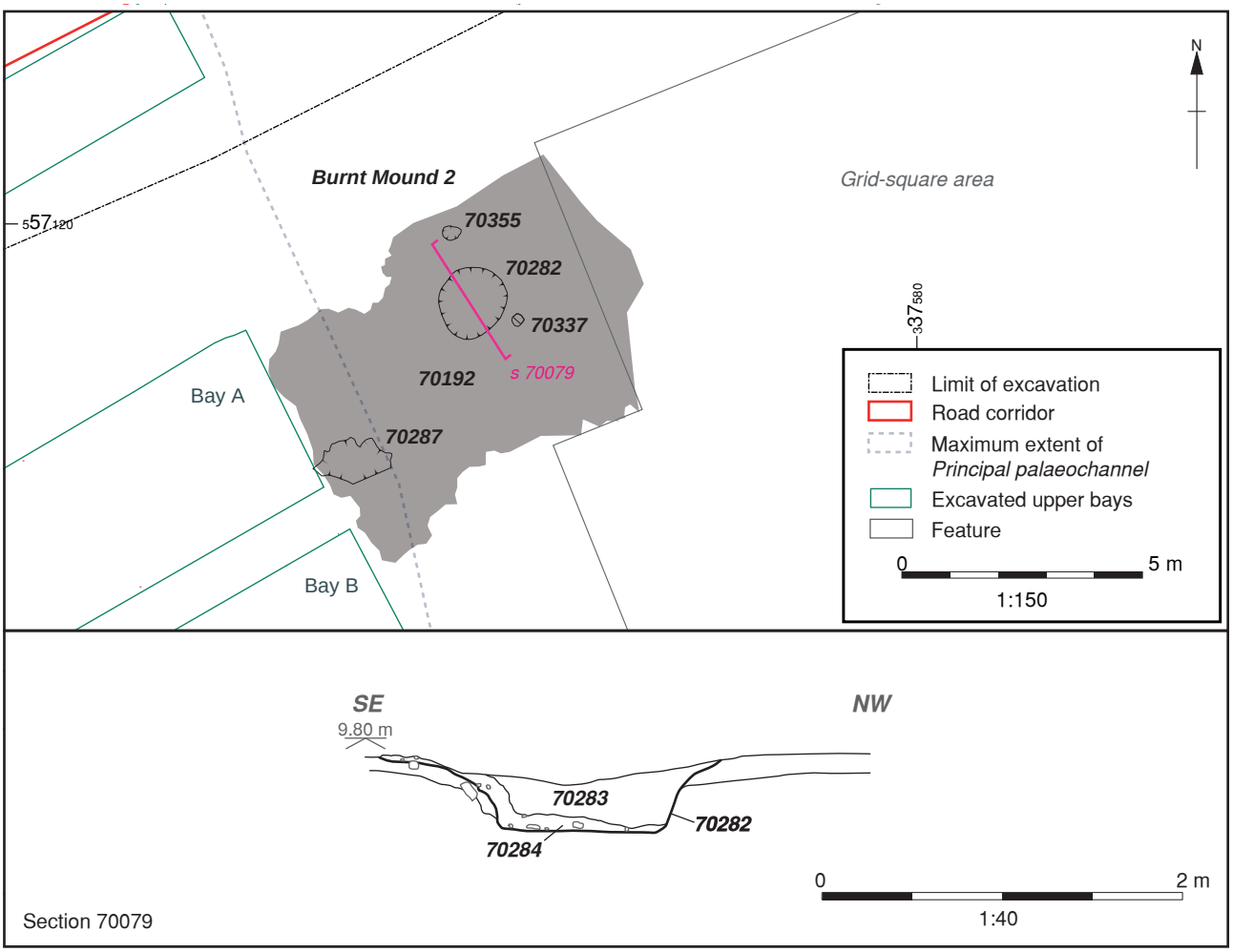


Figure 174: Burnt Mound 2

Plate 145: Trough **70287**, *and the remaining elements of the overlying burnt spread, Burnt Mound 2, following partial excavation*

residual assemblage of Late Mesolithic lithics from the Mesolithic encampment (*Ch 4*). As with Late Neolithic Burnt Mound 1 (*Ch 10, p 345*), the small size of some of the stones may suggest that they had been repeatedly subjected to heating and dousing, implying this burnt mound was, perhaps, repeatedly used over a considerable period of time. The percentage of charcoal within the material forming the mound was also comparatively high (*c* 50%), suggesting that the hearths used to heat the stone may have originally lain within the area covered by the mound. The charcoal was overwhelmingly dominated by alder/hazel, but with a little oak, ash, hawthorn-type, and blackthorn-type (*Appendix 18*). Heather pollen was also recorded (*Appendix 16*), and it may be that this plant was deliberately brought to Stainton West.

Beneath the spread, a circular, flat-bottomed, pit (***70282***), with steep sides, created a trough (Pl 146), with a diameter of *c* 1.4 m and a depth of 0.3 m. This contained two fills (***70284*** and ***70283***), composed of heat-affected stone, charcoal, and burnt clay comparable to that defining the covering mound, and they also contained residual Late Mesolithic flaked

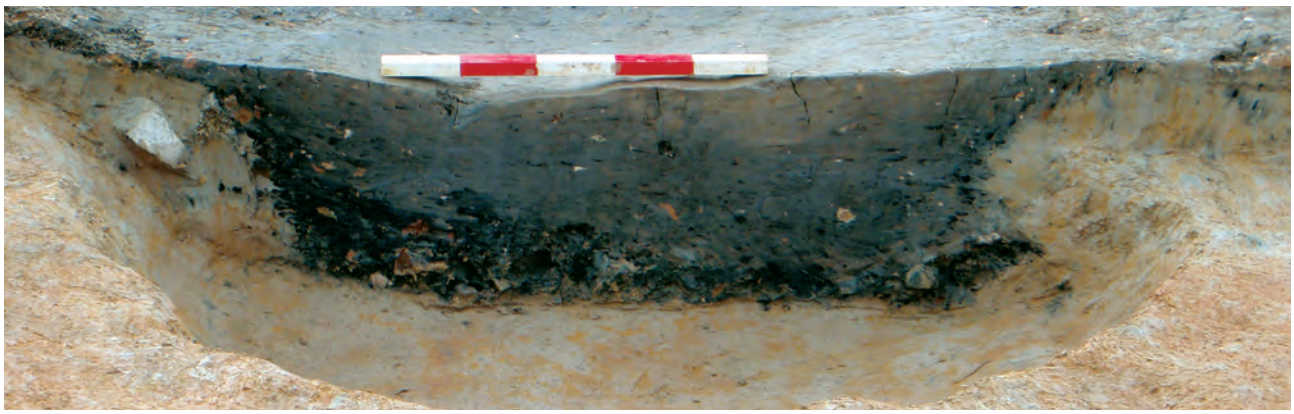


Plate 146: Trough **70287**, *Burnt Mound 2, following half-sectioning, looking west*

lithics. This suggested that the trough had filled with burnt-mound material, following its final use, analysis of the soil micromorphology suggesting that the upper fill (***70283***) may have entered the trough as a result of flooding (*Appendix 19*). The charcoal from these two fills again largely derived from alder/hazel, with small amounts of oak, ash, hawthorn-type, and blackthorn-type (*Appendix 18*). The blackthorn-type charcoal from the lower fill (***70284***) was identified as being from wild or bird cherry.

Fragments of alder/hazel and blackthorn-type charcoal from the lower fill (***70284***) returned statistically consistent dates of 2280-1980 cal BC (3720±35 BP; SUERC-32714) and 2200-2025 cal BC (3703±23 BP; SUERC-42015) respectively (Table 34). When these were integrated into the Stainton West chronological model (*Ch 1, pp 30-1*), it appeared that Burnt Mound 2 was used first in *2150-2030 cal BC* (*First Burnt Mound 2*) and last in *2140-1980 cal BC* (*Last Burnt Mound 2*; Fig 172), for a period of *0-90 years* (*Appendix 20*).

Two postholes (***70355*** and ***70337***) were also present beneath the mound (Pl 147). They were both *c* 0.2 m deep, had diameters in the region of 0.25 m, and appear to have formed part of a small structure, with a span of 2.3 m, erected above the trough. Soil analyses indicate that, following the abandonment

Plate 147: Trough **70287**, *Burnt Mound 2, following half-sectioning, and excavated postholes* **70355** *and* **70337**, *looking south-west*

of the mound, trees began to grow across this part of the site (*Appendix 19*). At a later date, perhaps at the end of the second millennium BC, this area was again flooded and the mound was covered by a deposit of *Bronze Age alluvium* (*p 368*).

The next mound to be established as part of the Chalcolithic/Bronze Age sequence of activity was Burnt Mound 4, on the western side of the channel (Fig 171), on a mound, or levée, of *Bronze Age alluvium* (***70024/70083/70035***; *p 368*). This alluvium was deposited during an extreme flood event and it also covered Burnt Mound 2 (*p 382*), clearly indicating that, stratigraphically, Burnt Mound 4 was a later feature. It was defined by a triangular spread of burnt and fire-cracked stone, set within a charcoal-rich soil (Pl 148), which was associated with a small collection of residual Late Mesolithic lithics. Immediately next to the channel, this thin spread covered an area of *c* 5.2 x 5.1 m (Fig 175), though parts of the mound had slumped down into the *Principal palaeochannel*, and these deposits (***70343***) partly sealed the *Chalcolithic alluvium* contained within. In this part of the channel, this deposit appears to have remained exposed, as it was effectively protected from becoming covered with later alluvial deposits by virtue of the adjacent levée (*p 371*). The mound comprised small- to medium-sized fragments of burnt stone, suggestive of stones that had been repeatedly reheated, set within a charcoal-rich soil. However, the north-western portion of the mound contained markedly more stone (*c* 90%), suggesting that most of the burnt material had been dumped in this area, following its use.

Significantly, this mound covered several other features. At its south-western end, these included

Plate 148: The spread of burnt stone and charcoal-rich soil defining Burnt Mound 4, prior to excavation, looking south-east

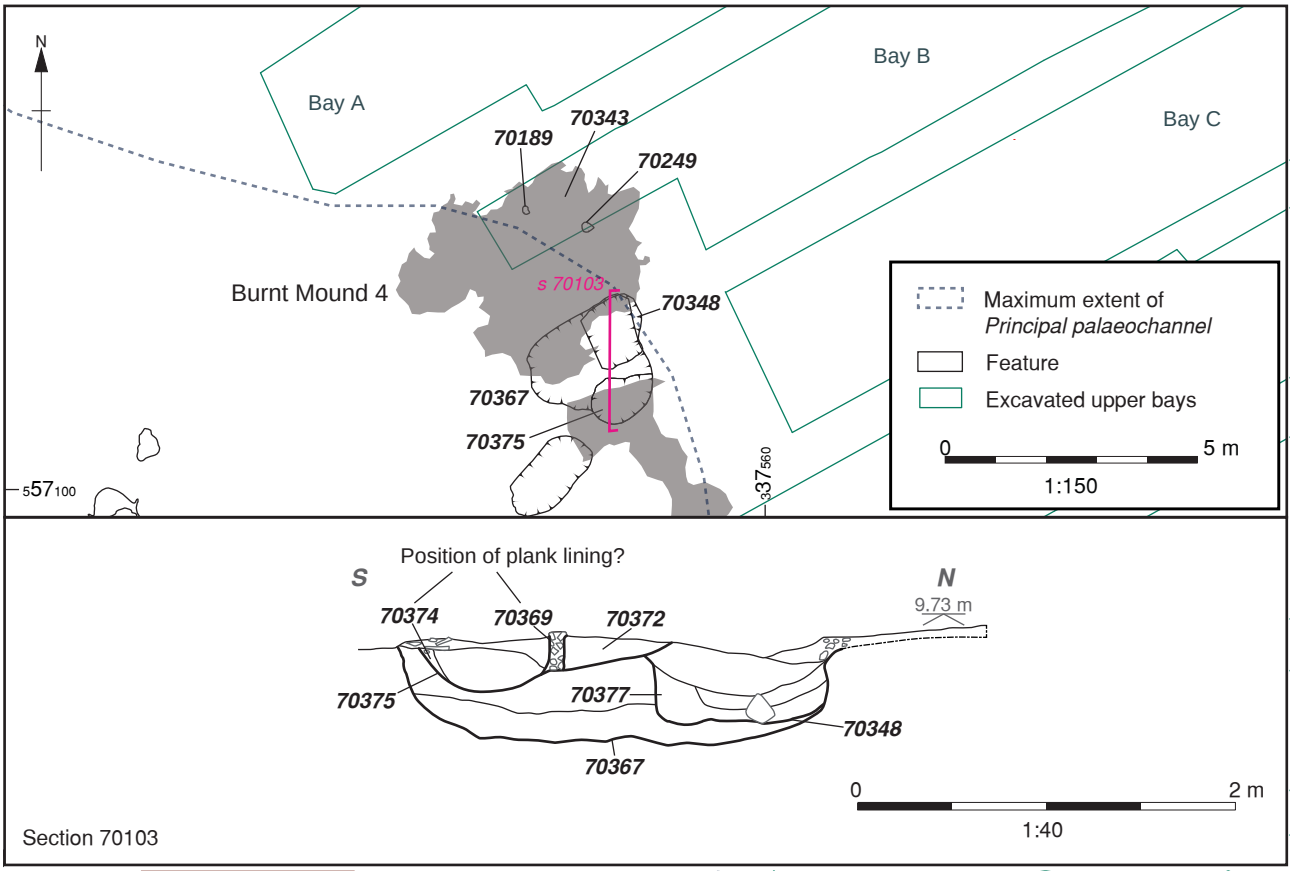


Figure 175: Burnt Mound 4

a large irregular-shaped pit (***70367***), with an approximate diameter of 2.5 m and a depth of *c* 0.5 m, which contained two separate fills. These were not associated with burnt material, suggesting that it pre-dated activity associated with the creation of the burnt mound. These fills did, however, contain a small assemblage of Late Mesolithic lithics, including 17 flint/chert flakes and a fragment of flaked tuff. Based on its size and irregular form, one possibility is that the pit was a tree-throw, marking the position of a fairly substantial tree next to the *Principal palaeochannel*, which may have been deliberately 'grubbed out' as part of the initial phases of burnt mound-related activity on this side of the palaeochannel. Alternatively, it might have fallen naturally, perhaps during an extreme flooding event, as analysis of the soil micromorphology suggested that its upper fill was deposited as a result of such activity (*Appendix 19*). In any event, its stratigraphic position clearly indicates that it was a feature dating to the early second millennium BC.

Following the filling of putative tree-throw ***70367***, a sub-rectangular pit (***70348***) was dug through its fills; this was *c* 2.2 x 0.9 m, and *c* 0.4 m deep (Pl 149). It had near-vertical sides, a flat bottom, and formed a primary trough. It contained clay, burnt stone, and charcoal, comparable to the material defining the overlying burnt mound. Analysis of the charcoal (*Appendix 18*) indicates that this was dominated by alder/hazel, with rarer occurrences of hawthorn-type, blackthorn-type, and oak; a fragment of alder/hazel charcoal from the lower fill (***70377***) was subjected to radiocarbon assay (*SUERC-32716*), providing an estimate of *1880-1630 cal BC* for the use of the mound (Table 34). Micromorphological analysis (*Appendix 19*) of the soils contained within this trough also indicated that, once the fills had been deposited within it, they were subjected to waterlogging, probably through repeated flooding of this area. This may imply that it could only have been used periodically, perhaps on a seasonal basis.

Once completely filled, pit ***70348*** was partly cut by another pit (***70375***), which created a secondary trough. This measured 1.8 x 1.4 m, containing, at the sides, two deposits of clay and burnt stone (***70369*** and ***70374***), one of which (***70374***) also contained a fragment of flaked quartz. It is likely that these deposits had entered the voids created by the removal of the planks that had originally lined the trough. If this was the case, the trough was *c* 0.6 m across and *c* 0.25 m deep, and had been backed on its northern side by a dump of clay (***70372***), associated with residual flint and chert flakes, and a narrow flint blade. Once the lining had been removed, it appears that the trough was deliberately filled with soil, containing several residual chert and flint flakes, and a chert blade. However, this material probably came from an area that was some distance from the burnt mound, as it did not contain any burnt or fire-cracked stones, which may suggest that, in some instances, it was only permissible to use certain types of materials to 'decommission' such a mound.

Apart from these two troughs, two other features may also have been associated with contemporary burnt-mound activity in this area. These were either beneath, or had been inserted through, the north-western sector of the burnt mound, and comprised a stakehole (***70189***) and posthole (***70249***), the latter containing a chert platform core. They were spaced

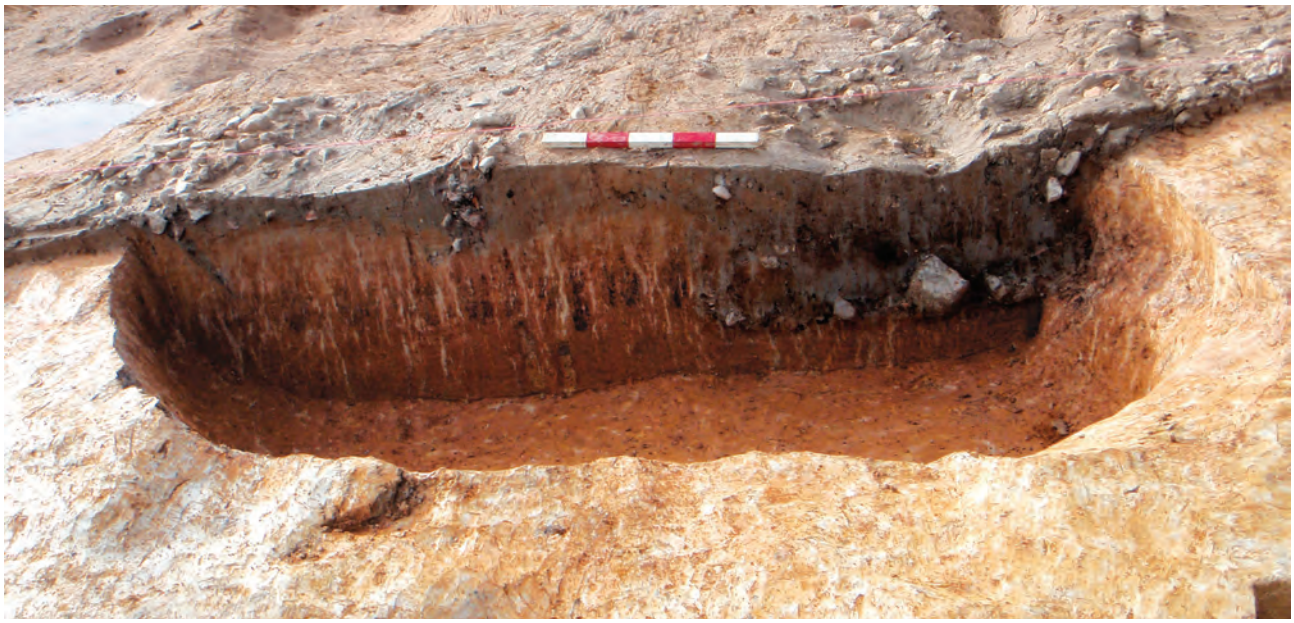


Plate 149: Troughs **70348** *(right) and* ***70375*** *(left), Burnt Mound 4, cut into infilled tree-throw* **70367**, *looking south-west*

Plate 150: Stakehole **70189** *and posthole* **70249**, *looking south-east*

c 1.2 m apart and probably related to a fairly ephemeral structure (Pl 150).

The last burnt mound in the sequence, Burnt Mound 3 (Fig 176), was immediately south-east of Burnt Mound 4, and also on the same mound, or levée, of *Bronze Age alluvium* (***70024***/***70083***/***70035***; *p 368*); it was also partly above a deposit of *Chalcolithic alluvium* (***70299***). In contrast to the others, the defining spread of burnt stone, within a charcoal-rich soil, had been heavily eroded (Pl 151). In consequence, only small portions of the original mound were present, covering an area with maximum dimensions of 5 x 2.2 m; again, as with the other burnt-mounds, the character of the stone suggested that, once acquired, it had been repeatedly heated. A small assemblage of lithics from this eroded spread comprised two flint flakes and a single chert blade, which were probably residual. The spread was associated with two pits (***70028*** and ***70280***), presumably to hold, or act as, troughs.

The easternmost (***70280***) was oval, *c* 1.2 x 0.9 m, with fairly steep sides and a slightly undulating base, and was *c* 0.3 m deep. It contained two fills, both containing burnt stone and charcoal, similar in character to the material defining the eroded mound. Two fragments of alder/hazel charcoal from the lower fill (***70289***) returned dates of 1630-1450 cal BC (3270±35 BP; SUERC-32715) and 1690-1520 cal BC (3324±26 BP; SUERC-42006).

The second pit (***70028***) was to the north-west, some 2.7 m distant, and had a sub-rectangular shape, measuring *c* 1.9 x 1 m. It had sharply sloping sides, was *c* 0.3 m deep, and contained five successive fills. It is notable that the primary clay fill (***70334***) did not contain any burnt material, and also few inclusions, suggesting that it acted as a lining to the trough. This was confirmed by a section excavated across the pit, which indicated that it had been used to create a near-vertical face at the south-western end. In contrast, the other fills were all associated with burnt material, and also contained lithics, probably residual, including flint, chert, and tuff flakes, two flint blades, and a chert blade. Two fragments of charcoal from fill ***70332*** returned dates of 1640-1500 cal BC (3297±26 BP; SUERC-42010) and 1610-1430 cal BC (3240±26 BP; SUERC-42014). These were statistically consistent with those from pit ***70280*** (Table 34), and the chronological model (*Ch 1, pp 30-1*) suggests that this burnt mound was first used in *1740-1520 cal BC* (*Start Burnt Mound 3*), with its last use in *1610-1380 cal BC* (*End Burnt Mound 3*), over a period of *0-130 years* (Fig 172; *Appendix 20*).

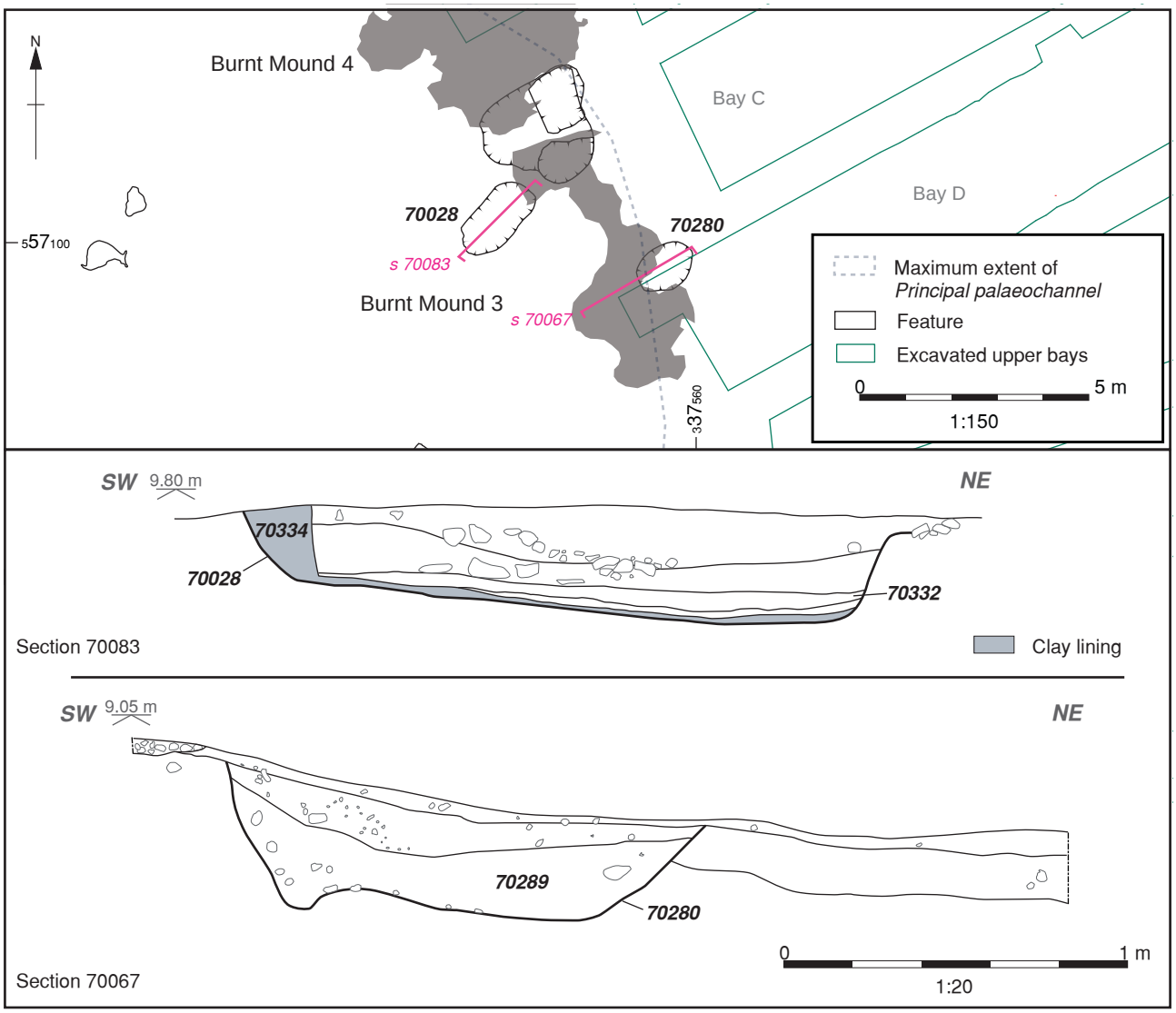


Figure 176: Burnt Mound 3

Plate 151: Burnt Mound 3, following partial excavation, looking south-west

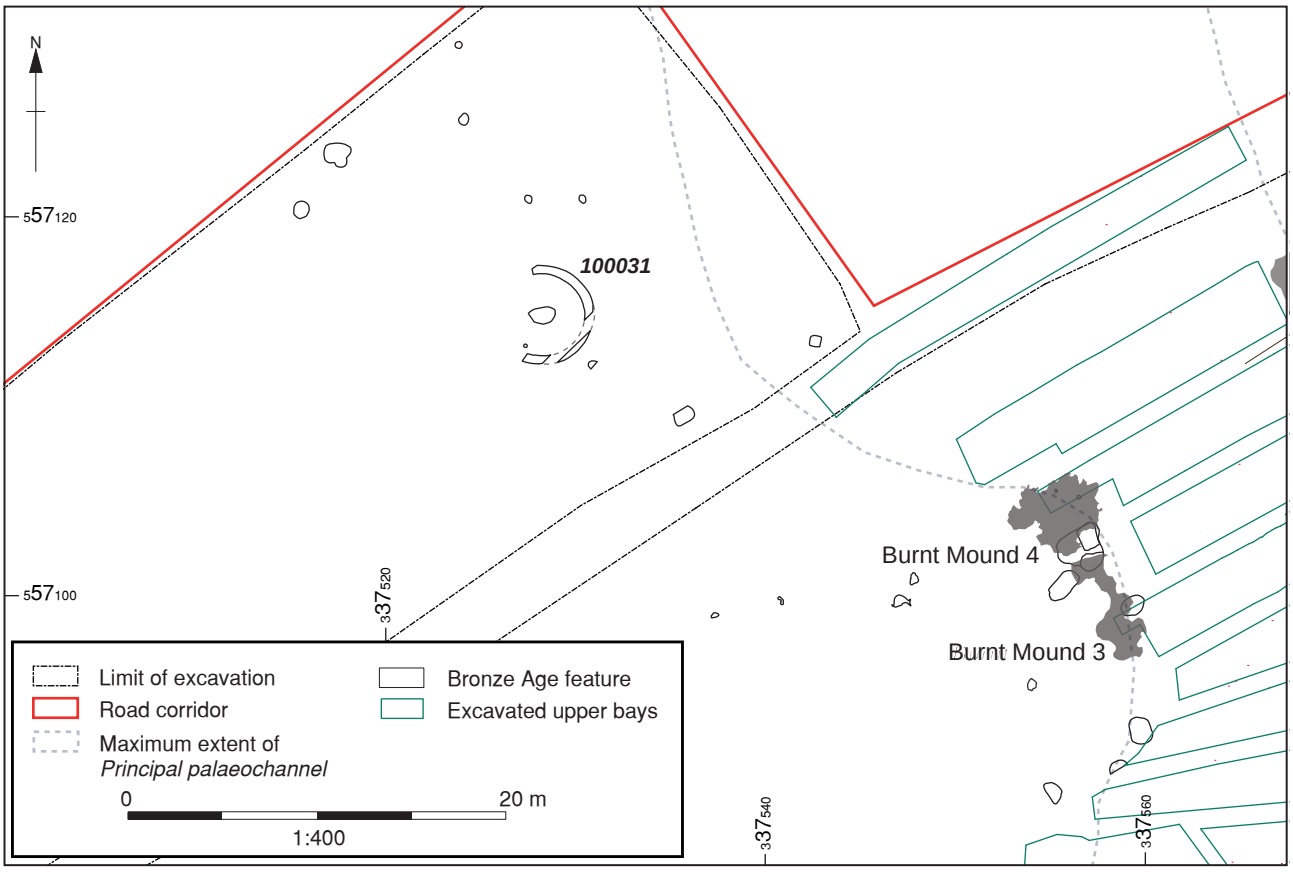


Figure 177: Other features associated with burnt mound activity

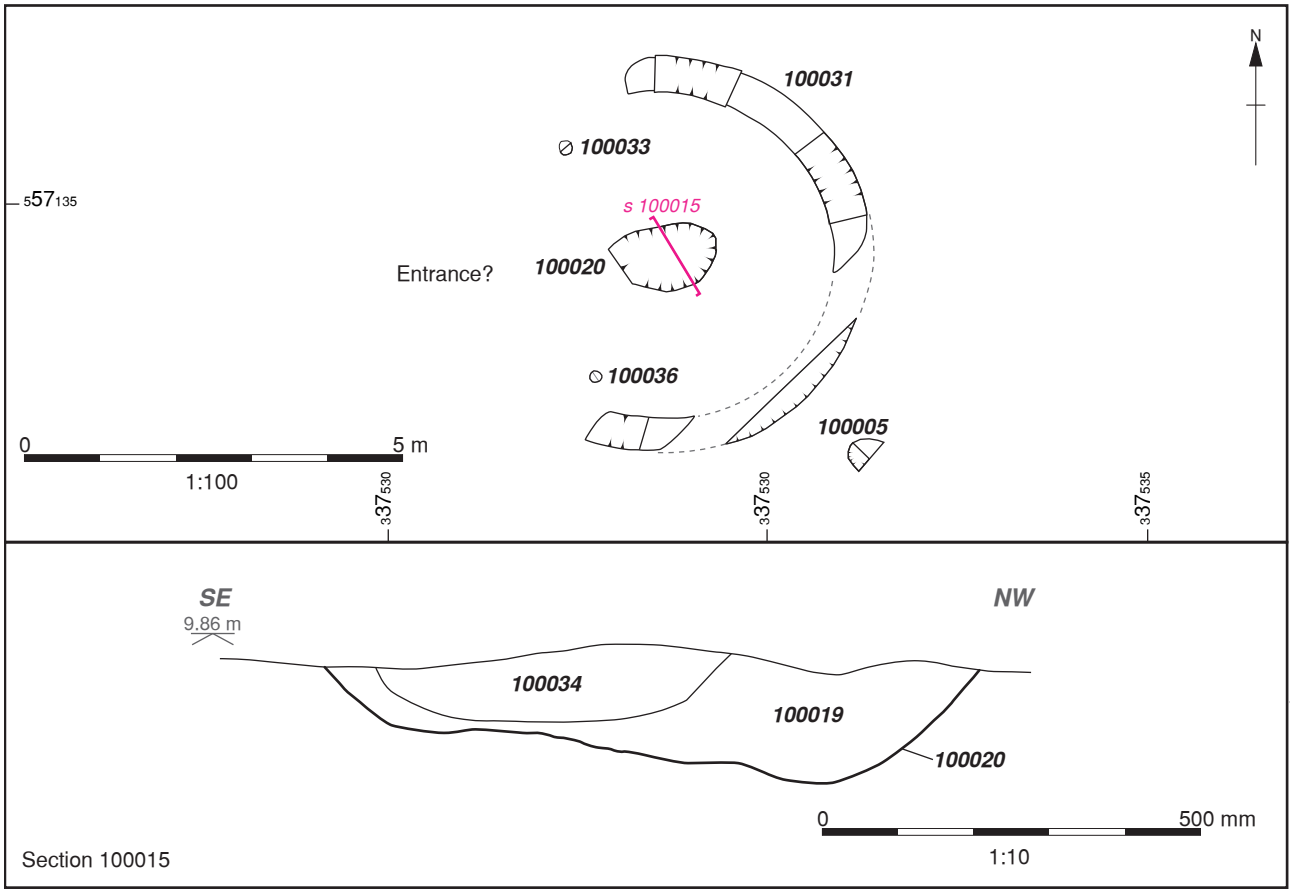


Figure 178: Ring-gully **100031**

It is worth noting that Burnt Mounds 3 and 4 were covered by alluvial deposits, which, given the date of these features, must post-date the mid-second millennium BC. Indeed, it is possible that these were broadly contemporary with those later deposits of alluvium on the eastern side of the channel in the area of Bay O (*Bronze Age/Iron Age alluvium*; *p 373*). If so, this would indicate that the land surface (***70486***) in the vicinity of Bay O was also contemporary with Burnt Mounds 3 and 4.

Related activity

Several other features and structures that relate to contemporaneous earlier Bronze Age activity were found in the vicinity (Fig 177). Principal amongst these was a circular structure, in the retention pond area of the site, *c* 27 m north-west of Burnt Mound 4. This was defined by a truncated ring-gully (***100031***; Fig 178), *c* 0.5 m wide and between 0.12 m and 0.26 m deep. This had a U-shaped profile, and enclosed an area with a diameter of *c* 4.2 m, probably entered from the west. It was filled with a sandy silt and contained a small assemblage of charcoal (*Appendix 18*), dominated by alder/hazel, with a little oak, hawthorn-type, and willow/poplar. Several artefacts were also recovered, including a small collection of residual Late Mesolithic lithics (*Appendix 9*), as well as a stone anvil, which again may have been residual (*Appendix 2*), along with two fragments of pottery (*Appendix 11*). These sherds may well date to the middle centuries of the second millennium BC and have parallels with a later vessel from a nearby pit (*p 397*).

Three features were present in the interior, one a centrally positioned hearth (***100020***; Pl 152). This was oval, *c* 0.5 x 0.9 m, with a shallow, *c* 0.15 m-deep, profile. It contained two deposits, the upper (***100034***) a charcoal-rich soil containing some burnt stone, with residual flint and chert flakes and blades (*Appendix 9*). The charcoal was dominated by alder/hazel, which may suggest that these species were intentionally selected as fuel (*Appendix 18*). The lower deposit (***100019***) was composed of silty clay, comminuted charcoal, and heat-affected stones. It was also associated with 25 lithics, all residual, including flint and chert flakes, and flint blades (*Appendix 9*). A fragment of alder/hazel charcoal from this deposit returned a radiocarbon date of 1870-1560 cal BC (3395±35 BP; SUERC-32713; Table 35). The other features were two small postholes (***100033*** and ***100036***), which might have aided in supporting the roof of the structure. The northernmost (***100033***) had a diameter of *c* 0.2 m, was *c* 0.3 m deep,

Plate 152: Ring-gully **100031**, *following excavation*

Area	Context	Comment	Sample	Depth in palaeochannel (m OD)	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Grid-square area	Hearth ***90434*** (fill ***90445***)	Intrusive material in Late Mesolithic hearth Element of earlier Bronze Age activity			SUERC-32638	Mineral-encrusted oak (*Quercus*) charcoal	3120±30	-26.2	1460-1290	-	-
Dryland area west of palaeochannel	Hearth ***100020*** (fill ***100019***)	Part of ring-gully ***100031*** Element of earlier Bronze Age activity	Bulk-sample 100004		SUERC-32713	Alder/hazel (*Alnus/Corylus*) charcoal	3395±35	-27.5	1870-1610	Statistically consistent with a poor agreement (T'=3.72; $T'(5\%)$=3.8; ν=1; A_{comb}= 46.7% (An= 50.0%)) combined calibrated range (95%)= 1730-1530 cal BC	*1780-1610*
	Posthole ***100033*** (fill ***100032***)	Part of ring-gully ***100031*** Element of earlier Bronze Age activity	Bulk-sample 100011		SUERC-32712	Charred grass-family (Poaceae) seed	3295±35	-26.4	1660-1490		*1660-1490*
	Bucket-shaped vessel	Vessel contained in pit ***100026*** (fill ***100029***) Element of earlier Bronze Age activity	-		SUERC-32627	Organic residue on the vessel	3075±35	-27.5	1430-1230	-	*1430-1230*

Table 35: Other Bronze Age radiocarbon dates from Stainton West

and contained silt, as well as residual lithics, and charred grass-family weed seeds. One returned a radiocarbon date of 1680-1490 cal BC (3295±35 BP; SUERC-32712). The other posthole (***100036***), which was also filled with silt, was slightly smaller, with a diameter of 0.15 m, and was 0.13 m deep.

When statistically tested, the radiocarbon dates from these features were found to be consistent, though they have poor agreement. It is therefore possible that one of the dates was derived from either an intrusive or residual ecofact, or perhaps only was associated with the use of the structure. If it is assumed that the dates relate to two different events, two separate chronological ranges can be suggested for the use of the ring-gully: either *1780-1610 cal BC* (*'Hearth 100020'*) or *1660-1490 cal BC* (*'Posthole 100033'*; *Appendix 20*). An alternative scenario is that both are contemporary, which is certainly possible, as statistically the dates are very close to the probability boundary used to separate indices with good and poor agreement. If this is the case, the combined dates would place the use of the ring-gully at 1730-1530 cal BC.

Surrounding ring-gully ***100031***, and extending towards the palaeochannel, was a loose scatter of features, comprising pits and hearths (Fig 179), and although many are undated, some probably related to Chalcolithic or earlier Bronze Age activity. Of these, a pit (***100026***) to the north-west of the ring gully was dated to the earlier Bronze Age by the presence of pottery. It was circular in shape, with a diameter of *c* 0.9 m, and had near-vertical sides and an undulating base, with a maximum depth of 0.3 m (Pl 153). It contained three sequential silty deposits, associated with comminuted charcoal and burnt stones. Comparable small circular pits, containing material similar to that normally associated with burnt mounds, are often described as 'fire pits', and may either be related to areas of settlement or burnt mounds (*cf* Maynard 1993b, 35). In the case of pit ***100026***, given the presence of the adjacent burnt mounds, it is quite possible that it was also associated with this activity. Five sherds of prehistoric pottery were present within the secondary fill, derived from a bucket-shaped vessel, with parallels in Deverel-Rimbury pottery, a type that is exceedingly rare in the Solway area

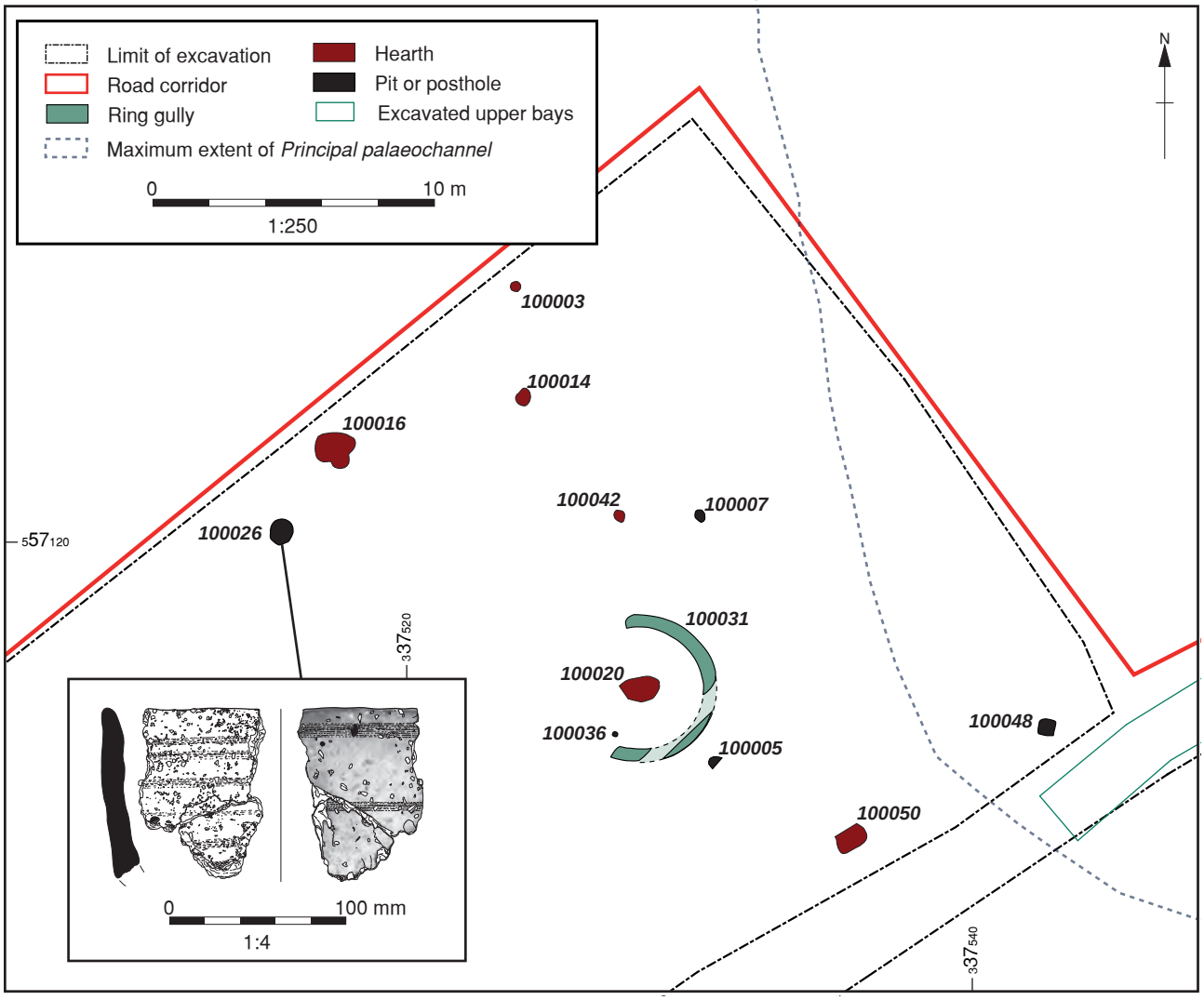


Figure 179: Features surrounding ring-gully **100031**, *and the pottery vessel from pit* **100026**

Plate 153: Pit **100026**, *looking north-west*

Plate 154: Hearth **100050**, *half-sectioned*

(Hodgson and Brennand 2006, 50). In northern Britain, this style was probably in use between *c* 1600 cal BC and 800 cal BC (*p 375*; Table 31), and organic residue from the Stainton West vessel was dated to *1430-1230 cal BC* (Table 35). Although this suggests that the pit was not contemporary with the nearby structure, or the burnt mounds, it indicates that the locale continued to retain a significance during the last centuries of the earlier Bronze Age.

The other features on the western side of the palaeochannel remain undated, but may well be broadly contemporaneous. One was a hearth (***100016***), immediately to the north-east of pit ***100026***, defined by a shallow oval hollow, *c* 1.3 x 1.2 m, with a depth of *c* 0.1 m, surrounded by the natural substrate, which had been affected by high temperatures. It contained a deposit of burnt stone and charcoal, as well as two residual flint flakes. The charcoal assemblage was dominated by alder/hazel, with smaller amounts of hawthorn-type and blackthorn-type charcoal (*Appendix 18*).

Four other hearths (***100003***, ***100014***, ***100042***, and ***100050***) also surrounded the structure, which suggests that they might again have been associated. All, like hearth ***100016***, were probably used to heat stones that could then be placed in the water-filled troughs associated with one or more of the nearby burnt mounds. Three (***100003***, ***100014***, and ***100042***) were to the north of the structure, all being defined by shallow circular scoops, which were associated with burnt stone and charcoal. In addition, a posthole (***100007***) was excavated *c* 2.6 m to the east of hearth ***100042***. Hearth ***100050***, to the south-east, was slightly more substantial in nature, and might also have contained several deliberately laid stones (Pl 154). It also appears that this hearth was the earliest, as it was sealed by the *Bronze Age alluvium* (***100008***/***100010***/***100062***), which the other hearths had been cut into. It contained a small assemblage of flaked lithics, though these were probably residual Late Mesolithic items (*Appendix 9*). To either side were two small pits (***100048*** and ***100005***), the former producing a small assemblage of oak charcoal (*Appendix 18*), which is, perhaps, significant. It is clear that oak was not favoured as a fuel on the site during the earlier Bronze Age and, by implication, suggests that this pit is comparatively early in the sequence, perhaps being contemporary with Burnt Mound 6, or even Burnt Mounds 1 or 5 (*Ch 10, pp 345-52*).

A small collection of undated pits (***70046***, ***70039***, ***70037***, ***70052***, ***70049***, and ***70041***; Fig 180) were excavated close to Burnt Mounds 3 and 4. These were probably contemporaneous with the burnt mounds, as they had been cut into the same mound of *Bronze Age alluvium* (***70024***/***70083***/***70035***). In addition, a hearth (***70007***), 1.2 x 0.8 m, was defined by a shallow bowl filled with a charcoal-rich soil, along with two other features (***70155*** and ***70278***) that probably represent the remains of two troughs, comparable to those associated with the burnt mounds to the north. However, in this instance, the absence of a covering mound of burnt stones implies that such a feature was either not associated with these troughs or that, if it did exist, it had been removed by later disturbance or erosion. Although one of the possible troughs (***70155***) had been heavily disturbed, it had clearly been a flat-bottomed feature, with a depth of *c* 0.3 m, and contained two deposits of burnt stone and charcoal, separated by a stone-free silty clay (Pl 155). Pedological analysis suggested that as it filled the pit flooded, and filled with silty-clay alluvium (*Appendix 19*). This

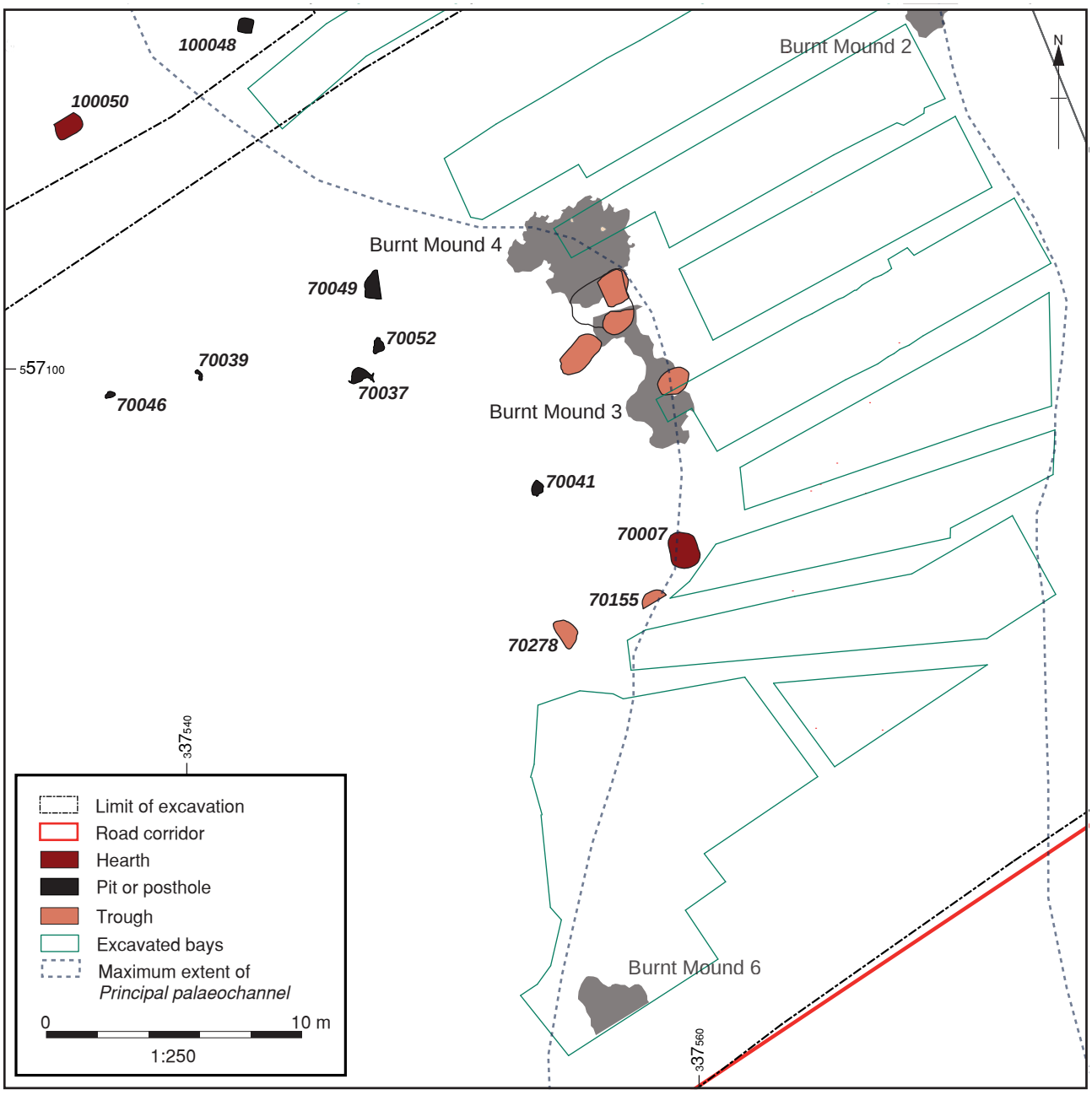


Figure 180: Features to the west of Burnt Mounds 3 and 4

Plate 155: Trough **70155**, *looking south-east*

event perhaps highlights the precarious position of this feature and the other burnt mounds, and may indicate that this area could only be used on a seasonal basis, when not covered by standing water. The other potential trough (***70278***) was more complete, with a sub-rectangular form, *c* 1.5 x 1.2 m and *c* 0.2 m deep, with sloping sides and a flat base (Pl 156). It also contained a large quantity of burnt stone.

There was also some limited evidence for earlier Bronze Age activity in the area to the east of the *Principal palaeochannel* and Burnt Mound 2. This comprised a charcoal fragment, intrusive in a Late Mesolithic hearth (***90434***; *Ch 4, p 116*), which

Plate 156: Pit **70278**, *half-sectioned, looking north-east*

was dated to 1460-1290 cal BC (3120±30 BP; SUERC-32638; Table 35), and several diagnostic lithic artefacts dating to the late third/early second millennium BC (Fig 181). These comprised a barbed-and-tanged arrowhead, four side-and-end-scrapers, and three all-round scrapers. Significantly, all but one of these was recovered from an area which contained the Late Mesolithic midden (*Ch 4, p 120*) and later Neolithic Burnt Mound 1 (*Ch 10, p 345*), which may suggest that both features were visible during the Chalcolithic period and earlier Bronze Age, and that these were perhaps referenced then, partly involving the placement of worked-stone artefacts on their surfaces.

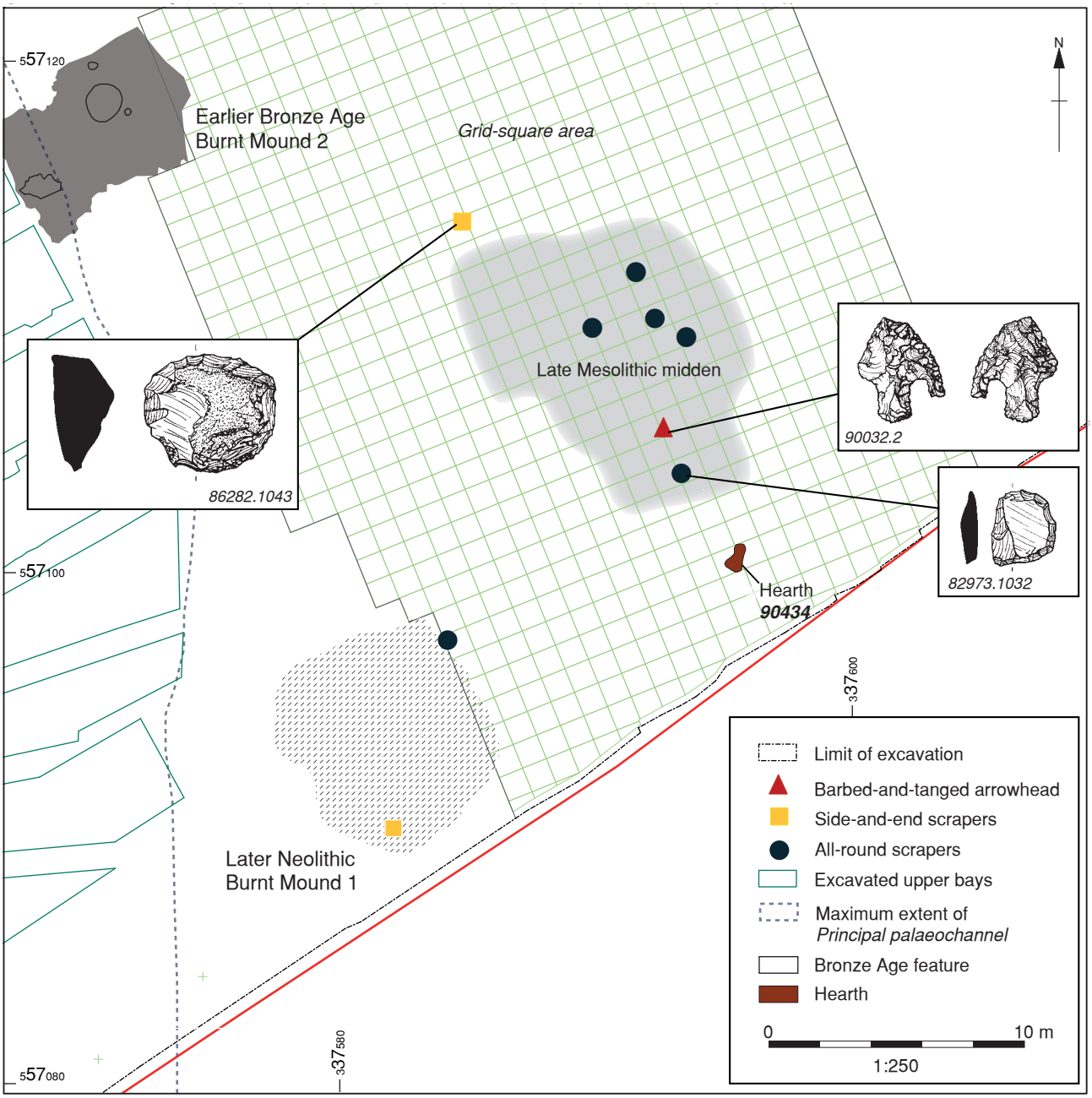


Figure 181: Hearth **90434**, *diagnostic Bronze Age lithics, and the extent of the Late Mesolithic midden in the* Grid-square area *(drawn lithics are at 1:1)*

The Chalcolithic and earlier Bronze Age environment

The local Chalcolithic vegetation cover at, and around, Stainton West can be discerned, to some degree, through the analysis of pollen (*Appendix 16*) from cores extracted from the *Chalcolithic alluvium* in Bays B and O, and a deposit of alluvium (***70327***) contained in one of the Chalcolithic reactivation channels (*p 367*). In addition, an assemblage of insects and waterlogged plant remains from Burnt Mound 6 (*p 383*) and deposits of *Chalcolithic alluvium* (*pp 367-8*), one of which directly sealed that burnt mound (*Appendices 14* and *17*), provides further corroborative evidence for the environment during this period.

The pollen evidence relating to the Chalcolithic period forms part of the CNDR 3 pollen superzone (*Appendix 16*) and indicates that a largely wooded landscape surrounded the site, with alder growing on the Eden's floodplain. There seems to have been an increase in alder at this time, which might indicate an increase in wetter conditions, perhaps associated with a rising watertable. It also seems from the waterlogged plant remains that alder was growing very close to the *Principal palaeochannel*, based on the presence of large numbers of catkin-scales, together with moderate numbers of seeds, within the Chalcolithic deposits. These deposits also produced waterlogged plant remains that indicate the presence of aquatic plants in the *Principal palaeochannel*, specifically rushes, sedges, and lesser spearwort, as well as smaller amounts of water-plantain, sedges, and ragged-robin, which again point to areas of standing water or wet ground. Similarly, some of the insect species indicate the presence of stands of waterside vegetation, and suggest that the *Principal palaeochannel* contained slow-flowing, still, or stagnant, water.

The pollen, waterlogged plant remains, and insects also paint a similar picture of the vegetation that existed away from the floodplain. For instance, this combined evidence reveals that a mixed-deciduous woodland was present, and that some small-scale clearance seems to have occurred, within which cultivation and/or grazing may have happened. The pollen evidence also indicates that throughout the Chalcolithic period there was a progressive decline in hazel, suggesting that this species may have been selected for fuel or building. In addition, small-scale clearance may have increased, perhaps at the end of the period, whilst the presence of cereal-type pollen (possibly barley) and ribwort plantain suggest the beginning of more concentrated disturbance associated with potential arable cultivation at this time. Fire activity was also detected within pollen zone CNDR 3, perhaps relating to clearance and settlement.

Pollen evidence (forming part of pollen superzone CNDR 4; *Appendix 16*) was also recovered from Burnt Mound 2 (*p 387*), the *Bronze Age alluvium* (*p 368*), buried land surface ***70486*** (*p 371*), and the lower part of the *Bronze Age/Iron Age alluvium* (*p 373*). Therefore, it probably relates to the landscape that existed around Stainton West at the very end of the third millennium BC and during the earlier part of the second millennium BC; in general terms, the pollen suggests that this was essentially similar to that at the end of the Chalcolithic period. For instance, the site appears to have been surrounded by a mixed alder, hazel, birch, and oak woodland, interspersed with open grassy areas and perhaps also shallow freshwater pools. From the wooded areas, hazel, and to a lesser extent alder, may also have been selected as building material or fuel. Cereal-type pollen may indicate the presence of nearby arable agriculture, whilst fungal spores suggest pastoral agriculture, implying that the open grassy areas were used as meadows or small arable plots. Overall, this evidence tallies well with that from other palynological sites on the Solway Plain (*eg* Tipping 1997a; 1997b; Hodgkinson *et al* 2000, 85-145); it suggests that the lowland landscape comprised several small areas of cleared ground, surrounded by woodland, in which some cereal cultivation occurred, along with the grazing of domesticated animals.

It is likely, however, that earlier Bronze Age clearance and agriculture in the vicinity was fairly transient, perhaps being associated with a shifting pattern of settlement, particularly as the assemblages associated with pollen superzone CNDR 4 showed periods of woodland clearance and encroachment. For instance, Burnt Mound 2 appears to have been in an area of alder woods, but after this became disused there was a decline in alder, which may be attributed to clearance and/or changing hydrological conditions. This decline is also evident in the data for the lower part of the *Bronze Age alluvium*, in Bays F and O, which, together with increases in herb pollen, suggest an increase in clearance adjacent to the floodplain. The floodplain was, however, subsequently subjected to renewed encroachment of alder carr, suggesting the later abandonment of the cleared areas. Similarly, the pollen relating to the period when Burnt Mounds 3 and 4 were used and initially abandoned, as present in buried land surface ***70486*** (*p 371*) and the lower part of the *Bronze Age/Iron Age alluvium* (*p 373*), suggests that the predominant habitat was one of alder carr. Therefore, taken as a whole, throughout the earlier part of the second millennium BC, clearance (and perhaps agriculture and settlement) close to Stainton West corresponded to periods when there was no burnt-mound activity at the site.

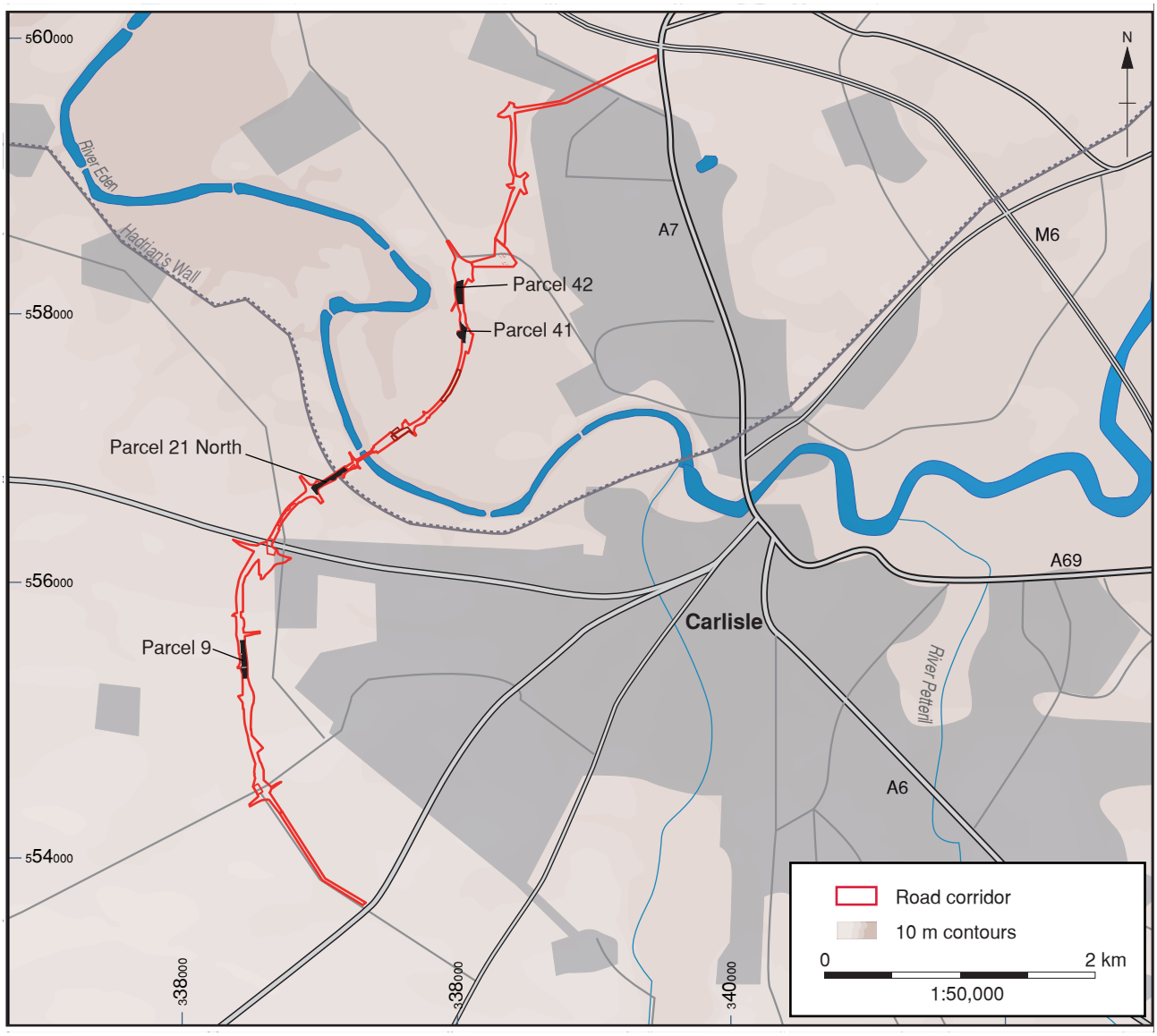


Figure 182: Chalcolithic/earlier Bronze Age settlements and agriculture (Contains OS OpenData © Crown Copyright [and database right] (2022))

Chalcolithic/earlier Bronze Age settlement and agriculture

Aside from Stainton West, several areas of early settlement and agricultural activity were present along the CNDR. These lay within Parcels 9, 21 North, 41, and 42 (Fig 182), and the radiocarbon dating evidence indicates that this settlement activity spanned the Chalcolthic/earlier Bronze Age (Table 36).

Parcel 9

Two post-rings were revealed in Parcel 9, to the south of the Eden. Based on their size and form, the artefacts and ecofacts, as well as the dating evidence, it is probable that these represent two earlier Bronze Age roundhouses (Houses 1 and 2; Fig 183). The radiocarbon-dating evidence suggests, however, that these were built and used at different times, with House 1 being the earlier structure, though both form part of the 'post-built roundhouse' tradition, which emerged in northern Britain in the early part of the second millennium BC (Pope 2015; *p 380*).

The roundhouses were spaced some 6.5 m apart, and the southernmost (House 1; Pl 157) consisted of a post-ring which had a diameter of *c* 4.7 m, defined by seven postholes, averaging 0.39 m in diameter and 0.3 m deep. These generally contained silt, with no evidence of post-pipes or packing. They were spaced *c* 1.5 m apart, although there was a notable gap in the post-ring on its southern side, which probably indicates that this area had suffered the greatest degree of disturbance, resulting in the destruction of a posthole in the original circuit. One of the postholes (***9037***) contained a fragment of prehistoric pottery (*Appendix 11*), whilst three (***9025***, ***9031***, and ***9033***) produced small quantities of charred plant remains (*Appendix 18*). These included charred cereal seeds and chaff, suggesting the consumption and processing of

Site	Structure	Context	Bulk sample	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Combined calibrated date range (95% confidence) cal BC
Parcel 9	House 1	Posthole ***9025*** (fill ***9026***)	9029	SUERC-32724	Alder/hazel (*Alnus*/ *Corylus*) and willow/ poplar (*Salix*/ *Populus*) charcoal	3485±35	-25.9	1900-1690	-	-
	House 2	Posthole ***9003*** (fill ***9004***)	9002	SUERC-32723	Hawthorn-type (Maloideae) charcoal	3205±35	-25.0	1610-1410	Statistically consistent with a good agreement (T'=0.69; $T'(5\%)$=3.8; v=1; A_{comb}= 106.0% (An= 50.0%))	*1500-1420*
				SUERC-42034	Charred barley (*Hordeum* sp) grain	3165±26	-26.3	1500-1400		
Parcel 21 North	House 3	Posthole ***21390*** (fill ***21392***)	21038	SUERC-42036	Alder/hazel (*Alnus*/ *Corylus*) charcoal	3765±26	-26.2	2290-2050		
	-	Pit ***21099*** (fill ***21158***)	21010	SUERC-32828	Charred barley (*Hordeum* sp) grain	3455±30	-24.9	1880-1690		
Parcel 41	-	Ditch ***41003*** (fill ***41005***)	41000	SUERC-32727	Alder/hazel (*Alnus*/ *Corylus*) charcoal	3180±35	-26.1	1530-1390		
Parcel 42	House 4	Hearth ***42037*** (fill ***42038***)	42000	SUERC-32728	Blackthorn-type (*Prunus* sp) charcoal	3210±35	-25.2	1610-1410	Statistically consistent with a good agreement (T'=2.64; $T'(5\%)$=3.8; v=1; A_{comb}= 70.7% (An= 50.0%))	*1500-1410*
	House 6	Hearth ***42163*** (fill ***42164***)	42067	SUERC-32732	Alder/hazel (*Alnus*/ *Corylus*) charcoal	3125±35	-26.0	1500-1280		

Table 36: Chalcolithic and Bronze Age radiocarbon dates from Parcels 9, 21 North, 32, 41, and 42

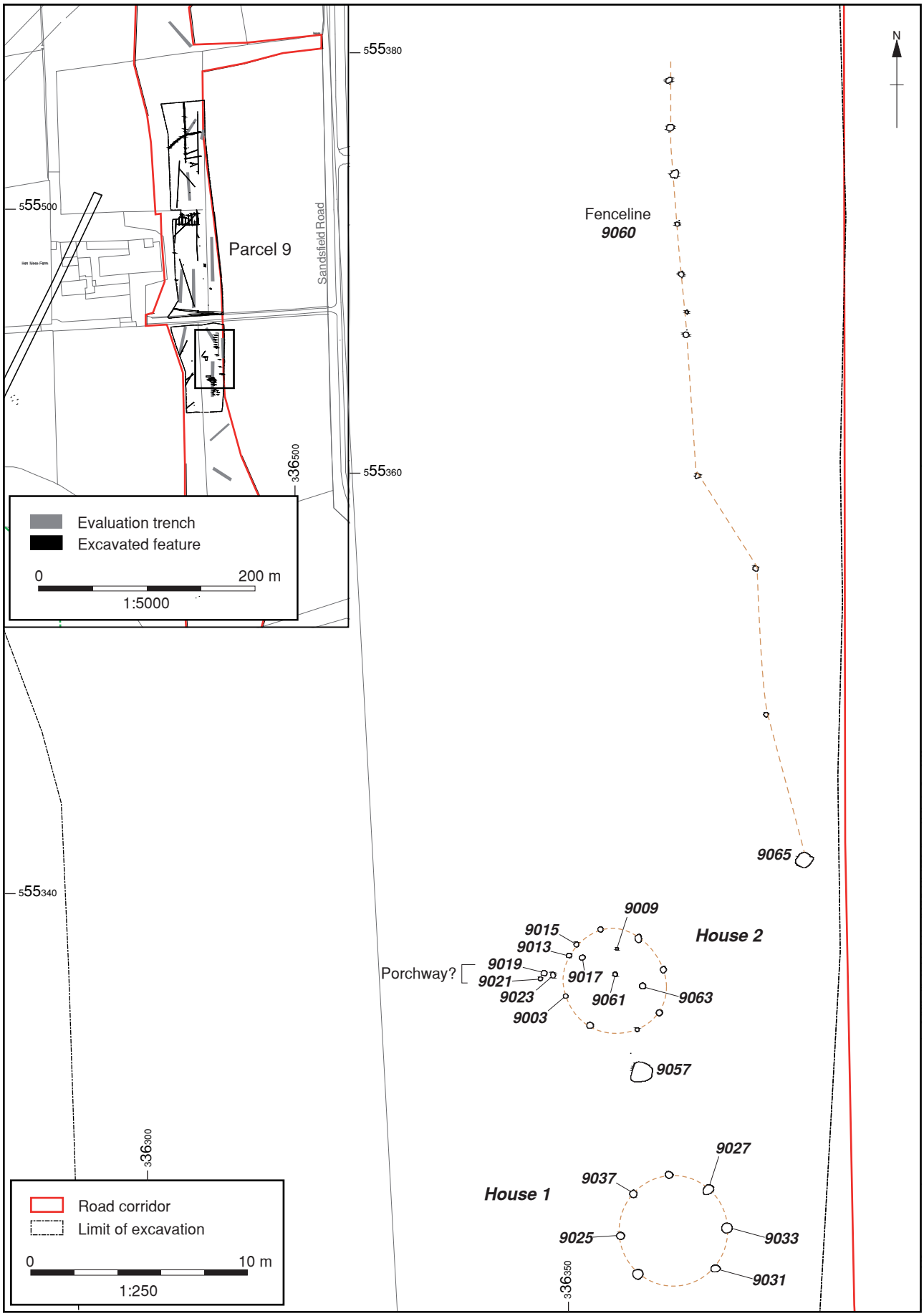


Figure 183: Earlier Bronze Age features in Parcel 9 (Contains OS OpenData © Crown Copyright [and database right] (2022))

Plate 157: Bronze Age House 1, looking east

barley and spelt wheat, along with charred weed seeds. The presence of grass caryopses and stem bases, and lesser stitchwort seeds, might also indicate nearby grassland, perhaps used for grazing. Small quantities of charcoal were also present in the postholes, and several fragments from posthole ***9027*** provided a date of 1900-1690 cal BC (3485±35 BP; SUERC-32724).

House 2 was defined by a post-ring with a diameter of *c* 4.6 m. This consisted of nine postholes with diameters ranging between 0.2 m and 0.35 m, and with average depths of 0.2 m. Generally, these posts were spaced *c* 1.6 m apart, though two (***9013*** and ***9015***) on the north-western arc were more closely spaced; one may have been a replacement. All contained single homogeneous silt fills, with no evidence of post-pipes or packing.

Three additional posts (***9019***, ***9021***, and ***9023***) to the west of this post-ring perhaps formed one side of a porch. Four postholes (***9017***, ***9061***, ***9063***, and ***9009***) were also present within this structure, three (***9017***, ***9063***, and ***9009***) possibly once supporting internal fittings, or even a raised floor area used for sleeping, in the north-eastern half of the roundhouse. However, one (***9061***) could have secured a central post, which may have been used during the construction of the house, or as a roof support (*p 380*). Its presence may also indicate that this house did not have a central hearth.

Although there were no artefacts, a small assemblage of charred barley seeds came from these postholes. Fragments of charred hazelnuts were present in one (***9023***), as well as charcoal, which was predominantly oak, with some fragments from mature trees (*Appendix 18*), several other postholes also being dominated by oak charcoal. A charred barley grain and hawthorn-type charcoal in posthole ***9003*** returned statistically consistent dates of 1500-1400 cal BC (3165±26 BP; SUERC-42034) and 1610-1410 cal BC (3205±35 BP; SUERC-32723). When these are combined, they suggest that this structure was in use in 1500-1420 cal BC.

Two pits were located in the vicinity of these structures, one (***9057***) being found between the two roundhouses, whilst the other (***9065***) lay *c* 8 m north-east of House 2. Pit ***9057*** was *c* 1 x 0.9 m and *c* 0.2 m deep, whilst ***9065*** was *c* 0.8 x 0.7 m and *c* 0.1 m deep. This contained charred cereal grains, a single emmer-wheat glume-base fragment, and numerous fat-hen seeds, which together suggest the presence of nearby areas of arable cultivation (*Appendix 18*). In addition, it contained charred hazelnuts, perhaps for food, or derived from wood that had been burnt for fuel, the charcoal being largely formed from the small branches and twigs of alder (*Appendix 18*).

To the north of, and perhaps orientated towards, pit ***9065*** was a north/south fenceline (***9060***), which kinked at its southern end. This boundary was traced for a distance of *c* 30 m, and was composed of ten postholes, seven of which, at the northern end, were closely spaced. Although its date could not be confirmed, it is possible that it formed a further element of the Bronze Age settlement, perhaps related to the early

division of the inner Solway Firth landscape, using fencelines comparable to those recorded at Bowness Common/Glasson Moss (Hodgkinson *et al* 2000, 114).

Parcel 21 North

A second area of early settlement activity was identified in Parcel 21 North, close to the River Eden, dating to the

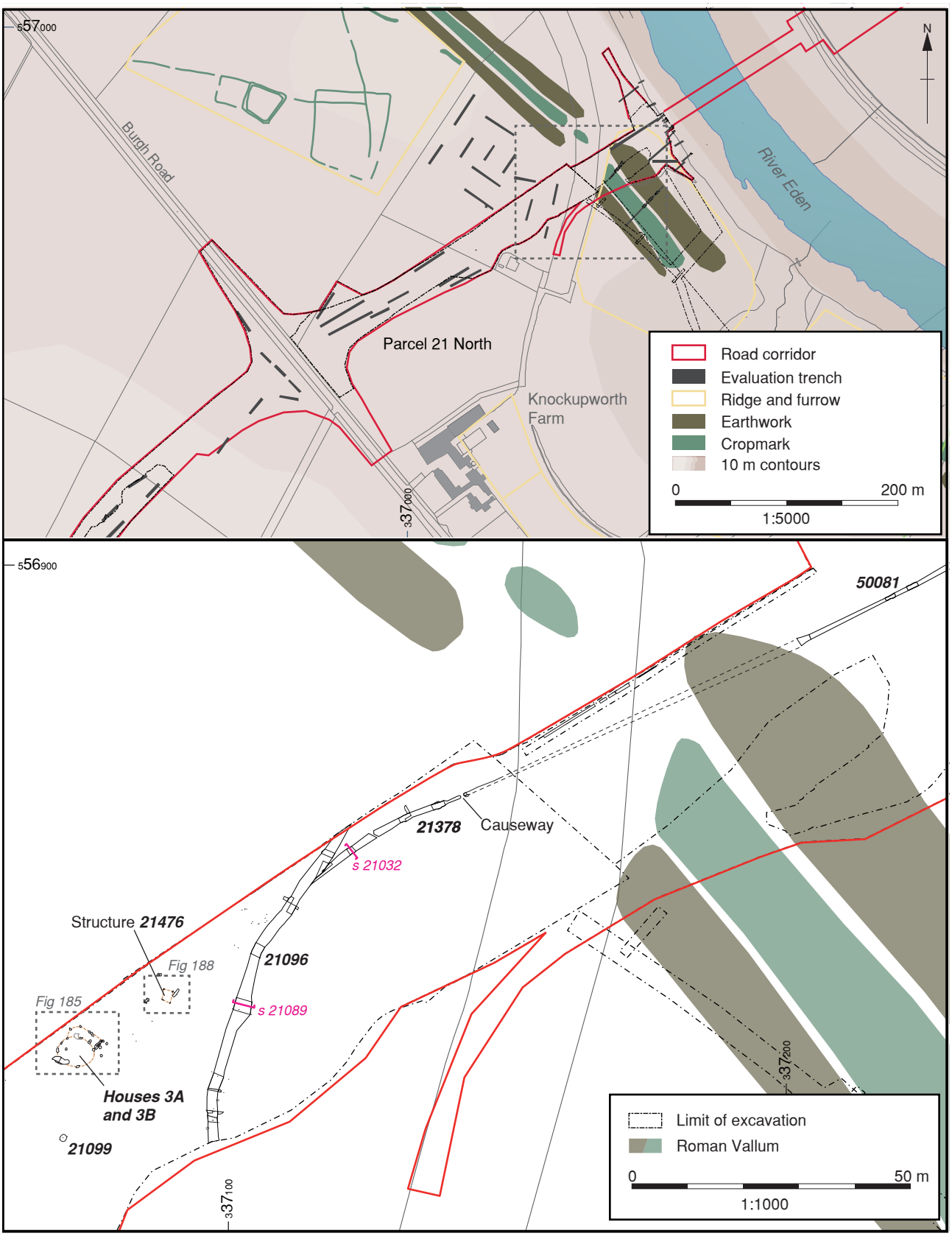


Figure 184: Chalcolithic and earlier Bronze Age features in Parcel 21 North, and the Vallum area of Hadrian's Wall
(Contains OS OpenData © Crown Copyright [and database right] (2022))

late third and second millennia BC. The earliest activity was found at the western end of the site (Fig 184), where an arcing scatter of 19 postholes (collectively grouped as House 3), with diameters ranging between 0.2 m and 0.4 m, and depths of 0.3-0.4 m, seemingly related to two successive post-built structures (3A and 3B) with fairly pronounced oval plans.

The earliest of these (3A) was some 8 m long, its surviving wall line being defined by eight postholes (***21341***, ***21400***, ***21397***, ***21408***, ***21411***, ***21390***, ***21393***, and ***21395***; Fig 185), five of which (***21341***, ***21400***, ***21397***, ***21408***, and ***21390***) contained post-pipes (Pl 158), indicating that the posts had rotted *in situ*. Given the close spacing of three postholes (***21397***, ***21408***, and ***21411***), it seems possible that the posts had been successively replaced. In addition, two others (***21388*** and ***21385***) were identified within the interior. One of the wall-line postholes (***21390***) contained alder/hazel charcoal, perhaps relating to the occupation, which returned a date of 2290-2050 cal BC (3765±26 BP; SUERC-42036; Table 36). This feature also contained a charred barley grain, which returned an early medieval date (*Ch 14, p 506*), presumably being intrusive.

Following the abandonment of House 3A, a second structure (House 3B) was constructed, partly covering

Plate 158: Section across posthole **21341**, *with post-pipe visible on the right-hand side as a darker soil stain*

the footprint of its predecessor. This measured *c* 6.6 x 5.4 m and its wall line was defined by eight postholes (***21304***, ***21406***, ***21403***, ***21420***, ***21414***, ***21416***, ***21381***, and ***21418***), two (***21414*** and ***21416***) being adjacent to each other, suggesting that one may have replaced the other. An additional posthole (***21424***) was positioned inside.

To the north-east, two fairly substantial intercutting ditches (***21096*** and ***21378***; Fig 184) may relate to land

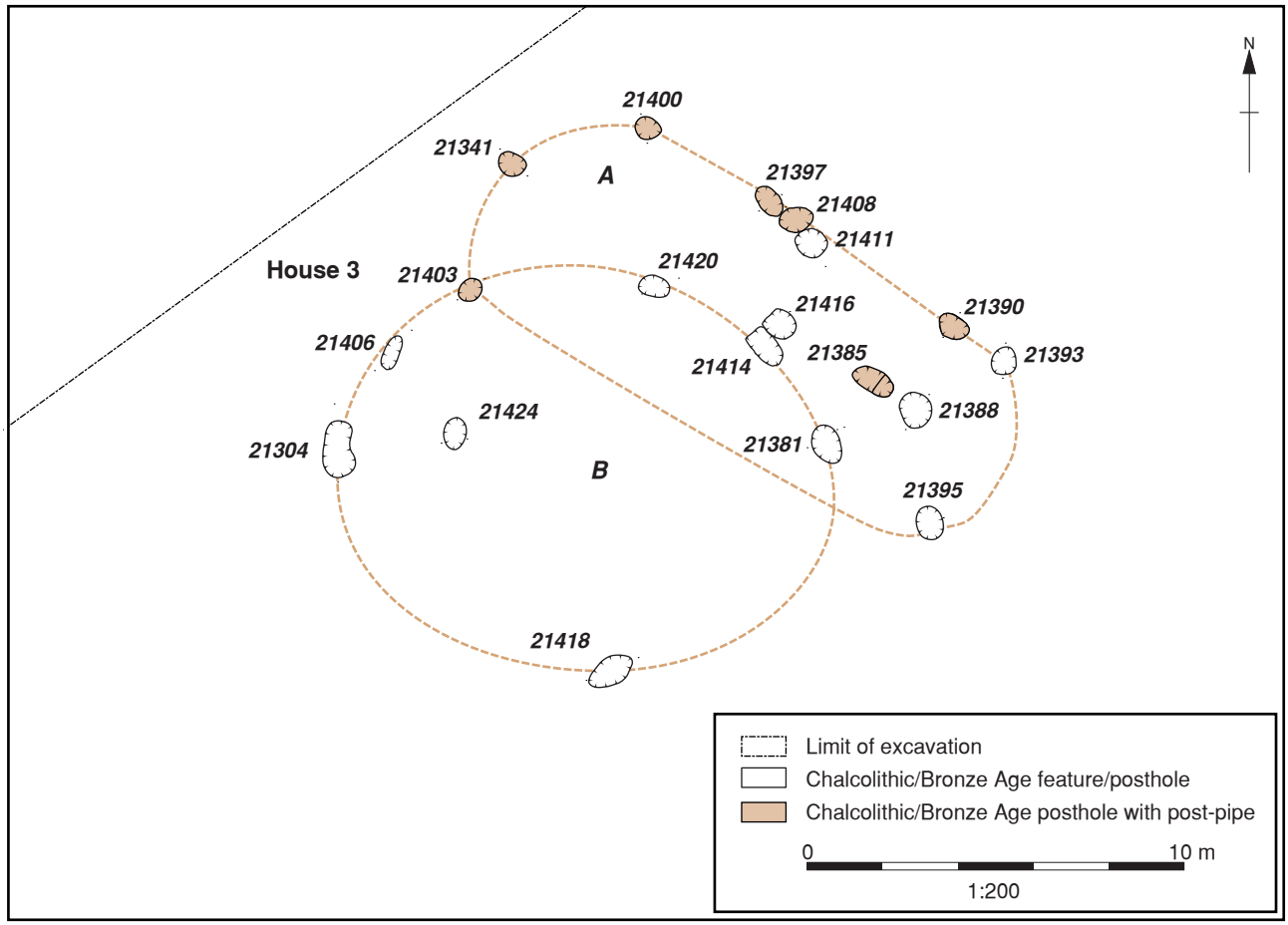


Figure 185: House 3

division or enclosure dating to the middle centuries of the second millennium BC. Ditch ***21378*** was the earlier, a *c* 42 m-long section being identified, although its course was continued to the north-east, close to Hadrian's Wall, for a distance of *c* 36 m by ditch ***50081***. It was *c* 0.6-1.5 m wide and up to 0.45 m deep, although its profile varied along its course, in some places being U-shaped (Pl 159), whilst in others it had a flat base and steep sides (Fig 186); a narrow causeway, 0.7 m wide, allowed access across this boundary. The ditch had initially filled with silt, which was sealed by a mixed deposit of silt and redeposited natural substrate, presumably either derived from the erosion of an associated mound, or from deliberate backfilling. Two unmodified, undiagnostic, flint flakes were the only artefacts, though, based on the date of the later ditch (***21096***; *below*), it is likely to date from the earlier Bronze Age. It is also clear that at least one section (***50081***) was visible as an earthwork in the Roman period, as it had been used as a drain under Hadrian's Wall. In this area, it was also found to cut through a possible Bronze Age buried soil (***50122***), sealed beneath the Turf Wall phase of Hadrian's Wall (*Ch 13, p 450*).

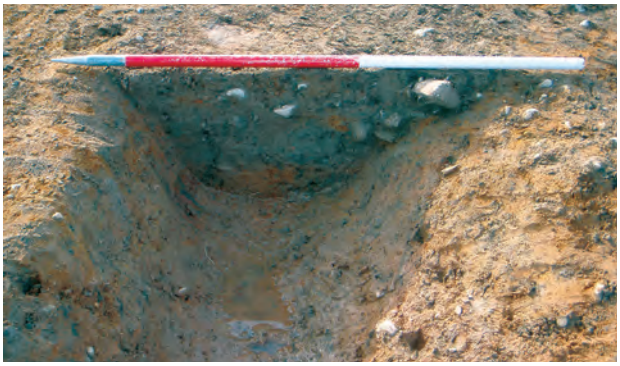


Plate 159: Ditch **21378**

The south-western end of ditch ***21378*** was cut by ditch ***21096***, which was traced for a distance of 62 m, following a slight arcing curve, broadly aligned north-north-east/south-south-west. This boundary was more substantial than its predecessor, being 1.8-3 m wide, with a maximum depth of 0.7 m. Three distinct fills were observed in most of its length, consisting of a primary silting (***21153***), overlain by a thin stabilisation horizon (***21154***), followed by a deeper deposit (***21155***). It is unclear whether this upper deposit was a deliberate backfill or the material derived from an eroded bank forming part of the boundary, presumably originally parallel to the ditch. Its date was seemingly established by three

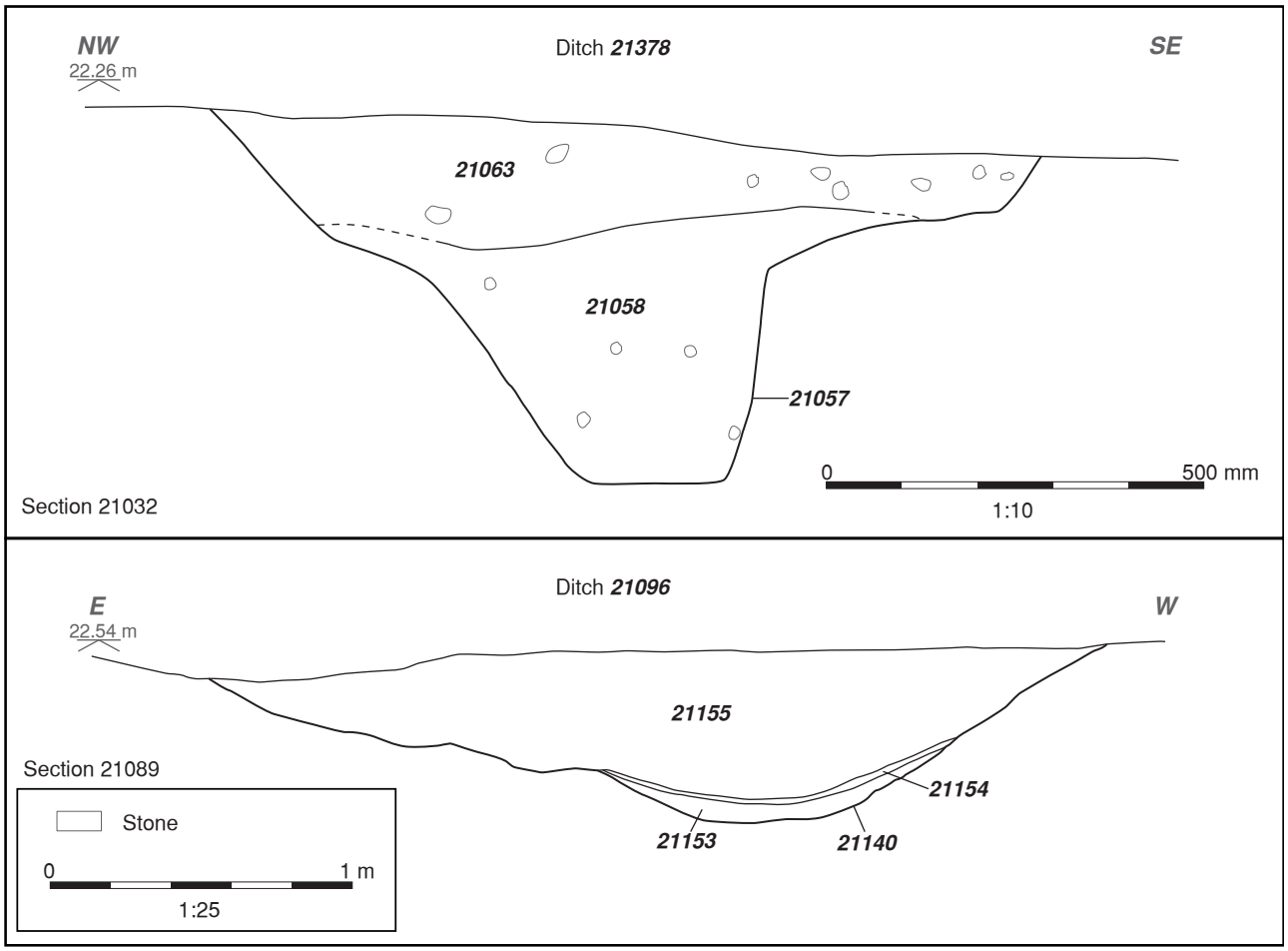


Figure 186: Sections across ditches **21378** *and* **21096**

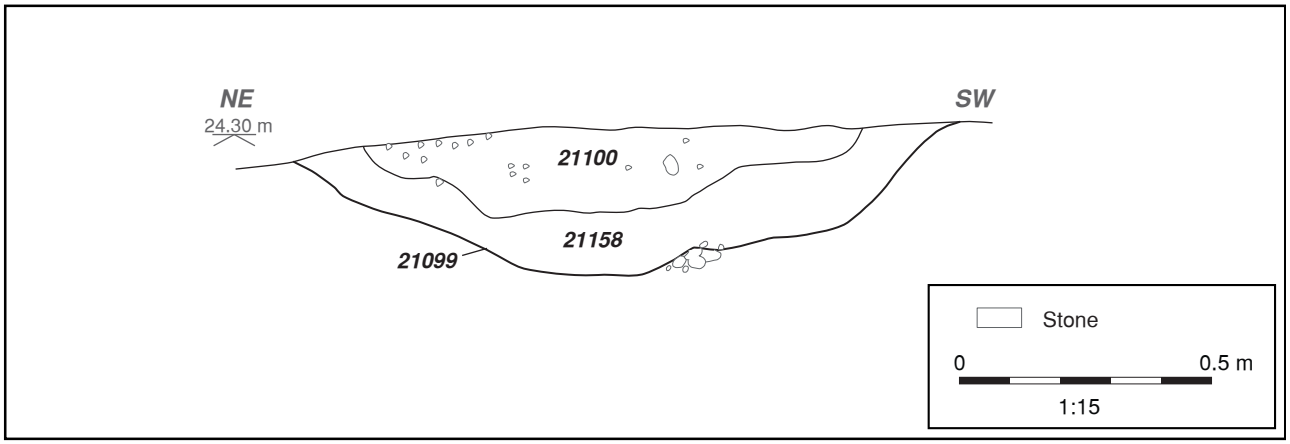


Figure 187: Section across pit **21099**

sherds of pottery from its primary fill, in a fabric that appears typical of mid-late second-millennium BC pottery (*Appendix 11*). Undiagnostic flint flakes and two crumbs of ochre were also recovered from it (*Appendix 2*), as well as a sherd of Romano-British pottery (*Appendix 11*). However, this latter sherd was found in the upper fill, suggesting that the ditch had remained visible as an earthwork for an extended period of time, before becoming completely filled in the early part of the first millennium AD.

Evidence for contemporary activity was found to the west, where an isolated pit (***21099***; Fig 184) was identified, which had a diameter of *c* 1.2 m and a depth of *c* 0.3 m. This had sloping sides (Fig 187), and contained two deposits, the lower of which (***21158***) produced an abundance of burnt wood and charcoal. This was sealed by a secondary deposit (***21100***), which also contained burnt material, though not in such abundance. Significantly, both were associated with a large quantity of charred barley grains, with nearly 6000 estimated in deposit ***21158*** (*Appendix 18*): one returned a date of 1880-1690 cal BC (3455±30 BP; SUERC-32828; Table 36).

The majority of the grains were extremely well-preserved and could be identified as naked barley. This is significant, as this variety is generally under-represented in Britain, though it was probably, along with emmer wheat, one of the principal cereals cultivated during the earlier Bronze Age (Huntley and Stallibrass 1995). It is easy to process, high in soluble fibre, and grows well in 'marginal' environments (*ibid*), and hence would have acted as an ideal cereal crop for the Bronze Age communities around the Solway Firth.

Some small quantities of chaff fragments were also present in its secondary fill (***21100***), derived from six-rowed (many-rowed) barley (*Appendix 18*). The number of charred weed seeds was small, but included tormentil and sheep's sorrel. The presence of such a large assemblage of charred cereal grains, and the relative lack of cereal chaff in comparison, combined with the near absence of weed seeds, suggests that it represents a fully processed crop which had been burnt. Given the nature of the assemblage, it is therefore tempting to suggest that the pit was directly connected with the processing of barley, which was perhaps roasted in it prior to milling. Wood charcoal was derived from alder, alder/hazel, and willow/poplar.

Given the evidence for Chalcolithic and earlier Bronze Age activity in Parcel 21 North, an undated structure (***21476***) was probably also related. This comprised four-posts, *c* 11.5 m west of ditch ***21906***, *c* 30 m north-east of pit ***21099***, and *c* 13 m north-east of House 3 (*p 407*; Fig 184). This had a typical sub-rectangular plan (Fig 188), measuring 2 x 1.6 m, its postholes averaging 0.17 m in diameter and 0.07 m deep. Such structures are often associated with late prehistoric settlements, perhaps being connected with the storage or processing of grain, and they usually date to the Middle and Late Bronze Age, or Iron Age (*cf* Brück 2001; Cunliffe 2005). It can be argued that in

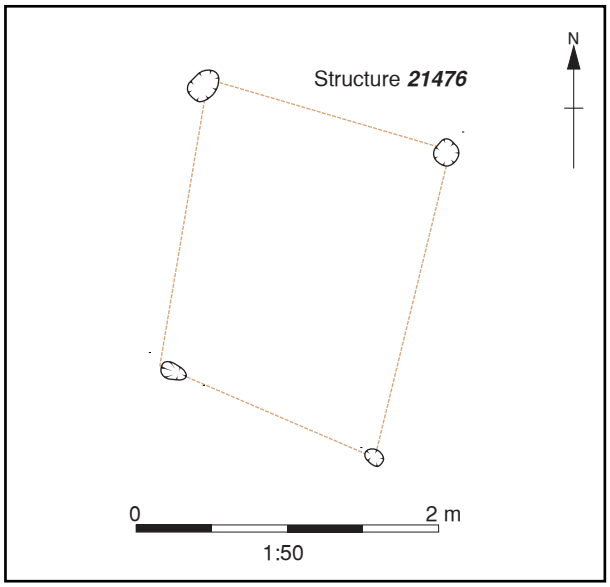


Figure 188: Structure **21476**

the Solway area these structures were also a feature of much earlier activity and it is therefore possible that the structure in Parcel 21 North did, indeed, date to either the late third millennium BC, being associated with the occupation of Houses 3A/3B, or the earlier second millennium BC, forming an element of the activity that resulted in the creation of pit ***21099***. Indeed, given the possible association of four-post structures with grain processing and storage, it is tempting to speculate that it was contemporary with this latter feature.

Parcel 41

At Parcel 41, to the north of the Eden (Fig 182), a short length of ditch related to a third area of earlier Bronze Age settlement and agricultural activity along the CNDR. This was aligned north-west/south-east and was divided into northern and southern segments (***41003*** and ***41009***; Fig 189) by a gap *c* 0.85 m wide. The northern segment (***41003***) was 6.8 m long and between 1.2 m and 0.7 m wide, and had a maximum depth of 0.25 m. It contained dumps of fire-cracked stones and charcoal, including a fragment of alder/hazel, from its southern terminus,

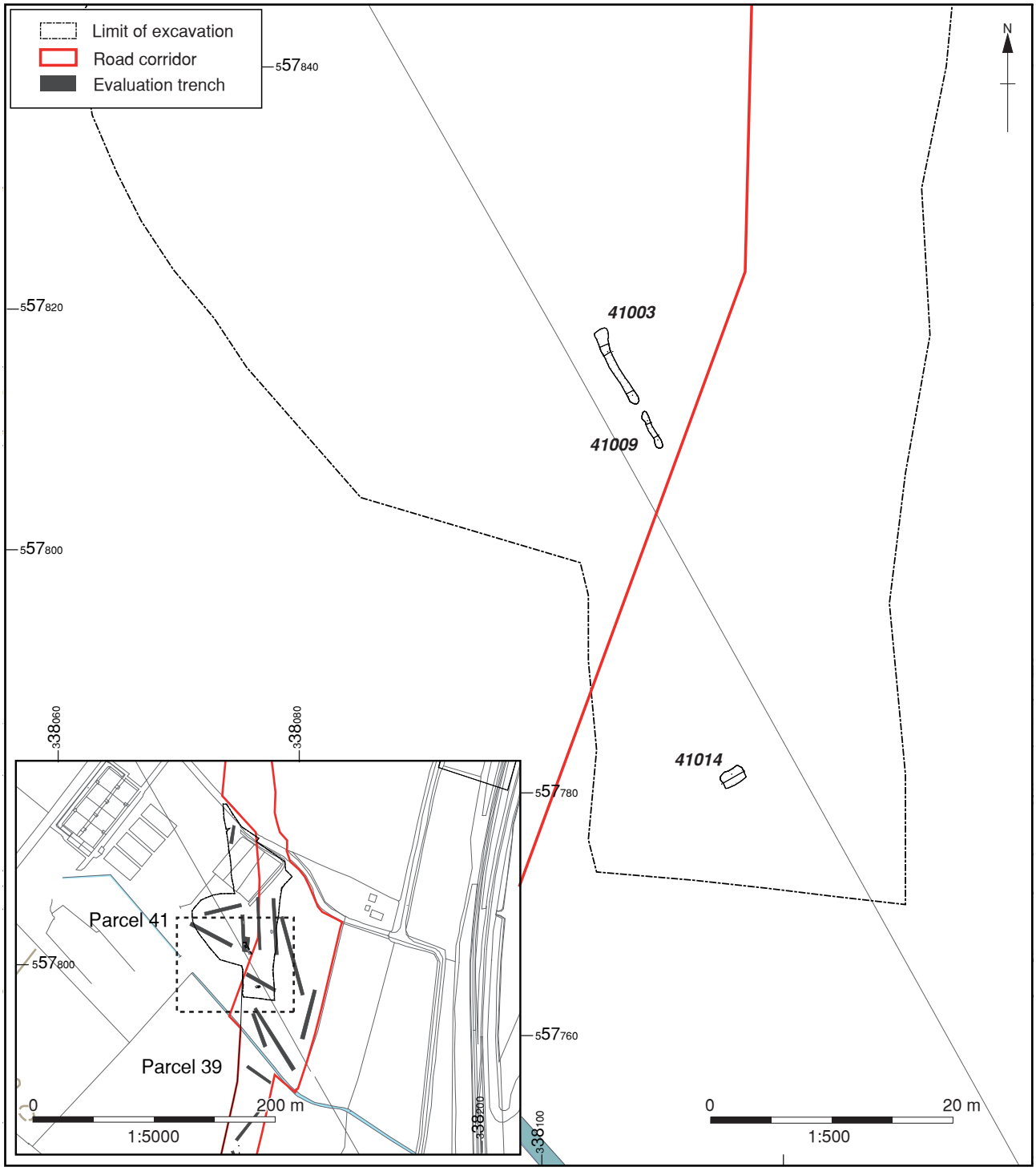


Figure 189: Earlier Bronze Age features in Parcel 41 (Contains OS OpenData © Crown Copyright [and database right] (2022))

which returned a radiocarbon date of 1530-1390 cal BC (3180±35 BP; SUERC-32727; Table 36). The southern segment (***41009***) was less substantial, measuring *c* 3.3 x 0.5 m, with a depth of 0.1 m, and it contained a silty deposit, with a small assemblage of charcoal, which was dominated by alder roundwood (*Appendix 18*).

Sub-rectangular pit ***41014*** was found approximately 27 m south of the segmented ditch, and just to the south of its alignment. This was 1.3 x 1.2 m, 0.27 m deep, with a flat base, and, in a similar fashion to the northern segment of the nearby ditch, it also contained dumps of fire-cracked stones and charcoal (Pl 160). This implies that it was contemporary with the ditch and formed another minor element associated with earlier Bronze Age activity at this locale.

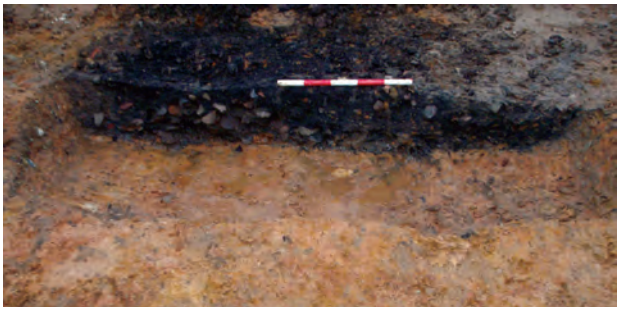


Plate 160: Burnt material in pit **41014**, *following half-sectioning*

Parcel 42

Parcel 42, to the north (Fig 182), contained important evidence for earlier Bronze Age settlement. This was on the brow above a small valley, which originally contained a watercourse flowing north-westwards into the River Eden. During the excavation, several tree-throws were identified, which might suggest that the area had been partially wooded prior to the establishment of the settlement. It comprised three roundhouses (Houses 4-6; Fig 190), dating to the middle centuries of the second

Figure 190: Earlier Bronze Age settlement in Parcel 42 (Contains OS OpenData © Crown Copyright [and database right] (2022))

millennium BC, typical of those associated with the 'post-built' roundhouse tradition (Pope 2015; *p 380*). The relative positioning of the houses, together with the radiocarbon assays, indicates that House 5 was the earliest, being replaced by Houses 4 and 6.

House 5 appears to have employed a double post-ring in its construction (Fig 191). The internal ring, supporting the roof, had a diameter of *c* 6 m and was defined by six postholes (***42091***, ***42236***, ***42071***, ***42073***, ***42069***, and ***42085***). These had diameters ranging between 0.2 m and 0.3 m, all were *c* 0.2 m deep, and several contained fragments of oak charcoal. The only surviving feature inside this post-ring was a posthole (***42075***) that may have secured an internal fitting. Only two posts (***42083*** and ***42087***) survived from an outer post-ring, which had an extrapolated diameter of *c* 9.2 m. These were similar in size and form to the other posts associated with House 5 and would have secured the external wall of the roundhouse.

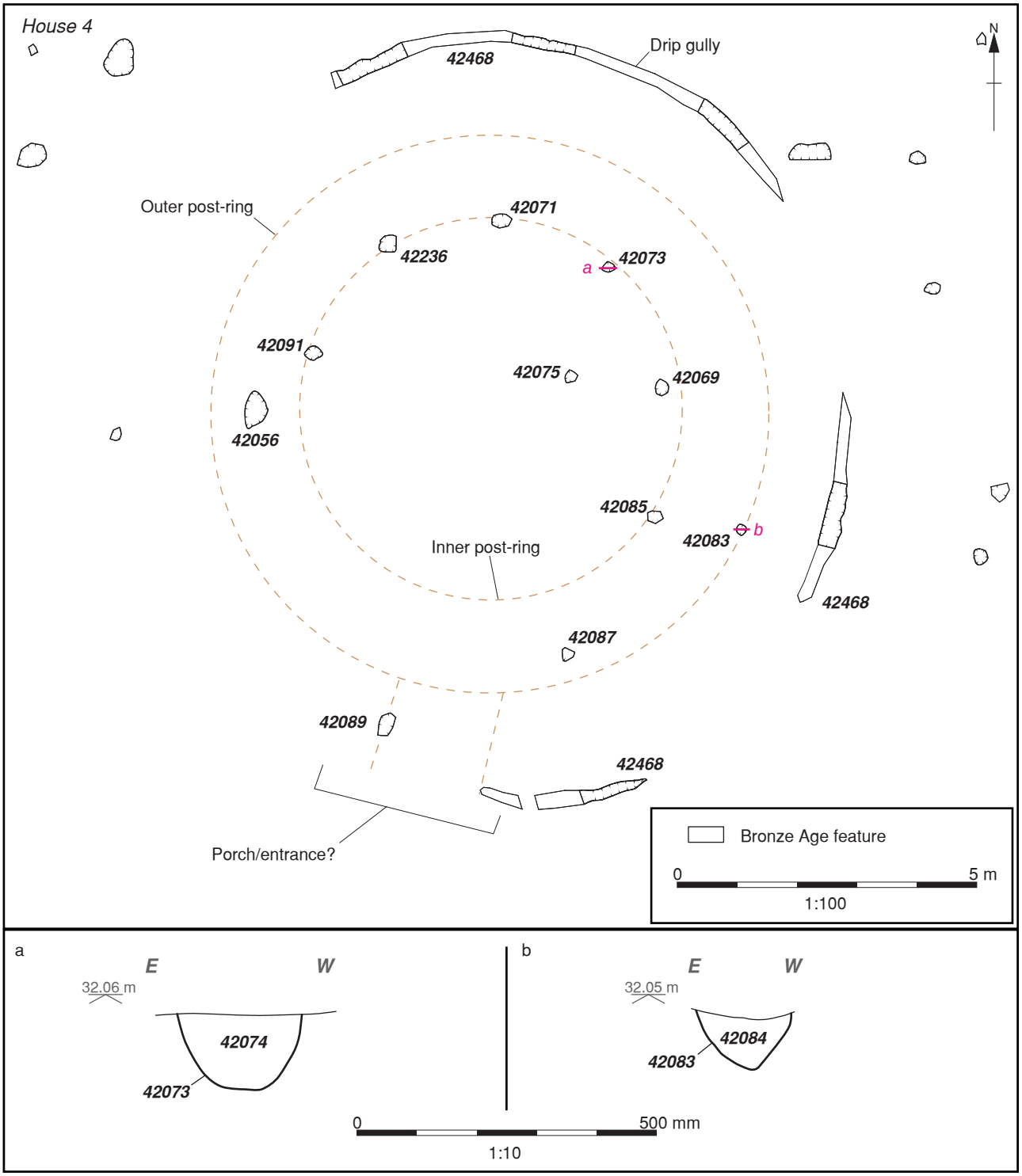


Figure 191: House 5

A posthole (***42056*** between the inner and outer post-rings, and another (***42089***), *c* 0.8 m south-east of the extrapolated line of the outer post-ring, were also identified. Given the position and form of the thresholds associated with other structures in this parcel (*pp 413-18*), it is quite possible that this latter post formed part of a porch, emphasising and covering an entrance into the dwelling, aligned south-south-west. It had a diameter of *c* 0.3 m, was 0.3 m deep, and contained small amounts of alder/hazel and oak charcoal.

An arcing, discontinuous drip gully (***42468***), with an extrapolated diameter of *c* 13 m, was revealed, approximately 1.5 m outside the extrapolated external wall of the roundhouse. This gully was, on average, 0.25 m wide and 0.1 m deep, and it contained oak charcoal, charred cereal grains, and also a chert flake. The drip gully had a clear terminus, close to the projected line of the eastern side of the putative porch. If this did indeed indicate its position, this porch might have been up to 1.5 m wide. Although it is possible that the gully never fully surrounded the structure, on the north-western side it had probably been removed by the construction of another house, providing a chronological sequence.

This house (House 4; Pl 161) was the western of the two possibly contemporary roundhouses, which were constructed following the demise of House 5. A hearth (***42037***; Fig 192), defined by a shallow oval-shaped scoop, *c* 1.2 x 0.7 m and 0.12 m deep, was in the centre of the structure, filled with a charcoal-rich soil. Alder and oak dominated its charcoal assemblage, suggesting these were the preferred species used as fuel (*Appendix 18*). A blackthorn-type charcoal fragment from this hearth returned a date of 1610-1410 cal BC (3210±35 BP; SUERC-32728; Table 36).

A post-ring was defined by seven posts (***42062***, ***42050***, ***42035***, ***42042***, ***42044***, ***42105***, and ***42048***), which would have supported the roof. This had a diameter of *c* 6 m, several of its postholes (***42062***, ***42042***, ***42044***, and ***42048***) being comparatively deep, straight-sided features, with depths of up to 0.5 m. One (***42044***) contained a post-pipe, indicating that the post had rotted *in situ*. These postholes also produced small amounts of charcoal, derived from oak, alder/hazel, and blackthorn-type species, as well as charred cereal grain and chaff, and charred weed seeds, including those of knotgrass, the St John's-wort family, fat-hen, and dock. Immediately adjacent to posthole ***42050*** was another deep, straight-sided posthole (***42046***), which was probably either its predecessor or replacement, suggesting that the roundhouse was repaired, on at least one occasion, in order to extend its life. Two other postholes (***42067*** and ***42065***) were located within the south-eastern segment of the post-ring, though these may have related to internal fittings and fixtures.

The partial remains of a second, outer post-ring had an extrapolated diameter of 9.4 m, as defined by five posts (***42052***, ***42058***, ***42219***, ***42060***, and ***42103***), one of which (***42219***) had been replaced by another (***42221***) at a later date. Significantly, this replacement was opposite the refurbished post (***42050***/***42046***; *above*) within the inner post-ring, suggesting that, at some stage, this side of the roundhouse required extensive refurbishment.

The outer posts were on average 0.15 m deep, with diameters of 0.3 m, and contained small amounts of

Plate 161: House 4, looking north-east

oak and alder/hazel charcoal. These posts would have formed elements of the outer wall line and two (***42058*** and ***42052***) also defined a *c* 1.2 m-wide entrance into the building. This was aligned to the south-south-west and was embellished by a porch, the remains of which were a *c* 0.9 m-long slot (***42225***), extending from posthole ***42058*** to a small posthole (***42229***), creating the foundations on the western side. Within the porch was a small, shallow pit (***42054***).

A drip gully (***42111***) around the outside of House 4 marked the position of the eaves of the roundhouse.

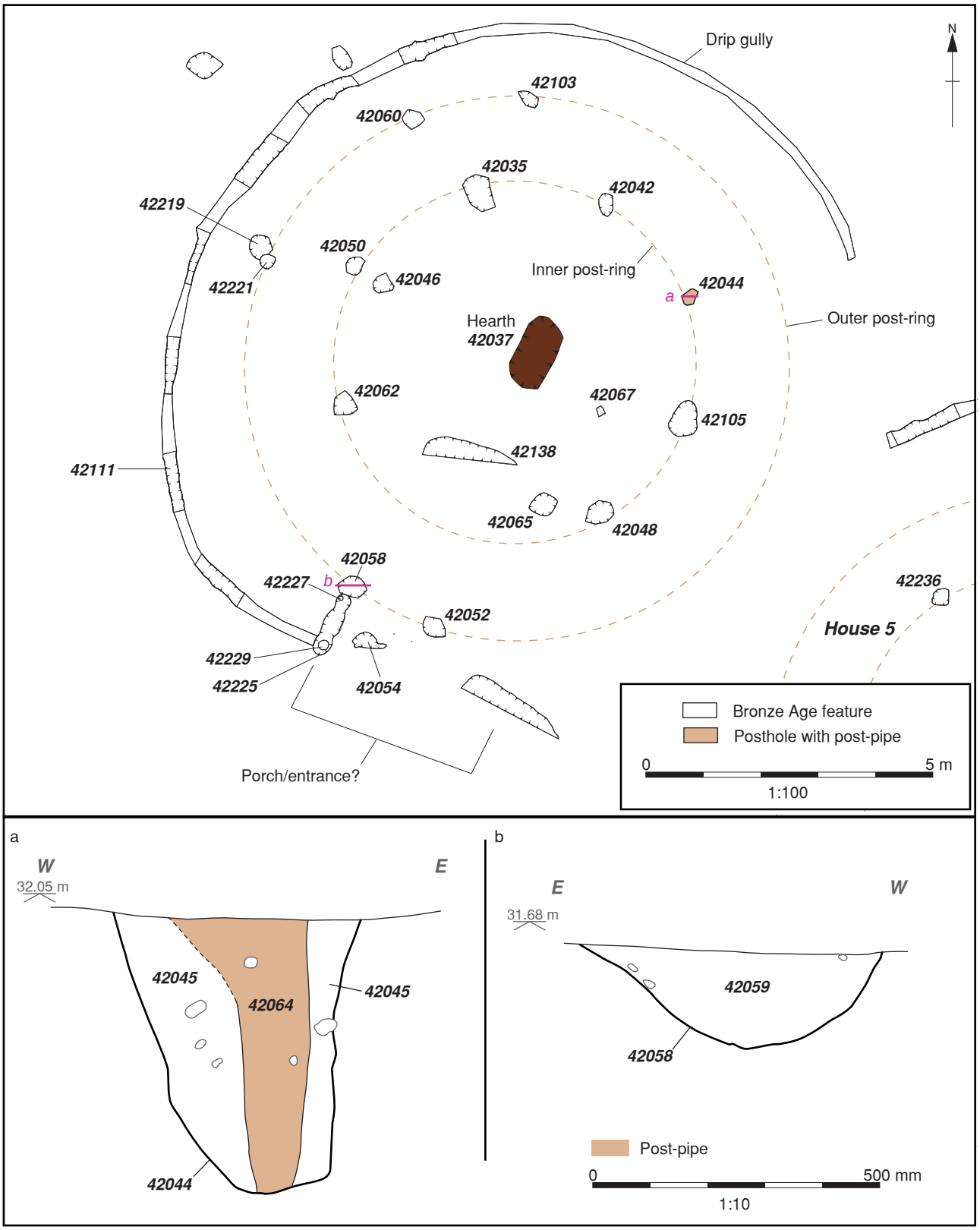


Figure 192: House 4

This gully extended from the porch to surround the western, northern, and north-eastern sides of the building, with an extrapolated diameter of *c* 12 m. It was *c* 0.2 m wide and *c* 0.1 m deep, containing a small assemblage of charcoal, dominated by hazel roundwood, and also a small collection of charred plant remains (*Appendix 18*). These latter comprise small amounts of cereal grains, including barley and weed seeds. Of these, the most abundant are pale persicaria, fat-hen, black-bindweed, and common chickweed, whilst there are lesser amounts of hemp-nettle, small fruits of the pea family, wild strawberry, cleavers, and seeds from the dead-nettle family. It is possible that wild strawberry was brought onto the site as a collected foodstuff.

House 6 was some 8 m east of House 4 and may have been a contemporary dwelling, being fairly identical in size. This house also contained a centrally positioned hearth (***42163/42165***; Fig 193), defined

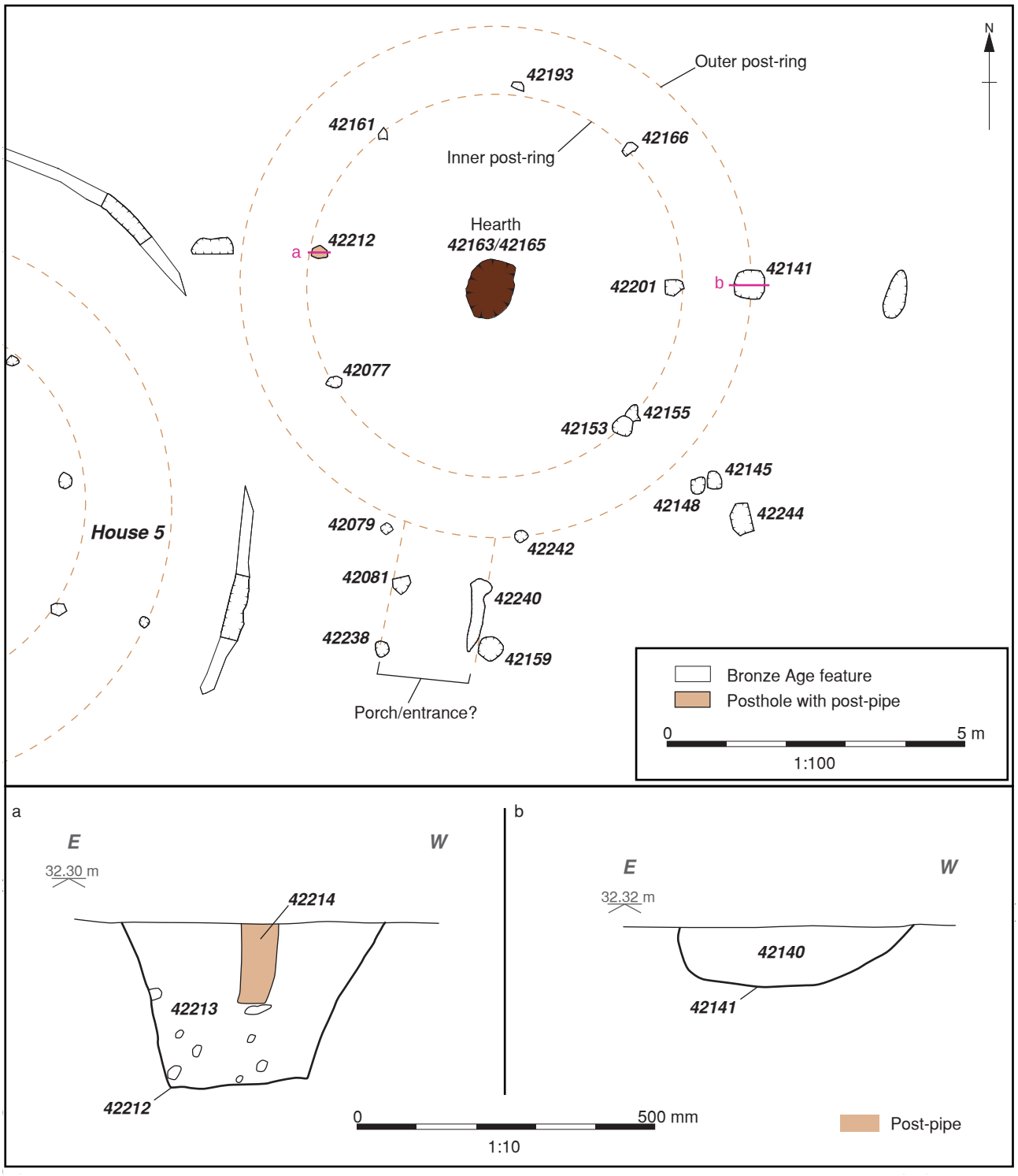


Figure 193: House 6

Plate 162: Hearth **42163**/**42165**, *looking east*

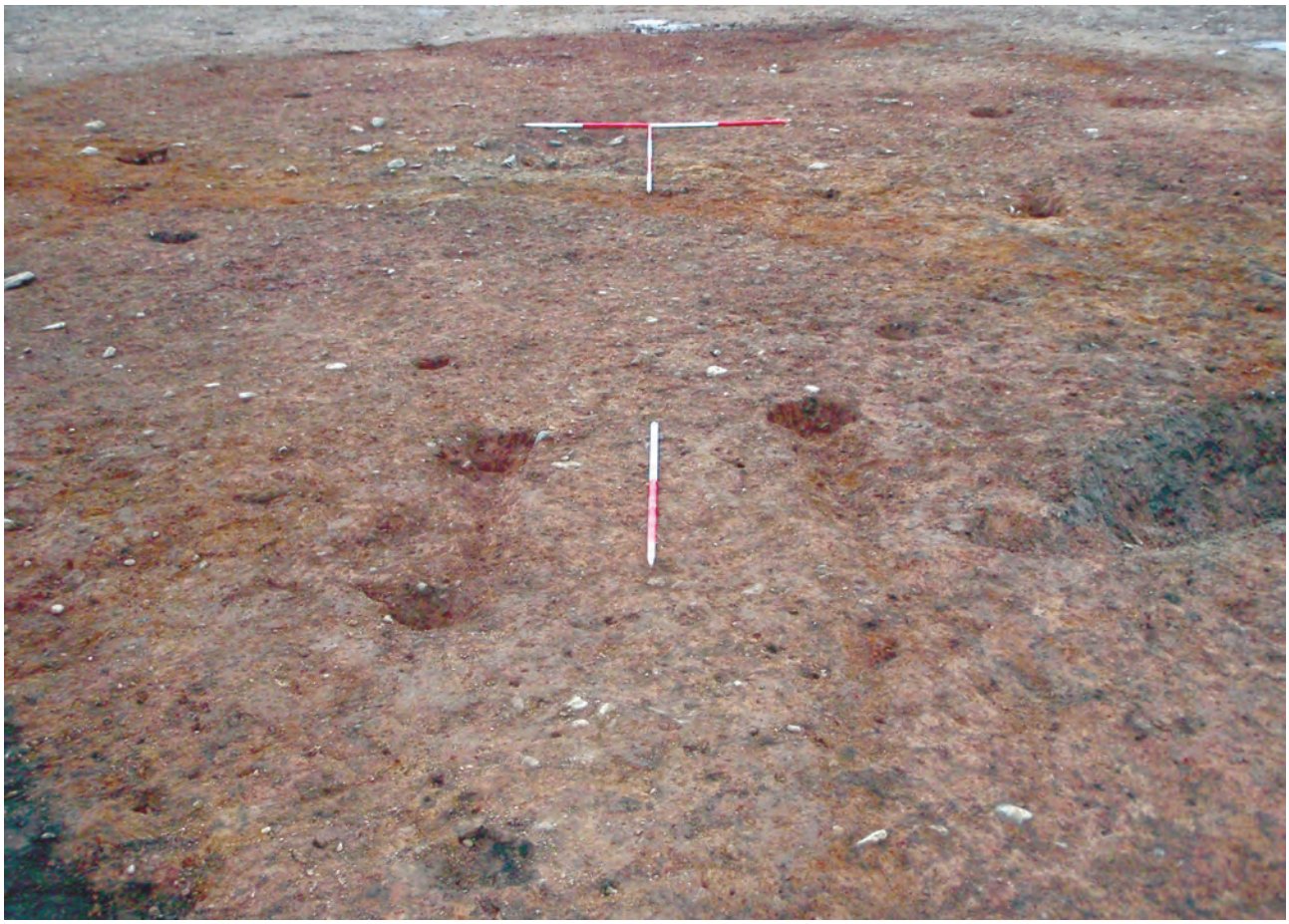


Plate 163: House 6, looking north

by a shallow oval-shaped scoop (Pl 162), *c* 1.1 x 0.8 m, which was *c* 0.15 m deep. It contained a charcoal-rich soil dominated by alder charcoal (*Appendix 18*), which returned a date of 1500-1280 cal BC (3125±35 BP; SUERC-32732), statistically consistent with the radiocarbon date obtained from the hearth in House 4 (Table 36).

House 6 (Pl 163) also comprised the partial remains of an inner post-ring, which supported its roof, an outer post-ring, defining its external wall line, with an entrance to the south-west, which was associated with a porch. The inner post-ring had a diameter of *c* 6 m and was defined by seven postholes (***42077***, ***42212***, ***42161***, ***42193***, ***42166***, ***42201***, and ***42153***), all with diameters in the region of 0.3 m and depths of *c* 0.2 m. A post-pipe was visible within posthole ***42212***, whilst a stakehole (***42155***) was immediately next to ***42153***; this contained spelt glume bases (*Appendix 18*). The outer post-ring, defining the roundhouse's wall line, was less complete, being defined by three postholes (***42141***, ***42242***, and ***42079***), and also two closely spaced posts (***42145*** and ***42148***) just beyond the ring, which probably represent sequential features associated with refurbishment. The largest of these postholes (***42141***) had a diameter of *c* 0.35 m and a depth of *c* 0.1 m, and it contained five fragments of prehistoric pottery (*Appendix 11*), whilst posthole ***42242*** produced charred cereal grain. Based on the positions of these posts, the outer wall line may have had a diameter of *c* 8.4 m.

The entrance to House 6 was defined by postholes ***42079*** and ***42242***, embellished by a comparatively large porch, which was *c* 1.1 m wide and *c* 2 m long. Its western side was defined by two *c* 0.3 m-diameter postholes (***42238*** and ***42081***), one of which (***42081***) contained charred weed seeds from the nightshades family, whilst the eastern side was defined by a *c* 1.2 m-long slot (***42240***) with a posthole (***42159***) to the south.

Several pits or postholes were also identified adjacent to the buildings, which probably represent further elements of the Bronze Age settlement (Fig 194). One pit (***42244***) lay immediately east of House 6, two others (***42109*** and ***42134***) to the north-west of House 4, and a posthole (***42101***) was identified between Houses 4 and 5; pit ***42109*** contained charred cereal and weed seeds. Other evidence for Bronze Age activity took the form of a pottery sherd from a modern land drain, close to pit ***42244*** (*Appendix 11*). Two features possibly associated with this activity were identified slightly further afield, one (***42536***), *c* 6 m north-west of House 4, containing burnt clay and charcoal-rich soil, dominated by alder charcoal, perhaps being

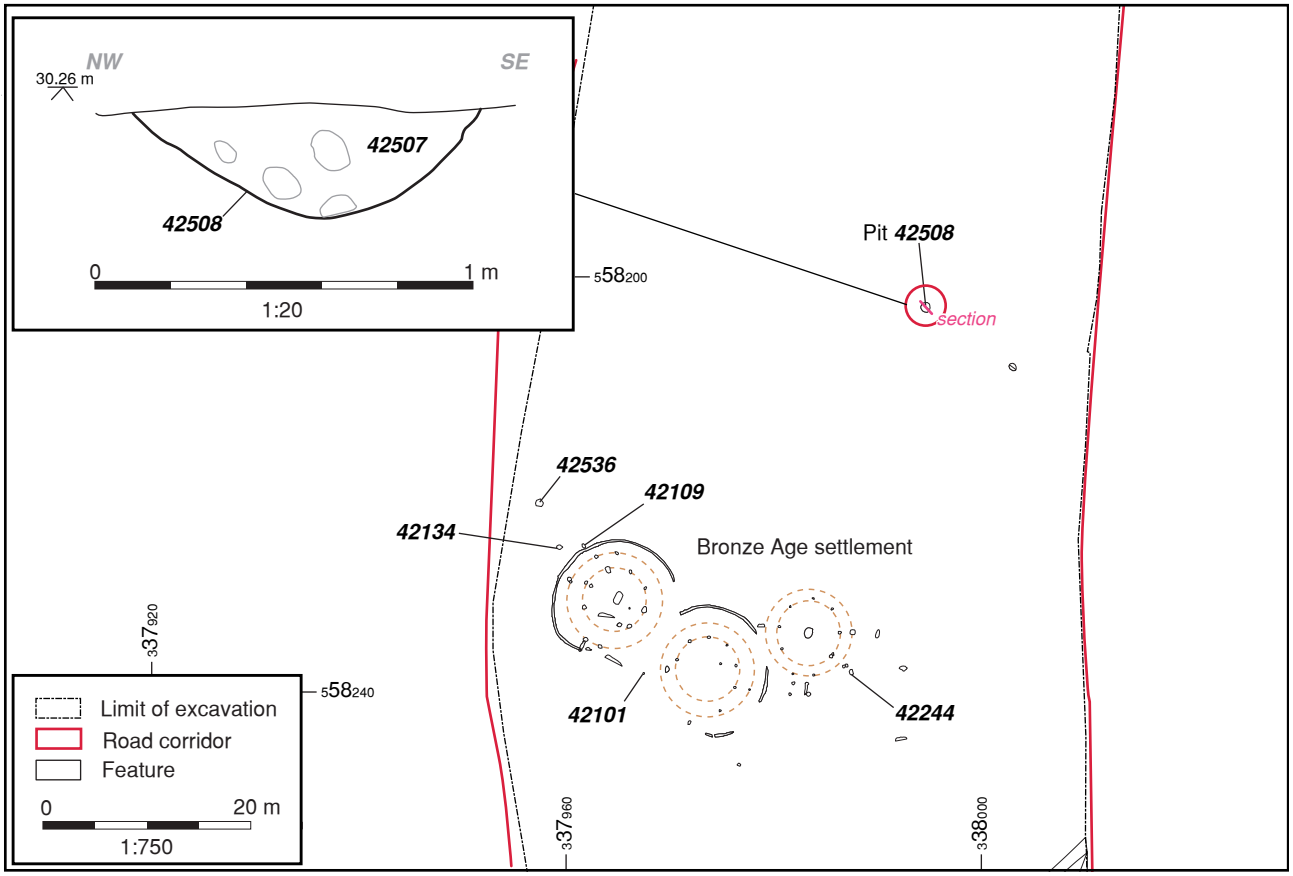


Figure 194: Other pits and postholes associated with the Parcel 42 Bronze-Age settlement

the remains of an isolated hearth. The other was a pit (***42508***), 35 m to the north, close to an early medieval settlement on the slopes of the valley (*Ch 14, pp 496-506*). This pit had a diameter of 0.9 m, was 0.3 m deep, and contained two lithic flakes.

The Later Bronze Age of the Inner Solway Firth (*c* 1150-750 cal BC)

The environment

Several significant changes occurred during the later Bronze Age, which were to have an impact on both the natural and cultural environment of the inner Solway Firth. The proxy-climatic sources, particularly studies of bog-surface wetness and alluviation, suggest that, nationally, climatic conditions throughout the majority of the later Bronze Age (*c* 1200-800 cal BC) were warm and dry (Brown 2008, table 2). Indeed, based on the study of Northern Irish peat bogs, it has been suggested that widespread summer droughts may have been a characteristic feature of this period (Swindles *et al* 2010). The evidence suggests that, around 850 cal BC until *c* 650 cal BC, there was a marked deterioration in the climate, which became much colder and wetter. This period of deterioration has been termed the '2.6 ka event' and has been recognised in the proxy-climatic data across Europe (*cf* Brown 2008, 14; Tipping *et al* 2012). One effect of the climatic downturn may have been increases in flooding, and it is quite possible that the alluvial deposits at Stainton West, grouped together as the *Bronze Age/Iron Age alluvium* (*p 373*), reflect such flooding stimulated by this.

Another important natural event within the inner Solway Firth dating to this period concerns changes in sea level. Although there may have been only minor fluctuations throughout much of the period, the later Bronze Age/earlier Iron Age transition may have witnessed a final sea-level regression. At Drumburgh Moss, on the southern side of the Solway, the event has been dated to 730-338 cal BC (2430 ±60 BP; B-103261; Lloyd *et al* 1999). For the Bronze Age communities of the region, this may have formed a significant long-term event, particularly as it probably occurred at a similar time to the marked deterioration in climatic conditions (*above*). In this sense, the greatest impact of climatic change may have been in the lowland environments, as opposed to the uplands.

Some insights can be gleaned from the regional pollen data for vegetation cover and land-use in the later Bronze Age. Generally, these suggest that clearance continued throughout this period, although, as in the earlier Bronze Age (*p 365*), this was probably a piecemeal affair. Based on the pollen data from Beck Burn, on Solway Moss, it is also possible that during the later Bronze Age there was a reduction in anthropogenic clearance and cereal cultivation at the head of the Solway Firth, with concomitant woodland regeneration (Rutherford and Gregory forthcoming), which was perhaps a direct result of the deteriorating climatic conditions. Indeed, it was not until the later centuries of the first millennium BC that the woodland cover was greatly reduced, in response to a significant expansion in agriculture (*ibid*; Tipping 1997a, 20; Hodgkinson *et al* 2000, 114).

At Stainton West, a pollen zone was identified (CNDR 5), largely constituting the assemblage associated with a buried subsoil, which might have dated to the second half of the second millennium BC, or perhaps even later (*Appendix 16*). However, the pollen assemblage within this zone is more indicative of later landscape activity, as it records the near total clearance of the alder woodland, the growth of acid heathland, and large increases of grasses, sedges, and cereal-type pollen (barley and oat/wheat-type), perhaps relating to the creation of larger areas for pasture and arable cultivation.

The settled landscape

Around the Solway Firth, the later Bronze Age is characterised by a dramatic decrease in the volume of archaeological evidence (*cf* Gregory 2002). For instance, burial mounds, cemeteries, and isolated burials from this period are unknown, as are ceramic types being used as grave goods (*ibid*). This may suggest that there was a conceptual shift connected with the treatment of the dead, which perhaps involved scattering cremated remains, retaining only small amounts for token deposition within a settlement area (Brück 1995). That said, later Bronze Age flat cemeteries are known in Ireland, whilst ring ditches, associated with small round barrows, have been identified across Ireland and England (*cf* Bradley 2007, 212; 2019, 245-6). Identifiable ritual monuments dating to this period are absent from the Solway area (Gregory 2002), settlements also being difficult to identify (*below*), and the volume of stray artefacts also decreases.

Prior to the investigations along the CNDR, the direct evidence for later Bronze Age activity was slim, although it included metalwork characteristic of this period (Fig 195). These principally comprised a small group of socketed axes from close to Carlisle, and an item of later Bronze Age goldwork from the northern Solway Plain (Clough 1969; Coles 1965). These complement other items of later Bronze Age metalwork known from the wider region, which comprise slender-leaf spearheads and swords (*cf* Clough 1969; Gregory 2002).

It is also possible tentatively to identify several later Bronze Age settlements in the area. At a broader level, across northern Britain, it is probable that unenclosed settlements, and various associated house types, continued to be a feature of both lowland and upland

Figure 195: Later Bronze Age artefacts and possible settlements across the inner Solway Firth (Contains OS OpenData © Crown Copyright [and database right] (2022))

landscapes during this time, and this certainly appears to be the case in the Solway area, based on the discovery of a seemingly unenclosed post-built roundhouse at Townhead Road, Dalston, probably built between 825 cal BC and 770 cal BC (Robinson and Town 2015). However, one significant feature of the later Bronze Age is the adoption of enclosed settlements, and also the first use of large hilltop, or hillfort, settlements, such as that at Burnswark, in eastern Dumfriesshire, to the north-west of the CNDR (*cf* RCAHMS 1997, 118, 130; Bradley 2019, 250-4).

Although, by virtue of topography, the large hilltop sites fall outside the lowland areas, one form of enclosed site that might potentially date to the later Bronze Age is the palisaded settlement. In regional terms, such settlements, enclosed by a substantial fence, have a long currency, extending across the first millennium BC and into the first part of the first millennium AD, but it is likely that a proportion of the curvilinear palisaded sites date to the later Bronze Age (RCAHMS 1997, 154). This is evidenced by the radiocarbon dates from several sites throughout the Border, in Northumberland and southern Scotland (*ibid*). Indeed, one good example that may be comparable to those in the inner Solway area was excavated at Aird Quarry, close to Stranraer (Cook 2006). This dates to the earlier part of the first millennium BC and comprised a curvilinear palisade, which enclosed a 'ring-groove' type of roundhouse, that had later been repaired.

Three curvilinear palisaded enclosures have been identified as cropmarks across the northern Solway Plain (RCAHMS 1997; Gregory 1998), whilst on the southern side, two sites associated with possible later Bronze Age palisaded settlements have been excavated to the east of Carlisle. One, at High Crosby, reportedly comprised a multiple-palisaded enclosure, whilst a similar multiple-palisaded enclosure was also investigated at Scotby Road (Flynn and McCarthy 1994; Hirst 1998; Jackson 2016). At this latter site, two sequential palisaded enclosures were identified, the earlier having a curvilinear shape, the latter a trapezoidal form. Although both remain undated, it has been postulated that the curvilinear enclosure might have been established in the later Bronze Age, whilst the trapezoidal enclosure could be of Iron Age date (Jackson 2016). Moreover, it does appear that some form of later Bronze Age activity occurred at this site, as a pit, *c* 100 m north-east of the ovoid enclosure, produced a charred hazelnut dating to 1190-910 cal BC (2855±39 BP; UBA-28821; *ibid*).

In addition to these sites, a possible curvilinear palisaded enclosure was excavated at New Cowper Quarry, Aspatria, to the south-west of Carlisle (Churchill 2017). This enclosure was defined by a narrow ditch, perhaps a foundation trench for a palisade, and was suggested to be of Early Neolithic date, given the presence of Neolithic pit clusters within it (*Ch 7, p 214*). The palisade trench did not, however, contain any datable material and morphologically the enclosure is more akin to a later prehistoric palisaded settlement (*cf* Gregory 1998). Tellingly, it is possible that the original palisade was refurbished at some stage between the eighth and sixth centuries cal BC, as a line of postholes, radiocarbon dated to this period, had been cut along the western length of the foundation trench (Churchill 2017).

The later Bronze Age at Stainton West?

At Stainton West, as in the wider region (*p 418*), the evidence of later Bronze Age activity was sparse. It is likely, however, that Terrace 3 was periodically flooded and, as such, some of the deposits forming elements of the *Bronze Age/Iron Age alluvium* (*p 373*) may date to this period.

Direct evidence for human activity lay to the east of the channel and included a small hearth (***90217***; Pl 164), with a diameter of *c* 0.3 m, and an adjacent posthole (***90247***; Fig 196), *c* 0.2 m in diameter. The hearth was defined by a charcoal-rich soil, associated with fragments of alder and alder/hazel charcoal. Two fragments returned statistically consistent dates of *1270-1080 cal BC* (*SUERC-41997*) and *1230-1020 cal BC* (*SUERC-32644*; Table 37), which place its use either at the very end of the earlier Bronze Age or in the first centuries of the later Bronze Age. A seemingly intrusive fragment of alder charcoal, from Late Neolithic tree-throw ***90522*** (*Ch 10, p 341*), was dated to 1220-1030 cal BC (2930±29 BP; SUERC-59312), also comparable with the dates from hearth ***90217***, and this may indicate contemporaneous activity. Another fragment of alder/hazel charcoal, from tree-throw ***90309***, produced a later Bronze Age/earlier Iron Age date of 800-560 cal BC (2543±26 BP; SUERC-59306). Again, this appears to represent intrusive material, particularly as the pit lay below the *Mesolithic overbank alluvium*, and, in the absence of any features at the site dating to this period, it is unclear whether it relates to human activity.

Plate 164: Hearth **90217**, *following half-sectioning*

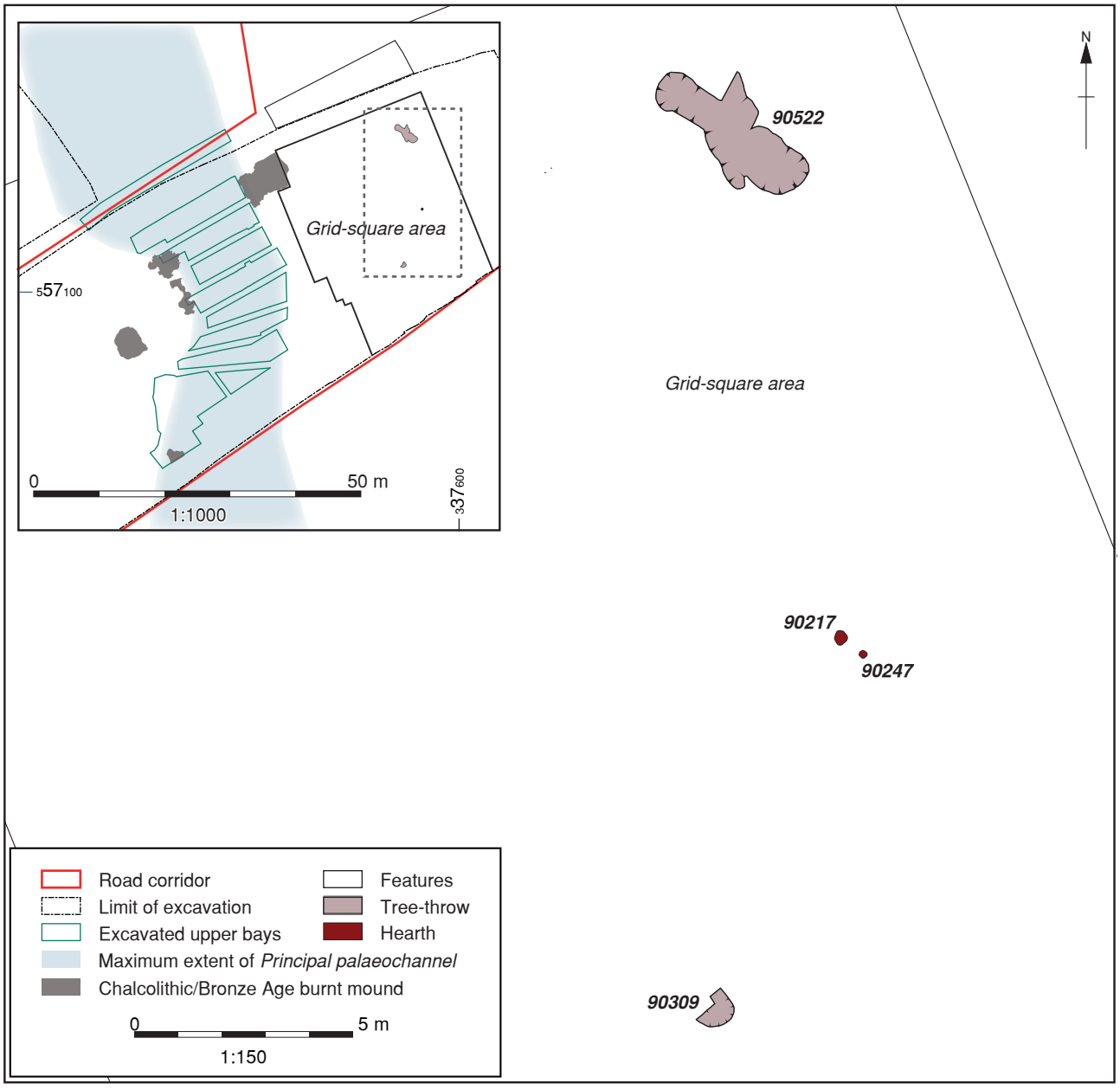


Figure 196: Features at Stainton West containing later Bronze Age charred material

Later Bronze Age settlement at Parcel 32

At Parcel 32, to the north of Stainton West (Fig 195), a tight scatter of pits and postholes was excavated at the northern end of the site. Handmade pottery (*Appendix 11*) was recovered from several of these features, indicating that they were a product of prehistoric activity, probably associated with a settlement. Their date was later confirmed through radiocarbon dating, which indicated that this potential settlement existed between the early twelfth and early tenth centuries cal BC. Significantly, this lies within the initial centuries of the later Bronze Age, and as such the remains appear to represent a rare example of a settlement dating to this period.

In total, 46 pits and postholes were concentrated within an area measuring some 30 x 20 m, whilst a smaller collection of postholes was also present to the south-west. Although taken as a group, these features are difficult to interpret, they undoubtedly relate to structures, probably contained within a settlement, or an area containing stock enclosures and pens. It appears, for instance, that a collection of postholes at the southern end of the group formed two fairly distinct fencelines (Fig 197). Although these may have formed elements of two separate animal pens, an alternative suggestion is that they formed part of a palisaded enclosure, with a funnel-like entrance, aligned north/south, perhaps designed to corral livestock into an area to the north. Two further postholes to the south (***32214*** and ***32204***) may have formed an additional fenceline as another element of this entrance. Such funnel-shaped arrangements are known from the inner Solway area, though these are normally

Area	Context	Comment	Sample	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Modelled date range (95% confidence) cal BC
Grid-square area	Hearth ***90217*** (fill ***90237***)	Element of later Bronze Age activity	Bulk sample 90000	SUERC-41997	Alder/hazel (*Alnus/Corylus*) charcoal	2956±26	-26.2	1260-1050	Statistically consistent with a good agreement (T'=0.76; T'(5%)=3.8; υ=1; A_{comb}=122.7% (An=50.0%))	*1270-1080*
				SUERC-32644	Alder/hazel (*Alnus/Corylus*) charcoal	2915±35	-26.3	1220-1000		*1230-1020*
	Tree-throw ***90522*** (fill ***90521***)	Intrusive material within Late Neolithic tree-throw Element of later Bronze Age activity	Bulk sample 90320	SUERC-59312	Alder (*Alnus glutinosa*) charcoal	2930±29	-27.3	1220-1020	-	-
	Tree-throw ***90309*** (fill ***90310***)	Intrusive material within late Mesolithic feature Element of later Bronze Age activity	Bulk sample 90108	SUERC-59306	Alder (*Alnus glutinosa*) charcoal	2543±26	-26.1	800-550	-	-

Table 37: Later Bronze Age radiocarbon dates from Stainton West

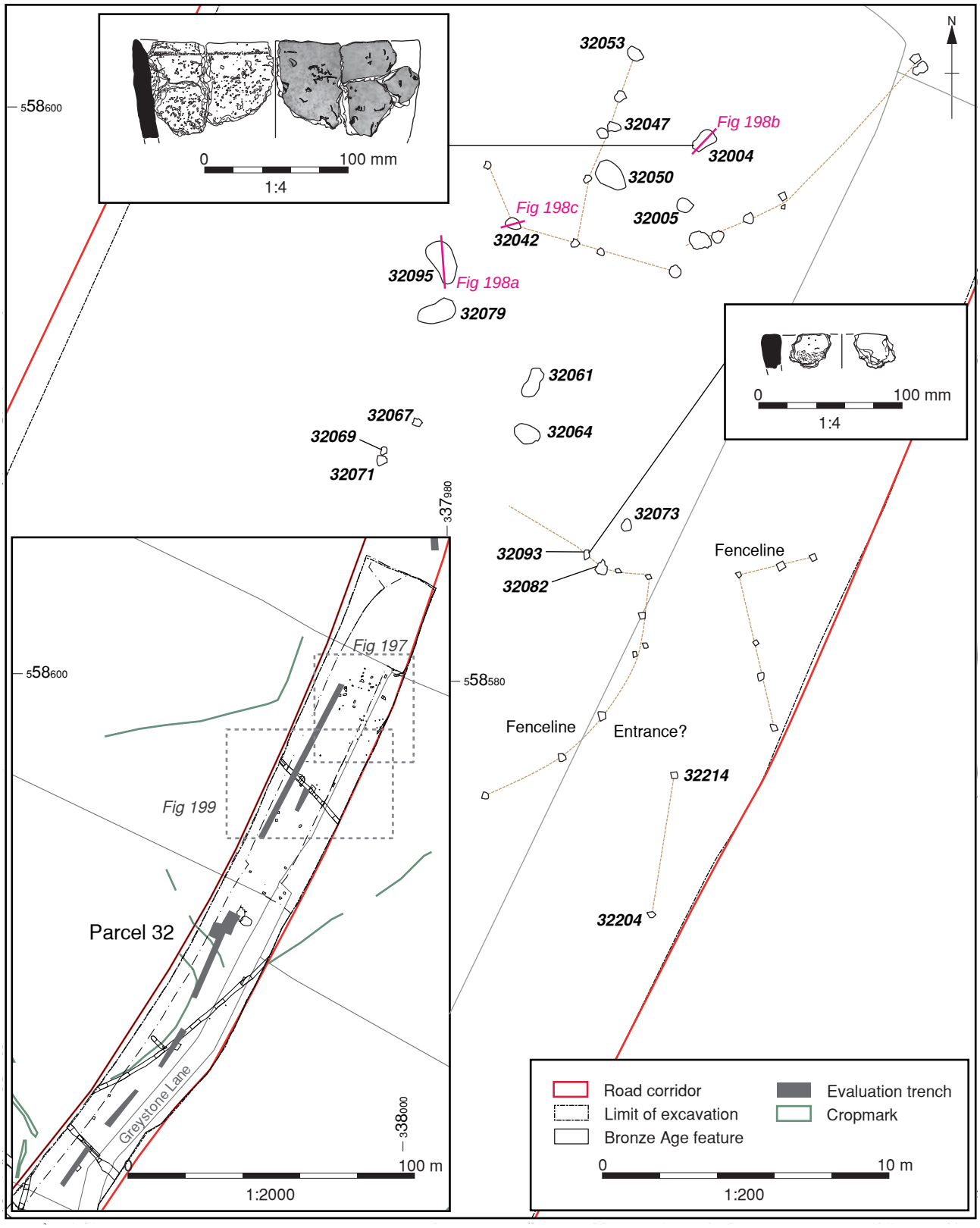


Figure 197: Later Bronze Age settlement in Parcel 32 (Contains OS OpenData © Crown Copyright [and database right] (2022))

defined by ditched boundaries and are associated with Iron-Age settlements (*cf* RCAHMS 1997, 57).

One of the postholes (***32082***) associated with the western fenceline contained alder/hazel and oak charcoal, and charred weed seeds, whilst an adjacent posthole (***32093***) contained blackthorn-type charcoal, as well as calcined animal bone, and 18 fragments of coarse prehistoric pottery. This probably derives from a flat-rimmed vessel, of a type characteristic of the ceramic forms present in northern Britain during the later Bronze Age (*Appendix 11*). To the rear (north) of the western fenceline

was a small pit (***32073***), which also contained alder/hazel charcoal and charred weed seeds.

To the north-west of this possible entrance, there were four large, concave-bottomed pits (***32095***, ***32079***, ***32064***, and ***32061***) and three postholes to the south-west (***32067***, ***32069***, and ***32071***). The pits were all oval, the largest (***32095***; Fig 198) measuring *c* 1.4 x 0.6 m and the smallest *c* 0.9 x 0.5 m, with depths ranging between *c* 0.2 m and 0.3 m; ***32095*** also contained fragments of oak charcoal. At least one of the postholes may have secured a post, or posts, associated with the putative palisade extending from the possible funnel entrance (*p 421*). Two contained fragments of charcoal (***32067*** and ***32069***) and one (***32069***) also contained charred grass-family seeds.

Immediately to the north-east of the pits was a concentration of postholes, several containing post-pipes, as well as oak and alder/hazel charcoal; these probably formed elements of structures. For example, this group appeared to contain three distinct posthole alignments, which may suggest that they defined animal pens or enclosures, or, more tentatively, lines of free-standing posts, associated with more abstruse activity. One posthole (***32042***) contained a post-pipe, within which were five sherds of prehistoric pottery. This was in a Neolithic-style fabric, and might therefore represent residual material, though it is equally possible that it dates to the later Bronze Age, given the difficulty of distinguishing between Neolithic and Bronze Age ceramic fabrics (*Appendix 11*). This posthole also contained charred crop- and weed seeds. Charred weed seeds were also recovered from posthole ***32053***, whilst eight further sherds of prehistoric pottery came from posthole ***32047***, in a similar fabric to those from posthole ***32042***.

Positioned between the posthole alignments were three pits (***32050***, ***32005***, and ***32004***), one (***32050***) containing a grey flint blade and another (***32005***) charred emmer wheat and weed seeds, along with a collection of alder, alder/hazel, ash, oak, and blackthorn-type charcoal (*Appendix 18*). The third pit (***32004***) also contained a small assemblage of pottery, charcoal, and charred plant remains. The ecofacts included alder/hazel, birch, and oak charcoal, and charred barley, wheat, and weed seeds (*Appendix 18*). Eight sherds of pottery together form a substantial part of the rim of a single

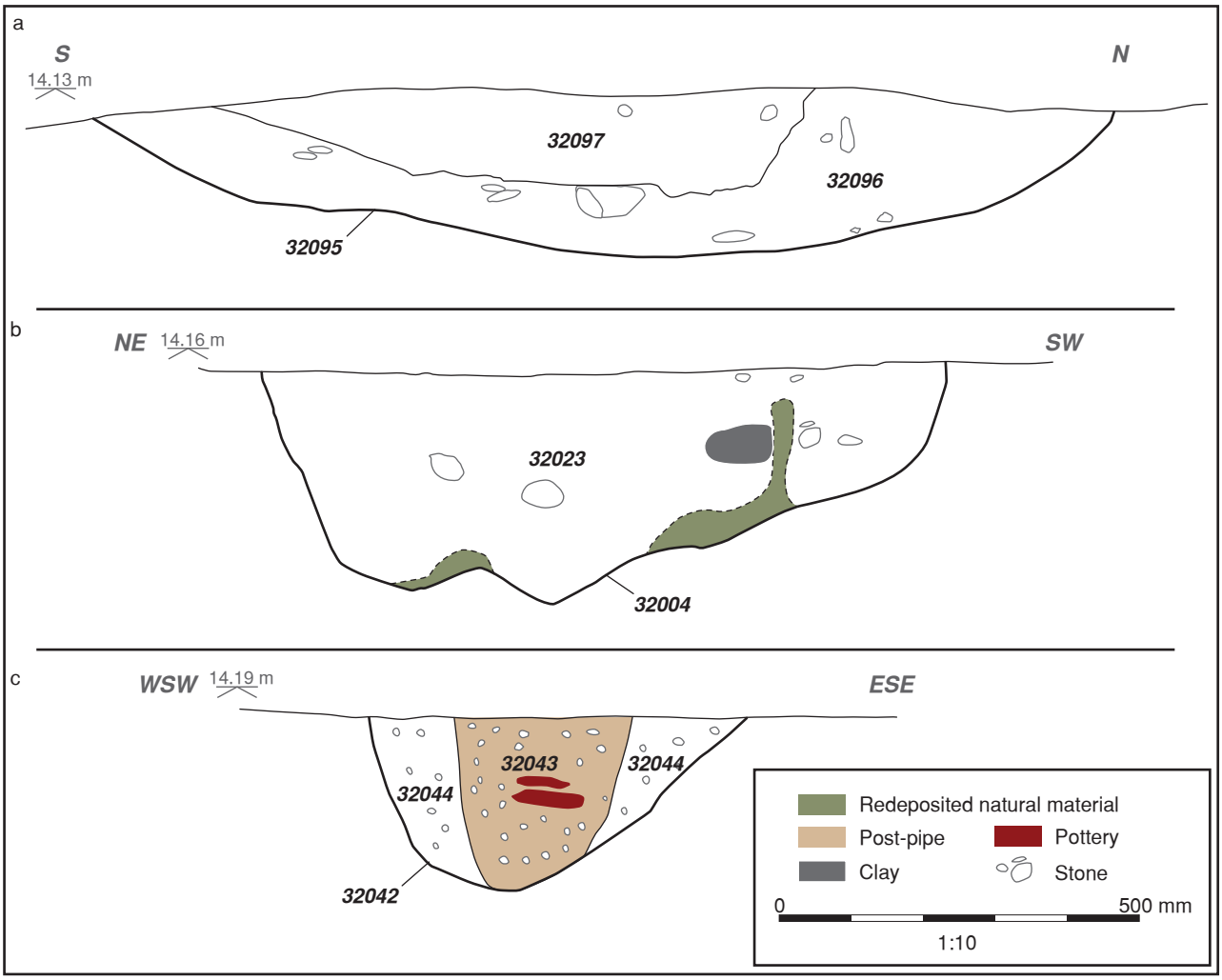


Figure 198: Sections across pits **32095** *and* **32004**, *and posthole* **32042**

vessel. This is a plain upright rim, with a slight internal bevel, and its internal surface has possibly been affected by heat (*Appendix 11*). The substantial nature of this rim suggests that it was deliberately placed in the pit, though whether this, along with the other remains, formed part of a 'structured deposit' is difficult to ascertain. The date of the pit, and in turn the ceramic vessel, was ascertained through two radiocarbon dates from a fragment of alder/hazel charcoal and a charred wheat seed. These returned statistically consistent dates of 1130-910 cal BC (2855±35 BP: SUERC-32726) and 1115-935 cal BC (2861±23 BP; SUERC-42037), which provide a combined date of 1110-940 cal BC (Table 38).

Another structure in Parcel 32, although undated, was probably contemporaneous with the later Bronze Age activity at the northern end of the site. This was a four-post structure (***32084***; Fig 199), which lay *c* 17 m south-west of the possible palisaded entranceway, and may have functioned as a grain store or possibly a malting floor (*Ch 12, pp 444-5*). This structure was *c* 1.9 m square, and its postholes had average diameters of 0.23 m and depths of 0.14 m. They also contained a relatively high proportion of stone, some of it apparently burnt, and it seems likely that this was post-packing material, perhaps even suggesting that the structure had burnt down.

Site	Context	Bulk sample	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal BC	χ^2 test	Combined calibrated date range (95% confidence) cal BC
Parcel 32	Pit ***32004*** (fill ***32003***)	32005	SUERC-42037	Charred wheat (*Triticum* sp) grain	2861±23	-23.0	1115-935	Statistically consistent with a good agreement (T'=0.05; T'(5%)=3.8; υ=1; A_{comb}= 125.8% (An= 50.0%))	*1110-940*
			SUERC-32726	Alder/hazel (*Alnus/ Corylus*) charcoal	2855±35	-27.7	1130-910		

Table 38: Later Bronze Age radiocarbon dates from Parcel 32

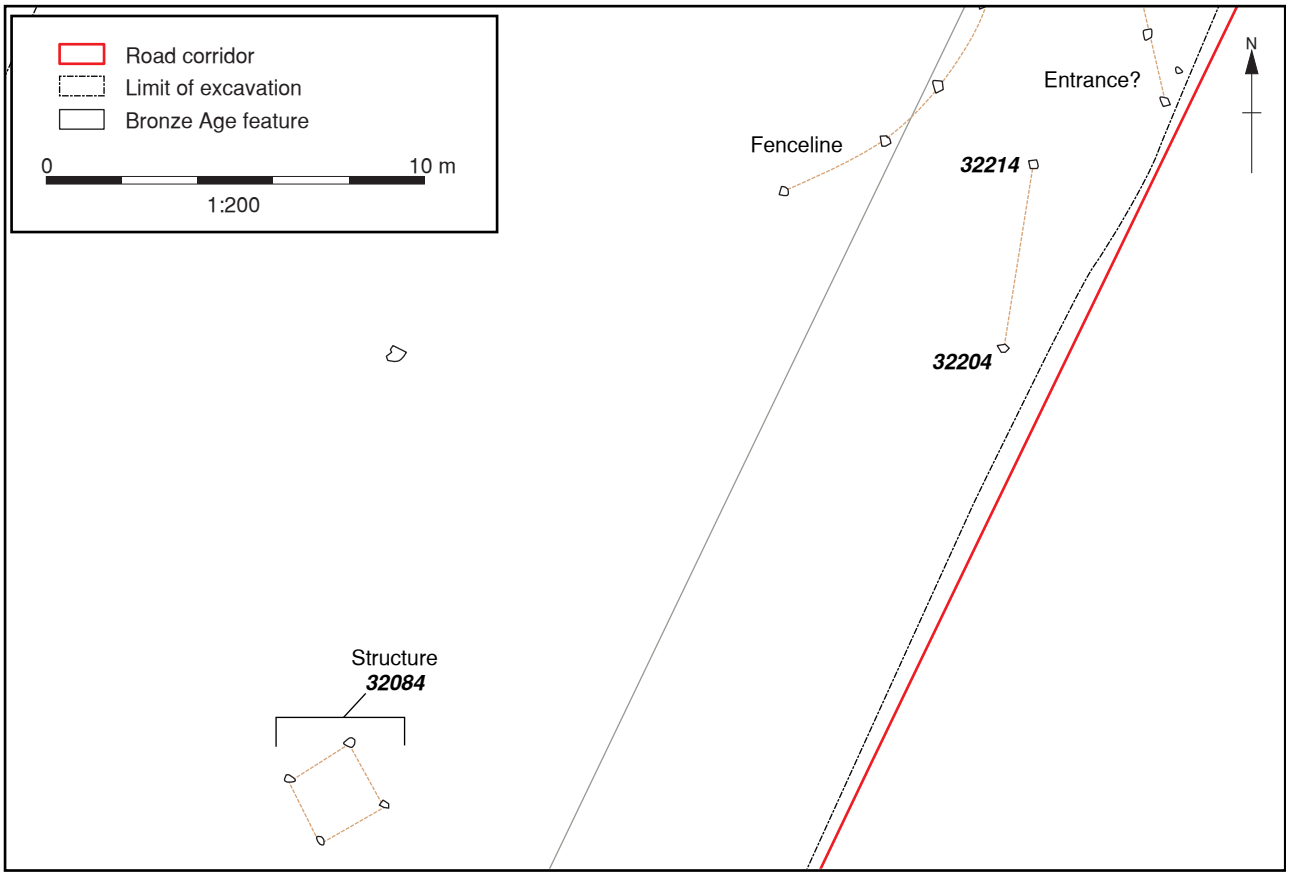


Figure 199: Structure **32084**

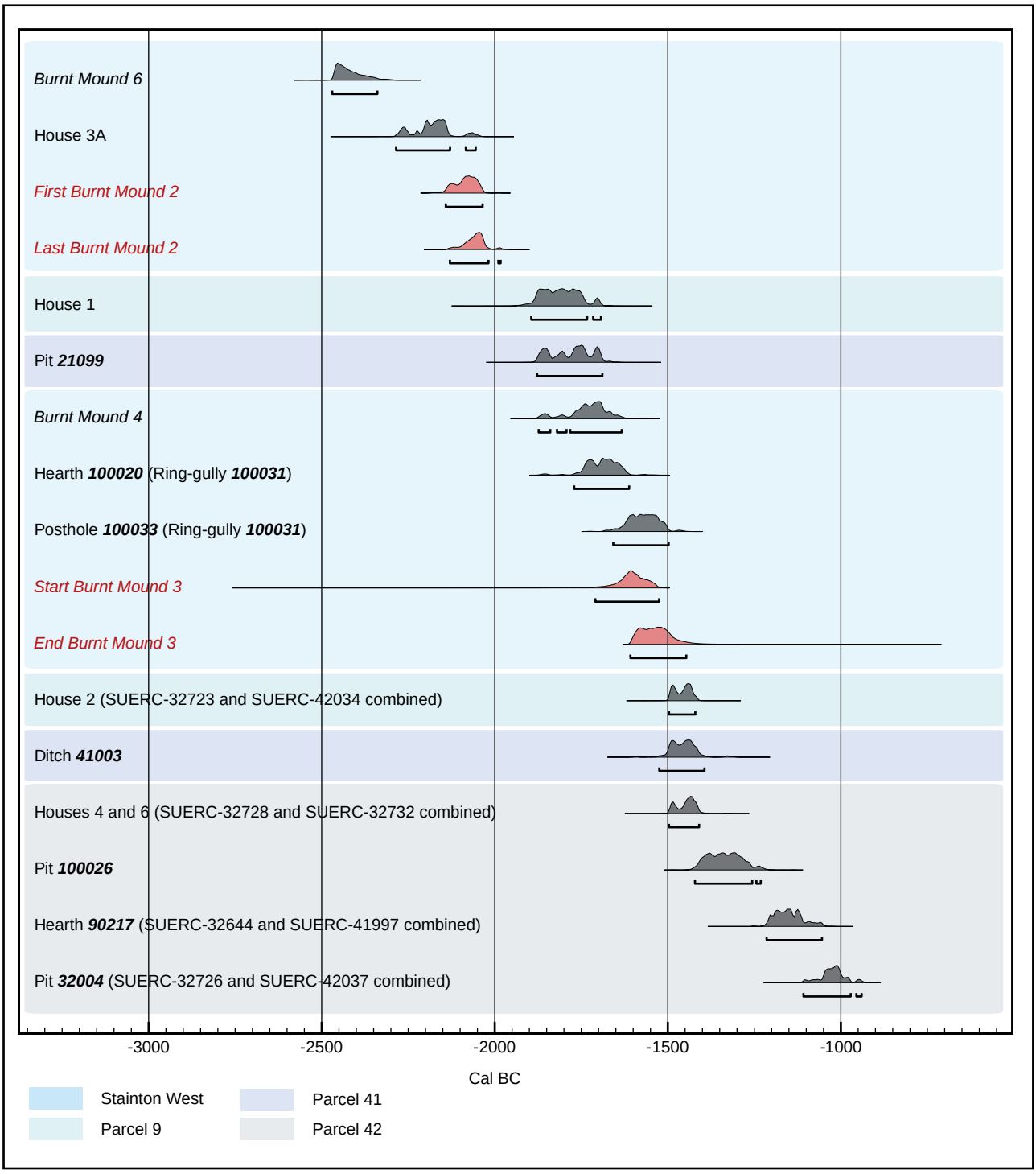


Figure 200: Probability distributions of calibrated radiocarbon assays and posterior-density estimates from the Chalcolithic and earlier Bronze Age remains from the CNDR

12

THE CHALCOLITHIC AND BRONZE AGE: BURNT MOUNDS AND SETTLEMENT

R A Gregory

The evidence for Chalcolithic and Bronze Age activity from the CNDR (*Ch 11*) is important in regional terms, though it also holds great significance for the wider Bronze Age archaeology of northern Britain. In general, it can be divided into activity which seemingly lay beyond the everyday, particularly burnt mounds, and that associated with perhaps the more mundane settlement, agriculture, and the early division of the landscape.

Burnt Mounds and Associated Features

Burnt-mound activity continued at Stainton West from the Neolithic period (*Ch 10, p 344*) into the Chalcolithic period and Bronze Age, the later mounds dating to *c 2480-1460 cal BC*. There were also several features (*ie* ring-gully ***100031***, and pit ***100026***; *Ch 11, pp 395-7*), probably also associated with this activity, broadly dating to *1780-1230 cal BC* (Fig 200). The chronological evidence therefore indicates that the site formed a perennially significant location for burnt-mound-related activities, particularly as it was revisited intermittently over a period of some 1000 years. Burnt-mound construction in Britain was predominantly between the Late Neolithic period and the Iron Age, with the majority of examples dating to 1750-800 cal BC (Topping 2011). The Stainton West burnt mounds represent, therefore, an important group, as they span most of the earlier part of this chronological schema.

The reasons for the persistence of this activity at Stainton West were probably twofold. On the one hand, it was certainly influenced by the presence of the palaeochannel, which throughout the later Neolithic and Chalcolithic periods, and earlier Bronze Age, periodically contained standing or flowing water. The channel would therefore have provided the required water, which could be heated as part of activities connected with the burnt mounds (*below*). Such locations would probably, therefore, have been favoured by prehistoric peoples engaged in such activity, similar groups of burnt mounds, dating to the late third and second millennia BC, having been identified clustering along relict palaeochannels at Pentrefelin, in Gwynedd, and Gallow Hill, Girvan, and Boreland Cottage Lower, on the Dunragit Bypass (Fig 201), in a manner reminiscent of the Stainton West group (Kenney *et al* 2014; Donnelly and MacGregor 2005; Bailie 2021). In addition, several burnt mounds in Cumbria have been found adjacent to palaeochannels (*p 432*). As far as can be ascertained, at Stainton West, in all instances, this water was manually brought to the trough in containers of some description, as systems of water management were not evident that could be comparable to those identified at other sites, such as Gallow Hill (Donnelly and MacGregor 2005).

Secondly, if it is considered that burnt-mound-related activities were only performed at certain times and under certain circumstances, at Stainton West the presence of a nearby henge monument may also have influenced their creation. For instance, it is quite possible that the henge was still being used throughout the Chalcolithic and earlier Bronze Age, and, as in the Late Neolithic period, there may even have been a direct link between the burnt mounds and ceremonial activities undertaken at this ritual site (*Ch 10, p 353*). In a broader sense, the henge might also have embedded Stainton West within a sacred landscape, in which only certain activities could be undertaken. Moreover, this may have been bolstered by the presence of the Late Mesolithic midden, which was probably a visible landscape feature, and might have made the area 'different'. This ancient feature was certainly referenced during the earlier Bronze Age (*Ch 11, p 400*) and it perhaps therefore contributed to the *genus loci* of Stainton West, via a process of historical resonance, which may have further encouraged the use of this locale for 'special' (*ie* burnt-mound-related) activities.

The remains associated with this Chalcolithic and earlier Bronze Age activity covered several discrete areas (Burnt Mounds 2-4, and 6) and are largely comparable, in that they included spreads of fire-cracked stones (Pl 165) sealing and, at times,

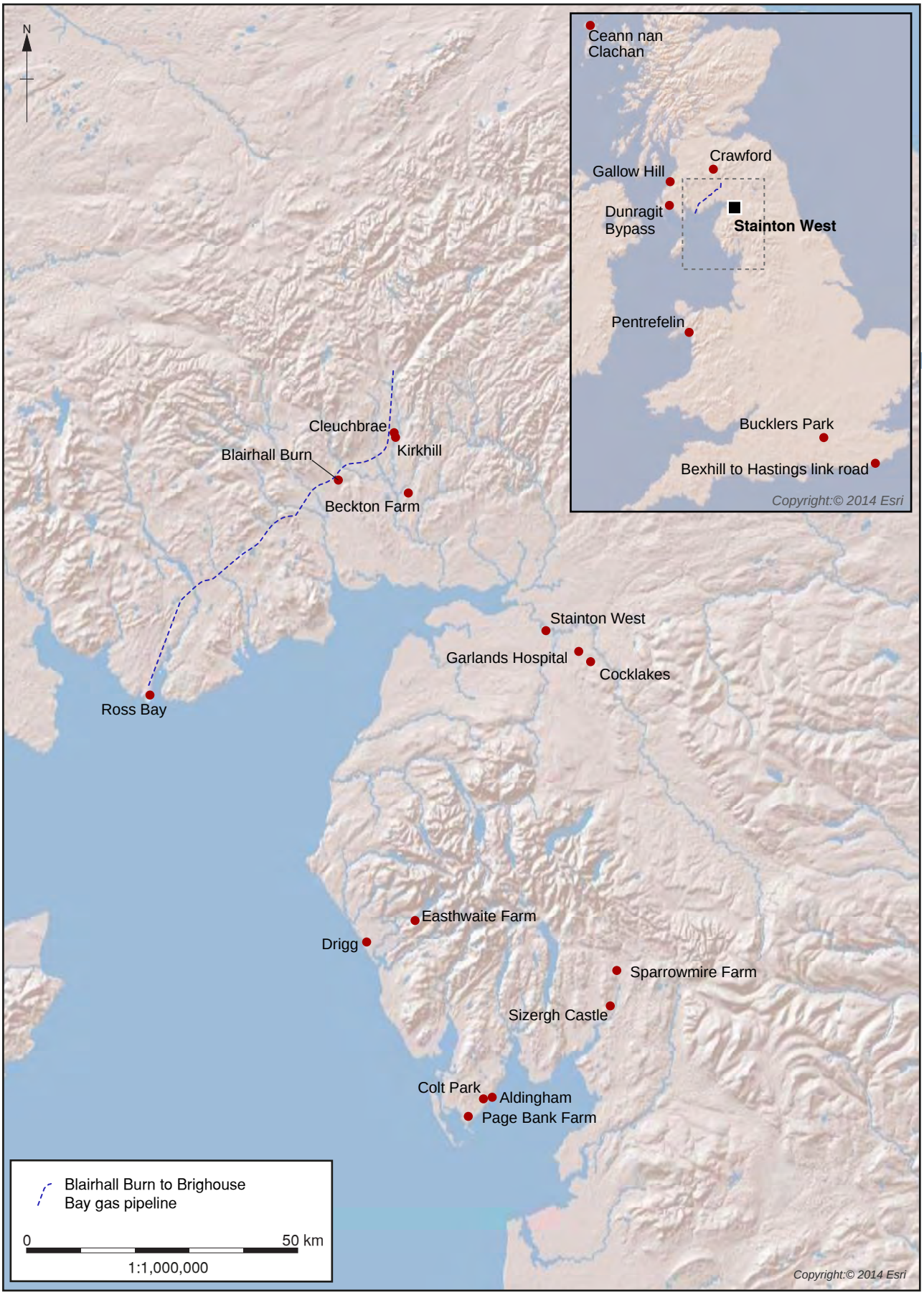


Figure 201: Burnt mounds mentioned in the text

Plate 165: The spread of burnt stone and charcoal-rich soil defining Burnt Mound 4

filling flat-bottomed pits or troughs. Two comparable pits (***70155*** and ***70278***; *Ch 11, p 398*) filled with burnt stone, although not directly covered by spreads of such stones, probably also functioned as troughs. A smaller pit (***100026***; *Ch 11, pp 397-8*), containing burnt-mound material and pottery sherds, was also present, and whilst this was probably not a trough *per se*, it is likely that it too was related to this activity.

Taken as a whole, the evidence suggests that burnt-mound activity principally involved the digging of troughs to hold water, and the subsequent heating of stones, which were then placed into the water-filled troughs to produce hot water and perhaps also steam (*p 435*). However, in an economical manner, once acquired, heated, and doused, these stones appear to have been repeatedly reheated and reused, before being finally discarded close to some of the troughs. Six isolated hearths were identified on the western side of the palaeochannel, along with one directly within the channel (Fig 202), which could have been used to heat the stones. Based on the charcoal concentrations, it may also be that the hearths associated with Burnt Mound 2 on the eastern side of the channel were originally directly adjacent to its trough. More generally, the charcoal evidence suggests that, throughout the earlier Bronze Age, the wood burnt was predominantly alder and hazel,

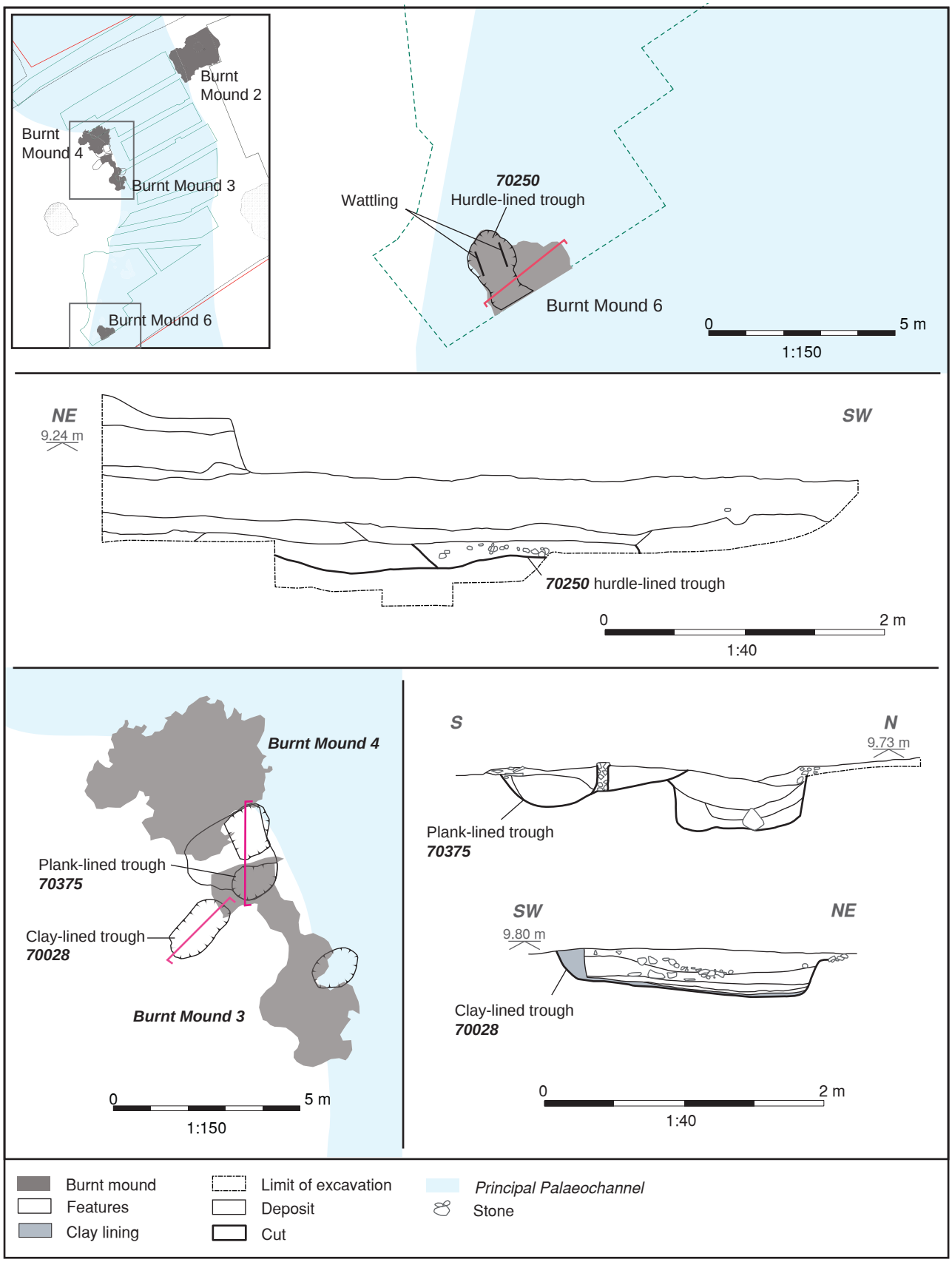


Figure 202: The lined troughs at Stainton West

in contrast to the use of oak and ash as fuel during the later Neolithic, and perhaps also during the Chalcolithic, period.

Both circular and rectangular troughs were present, and many, if not all, were probably originally lined, presumably to make them watertight. The linings

Plate 166: In-situ *possible hurdle panels, Burnt Mound 6, under fire-cracked stone* **70247**

varied, however, as in one instance, at Burnt Mound 6, the trough (***70250***; *Ch 11, p 386*) had been lined with hurdle panels (Pl 166), whilst another (***70375***; *Ch 11, p 391*), associated with Burnt Mound 4, appears to have possessed a plank lining. A third type was evident in trough ***70028*** (*Ch 11, p 392*), associated with Burnt Mound 3, which had been lined with clay. All of these linings were common to burnt mounds throughout the British Isles (*cf* Buckley 1990; Ó'Néill 2009; Ripper and Beamish 2011; Donnelly and MacGregor 2005; Bailie 2021), and at Stainton West, a chronology can be recognised, with hurdle panels representing the earliest form, followed by plank linings, and finally the use of clay. It has also been suggested that small circular troughs preceded the use of larger rectangular troughs (Ripper and Beamish 2011, 199); however, this is not apparent at Stainton West, as a fairly sizable sub-rectangular trough was associated with one of the Late Neolithic burnt mounds (Burnt Mound 5; *Ch 10, p 350*).

Significantly, several contemporary timber structures were identified in addition to the troughs and hearths. These comprised elements of a probable structure, apparently covering the trough associated with Burnt Mound 2, and part of a structure associated with Burnt Mound 4 that might again have covered a trough. Another, more substantial, circular structure, some distance away, was defined by ring gully ***100031***, postholes, and a central hearth (Pl 167). Although the size of this structure is akin to a small roundhouse (*eg* Houses 1 and 2 from Parcel 9; *Ch 11, pp 402-5*), given its position close to the burnt mounds, its situation within a probable ritual landscape, and also in an area that periodically flooded, it is likely that it too was associated with the burnt-mound activities at the site, as opposed to domestic occupation (*p 436*).

Regional context

Placed within their regional setting, the Chalcolithic/Bronze Age burnt mounds at Stainton West certainly add to the growing corpus known from Cumbria and Dumfriesshire (*cf* RCAHMS 1997; Hodgson 2007; Quartermaine and Leech 2012). Numerous burnt mounds have been recorded as standing earthworks

Plate 167: Ring-gully **100031**, *with hearth* **100020**, *a possible sauna*

throughout these counties, although their distribution is largely confined to specific parts of the uplands. These tend to be areas that have not been subjected to extensive medieval and later cultivation, and have also been examined by archaeological field surveyors with experience in identifying these types of small-scale monument (*cf* Halliday 1990; Hodgson 2007). In contrast, in other parts of Cumbria and Dumfriesshire, such as the Solway coastal plains, there is a dearth of sites, probably a result of their destruction by later land-use in these more agriculturally productive areas, allied to the clear difficulties in locating such sites through non-intrusive survey. However, the serendipitous discovery of this group of burnt mounds at Stainton West, together with other similar sites discovered by chance in the lowlands of Cumbria and Dumfriesshire, suggests that they probably once formed a relatively common component of the Bronze Age landscape of the inner Solway Firth area.

Several sites have been excavated in Cumbria (Fig 201), which are comparable to the Stainton West burnt mounds in terms of both date and the repertoire of surviving remains. For instance, at Drigg in west Cumbria, parts of a burnt mound were discovered eroding from the low cliff face. These comprised fire-cracked pieces of granite, charcoal, and peaty soils, set above and below well-preserved organic deposits (F Brown 2014). It appears that the mound was next to a wetland area and may also have been in a similar topographical position to Stainton West, as at Drigg earlier timber platforms and walkways appear to have been constructed within a palaeochannel. Radiocarbon dating of the mound and the associated deposits, and subsequent Bayesian modelling of these results, suggested that the burnt mound dated to *2430-2210 cal BC (95% probability)*, placing its use at a similar time to Burnt Mound 6 (*Ch 11, p 383*) at Stainton West.

Similarly, at Aldingham, near Barrow in Furness, a circular mound, composed of heat-affected stone, has been partially excavated (Morecambe Bay Archaeological Society 2006). This returned radiocarbon dates of 2290-2020 cal BC (3740±40 BP; SUERC-1855) and 2140-1910 cal BC (3640±35 BP; SUERC-1856), placing its use at a similar time to Burnt Mound 2 at Stainton West. Partial excavation was also undertaken on a burnt mound at Page Bank Farm, Barrow in Furness (Appley 2008). This was next to a palaeochannel and had a diameter of *c* 7.5 m. Charcoal extracted from its burnt-stone deposit produced radiocarbon dates of 2030-1770 cal BC (3570±35 BP; SUERC-19828) and 1930-1740 cal BC (3510±35 BP; SUERC-19829), whilst charcoal from another partially excavated burnt mound, also in Barrow in Furness, at Colt Park, has been dated to 1430-1290 cal BC (3090±30 BP; SUERC-19406). This site was adjacent to a stream and had been established above a substantial layer of peat (Headland Archaeology 2008).

In addition, at Cocklakes, to the south-east of Carlisle, archaeological trenching identified three shallow pits containing large quantities of charcoal and fire-cracked stone (Johnson *et al* nd). In this instance, this material probably derived from nearby burnt-mound activity, although pits filled with fire-cracked stone, and other artefactual materials, are also associated with other forms of prehistoric domestic activity, particularly that dating to the Neolithic period (*cf* Garrow *et al* 2005). Material from one of the Cocklakes pits returned statistically consistent radiocarbon dates of 2850-2350 cal BC (4000±40 BP; Beta-164101) and 2490-2210 cal BC (3900±40 BP; Beta-164102), which when combined provide a date of 2570-2340 cal BC, hinting at the presence of another Late Neolithic or Chalcolithic burnt mound in the Eden Valley. This pit also contained a Bronze Age flint scraper and a chert flake, and was associated with a small arc of stakeholes, suggesting that it had been protected by a windbreak, or covered by a light structure (*ibid*).

Close to these pits, two probable unlined troughs, 2.5 m wide and 0.25-0.5 m deep, were also identified that, again, contained charcoal and fire-cracked stone (*ibid*). Charred material from one of the troughs returned statistically inconsistent radiocarbon dates of 1940-1690 cal BC (3500±40 BP; Beta-164105) and 1860-1530 cal BC (3380±40 BP; Beta-164106), whilst charred material from the other produced statistically consistent dates of 1880-1650 cal BC (3390±40 BP; Beta-164103) and 1750-1520 cal BC (3350±40 BP; Beta-16104), which provide a combined date of *1750-1610 cal BC*. It therefore appears that there were at least four episodes of potential burnt-mound activity at this site, throughout the Chalcolithic and earlier Bronze Age.

More complete evidence for burnt-mound activity has been found at the other four Cumbrian sites. For instance, a primary trough was uncovered under a mound with a central depression, at Sparrowmire Farm, Kendal, which was associated with, and surrounded by, a circular bank of fire-cracked stone (Heawood and Huckerby 2002). At a later date, this trough had been replaced by a secondary feature, lined with oak planks, which again was associated with, and surrounded by, fire-cracked stones. This plank-lined trough had been probably similar to that seemingly associated with Burnt Mound 4 at Stainton West, which was also a secondary feature. Coincidentally, these two plank-lined troughs might also date to the same general period, spanning the middle of the second millennium BC, since a radiocarbon assay of 1880-1630 cal BC (3430±35 BP; SUERC-32716), derived from material in the primary trough at Stainton West, provides a *terminus post quem* for the construction of

its planked-lined successor. Similarly, at Sparrowmire Farm, the plank-lined trough was constructed prior to 1510-1400 cal BC (3020±50 BP; AA-34791), but after 1680-1410 cal BC (3240±50 BP; GU-8432) and 1530-1310 cal BC (3165±50 BP; AA-34790; *op cit*, 46).

A similar oak-plank-lined trough associated with, and surrounded by, a low mound of fire-cracked stone has been excavated at Sizergh Castle, Kendal (Gregory and Vannan 2014). However, this trough was earlier in date than those at Stainton West and Sparrowmire Farm, as charcoal from its fill, and also from the lower portion of the associated burnt mound, returned radiocarbon dates of 2460-2140 cal BC (3823±33 BP; SUERC-49749) and 2470-2210 cal BC (3871±30 BP; SUERC-49748; *op cit*, 16). This trough therefore appears to date to the Chalcolithic period, and thus was broadly contemporary with Burnt Mound 6 at Stainton West. However, at Sizergh, there was also a suggestion that the site was revisited in the early second millennium BC, and witnessed a similar form of burnt-mound-related activity, as a radiocarbon date of 2210-1980 cal BC (3705±33 BP; SUERC-48747) was obtained from charcoal derived from the upper part of the mound (*ibid*).

Garlands Hospital, on the eastern side of Carlisle, provides parallels with the burnt mounds at nearby Stainton West (Neighbour and Johnson 2005). During excavation, two troughs were uncovered, which were lined with alder planks, whilst a third unlined trough appears to have been present some 5 m to the south-west. A hearth lay between the two plank-lined troughs, whilst a small probable posthole was close to these features, which may have formed an element of a covering structure or windbreak. All were sealed beneath a circular spread of fire-cracked stone, though the dating evidence indicates that the two lined troughs were not contemporary and that the site, after its initial use, was subsequently revisited, a similar pattern of activity being initiated. The earlier of the troughs returned a date of 2300-1980 cal BC (3730±50 BP; GU-8007), indicating initial use during the Chalcolithic period or the beginning of the earlier Bronze Age, whilst the later trough was dated to 2030-1530 cal BC (3470±90 BP; GU-8008), suggesting that the site was reused at some stage in the second half of the second millennium BC (*op cit*, 19).

A site at Easthwaite Farm in Nether Wasdale was adjacent to a small beck and a possible Bronze Age cairn (OA North 2016). This was associated with two phases of burnt-mound-related activity, the earlier of which dates to the earlier Bronze Age, defined by deposits of fire-cracked stone and charcoal, contained in two irregular hollows, one of which was associated with two unlined pits/troughs. Charred material from the troughs returned similar radiocarbon dates of 1870-1550 cal BC (3388±39 BP; SUERC-56262) and 1880-1560 cal BC (3392±39 BP; SUERC-56265), while charred material from an adjacent hollow returned a comparable date of 1880-1610 cal BC (3399±39 BP; SUERC-56264). Eventually, the area was flooded and the site was sealed by layers of alluvium. However, intriguingly, the site was then revisited and two further burnt mounds were established above the alluvium. These were also defined by dumps of fire-cracked stones and charcoal, and one was associated with a pit. Material from these two mounds was radiocarbon dated, and surprisingly indicated that one dated to the tenth-eleventh century AD, and the other to the eleventh-twelfth century AD. Therefore, these appear to represent England's first known early medieval burnt mounds, suggesting that burnt mound-activity had a much longer currency than previously anticipated.

Several burnt mounds have also been excavated on the northern side of the Solway Firth, in Dumfries and Galloway. These include two examples from Annandale, one of which, at Kirkhill, was dated to the Late Neolithic period (Pollard 1993; *Ch 10, p 353*), whilst the other, from Cleuchbrae, dates to the end of the second millennium BC. This latter example was associated with *in-situ* wooden stakes and a trough lined with a hollowed-out oak baulk (Duncan and Halliday 1997). In addition, a large group of burnt mounds and related sites was examined during the construction of a gas pipeline extending from Blairhall Burn, close to Dumfries, to Brighouse Bay, Kirkcudbrightshire (Maynard 1993b; Strachan *et al* 1998). Generally, the sites were all adjacent to wet areas and were represented by generic burnt-mound features, such as low spreads of burnt stone, and in some instances pits, which may have been troughs. In addition, several small isolated pits were identified that had been filled with burnt-mound material, which were termed 'firepits' (Maynard 1993b, 35). Charcoal samples from ten of the sites produced radiocarbon dates that covered the period between the late third and early first millennia BC (*op cit*, 45; Strachan *et al* 1998).

Although these sites provide further information on the date and form of burnt mounds in the wider Solway area, their importance lies more with their frequency and the means of discovery. Significantly, prior to the construction of this pipeline, the 100 m-wide corridor was fieldwalked, identifying five burnt mounds as earthwork sites. However, once construction began, 15 additional burnt mounds were revealed, which had not been visible as surface features, along with five firepits. Based on these figures, it was argued that this lowland area of south-west Scotland contained a fairly dense concentration of burnt mounds, with up to five sites per square kilometre (Maynard 1993b, 51). Given this, it is probably not too speculative to

suggest that, originally, the coastal plains on both sides of the inner Solway Firth may have contained a similar, if not higher, density of burnt mounds, many of which would have formed important components of the Bronze Age landscape.

Burnt mounds were also found on the route of the Dunragit Bypass (Bailie 2021), ten being recorded along the 5.3 km long corridor (six at Boreland Cottage Lower, two at Droughduil Bridge, one at Whitecrook Bridge, and one at Mid-Challoch). These were again defined by spreads of burnt stones and charcoal, associated with pits/troughs, and their siting seems to have been influenced by a series of braided streams, which would have provided the required water, though the position of those at Boreland Cottage Lower might also have been influenced by specific activities, potentially associated with the ritualised/sacred use of the landscape (*p 437*).

The mounds reflect a long chronology of use, with the earliest (from Boreland Cottage Lower and Whitecrook Bridge) dating to the Late Neolithic period (*Ch 10, p 353*) and the latest (from Droughduil Bridge) from the Late Bronze and Iron Ages. Most, however, like those at Stainton West, relate to activity throughout the Chalcolithic and earlier Bronze Age. Specifically, a Chalcolithic radiocarbon date was obtained from a burnt mound at Whitecrook Bridge (2470-2200 cal BC; 3867±31 BP; UBA-41496), four earlier Bronze Age dates of 2150-1940 cal BC (3659±30 BP; UBA-41495), 1890-1690 cal BC (3474±34 BP; UBA-41492), 1670-1500 cal BC (3305±33 BP; UBA-41494), and 1540-1440 cal BC (3240±27 BP; UBA-41493) came from several burnt mounds at Boreland Cottage Lower, whilst charred materials from a burnt mound at Mid-Challoch was dated to 1940-1740 cal BC (3523±28 BP; UBA-42816) and 1930-1690 cal BC (3485±38 BP; UBA-42817; *ibid*).

It was also clear that the related acivities had probably had a significant impact on the surrounding woodlands, which formed sources of both fuel and kindling (*ibid*). At Stainton West, it seems that, initially, mature oaks were used as fuel for the Late Neolithic burnt mounds, then alder/hazel became the dominant fuel during the Chalcolithic period and earlier Bronze Age. This might suggest that the last of the large, mature oaks on the floodplain were felled and burnt in the Late Neolithic period (perhaps by virtue of their age and longevity being viewed as a 'special' or 'ancestral' woodland resource, which could in turn be linked to particular types of burnt-mound activity), after which a switch to other woodland species to fuel later episodes of burnt-mound activity was necessary (*Appendix 18*).

A superficially similar feature to the apparently associated structure (***100031***; *Ch 11, p 395*) at Stainton West has been excavated at Beckton Farm, Lockerbie (F111; Pollard 1997). As with the Stainton West example, this was defined by a ring gully, enclosing an area with a diameter of *c* 4 m (Fig 203), which was associated with a series of stakeholes, suggesting that it had a double-skinned wall. It was also supported by a centrally positioned timber upright. However, in contrast to that at Stainton West, the Beckton structure probably dates to the Late Neolithic period, as a sherd of Grooved Ware was found, the presence of which may be significant, as it represents a type of pottery that has normally been associated with ritualised/symbolic activity (Mukherjee *et al* 2008; *Ch 10, pp 356-7*). This may therefore suggest that some small circular structures were associated

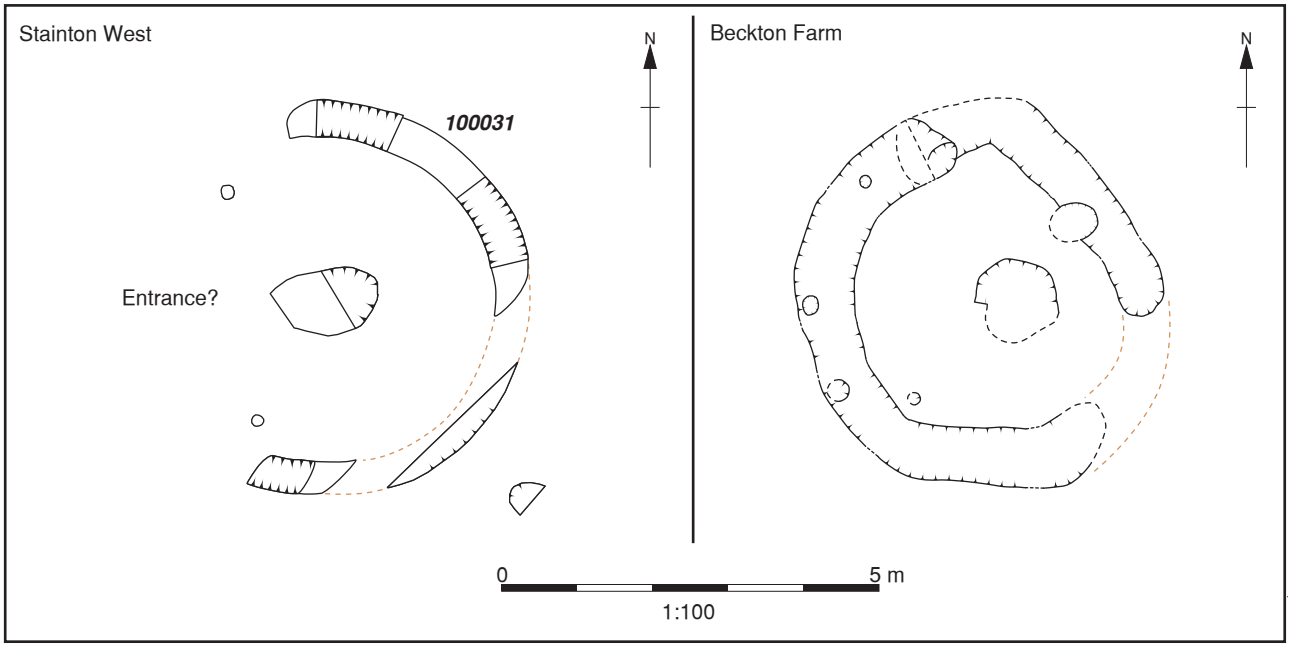


Figure 203: The Stainton West and Beckton Farm ring-gully structures

with activities (shamanism/purification?) beyond the 'domestic' sphere.

The function of the burnt mounds and associated features: steam baths and a sweat lodge?

Although it is clear that the main type of activity associated with burnt mounds was the heating of stones, which were then used to heat water within a trough, the reasons for this have been the subject of much debate (*cf* Topping 2011). However, two main suggestions have been favoured: one is that they represent cooking sites, whereby joints of meat were boiled within the trough (O'Kelly 1954); whilst the other is that they acted as saunas/steam baths, akin to the Native American sweat lodges (Barfield and Hodder 1987). Other suggestions have included heating water for use in leather working (Coles 1979), basketry (Heseltine 1982), brewing (O'Drisceoil 1988), textile production (Jeffery 1991; Mudd and Masefield 2015; Brown *et al* 2016), and copper production (*cf* Hawkes 2018).

However, given the long currency of burnt mounds and their discovery across a range of differing landscapes, their function was probably not prescriptive. Indeed, it is quite possible that they were employed for different purposes, at different times, by different groups of prehistoric peoples. For example, it has been argued that groups of Chalcolithic/Bronze Age burnt mounds at Girvan (Gallow Hill; *p 427*) and Crawford, in south-west Scotland (Fig 201), and on the Northern Isles, were linked to the cooking of food, which, in the case of those from the Northern Isles, may have related to communal feasting (Banks 1999; Banks *et al* 2008; Hedges 1975; Moore and Wilson 1999; Toolis 2007). Similarly, in Ireland, a case has been made that the majority of Bronze-Age burnt mounds (*fulachtaí fia*) represent open-air cooking sites that were used for the communal consumption of food by small family groups (Hawkes 2015; 2018).

In contrast, a study of the environmental signatures of several Irish burnt mounds of this date suggests that some at least may have been explicitly connected with the cleaning/dyeing of wool/plant fibres, linked to a wider 'textile revolution' (Brown *et al* 2016). However, there is also evidence that at least some examples from Scotland and Ireland were connected with steam bathing (*inter alia*; Armit and Braby 2002; Gleeson *et al* 2011; Cleary 2015). Indeed, the same may also be true for some of the burnt mounds from southern Britain, particularly as two such sites (on the Bexhill to Hastings Link Road, East Sussex, and Bucklers Park, Berkshire) have produced human fleas which might, in turn, suggest a link with bathing/cleansing (Champness *et al* 2019; Chittock *et al* 2021). Furthermore, it has also been suggested that some burnt mounds could, in fact, have been used for a variety of purposes, including both cooking and bathing (O'Drisceoil 1988; Barber 1990). Given this, it is essential to consider the evidence from each burnt-mound site on an individual basis, and assume that no over-arching interpretation is applicable.

The available evidence suggests that the use of the burnt mounds at Stainton West for bathing might be the most applicable. For instance, there are certain key criteria required for a bathing site (*cf* Barfield and Hodder 1987; Banks 1999), which appear to be fulfilled, in some measure, by the Late Neolithic-earlier Bronze Age remains at the site. These criteria include heat sources, devices to generate vapour/steam, covering structures, and a body of water (in this case the nearby River Eden) suitable for bathing, in order to wash away sweat and close pores.

Based on the assumption that Stainton West acted as a bathing site, it is quite possible that some, if not all, of the burnt mounds functioned as small steam baths, used to induce a sweat. All of the burnt mounds were associated with troughs, which, when filled with water, could generate the required steam, through the immersion of hot stones. There was also evidence for the presence of structures associated with Burnt Mounds 2 and 4, in the form of post/stakeholes, and one suggestion is that these originally formed the more substantial elements of structures that covered the respective troughs. These putative structures must have been relatively ephemeral in character, as the limited number of post/stakeholes found did not define the complete outline of a covering structure. However, based on the evidence of Native American sweat lodges, such structures may only have been light and impermanent, being used only for a few seasons, perhaps mainly constructed of a framework of bent timber (hazel?) poles, which would leave little archaeological trace (Bruchac 1993, 33). Indeed, based on the known design of the native American sweat lodges, the structures at Stainton West may have resembled small tents that were covered with animal skins, bark, or rush mats (*ibid*; Pl 168).

Plate 168: A native North American (Rosebud Sioux tribe (Sicangu Lakota Oyate)) sweat lodge, photographed in 1898, on the Rosebud Reservation in South Dakota (image courtesy of the Denver Museum of Nature and Nature [BR61-168])

Significantly, another of these tent-like structures may have been recognised at Cocklakes, to the south-east of Carlisle (Johnson *et al* nd; *p 432*). There, the structure was defined by a small arc of stakeholes on the edge of a shallow pit. It is quite possible therefore that an ephemeral structure covered this 'pit', which contained burnt material dating to the late third millennium BC.

Several Bronze Age burnt-mound sites interpreted as steam baths/sweat lodges, given the presence of structures that covered troughs, have been excavated in Ireland. These include several sites in Co Cork and one in Co Kilkenny (*cf* Cleary 2015, 81-2; Hawkes 2015, 25-6). However, in contrast to the putative steam baths at Stainton West and Cocklakes, which were characterised by small-sized troughs and ephemeral structures, all the Irish sites were associated with large rectangular troughs, and fairly substantial covering structures. Given this, it has been argued that they may instead represent roofed cooking huts, to produce large amounts of food that could then be used for communal feasting (O'Brien 2012, 134-5); presumably, though, they could also have been used for communal bathing.

Small circular structure ***100031***, with an internal diameter of *c* 4.2 m and a central hearth, may indeed have acted as a sweat lodge. Given the absence of a trough, however, it is quite possible that this was a sauna, as opposed to a steam bath. Stones may have been heated directly within the structure, in the hearth, and sweating could have been induced through either dry heat or by pouring small amounts of water onto the hot stones, to produce steam. Indeed, this latter interpretation may explain the fragments of a pottery vessel within this structure. This style of sweat lodge, in a similar fashion to the Mayan temescal, the North American direct-fire sweat house, and the European sauna, would also allow for the addition of herbs/aromatics to the hot stones (Bruchac 1993, 11).

Such structures (*ie* temescals) were often more permanent in character, and it may therefore be significant that the form of the circular structure at Stainton West also suggests that it was a more permanent 'lodge' than those putative tent-like structures covering the troughs associated with the burnt mounds. The 'firepits' that are often found at burnt-mound sites, such as pit ***100026*** at Stainton West (*Ch 11, p 397*), might also form part of a similar style of sauna/direct-fire sweat lodge. If this was the case, these may have been associated with more temporary structures, comparable to those suspected to cover the Stainton West troughs (*p 435*). It is of course possible that structures comparable to the Stainton West sauna were fairly common at burnt-mound sites, though they have escaped detection, as excavation often focuses on the burnt mound as opposed to its immediate environs. Indeed, the only comparable prehistoric example to the putative Stainton West sauna, in terms of function, is a possible Early Iron Age sweat lodge, associated with a burnt mound, excavated at Ceann nan Clachan, North Uist (Armit and Braby 2002; Fig 201). In a similar fashion to the Stainton West structure, this was also of a small size, with an internal diameter of 5 x 2.5 m, and seemingly functioned as a sauna, as it was not associated with a trough, or any other features that might hold water.

The reasons behind inducing a sweat are naturally difficult to ascertain for the prehistoric period, though it is possible, as in Native American culture, that it was linked to some form of ritual purification, which could conceivably have been associated with key events in an individual's life-cycle (for instance, birth, puberty, marriage, or death), or be related more specifically with shamanic activity (Bruchac 1993). Intriguingly, pollen analysis detected the presence of heather associated with Burnt Mound 2 (*Ch 11, p 387*), and one suggestion is that this aromatic plant, which at times has been used medicinally, was deliberately brought to this site, perhaps associated with the purification activities that may have been undertaken these (Dickson and Dickson 2000).

Given the shamanic or special nature of sweat-lodge activities in North America, these were normally undertaken away from the settlement (Bruchac 1993) and it is perhaps significant that the Stainton West burnt mounds also appear to conform to this pattern: the site was on a river terrace that was periodically flooded, and was thus unsuitable for domestic occupation. The pollen evidence (*Ch 11, p 401*) also suggests that activities associated with Burnt Mounds 2-4 occurred at periods when there was a cessation of clearance close to the site. By implication, at these times it may be that settlement lay some distance away. One final point is that the site also potentially lay within a sacred landscape (*p 427*), the focus of which during the Chalcolithic period and earlier Bronze Age was probably the putative henge monument uphill to the north-east. Given this, it is plausible that the activities associated with the burnt mounds may have been tightly bound with those undertaken at the henge, and this association may explain why the site was intermittently used for potential bathing/purification over an extended period of time (*Ch 10, p 353*).

Similar locational associations have been noted at other burnt mounds in Cumbria. For example, the Sparrowmire and Easthwaite Farm burnt mounds were close to burial cairns (Heawood and Huckerby 2002; OA North 2016); the Garlands Hospital site was close to a Bronze Age cemetery (Neighbour and Johnson 2005); and the Aldingham burnt mound was within 1 km of a standing stone and cairn (Morecambe Bay Archaeological Society 2006). The burnt mound at Sizergh was also close to a stone circle and several

burial cairns (Gregory and Vannan 2014). This appears, therefore, to suggest that the activities associated with burnt mounds, whether they were connected with bathing or perhaps, in some instances, the communal consumption of specific types of food, was explicitly linked to ritually significant sites.

This may also be relevant to other parts of western Britain, particularly since it has been suggested that Bronze Age burnt mounds in Wales are often near to standing stones, whilst many of those in Ireland are close to stone circles, as well as other Bronze Age ritual monuments (Bradley 2019, 250; Hawkes 2015, 25). The six burnt mounds at Boreland Cottage Lower, used in *c* 2140-1440 cal BC, also seem to have been situated in a sacred landscape, as they were contemporary with a nearby earlier Bronze Age funerary complex with multiple cremation burials, stone-lined graves, and ring-ditches (Bailie 2021; *p 434*). This may suggest that this area was ritually significant, venerated across many generations, particularly as the funerary complex was close to an earlier Neolithic post-built cursus monument and other Neolithic features, possibly associated with ritual activity (*Ch 7, p 216*).

Although in most cases, once the activities associated with the putative steam baths at Stainton West had finally ceased, the troughs were probably left to fill naturally, in one instance (Burnt Mound 4) a trough was more formally 'decommissioned'. This involved removing its plank lining and filling it with a soil that did not contain any burnt material. This deliberate attempt at filling the trough may have related to 'sealing' or 'closing' the activities that were once associated with it. Indeed, the 'closing' of burnt mounds has been noted at several other sites, where it was associated with the deliberate placement of enigmatic artefacts and animal skulls (*cf* Brown *et al* 2016, 285). Whilst this suggests that such actions were perhaps commonplace, they may also bolster the suggestion that burnt mounds were associated with ritualised activities, such as purification (*p 436*), that needed to be divorced from the domestic arena.

Settlement

The evidence of Chalcolithic and Bronze Age settlement along the CNDR principally comprised houses and other structures. This has created an extremely valuable sequence of lowland dwellings, which will, in turn, have wider relevance for the prehistoric settlement archaeology of northern Britain.

Late third millennium BC houses

Of the early structures, those possibly dating to the late third millennium BC were found within Parcel 21 North (Fig 204). There, a scatter of posts was encountered and, although there is a slight possibility that these were small free-standing timber circles, comparable to that excavated at Botcherby Nurseries, Carlisle (Barkle 1998; Fig 205), the lack of 'ritual' deposits probably indicates that they formed the remains of two oval-shaped houses (House 3 (A and B)), successively built on the same site. These were around 7-8 x 5.4 m and both may have been refurbished. As far as can be ascertained, they were in an unenclosed settlement, there being no evidence of an enclosing earthwork or palisade. It is, however, possible that they were associated with the nearby, undated, four-post structure (*Ch 11, p 409*). A single radiocarbon date suggests that they were occupied during the time when Beaker pottery was in use, at the transition between the 'Early Beaker' and 'Climax Beaker' periods (Needham *et al* 2010, Periods 1 and 2; *Ch 11, p 407*); they may also date to the period when Food Vessels were first introduced into the wider region.

If they were indeed successive dwellings, at a national level, they represent a significant addition to the corpus of late third millennium BC houses in Britain, particularly as domestic structures dating to this period are comparatively rare (Bradley 2019, 92, 161-3). Across the British Isles, as in Parcel 21 North, these dwellings are often oval in shape and are generally ephemeral in nature, being composed of scatters of small pits and stakeholes (*ibid*). It is unclear whether such houses were a continental 'import' or an indigenous development (*cf* ScARF 2012c, 20), but the tradition of oval-shaped house architecture appears to have continued into the earlier Bronze Age, as evidenced by examples in northern Britain, which include several from the Western and Northern Isles directly associated with Beaker pottery (*cf* Downes and Lamb 2000; Simpson *et al* 2006; Pope 2015).

Examples from north-west England and south-west Scotland are extremely rare. No clear domestic structures dating to this period have been excavated in south-west Scotland, though possible settlements may have existed at Warden's Dyke, Gretna (Banks 2004), and also slightly further north at Kirkburn, Lockerbie, where several pits containing domestic Beaker pottery were present (Cormack 1963). It is also conceivable that some of the 'unenclosed platform settlements', found in the upland areas fringing the Solway Firth, date to the late third millennium BC (*Ch 11, pp 378-9*). Perhaps significantly, these 'platform' houses often had roughly ovoid plans, though they differed from the post-built oval houses at Parcel 21 North in that they used a stake-groove foundation trench, which probably assisted in supporting the roof (*cf* Terry 1995).

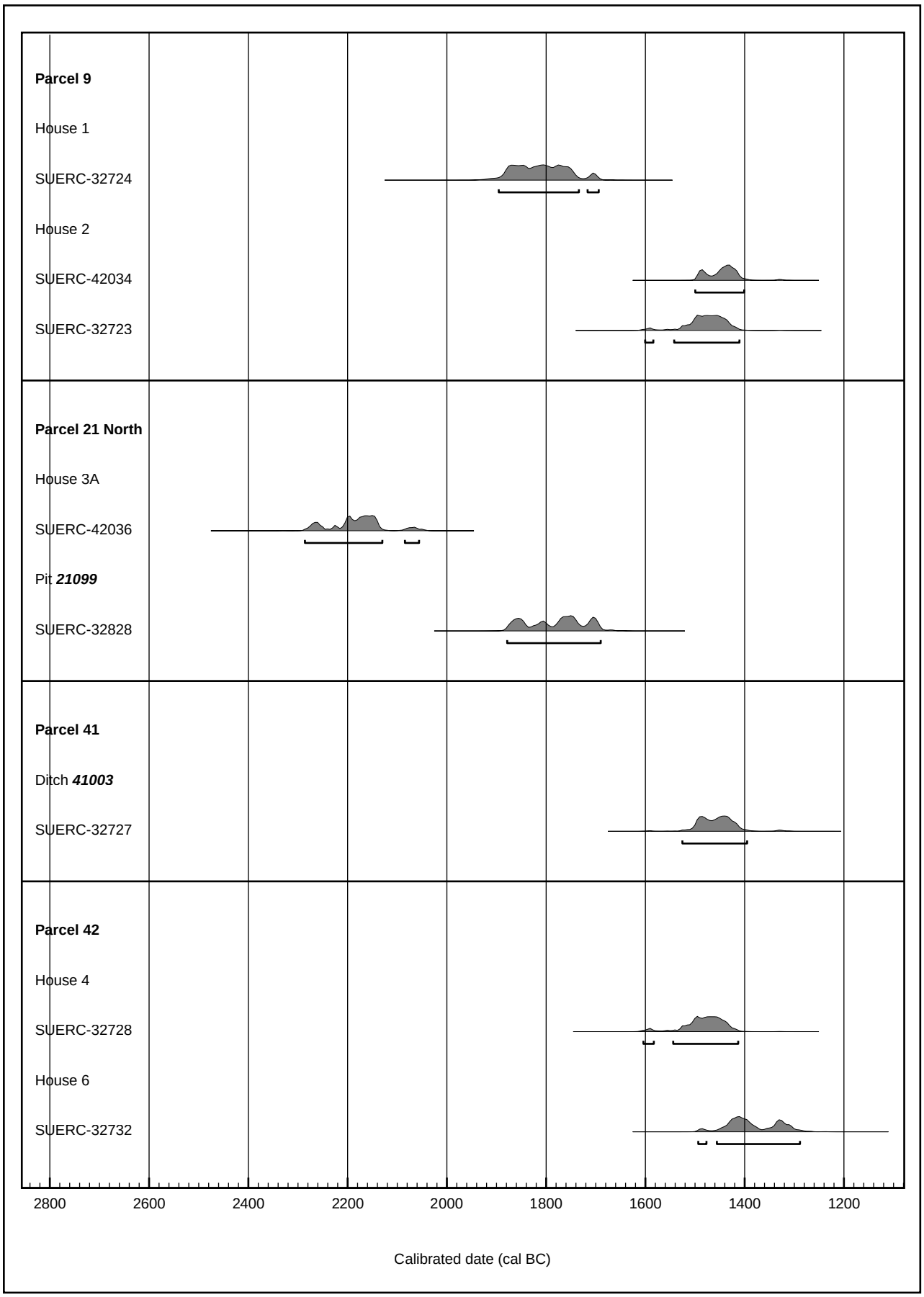


Figure 204: Probability distributions of the calibrated radiocarbon dates associated with Chalcolithic and earlier Bronze Age settlements on the CNDR

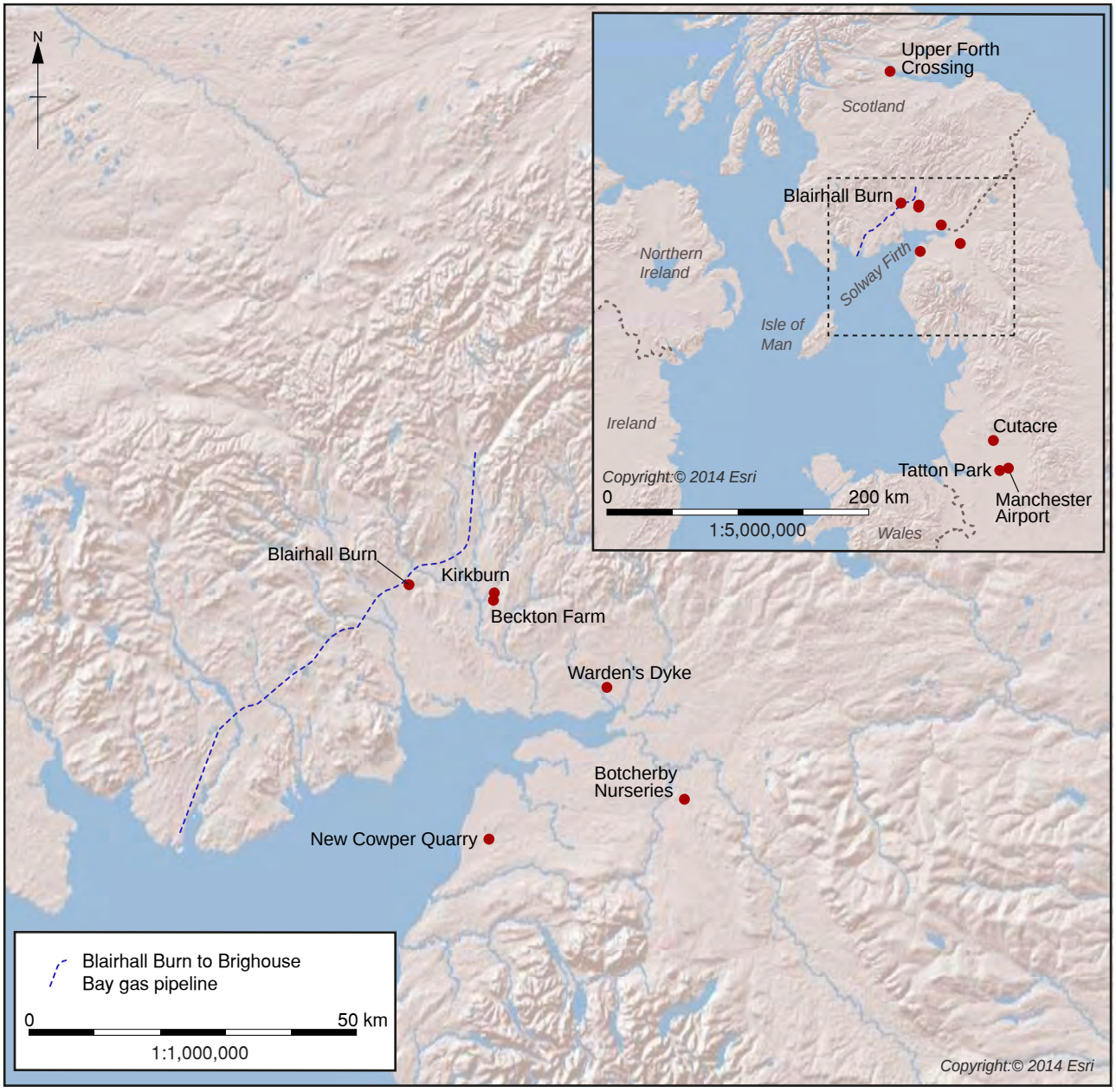


Figure 205: Chalcolithic and Bronze Age settlements mentioned in the text

Slightly more evidence is available from north-west England, as several oval post-built structures have been discovered in Cheshire that may be chronologically comparable, and are superficially similar to those in Parcel 21 North. These include structures at Tatton Park (Higham and Crane 1999) and Manchester Airport (Garner 2007, 35-40) that may well have been similar in design and size (Fig 206). At the former site, an arc of postholes was identified which may date to the close of the third millennium BC, whilst at Manchester Airport, two oval-shaped structures were excavated, one associated with Beaker pottery, whilst the other (Structure 4) produced radiocarbon dates of 2140-1770 cal BC (3600±60 BP; Beta-133366) and 2140-1750 cal BC (3590±70 BP; Beta-133361). It is therefore possible that both date to the late third millennium BC, or the very early second millennium BC.

A possible Chalcolithic 'house' (Structure 4) has also been discovered on the southern side of the Solway at New Cowper Quarry (*Ch 11, p 373*), on the Abbeytown ridge, some 26 km south-west of the CNDR (Churchill 2017). This comprised a cluster of six pits, a small hearth, and a scattering of stakeholes covering an ovoid area, 5 x 4 m, associated with a charcoal-rich (occupation?) deposit. Its form is difficult to determine and indeed it has been described as a 'four-post' structure, based on the position of four of the pits (*ibid*), but it is possible that this could have been a house, comparable in form to a slightly earlier tradition of Late Neolithic timber buildings

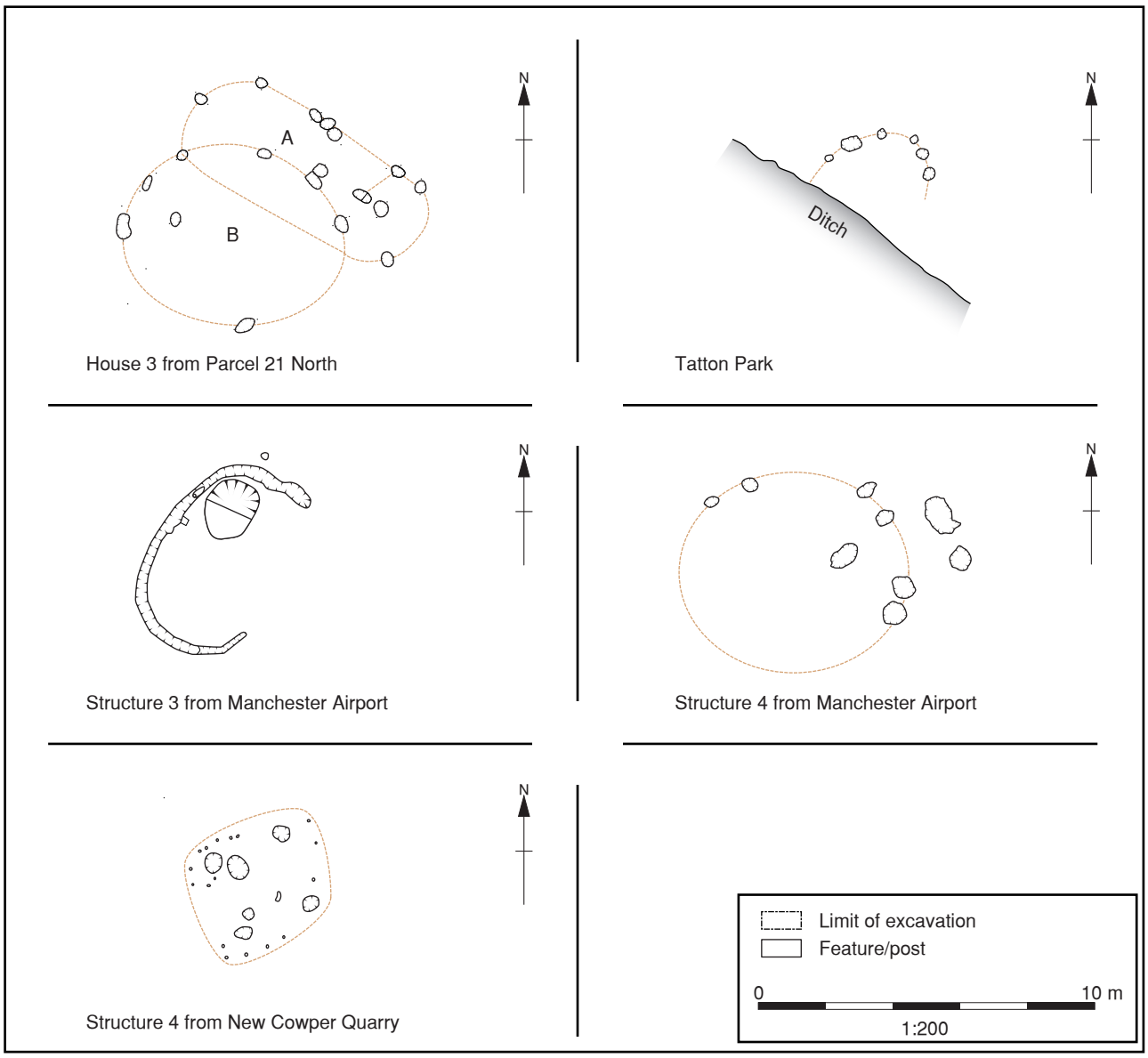


Figure 206: Chalcolithic structures from Parcel 21 North, Tatton Park, and New Cowper Quarry, and late third/early second millennium BC structures at Manchester Airport

(often associated with Grooved Ware) defined by a central square setting of uprights, surrounded by a more ephemeral wall line (Bradley 2019, 92; Cummings 2017, 186-7; R Bradley *pers comm*). Radiocarbon dating indicates that the New Cowper Quarry structure was in use between 2400 cal BC and 2140 cal BC (*ibid*), and one of the pits contained a large number of sherds from a Beaker vessel, other comparable sherds being found in a layer of rubble covering it (Young 2017).

Earlier Bronze Age houses

The other earlier Bronze Age dwellings found on the CNDR date to the early and middle centuries of the second millennium BC, all apparently unenclosed settlements to the north and south of the River Eden. These form part of the 'post-built roundhouse' tradition (*Ch 11, p 380*), which, on current dating evidence, appeared around 1800 cal BC (Pope 2015).

Two different styles were uncovered, the first in the form of two small roundhouses (Houses 1 and 2) in Parcel 9 (*Ch 11, pp 402-5*), which were defined by a single post-ring (Fig 207). Significantly, the earlier (House 1) seems to date from the beginning of this tradition and is one of the earliest examples yet to be excavated in northern Britain (*cf op cit*, 168-71). The other single post-built roundhouse (House 2) was of a later date, being constructed in the mid-second millennium BC (Pl 169).

The second variant of this tradition is demonstrated by the three roundhouses (Houses 4-6) in Parcel 42 (*p 443*), forming another discrete earlier Bronze Age settlement to the north of the Eden, some 3.2 km from the Parcel 9 settlement. These were double-ring roundhouses (*cf* Guilbert 1981), in that all utilised inner post-rings to support their roofs, with evidence for an outer wall line, also defined by earthfast posts (Fig 208).

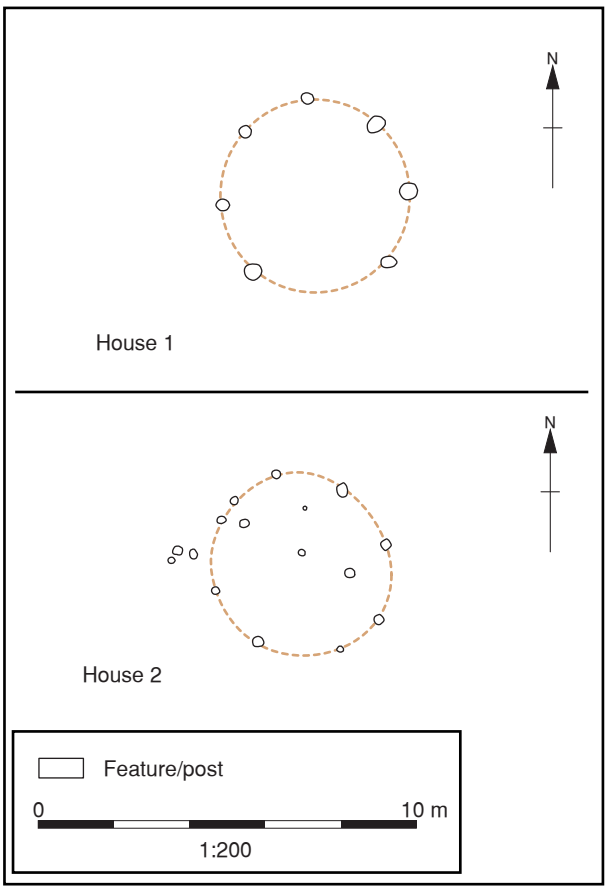


Figure 207: The earlier Bronze Age houses on the CNDR (Parcel 9)

Based on the outer post-rings, and the positions of associated drip gullies, it also appears that all were of a similar small size, with internal diameters in the range of 8.4-9.4 m.

One common feature, which may have been shared by both the single- and double-ring roundhouses on the CNDR, was a porch covering the entrance. These were on the southern side of the roundhouses in Parcel 42, being aligned south-south-west, whilst the putative porch associated with one of the houses at Parcel 9 (House 2; *p 443*) was aligned to the west. It is quite possible that its earlier counterpart also possessed a similar entrance, though no clear evidence for this survived.

Although porches were a common feature, it is not clear whether there was any significance in their position or alignment, as has been suggested for some of the entrances associated with Iron Age roundhouses (*cf* Parker Pearson 1999; Pope 2007). For example, the CNDR entrances were not aligned on any significant solar event, such as the rising sun at the equinoxes or the mid-winter solstice, nor would they have offered any enhanced shelter from the prevailing westerly winds (*ibid*). These entrances were also not associated with structured deposits of artefacts, such as those recorded at several other Bronze Age houses in Britain (*cf* Brück 2001, 150). That said, a pit of unknown function (***42054***; *Ch 11, p 414*) was found inside the porch of House 4, which might conceivably have been

Plate 169: Bronze Age House 2, looking east

Figure 208: The earlier Bronze Age houses, and comparable structures from Blairhall Burn, Dumfries

dug to contain a foundation deposit of some description, which had been destroyed by the post-depositional environment. For example, unburnt animal and human bone deposited during the prehistoric period would certainly have been degraded by the acid-soil conditions, as would organic objects in the absence of waterlogging.

Several artefacts were, however, recovered from both of the post-built roundhouse settlements, including small quantities of pottery (House 1; *Ch 11, p 402*; and House 6; *Ch 11, p 415*) and a single chert flake (House 5). Several features also survived within them and, perhaps, originally all might have contained a similar set of features. These included hearths, which survived in Houses 4 and 6 (Parcel 42), and several postholes that probably related to additional fixtures and fittings in Houses 2 (Parcel 9), 4, and 5 (Parcel 42).

In addition to the artefacts, the structures were associated with small quantities of charred plant remains, giving some indication of the plants grown and consumed by these Bronze Age households. These comprised cereals, including barley (Houses 1, 2, and 4), spelt (Houses 1 and 6), and emmer wheat (House 1), and burnt hazelnut shells (Houses 1 and 2). The spelt at Houses 1 and 6 is comparatively early for the cultivation of this crop, as the wider evidence from Britain indicates that it was more commonly cultivated in the first millennium BC and early part of the first millennium AD (*cf* van der Veen 1992). The houses were also associated with a fairly wide selection of charred weed seeds, though it is unclear which, if any, were used as sources of food. Charcoal was also recovered from the houses, and this, particularly from Parcel 9, tentatively suggests that oak was favoured as a structural wood, whilst the short-lived woods of alder, hazel, hawthorn-type, and blackthorn-type, and to a lesser extent, willow/poplar, were used primarily for fuel.

In both of these settlements, there was also evidence for sequential construction, though this may not necessarily reflect continuous occupation, and also some evidence for the repair and refurbishment of individual houses (*Ch 15, p 556*). For instance, at Parcel 9, the radiocarbon evidence suggests that House 1 formed the initial dwelling and was succeeded by House 2 (*Ch 11, p 405*). It also appears that, once constructed, House 2 was refurbished, as one post had possibly been replaced. The radiocarbon dates from these two houses do not overlap, and this implies that, following the abandonment of House 1, a significant period of time elapsed before House 2 was constructed. Therefore, in this instance, it seems that there was knowledge of, and attachment to, specific locales in the landscape, which may have spanned at least one generation. Alternatively, it is possible that following its establishment, in the early second millennium BC, the Parcel 9 settlement moved across into the landscape immediately beyond the CNDR corridor, before moving back into the corridor in the mid-second millennium BC.

Similarly, in Parcel 42, a primary dwelling (House 5; Pl 170) was succeeded by two later structures (Houses 4 and 6) that, on the basis of the radiocarbon evidence, were probably contemporary, dating to the mid-second millennium BC. It is also possible that these later dwellings were constructed when other parts of the landscape were being used for settlement and agriculture. For instance, they were probably contemporary with ditch ***41003*** in Parcel 41 (*Ch 11, p 410*) and perhaps also House 2 in Parcel 9 (*above*), based on the results of an Order Analysis which considered the probabilities that these dated events were earlier or later than each other (*Appendix 20*). The lack of dating evidence from House 5 at Parcel 42, however, makes it difficult to ascertain whether a period of time elapsed between the abandonment of the primary dwelling and the construction of the later buildings. However,

Plate 170: House 5, looking south-east

given the nature of occupation in the wider region, and the eccentric position of the later dwellings, it does at least seem possible that this site was deserted and then reoccupied at a later date, following a period of abandonment. What is clear is that, once constructed, both of the later dwellings were refurbished or repaired, since replacement posts were identified.

In northern Britain, the closest parallel for the Parcel 9 single-ring roundhouses is from Scotland, excavated at the Upper Forth Crossing (UFC H8; *cf* Pope 2015; Fig 205). This single post-ring roundhouse was similar in size, with a diameter of *c* 4 m, and of similar date to the later example (House 2) from Parcel 9 (*ibid*). Both also had possible central posts. Moreover, it has been suggested that, given its small diameter, the central post at the Upper Forth Crossing may have been used to support a tent-like structure (*ibid*), and, perhaps, such a technique may also have been used to roof the two houses in Parcel 9.

Two comparable roundhouses to those at Parcel 42 have been identified at Blairhall Burn, during excavation on a gas pipeline west of Dumfries (Strachan *et al* 1998). Again, there was no indication of their presence prior to the intrusive stages of archaeological work, which may indicate that many other unknown examples are scattered across the lowland parts of the Solway. In a similar fashion to the CNDR examples, the two Blairhall Burn structures were defined by double post-rings, used to support the roof and define the outer wall line, and one (Structure 1; Fig 208) also had an associated porch. They were comparable in size, in that Structure 1 had a diameter of *c* 10 m, whilst the other was *c* 7.5 m in diameter. The larger structure produced a radiocarbon date of 1880-1530 cal BC (3440±60 BP; Beta-73950), which suggests that this tradition of architecture had been established for some time prior to the construction of the houses at Parcel 42. Radiocarbon assay of material from the other structure at Blairhall Burn suggested that this was slightly later than the post-built houses excavated on the CNDR, dating to the second half of the second millennium BC. As with the Parcel 42 examples, the Blairhall Burn structures were also associated with comparable fragments of plain domestic pottery and chert, charred barley grains, as well as a saddle quern, pot boilers, and a cannel-coal 'napkin ring' (*ibid*).

Other earlier Bronze Age settlement features: pits and a four-post structure

Significantly, the earlier Bronze Age settlements on the CNDR did not exist in isolation but were seemingly associated with other elements. In Parcel 9, these included several pits, whilst, similarly, in Parcel 42, several pits, along with a hearth, were found in the immediate environs of the roundhouses. Other features were at some distance from the settlements, though these probably formed contemporary elements associated with activity in the wider landscape. These included a short section of segmented ditch in Parcel 41 (*Ch 11, p 410*), filled with burnt stone and charcoal (Pl 171), and an associated pit, also containing burnt material. Although the precise function of the ditch and pit are difficult to ascertain, the presence of fire-cracked stone and charcoal implies that an undiscovered area of settlement was in the vicinity, or alternatively, that undiscovered burnt mounds were somewhere nearby.

Several features were present in Parcel 21 North, to the south of the Eden, some 1.6 km north-east of the Parcel 9 settlement, which probably date to the early second millennium BC. These included a pit (Pl 172), dating to 1880-1690 cal BC (3455±30 BP; SUERC-32828), which was perhaps used to roast or crack fully processed naked-barley grains, as a preparatory process in the creation of porridge or gruel (*Appendix 18*).

There was also a four-post structure at Parcel 21 North. Although this feature remains undated, it is possible, based on adjacent remains, that it was associated with the Chalcolithic-age houses (House 3; *p 437*), or, on the basis of the grain-roasting pit and boundaries, that it formed an element of a Bronze Age settlement beyond the road corridor, which dated to the earlier second millennium BC. Given the evidence for nearby grain roasting, it is perhaps more feasible that this structure did, in fact, date to the earlier second millennium BC, as such structures were probably associated with grain storage or processing. For instance, in southern England, they are often found in Bronze Age settlements (albeit dating to a slightly later period), where they are suspected of having acted as raised granaries (*cf* Gent 1983; Brück 2001, 149).

Plate 171: Burnt material in a section through segmented ditch **41003**, *Parcel 41*

Plate 172: Roasting pit **21099**, *half-sectioned, Parcel 21 North*

Another possibility, based on evidence from Cutacre, Greater Manchester (Fig 205), is that, in north-west England at least, such structures were connected with the malting of barley, which could then be used to make sweet malt (an ingredient for barley cakes and malt porridge), or in the brewing of ale (Dineley 2004). At Cutacre, two sequential four-post structures were found, elements of a settlement dating to *c* 1500-1100 cal BC (Gregory *et al* 2021). Significantly, one of these structures had burnt down and its postholes contained a rich assemblage of sprouted or part-sprouted barley grains, suggesting that it had supported a raised malting floor (*ibid*).

In the context of the Solway area, the presence of a four-post structure is a rare discovery, though the limited evidence suggests that they may have had a fairly long ancestry. For instance, two such structures were identified at Beckton Farm, Lockerbie, which, given the date of surrounding features, might have formed integral elements of a Neolithic settlement (Pollard 1997). It was suggested that they acted as either raised granaries or were excarnation platforms, on which human corpses were placed to be naturally stripped of flesh. However, it is perhaps worth stressing, in light of the evidence from the CNDR, that at Beckton Farm one of the four-post structure's postholes contained barley grains, and both structures were adjacent to a clay-lined pit that may have been used to process barley, which also contained a saddle-quern fragment (*ibid*). Therefore, these associations have parallels with the evidence from Parcel 21 North and they thus strengthen the case for a long-lived tradition of four-post structures in the region being connected with the storage and processing of grain. It is perhaps worth noting that the Beckton Farm structures have been reinterpreted as Late Neolithic roofed dwellings or roofed/unroofed monuments (Noble *et al* 2012). However, this suspected building tradition normally consisted of a four-post structure set within a circular setting of posts, and no such evidence for outer post rings was present at Beckton Farm.

Dividing the earlier Bronze Age landscape

The CNDR produced some evidence for the division of the earlier Bronze Age landscape of the inner Solway Firth. This was probably associated with increased levels of clearance and agriculture, reflected in the large increases of grasses, sedges, and cereal-type pollen present in the sections of the Stainton West palaeoenvironmental monoliths dating to this period (*Ch 11, p 401*; *Appendix 16*). Based on the evidence from Parcel 9, it appears that, in the early second millennium BC, this division may have taken the form of fenced boundaries. However, such boundaries, by their very nature, may not have been particularly permanent and suggest that land division during this period might have been fairly dynamic in character.

Plate 173: Section through boundary ditch **21096**, *Parcel 21 North*

In contrast, at Parcel 21 North, the two substantial intercutting ditches, which, on the basis of the pottery, might date to the middle centuries of the second millennium BC (*Ch 11, pp 407-8*), suggest that during this period the first large-scale division of the landscape was initiated through the creation of substantial earthwork boundaries (Pl 173). Presumably, therefore, other comparable earlier Bronze Age boundary ditches and associated banks existed on the southern Solway coastal plain and, given this, it is quite possible that many of those visible as linear cropmarks recorded during campaigns of aerial photography in the area (*cf* Higham and Jones 1975; Walker and Jones 1983), may belong to this period, and they might also include several boundaries, enclosures, and trackways excavated at New Cowper Quarry, Aspatria (Churchill 2017). These cropmarks and excavated features are largely undated, and although at least some are probably later prehistoric or from the Roman period, the evidence from Parcel 21 North suggests that some at least were created by the mid-second millennium BC. If this was the case, it may well be that fixed boundaries were used to define particular territorial areas.

Later Bronze Age settlement

In addition to earlier Bronze Age settlement, important evidence for later Bronze Age activity was encountered along the CNDR. This was principally confined to Parcel 32 (*Ch 11, p 421*) and comprised a scatter of pits and postholes, possibly defining a palisaded enclosure, with a funnel-like entrance, which contained several animal pens. Although there was no clear evidence for domestic structures, for such occupation was apparent, in the form of pottery, charcoal, and charred plant remains, including barley and wheat. Furthermore, a four-post arrangement beyond the enclosure was probably another example of a raised structure connected with the storage and processing of grain (*p 444*), perhaps an external component of the later Bronze Age settlement. Significantly, the radiocarbon evidence indicates that this settlement was seemingly occupied at the transition between the second and first millennia BC, and thus may be a comparatively early later Bronze Age enclosed site. It therefore complements other suspected later Bronze Age palisaded settlements known from the inner Solway Firth area (*Ch 11, p 420*), and provides firm evidence that there was a change in the character of settlement during this period.

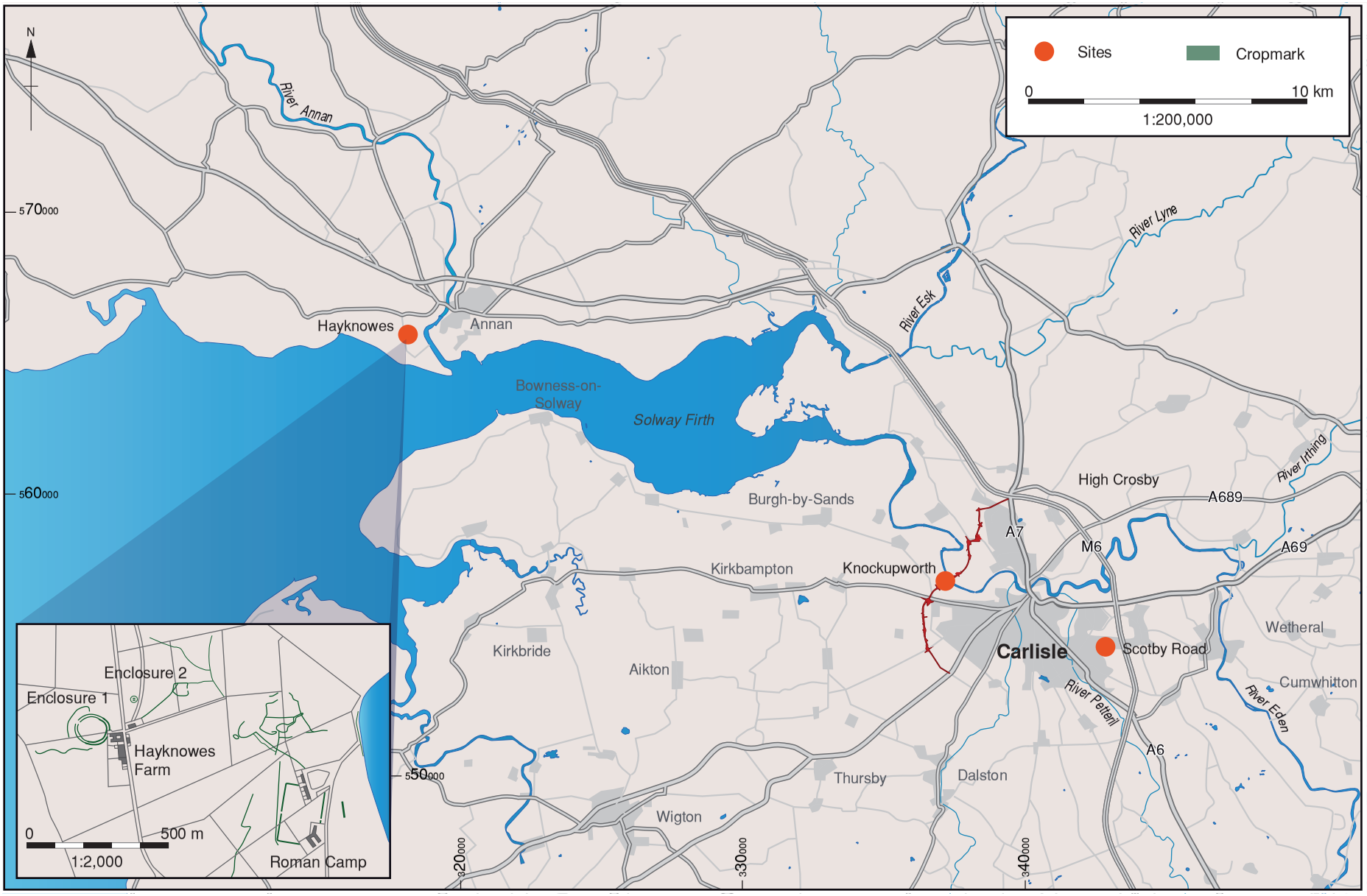


Figure 209: Iron Age sites mentioned in the text (Contains OS OpenData © Crown Copyright [and database right] (2022))

13

THE 'MISSING' IRON AGE AND THE ROMAN FRONTIER

The 'Missing' Iron Age on the CNDR

R A Gregory

One notable feature of the archaeology of the Solway area is the fairly rich body of evidence that exists for Iron Age (*c* 750 cal BC-cal AD 70) settlement and land division. In the lowland areas, many of these sites have been detected as cropmarks, whilst in the uplands some are visible as earthworks (*cf* Higham and Jones 1975; Bewley 1994; RCAHMS 1997; Gregory 1998; Deegan 2017), but these sites invariably consist of settlement areas enclosed within either curvilinear or rectilinear boundaries. These are often defined by banks and ditches, though palisaded enclosures were also constructed during this period (including a possible Iron Age rectilinear palisaded enclosure at Scotby Road; Hirst 1998; Fig 209), continuing the settlement tradition established in the later Bronze Age (*Ch 11, pp 418-26*). Some of the larger curvilinear enclosures are multivallate in form, with two or more ditched and banked boundaries (*cf* Gregory 1998). Other ditched/banked boundaries are also associated with many of these sites, forming large agricultural enclosures (probably principally for stock), trackways, and droveways (*cf* RCAHMS 1997; Gregory 1998; 2001a; Deegan 2017; Mercer 2018).

Several of these sites around the Solway have been excavated (RCAHMS 1997; Gregory 1998), one important concentration of later prehistoric sites having been examined at Hayknowes Farm close to Annan, which sheds some light on the chronology of Iron Age settlement (Gregory 2001c). There, aerial photography revealed an extensive array of cropmarks defining a large curvilinear settlement (Enclosure 1), enclosed by two concentric ditches, a nearby track or droveway, and a smaller rectilinear enclosure (Enclosure 2) linked to a system of ditched boundaries creating agricultural enclosures. A Roman temporary camp was also present, which probably relates to the conquest of this area in the AD 70s (Gregory 1996). Excavation at the curvilinear settlement uncovered its entrance (Pl 174), defined by the ditch terminals and a timber gateway; a large roundhouse close to the centre had opposing

Plate 174: The entrance of the large multivallate Iron Age settlement at Hayknowes Farm, Annan, under excavation

entranceways, one of which was defined by a porch. Intriguingly, a stone inscribed with rock art had been incorporated into this. The settlement probably dates to the later Iron Age, based on a radiocarbon date of 180 cal BC-cal AD 130 (2010±60 BP; Beta-97286) obtained from a fragment of blackthorn from the base of its inner enclosure ditch terminal. Another radiocarbon date of 540-40 cal BC (2240±90 BP; Beta-97285) was obtained from the remains of an oak post forming part of the entrance gateway, though this probably dates the heartwood and is presumably 100 or so years earlier than the settlement.

Excavation was also undertaken across the droveway, which was radiocarbon dated to 360 cal BC-cal AD 30 (2090±50 BP; Beta-129027), raising the possibility that this was contemporary with the curvilinear settlement. The rectilinear settlement was also partially excavated, revealing its entrance, associated with a timber gateway. Charred material from the base of its enclosure ditch produced a radiocarbon date of 60 cal BC-cal AD 210 (1950±50 BP; Beta-129208), suggesting that this was later than the curvilinear settlement and droveway, and might even date to the Roman period. Indeed, this was partly confirmed by the fact that this settlement had been built across an infilled boundary that was probably associated with the droveway and curvilinear settlement.

Based on this evidence, and also that from the wider region, it has been suggested that, in the Solway area, the earlier Iron Age (*c* 750-200 cal BC) landscape was dominated by defensive sites, or forts, of moderate size, whilst other settlement types included unenclosed forms (single or groups of roundhouses) and palisaded settlements (Gregory 2001a). In the later Iron Age (*c* 200 cal BC-cal AD 70), population levels seem to have increased, and this was apparently associated with increased levels of woodland clearance (*cf* Tipping 1997a; Hodgkinson *et al* 2000; Stallibrass and Huntley 2011, 26-7). This population increase may have led to the proliferation of smaller undefended settlements (including small curvilinear and rectilinear settlements), with some of the fort sites being retained, particularly the large bivallate sites in the coastal lowlands (RCAHMS 1997; Gregory 2001a). Large systems of land division were created at many of these latter centres, suggesting that these settlements controlled substantial agricultural resources (with the emphasis on cattle?) and perhaps procured labour from less dominant households for the construction and maintenance of the settlement and its associated holdings.

Iron Age activity on the CNDR

Given the suspected presence of numerous Iron Age settlements and systems of land division on both the southern and northern sides of the Solway, perhaps surprisingly, very little evidence for such activity was recorded along the CNDR. Indeed, the only real suggestion of activity came from Knockupworth, during the excavation of Hadrian's Wall (*p 483*). At this site, a few remnants of buried soils pre-dated the construction of the Roman frontier, and could conceivably be Iron Age in date. One (***51056***; Fig 210), comprising a layer of pale/mid-bluish-grey sandy clay, up to 0.14 m thick, survived immediately beneath spread deposits, possibly from the Vallum, associated with the Roman frontier (*pp 452-3*). This soil also partially overlay a palaeochannel (***51057***), cutting the natural red-brown clay, which may have been parallel with the present course of the Eden. The channel was 8.1 m wide and in excess of 1 m deep, but it is clear that only the top of the feature was exposed, and its full depth and profile remain unknown. It was filled with several interleaving deposits, mostly clean, largely stone-free, red-brown or bluish-grey sandy or silty clays. None of these layers was anoxic, and none yielded any artefacts.

Other fragments of similar buried soils, representing the old ground surface in the Late Iron Age and early Roman period, also survived beneath the north mound of the Vallum (*p 462*), or below spreads of material derived from it (*Appendix 19*). That at least two phases of soil build-up occurred prior to the construction of the Vallum was suggested by the discovery of a small pit (***50060***), which cut the pre-Roman deposits and was sealed by the possible spread from the northern mound of the Vallum (*p 468*). This feature was not well preserved, but it had a U-shaped profile, was 0.28 m deep, and had filled with a fine, black silt. Pollen from a monolith through buried soil ***50072*** indicated that alder woodland was dominant, with hazel stands on drier ground, whilst grass pollen indicated open, possibly cleared areas, presumably in the late pre-Roman Iron Age or early Roman period (*Appendix 16*).

Other evidence from the site that could be confidently dated to the Iron Age included residual organic material from a fill (***51039***; *p 467*) within the recut Vallum ditch, which was dated to 350-50 cal BC (2121±29 BP; SUERC-43037). A block of laminated turf (***51026***) from the primary Vallum ditch was probably derived from the Turf Wall (*p 453*), but a radiocarbon determination of 370-170 cal BC (2183±26 BP; SUERC-42030) demonstrated that it contained organic material of Iron Age date. Presumably, therefore, the turf had been growing for some considerable time before it was stripped from the adjacent ground for use in the construction of the Hadrianic frontier.

The pollen evidence from this turf block (*Appendix 16*) suggests that a largely open landscape existed during the later Iron Age, which contained some acid heathland. Rare fungal spores also suggest the possible presence of grazing animals. The waterlogged plant remains from the same deposit (*Appendix 17*) were dominated by taxa indicative of wet ground, including rushes and sedges, but also by species that can thrive in a wide variety of habitats, such as creeping buttercup and tormentil, were also present in significant numbers, together with more limited evidence for grasses with medium-sized fruits, and taxa suggestive of disturbed or cultivated ground. In addition, the presence of heather seeds suggests that mires, or heathland, were close to the site at this time. The pollen evidence from Knockupworth suggests a landscape that had been subject to much clearance during the later centuries of the first millennium BC, which might equate to the beginnings of the intensive phase of forest clearance that seems to characterise the Late Iron Age in the Solway area (*above*).

The Roman Frontier

J Zant

It was recognised from the early stages in the design of the CNDR that the scheme would need to cross a section of Hadrian's Wall and part of the associated Vallum, both forming elements of the *Frontiers of the Roman Empire: Hadrian's Wall World Heritage Site* (*Ch 1, p 1*). To minimise the impact on this internationally significant

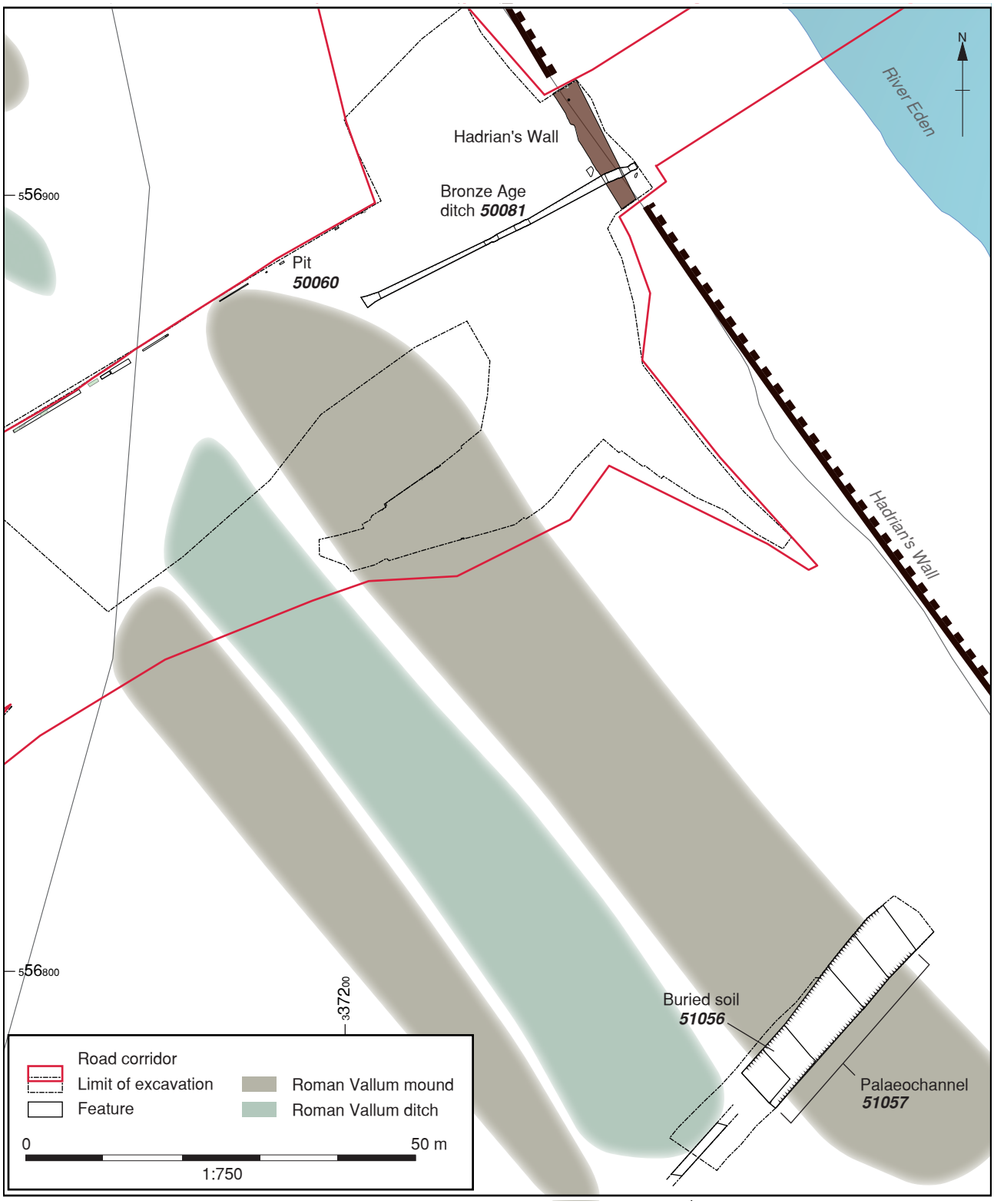


Figure 210: Features pre-dating the construction of the Roman frontier at Knockupworth

monument, an area at Knockupworth Farm (Wall Mile 67; NHLE 1014692; NHLE 1018309), approximately 3 km west of Carlisle, was selected as a suitable location for the construction of the new road bridge to carry the CNDR across the River Eden, since the frontier there had been affected by the construction of a canal, then a railway, in the nineteenth century (*Ch 14, p 14*).

The position of the new bridge was carefully selected to cause the minimum amount of damage to the Roman frontier, but its construction nevertheless offered a significant research opportunity, in that it provided a rare, and academically important, chance to excavate a complete transect across the frontier system. Indeed, such a transect in the west had been

identified as a key strategic goal in the *Research Agenda and Strategy* for Hadrian's Wall (Symonds and Mason 2009a, 32, 40-2). It was also envisaged that the excavation would go some way to addressing the geographical imbalance in the quantity of available data pertaining to the Wall (*op cit*, 9), as historically, earlier researchers tended to concentrate on the better-preserved remains in the central sector and also on the east, where the main academic centres undertaking Wall studies have traditionally been based, with the western sector being comparatively poorly investigated (*ibid*).

The frontier system

The developmental history of the Hadrian's Wall frontier system is complex (Breeze 2006, 50-3), and particularly so in its western sector, which extends for 45 km west of the River Irthing, where the Wall was initially constructed (in the early AD 120s; *p 451*) largely of turf, earth, and timber (the so-called Turf Wall; *op cit*, 58-9; Wilmott 2009a), being rebuilt in stone (sometimes on a slightly different line) later, in the mid-second century AD (*p 451*). The Wall itself was only one element, albeit the most significant, of the frontier system. To the north (in most areas at least) was a ditch (Breeze 2006, 62-3), whilst to the south, situated at widely varying distances from the Wall, lay the Vallum. The purpose of this substantial but enigmatic series of earthworks, the principal component of which was a flat-bottomed ditch flanked by mounds, continues to excite debate (*op cit*, 86-7; Breeze 2015; *p 480*), but it could have been multi-functional (Woolliscroft 1999), perhaps regulating and restricting access across the frontier (*ibid*; Breeze 2015), whilst also defining the southern boundary of a 'militarised zone' to the rear of the Wall (Wilmott 2008, 126-7).

Another linear element of the frontier system was a road, known as the Military Way, which was probably added in the early AD 160s (Breeze 2006, 89; 2015). In many areas, this followed the north mound of the Vallum, but west of the Irthing it frequently lay between the Wall and Vallum (Breeze 2006, 89). The Wall itself incorporated small fortlets, or rather fortified gateways giving access through the curtain wall, at intervals of approximately one Roman mile (consequently known as milecastles), and a series of towers (known as turrets) spaced at intervals of one-third of a mile (two between each pair of milecastles; Fig 211). The milecastles and turrets, but not the

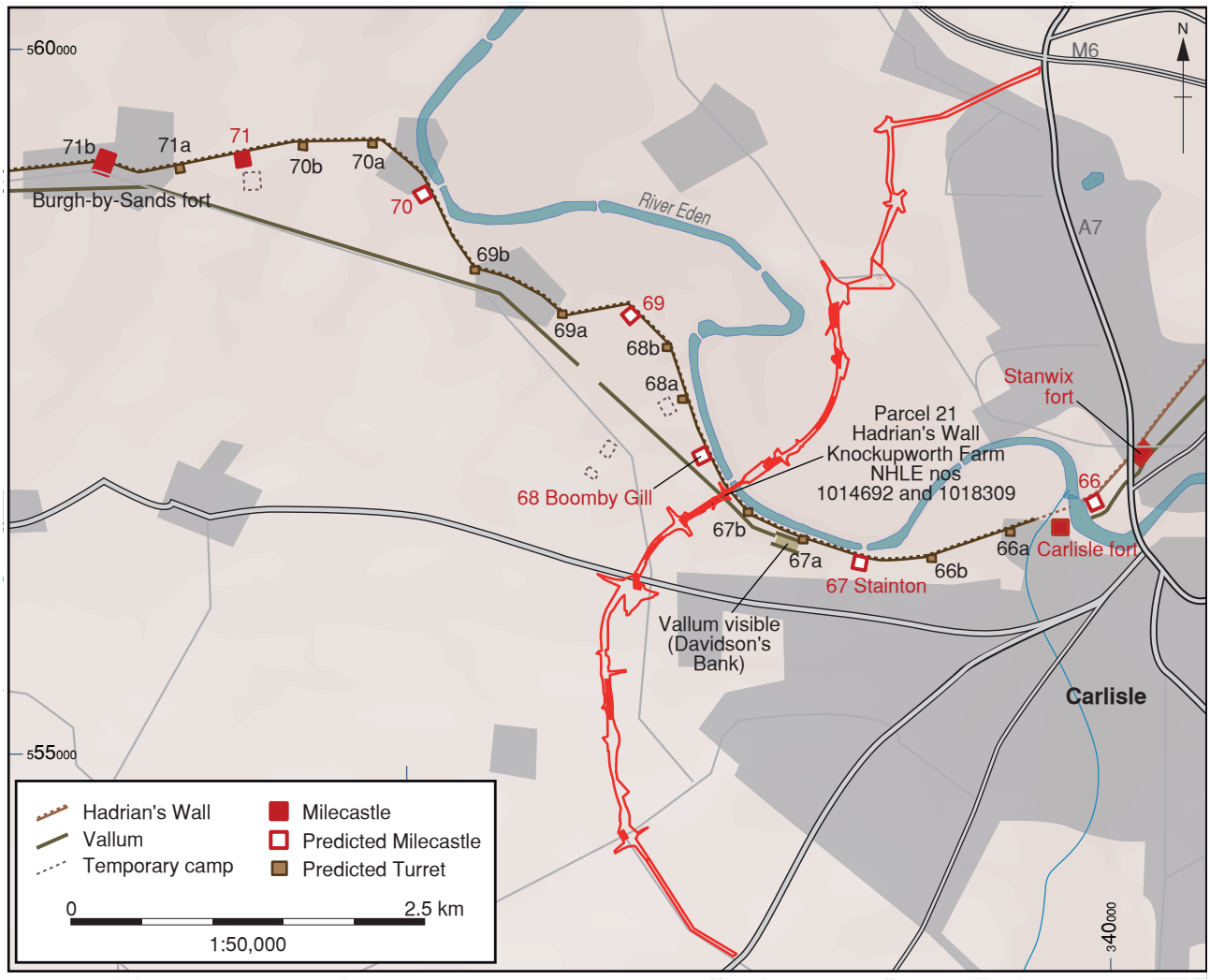


Figure 211: Hadrian's Wall in the vicinity of Knockupworth (Contains OS OpenData © Crown Copyright [and database right] (2022))

curtain wall, were continued beyond the western end of the Wall at Bowness down the Cumbrian coast for at least 32 km (*op cit*, 51).

Work probably commenced on the Wall in AD 122-3 (Breeze and Dobson 2000, 66), though an earlier start date has been posited (Graafstal 2018) and it has also been suggested that the Turf Wall may have been begun slightly earlier, perhaps in response to hostile action (Shotter 2004, 75-9), though there is no clear way of establishing this (Breeze 2006, 59). It is generally accepted that, in the original scheme, the only troop accommodation on the Wall itself was provided by the milecastles and turrets (Breeze and Dobson 2000, 39-40), the intention presumably being to retain the garrisons of a number of pre-existing forts (including Carlisle), which would have provided the troops needed to patrol the new frontier line.

During the construction programme, however, possibly in AD 123 or AD 124 (*op cit*, 74; Hodgson 2009, 16), a decision was made to place forts on the Wall itself, those closest to the CNDR being at Stanwix, approximately 3 km to the east, and Burgh-by-Sands, *c* 5 km to the north-west (though the fort astride the wall may actually have been associated with a later refurbushment (*below*)). Hadrian's Wall remained in commission to the end of the Roman period, except for a break of no more than 20 years from *c* AD 140, during the reign of Antoninus Pius (AD 138-61), when the northern frontier of the province of *Britannia* was advanced to the Forth-Clyde isthmus and a new frontier system, known today as the Antonine Wall, was built (Breeze 2006).

It would seem that the eastern part of the Turf Wall, from the River Irthing westwards to just beyond Milecastle 54 (Randylands), was rebuilt in stone before Hadrian's death in AD 138 (*op cit*, 60), but the western sector, in which the CNDR lies, was not reconstructed until later, perhaps around the time of the return from the Antonine Wall, probably in the late AD 150s or early AD 160s, according to current theories (Hodgson 2009, 30). Whilst this is the generally accepted date for this reconstruction, the evidence is currently very limited (Bidwell 1999, 23; Bidwell and Hill 2009, 39), and a date as late as the reign of Septimius Severus (AD 193-211) has been suggested (Hassall 1984).

The Turf Wall was approximately 6 m, or *c* 20 Roman feet (*pedes Monetales*, or *p M*) wide at the base (Fig 212) and, in ideal circumstances, was built of cut turves laid in courses (Breeze 2006, 58). In practice, however, the earthwork seems to have been constructed of whatever material came readily to hand (Wilmott 2009a, 42), including earth and clay, as well as turf blocks. In a few places, as at Burgh-by-Sands, the rampart was placed on a cobble foundation up to 5.8 m wide (Austen 1994, 38), but this was not provided along the greater part of the Turf Wall, and may have been a result of the activities of a particular construction detail. There is also some evidence to suggest that, in boggy ground, the Wall rested on a piled foundation (Breeze 2006, 60).

The Stone Wall, as first conceived, may have been intended to be approximately ten *p M* (*c* 2.96 m) wide, though where completed, it averages 2.85-2.9 m, and is often stated to have had a foundation of flags bedded in clay (*op cit*, 53; Wilmott and Bennett 2009, 72), though this has been shown to be the case only in certain sectors; elsewhere, the foundation is more

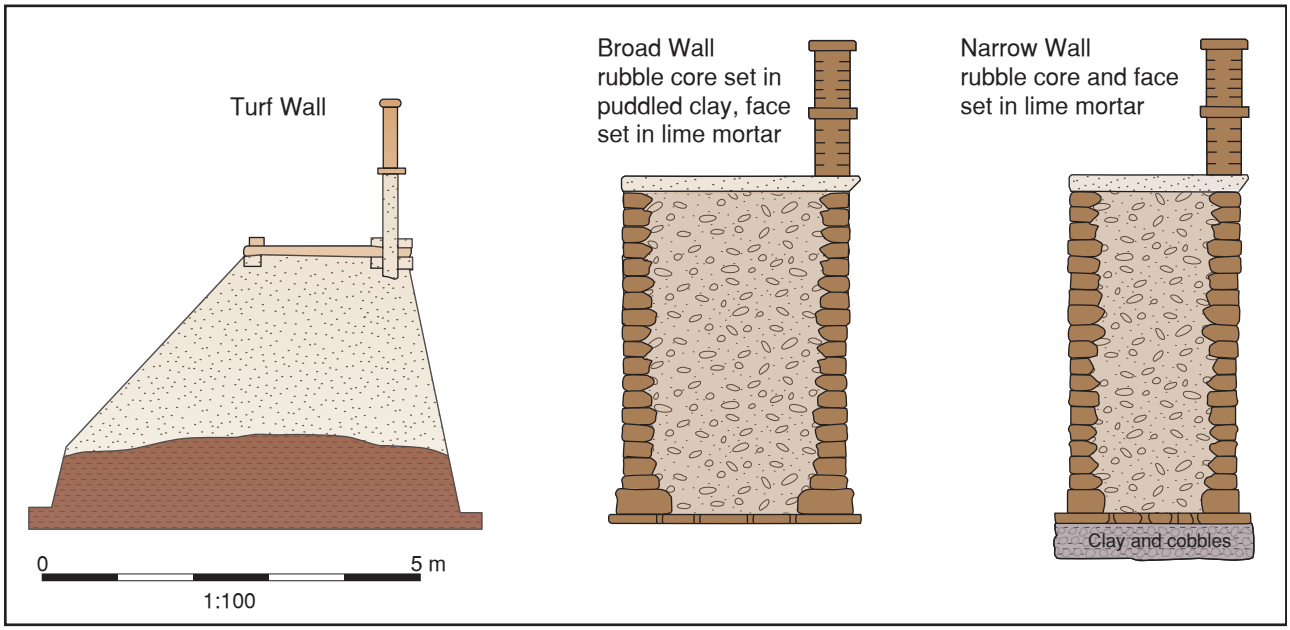


Figure 212: Schematic reconstructions of 'idealised' cross-sections of the Turf and Stone Walls (after drawings originally by Sir Ian Richmond (Richmond 1947, 55))

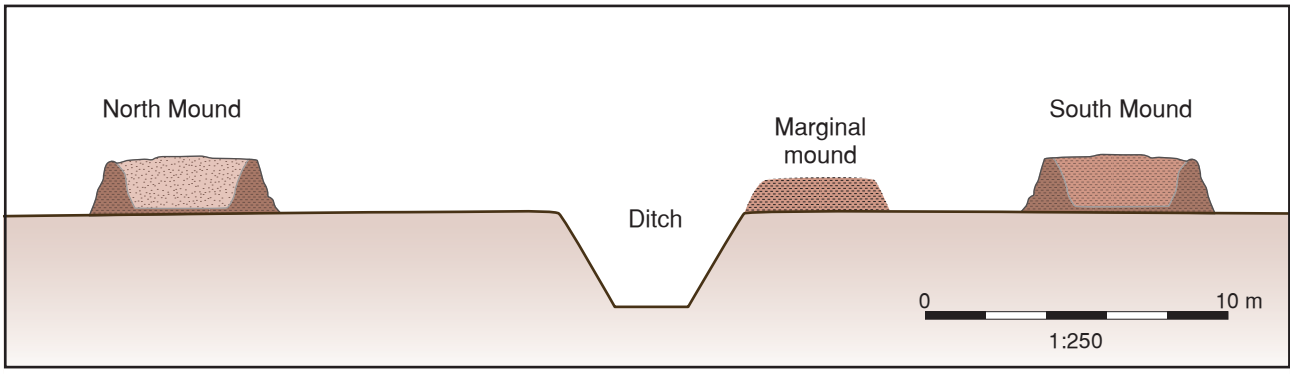


Figure 213: Schematic reconstruction of an 'idealised' cross-section through the Vallum (Breeze 2006, 85)

variable (Breeze and Hill 2013). However, when only certain sections of the Wall and/or its foundations had been completed, there was a decision to reduce the width to approximately 2.25-2.29 m, or just under eight *p M* (*ibid*; Breeze 2006, 53). This Narrow Wall is often said to have been provided with foundations of rough stones bonded with, and sealed by, clay (*ibid*), though, as with the Broad Wall, this is true only of certain sectors (Breeze and Hill 2013). The stone replacement for the Turf Wall averages 2.75 m wide (Wilmott and Bennett 2009, 72), though the western sector, within which the CNDR lies, was seemingly of extremely variable width, 2.44-2.9 m, set on a slightly wider foundation (Breeze 2006, 54, table 2).

The Wall invariably had a rubble core faced on both sides with squared coursed blocks (Hill 2006, 41, 53-4; Wilmott and Bennett 2009, 72). The rubble used in the core was sometimes mixed with clay, mortar, or earth, or sometimes with no other admixture (Hill 2006, 99; Breeze *et al* 2020, table 4). At Knockupworth, the core was of unbonded rubble and earth (*pp 457-60*), and this has also been recorded at other locations (Breeze 2006, 54; Wilmott and Bennett 2009, 73), though not, it would seem, in association with any specific gauge of the Wall.

To the rear was the Vallum, which was built along the entire length of the frontier, except, seemingly, at the extreme eastern end, between Wallsend and Newcastle, where it has not been recorded (Bennett 1998, 17-37). In what might be termed its 'classic' form (Fig 213), the Vallum comprised a large, flat-bottomed, V-shaped ditch, *c* 6 m (*c* 20 *p M*) wide at the lip and *c* 3 m (*c* 10 *p M*) deep, flanked on both sides by mounds, each *c* 6 m (*c* 20 *p M*) wide at the base, set back *c* 9 m (*c* 30 *p M*) from the lip of the ditch (*op cit*, 84-5; Hill 2006, 35); the whole complex was seemingly intended to be approximately one *actus* (120 *p M*) wide. However, in practice, there seems to have been no great consistency in the various features within the Vallum (Wilmott 2008, 121; Breeze 2015).

The mounds, which may have been intended to be five *p M* (*c* 1.5 m) high and 15 *p M* (*c* 4.4 m) wide at the top (Breeze 2006, 84-5), were formed of upcast from the ditch (Wilmott 2009b, 97-8), and, where local conditions allowed, might have been revetted with turf, though stone revetments have also been recorded (Breeze 2006, 84-5). Evidence for a metalled trackway, presumably some form of patrol track, has also been found at several places on the south berm (the space between the ditch and the south mound). This is thought to be an original feature that was later superseded by the Military Way around AD 160 (*p 450*). There is also evidence for metalling on the north berm in some places (Breeze 2015, 7).

An additional mound recorded on the southern lip of the ditch in several places is known as the marginal mound; the existence, in places at least, of a northern marginal mound has also been posited, although this remains to be proven (*op cit*). At most places investigated, the southern marginal mound appears to have been formed from loose material (in some cases described as silty), quite different in character from the materials used in the north and south mounds (*ibid; above*). This suggests that the marginal mound was not generally a primary feature but was created later, perhaps when Hadrian's Wall was recommissioned *c* AD 160 (Breeze 2006, 88), with some of the silty material perhaps being derived from a scouring of the Vallum ditch (Heywood 1965; Breeze 2015). At some sites, though, the marginal mound may have been a primary feature (*ibid*; Wilmott and Bennett 2009, 135; *p 470*), though this has been called into question (Breeze 2015).

Originally, the Vallum could be crossed only at forts and (possibly) at a few milecastles, though when the Wall was abandoned in the mid-second century, secondary crossings were constructed in many places, mostly at intervals of approximately 41 m, though longer and shorter intervals are attested (*ibid*). This deliberate slighting involved the cutting of gaps in the mounds and infilling the ditch (Simpson and Shaw 1922), though it has been noted that the gaps are not always large enough to have generated sufficient spoil with which to fill the adjacent ditch completely

(Breeze 2015). It is not clear if the Vallum was fully recommissioned following the Antonine withdrawal from Scotland; certainly, the fact that many secondary crossings remain visible today demonstrates that they were not removed. Elsewhere, there are seemingly indications that the ditch was recut and the gaps in the mounds infilled (Breeze 2006, 88), though this evidence has now come under critical scrutiny (Wilmott 2008; Breeze 2015).

The frontier at Knockupworth

At Knockupworth, Hadrian's Wall follows the top of a steep escarpment forming the south bank of the River Eden (Breeze 2006, 347; Pl 175), and the lines of the principal elements of the Hadrian's Wall frontier, namely the turf and stone phases of the Wall and the Vallum, are known, being aligned north-west to south-east, roughly parallel to the lip of the escarpment (Fig 214). All were targeted as part of archaeological evaluation during the planning phase of the project (*Ch 1, pp 2-9*), and by the open-area excavations in 2009 (*Ch 1, p 9*).

The excavations examined the Turf Wall, the later Stone Wall, and the Vallum. Within the site (Brown 2009), there was no direct stratigraphic link between the remains of the Vallum and the two Wall phases. However, the broad chronological relationship between these features (*cf* Breeze and Dobson 2000; Breeze 2006; Symonds and Mason 2009b; Hodgson 2009) is not in doubt. It was not anticipated that any of the Wall's other major components, such as milecastles or turrets, would be affected by the construction works, since the place where the road crossed the line of the frontier had been carefully selected to be between the measured positions of Milecastles 67 (Stainton), on the east, and 68 (Boomby Gill), to the west (Fig 211), whilst the measured position of Turret 67b lay *c* 225 m to the east (though, in fact, none of the precise positions of these installations has been fixed by excavation).

The road corridor had been designed to cross the Wall where it did not survive well, and thus only short sections of the Turf and Stone Walls were available for investigation. It was also envisaged (correctly) that the ditch fronting the curtain wall would not be encountered, since it had probably been rendered superfluous by the steep escarpment above the River Eden (Breeze 2006, 347) or, if once present, would have been destroyed by post-Roman river erosion. The possibility that other, archaeologically attested, elements of the frontier works, including the Military Way and 'minor' features associated with the Vallum, such as marginal mounds and secondary crossings, would be exposed during the course of the project was acknowledged (OA North 2008b, 9-10), but precisely where (or even if), such features might be encountered could not be determined prior to excavation.

The Turf Wall

Before this project, the Turf Wall had been recorded very infrequently west of Carlisle (Wilmott 2009a, 41), and its line in Wall Mile 67 was entirely unknown.

Plate 175: Knockupworth, looking south-west, showing the River Eden and the line of the Vallum on its southern bank, the latter visible as an earthwork

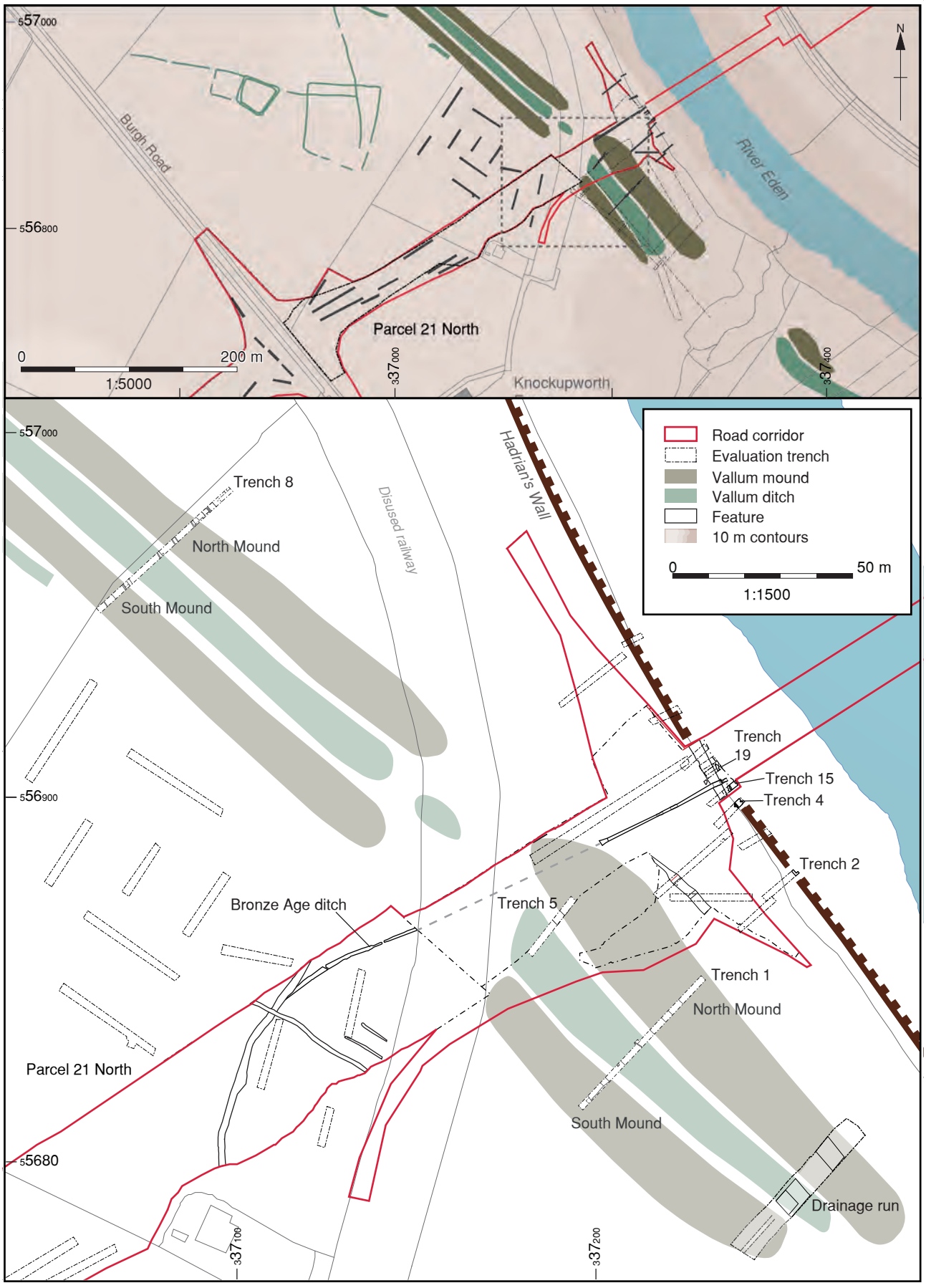


Figure 214: The route of the CNDR at Knockupworth, with the CFA and CAU evaluation trenches (Contains OS OpenData © Crown Copyright [and database right] (2022))

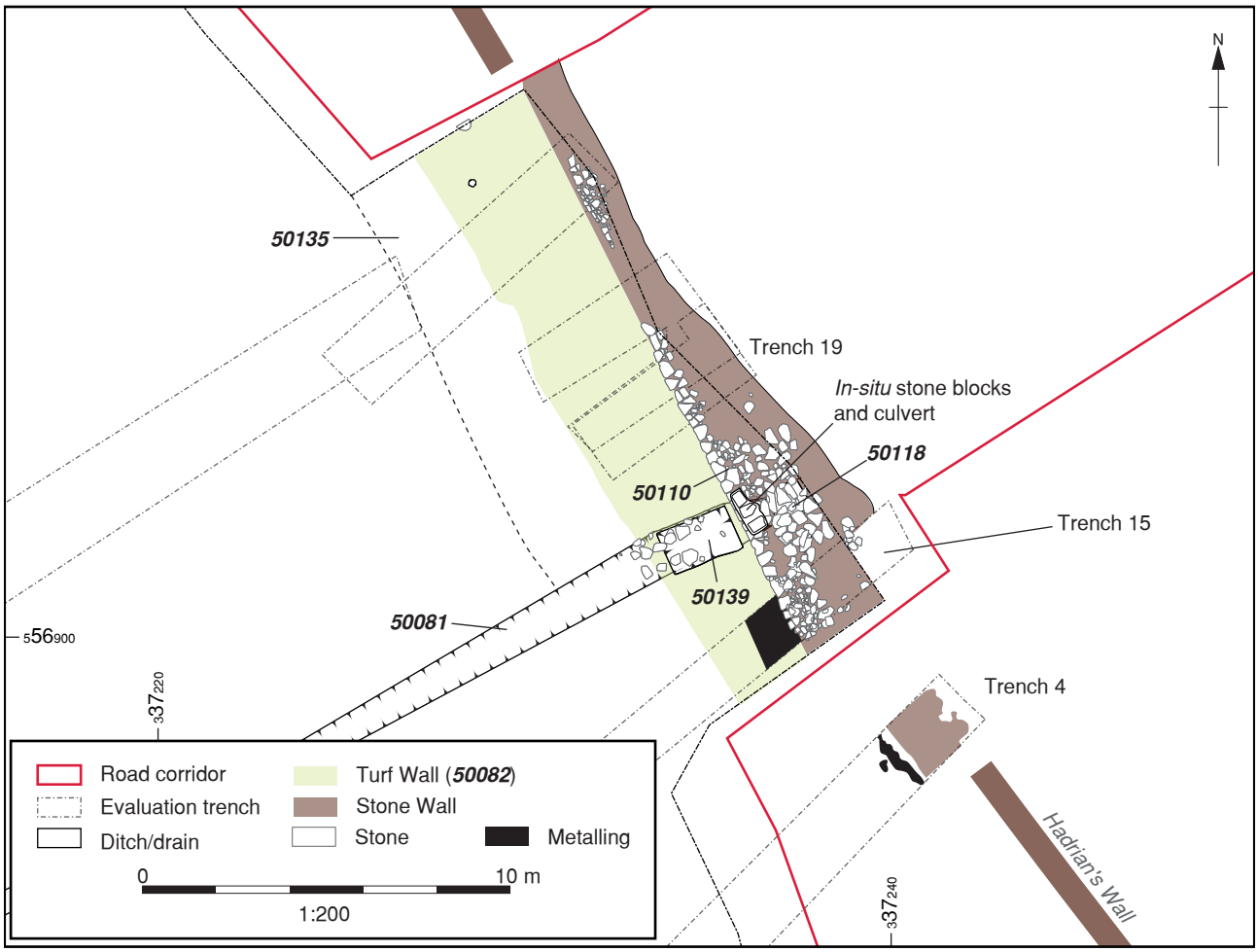


Figure 215: The Turf and Stone Walls, and associated features

Neither had any trace been recorded during the evaluation phases of the project (*Ch 1, pp 2-9*). The remains found at Knockupworth comprised a low bank, up to 3.45 m wide and 0.3 m high, extending broadly north-west/south-east along the extreme north-eastern side of the site (a distance of 17.5 m), sealed in part by the remains of the Stone Wall (Fig 215). There, the earthwork comprised fine, pale/mid-grey compacted sandy silt, interleaved with a few much darker bands, the remains of laid turves (Pl 176).

Plate 176: Laminated earth and turf deposits forming the levelled Turf Wall, looking north, with flagged foundation **50110** *for the Stone Wall above*

At the tail of the bank, however, south of the Stone Wall, the surviving material was generally darker and more mixed, with little clear evidence for turf layering (Pl 177). While the Turf Wall was standardly approximately 6 m wide at the base (*p 451*; Breeze 2006, 58; Wilmott and Bennett 2009, 73), it is clear that the earthwork at Knockupworth survived, at best, to little more than half its original width, its north-eastern edge having been destroyed by erosion of the escarpment, as well as having suffered disturbance during construction of the later Stone Wall (*pp 457-8*).

For the most part, the Turf Wall had been built directly over the natural glacial clay, though a small fragment of a buried soil was recorded beneath it in one place, which is suspected to date to the Bronze Age (*Ch 11, p 408*). Buried soils were also absent from the area immediately south of the Wall (though a few patches survived, which might date to the Iron Age (*p 448*), beneath the Vallum mounds and the spread mound material), suggesting that turf and topsoil were stripped from the surrounding area, presumably for use in the construction of the Wall itself. In places, a layer of red-brown sandy silt (***50135***), up to 0.25 m thick, extended back from the tail of the Wall for up to 2 m. This overlay the natural clay and was sealed by modern topsoil, so its date and significance are unclear. It could conceivably have been a Roman-period soil that accumulated immediately behind the Turf Wall, but it might equally have been the remnant of a much later, post-Roman, accumulation.

A small fragment of orange oxidised ware was recovered from the tail of the Turf Wall (deposit ***50082***; *Appendix 11*), and a residual prehistoric flint was also found (*Appendix 12*), the latter perhaps incorporated into the earthwork in topsoil stripped from the adjacent area. The potsherd may possibly derive from a vessel produced by the military-controlled kilns at Brampton, *c* 14 km east of Carlisle (Hogg 1965), which were in use from the late first century AD to *c* AD 140 (Swan *et al* 2009, 591). A further six sherds in either the same, or a very similar, fabric were recovered from modern topsoil in the same general area.

The remains of a stone lining (***50139***) were found at the northern end of Bronze Age ditch ***50081*** (*Ch 11, p 408*). This comprised large, undressed sandstone blocks, of which only a single, fragmentary, course survived, defining a central channel, *c* 0.3 m wide (Pl 178). Only a short segment of this lining, 1.75 m long, remained, but whether this was its full length, or if some of the

Plate 177: The tail of the Turf Wall, looking north-west, showing homogeneous deposit **50082**

Plate 178: Stone lining **50109** *at the northern end of ditch/drain* **50081**, *looking north*

stonework had been robbed, is uncertain, although the south-western end of the stones coincided almost exactly with the rear edge of the Turf Wall (deposit ***50082***). This lends support to the idea that the stone channel was a drain laid through the base of the Turf Wall, and suggests that the stonework may never have extended further to the south-west. To the north-east, it is conceivable that the lining had been removed or otherwise disturbed when the stone phase of the Wall was constructed, an occasion when the feature was itself reinstated as a drain for the Stone Wall (*p 460*).

If the lining was indeed a drain associated with the Turf Wall, it appears that the Wall-builders utilised the partially silted remains of the Bronze Age boundary ditch, as a ready-made 'construction trench' in which to lay the drain (Pl 179). Following its insertion, it became filled (***50085*** and ***50084***), probably during the Roman period, and was eventually partially sealed by a spread of clay, earth, and turf (***50083***), presumably deriving from denudation of the north mound of the Vallum (*p 463*; Fig 216).

The Stone Wall

The Stone Wall in this sector (*p 452*) is part of the frontier believed to have been reconstructed following, or perhaps immediately prior to, the withdrawal from the Antonine Wall in *c* AD 160 (*p 451*), though this dating is still open to question (Bidwell and Hill 2009, 39). That the Turf Wall at Knockupworth had been comprehensively demolished and levelled prior to construction of the Stone Wall is clear, as the latter was built directly on top of the Turf Wall (*above*). The Stone Wall itself (Fig 215) had been constructed over the front half of the earlier earthwork, on a subtly different alignment (slightly more towards north/south than

Plate 179: Ditch/drain **50081**, *looking north-east, with stone lining* **50109** *at its north-eastern end*

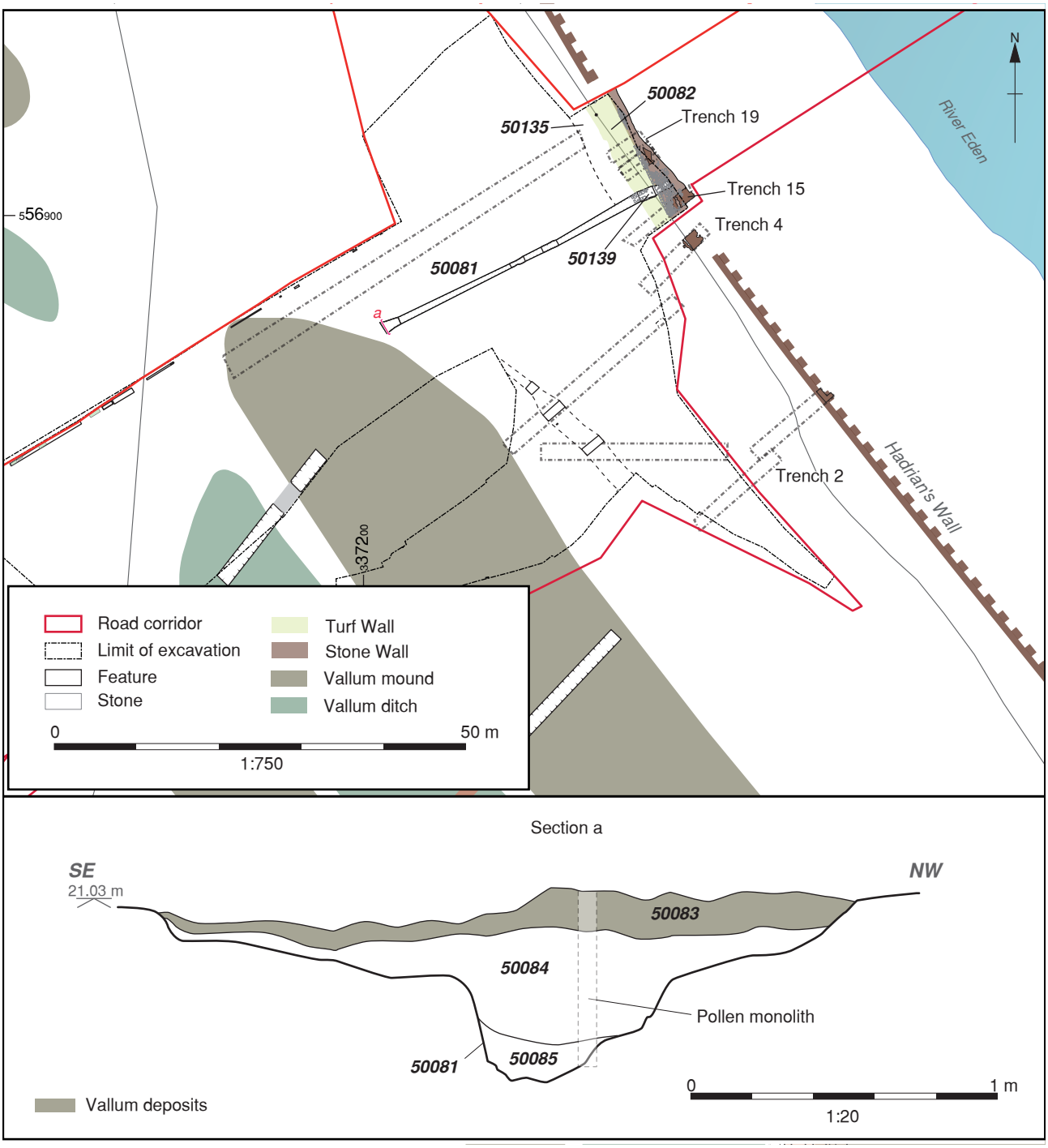


Figure 216: The Turf and Stone Walls, and a section through ditch/drain **50081**

the Turf Wall), so that its rear (south-western) face was offset *c* 2.1-3.3 m north-east from the tail of the Turf Wall (Pl 180).

During the evaluation of the site in 1997 (McCarthy *et al* 1997), a spread of sandstone rubble, close to the edge of the escarpment above the River Eden, was thought to have derived from the Stone Wall which, it was believed, had been wholly or largely destroyed by erosion there (*op cit*, 15, 17-18, fig 6). Subsequent trenching (CFA 2005a) located the poorly preserved remains of the Wall in four areas (Trenches 2, 4, 15, and 19; Fig 216), though nowhere had the full width survived, its northern face having been destroyed by erosion of the escarpment. Where best preserved, it was 2.72 m wide (*op cit*, 23), but only the base of the rubble core and the southern edge of the Wall foundation, represented by a layer of sandstone slabs, survived. A single sherd of Black-burnished ware from Trench 4 (*op cit*, 22) was the only Roman artefact from a deposit directly associated with the Stone Wall, though even this relationship was tenuous, since the sherd came from a root-disturbed layer of soil and rubble overlying the rubble core.

*Plate 180: The Stone Wall, looking north-west, showing the inner (south) face, the unbonded rubble core (***50118***), and its position relative to the tail of the levelled Turf Wall*

Within the open-area excavation, the partially eroded Stone Wall survived in two separate sections, the best preserved, 9.8 m in length, to the south of the other, 2.75 m long, to the north-west, separated by an area of greater disturbance, 2.2 m wide, where all trace of the Wall had been removed (Pl 181). Only the

Plate 181: The poorly preserved north-western fragment of the Stone Wall, looking south-east

southern edge of the Wall foundation, comprising a course of relatively thin (*c* 80-100 mm), red sandstone flags (***50110***), survived, together with the rubble core, but even these had been removed in places (Fig 215). A single course of masonry above this foundation survived in only a limited area, *c* 6 m long. This comprised a facing of squared, coursed rubble (red sandstone blocks, *c* 0.3-0.45 x 0.25-0.35 x 0.25-0.3 m), of which only three remained *in situ*, with a core (***50118***) of red sandstone rubble and a few river cobbles in a red-brown silty soil (Pl 182).

The facing stones were offset by 100-120 mm from the southern edge of the foundation slabs, and where they had been removed, the position of the south face was marked by a distinctive linear crack in the flags, marking the pressure point along the outer edge of the face. This has been described as a 'virtual signature' of the rebuilt Stone Wall, recorded at several sites in the western sector of the frontier (Wilmott 2009a, 43; 2009c, 177; *p 476*). It was notable that the flagstone foundation was present only along the southern edge of the Wall, as a course up to 0.5 m wide, but was absent beneath the *in-situ* rubble core, which was laid directly on the underlying remains of the Turf Wall. Presumably, the intention was to underpin the facing stones only, leaving the core with no additional support. No trace of flags on the north-eastern face of the Wall was found, nor were any facing stones recorded, demonstrating that the front of the Wall had been completely destroyed by erosion of the escarpment edge. Where best-preserved, the Wall foundations survived to a width of 2.5 m (*c* 2.2 m, measured from the offset southern face), slightly less than the 2.72 m for the foundation recorded during the evaluation (CFA 2005a, 23; *p 458*). Allowing a minimum width of 0.3 m for the vanished front (north) face, the Wall must have been at least 2.5 m wide above its foundations, slightly less than the average of 2.75 m for the Wall in the western sector (Wilmott and Bennett 2009, 72), but within the recorded range of 2.44-2.90 m (Breeze 2006, 54).

Drainage channel ***50139***, associated with the Turf Wall (*p 456*), also extended beneath the Stone Wall, as the foundation slabs for its south face had clearly settled slightly over the soft ditch fills (Pl 183). Presumably, the drain associated with the Stone Wall at precisely the same place was a direct replacement for the putative Turf Wall feature. This was created by a narrow (*c* 0.25 m-wide) gap between two of the surviving Stone Wall facing stones, behind which, within the rubble core, were the poorly preserved remains of a small culvert, aligned precisely on stone-lined channel ***50139*** to the south. The collapsed capping of this feature was represented by a line of four pitched sandstone blocks, each *c* 0.5-0.6 m long (Pl 184), aligned perpendicular to the Wall, visibly contrasting with the randomly distributed rubble in the rest of the core. Subsequent removal of the core

*Plate 182: The flagged footing (***50110***) for the south face of the Stone Wall, looking north-east, showing the distinctive cracking caused by downwards pressure from the offset facing stones*

Plate 183: The Stone Wall, looking east, showing settling of the facing stones over ditch/drain **50081**

Plate 184: The four collapsed capstones of drain **50081** *within the Wall core, looking north*

revealed what remained of the sides of the culvert, comprising a fragmentary course of roughly dressed sandstone blocks defining a channel, 0.3-0.35 m wide. The culvert had been built at the level of the foundation slabs beneath the facing stones (rather than beneath the foundation), but there was no evidence that the base of the drain had itself been flagged.

Traces of what may have been a metalled surface, up to 1.65 m wide and 0.2 m thick in two of the evaluation trenches (Trenches 4 and 15; Fig 215), comprised large cobbles set into the underlying natural clay, immediately inside the inner (south) face of the Stone Wall (CFA 2005a, 12, 19). The significance of this deposit is not clear, though it could conceivably have been the remains of a track associated with the Stone Wall, as has been recorded elsewhere, immediately behind the Wall (Breeze 2006, 89; *pp 467-8*), or just possibly a feature similar to the mysterious 'platform' found immediately to the south of the Antonine Wall at Tollpark (Keppie and Walker 1981).

The Vallum

Elements of the Vallum were excavated in three parts of the Knockupworth site: within the footprint of the road itself; the adjacent pedestrian underpass; and in the deep drainage trench approximately 95 m to the south-east of the road (Fig 217). The latter was very narrow, some 5 m wide at the top but only 1 m wide at the base, which made access, recording, and interpretation extremely difficult (Pl 185). A substantially complete section through the Vallum was obtained, however,

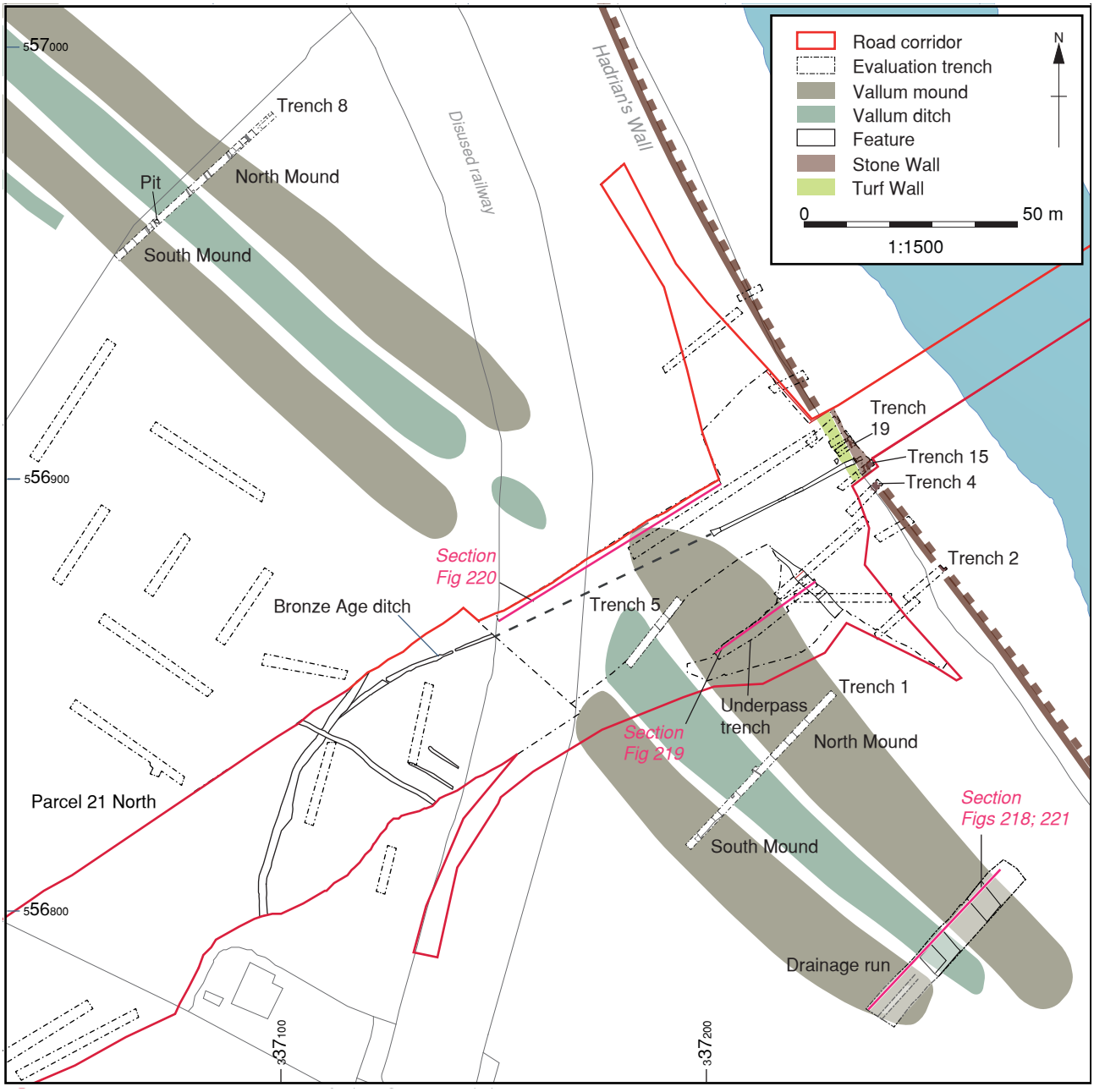


Figure 217: The excavations across the Vallum (Contains OS OpenData © Crown Copyright [and database right] (2022))

Plate 185: Inserting box-shoring into the deep drainage trench to facilitate excavation of the Vallum ditch, looking south-west

including a full profile of the ditch, the remains of the north Vallum mound, and, on the southern lip of the ditch, material that possibly represents the remains of a marginal mound; the southern mound was not recorded in this area.

To the north, where construction works did not penetrate nearly so deep, only the top of the Vallum ditch was disturbed, and most of the upper fills had in any case been destroyed during the nineteenth century, when the canal and subsequently the railway were constructed (*Ch 14, p 520*). There too, the north Vallum mound was sectioned, and material that had spread north-eastwards from this was also sampled, though deposits associated with the mound were retained *in situ* wherever possible. These elements were also recorded in various evaluation trenches (*pp 467-70*), together with material probably derived from the south mound.

Because of the poor preservation of the Vallum mounds, and the limited nature of the investigations, the interpretation of these features remains rather equivocal, though what is certain is that the Vallum ditch was approximately 50 m behind (south-west of) the Turf Wall (*c* 52-53.5 m south of the Stone Wall), with the remains of the north mound parallel to it. Where well defined, the north mound was 5.25-11.4 m wide, but more diffuse spreads of material, up to 24 m wide, were associated with it, possibly caused by ploughing and/or by deliberate slighting. The deposits comprising the putative marginal mound extended at least 13.5 m south-westwards from the ditch, but these were not revealed to their full extent, and their precise interpretation is open to question (*p 452*).

The ditch

During evaluation, only the very latest fills of the Vallum ditch were observed (CFA 2005a, Trenches 1, 5, 8), some clearly very recent, since they yielded late post-medieval pottery and clay-pipe fragments (*op cit*, 10-11, 16); they may therefore relate to infilling or disturbance of the ditch associated with the construction of either the canal or railway in the nineteenth century (*Ch 14, p 520*). Augering to depths of *c* 0.6-1 m below the modern surface revealed earlier deposits, some with waterlogged organic preservation, mostly seeming to represent natural silting of the upper part of the ditch (*op cit*, 11, 13, 16), perhaps during the post-Roman period. Within the footprint

of the road and the underpass, the upper part of the ditch was also observed, most being retained *in situ* beneath the new construction. The only deposit possibly associated was a layer of grey-brown sandy silt, at least 3.4 m wide and 0.35 m thick, which was recorded in section only. The base of this deposit was not observed, and it had been cut on all sides by nineteenth-century groundworks.

In the south-eastern part of the site, in the drainage trench, the considerable practical problems with excavating the ditch were, not least, controlling the ingress of groundwater into the excavation and stabilising the sides of the trench, since the soft ditch fills were prone to frequent collapse (Pl 186) and required elaborate shoring. The ditch was found to have been recut at some stage (*below*), which had resulted in the removal of the southern edge of the primary feature, together with all the upper fills (Fig 218). From its northern lip to the point where it had been destroyed by this recut, the ditch (***51050***) was 4.7 m wide, with a flat base and a steeply sloping northern edge, as is found elsewhere (*p 478*; Wilmott 2009d, 51). The base of the southern edge was observed in the bottom of the cut, and if it is assumed that the ditch profile was broadly symmetrical, the feature would indeed have been approximately 6 m wide. Similarly, although only the lower 1-1.5 m of the primary ditch survived, it seems probable that the original feature was of the same, or similar, depth to the recut, which was *c* 2.7 m deep.

The ditch had been dug largely through the natural sandy-clay glacial till, the upcast being used to form the bulk of the north and south mounds (*p 467; p 470*). To the south, a buried-soil horizon (***51056***; *p 448*) overlay the natural clay, but any stratigraphic relationship between the primary ditch and this layer had been removed when the feature was recut. The primary fill (***51044***), comprising interleaving layers of pinkish- and greyish-orange-brown clay, up to 0.8 m thick, was present only at the base of the southern edge of the cut. This deposit probably derived from weathering or slumping of the upper part of the southern edge of the ditch, an hypothesis supported by the fact that 'tip lines' visible within the material clearly dipped from south to north, from the top of the cut towards the base. This evidence for primary silting was consistent with that recorded in other sections of the ditch (Wilmott 2008, 121-2), for example at Black Carts (Wilmott 2009b, 92, fig 202, 96-7), where the upper edges slumped into the base until a secure angle of repose had developed, after which the ditch, now with a somewhat rounded profile, began to silt gradually.

*Plate 186: Ingress of groundwater and collapse of the fills of the primary Vallum ditch (**50150**) in the drainage trench, looking north-west*

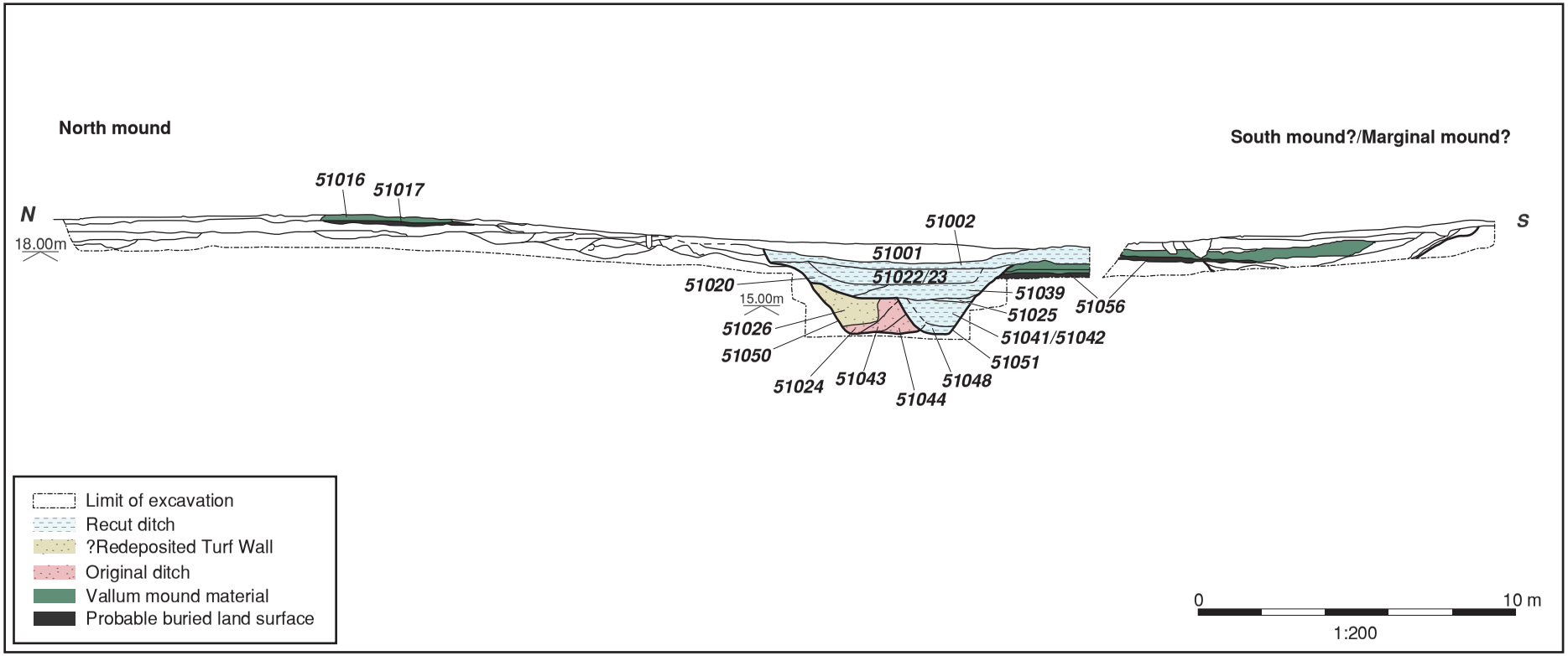


Figure 218: West-facing section through the Vallum ditch and mounds in the drainage trench

At Knockupworth, however, there was no trace of a similar layer of slumped material on the north side of the ditch. There, further deposits of redeposited, stiff pinkish-grey or pinkish-brown silty clay and pebbles (***51043*** beneath ***51024***), up to 0.8 m thick in total, had also entered the ditch from the south.

By far the most interesting of these fills, though, was the uppermost (***51026***), which comprised a large block of laminated organic material, *c* 2 x 1 m at its greatest extent, which had been deposited against the northern edge of the ditch (Pl 187). Where best preserved, this was composed of pale-mid-grey silty-clay interleaved with thinner layers of black silty material. Thin-section analysis (*Appendix 19*) demonstrated that ***51026*** was composed of horizontally laid layers of turf and topsoil formed in a moderately wet, probably grazed, grassland environment. The turves had been laid grass-to-grass, a feature typical of Roman turf-built features, such as ramparts and similar earthworks (Crowther *et al* 1996; Macphail *et al* 2003), and a radiocarbon date indicates that the turf had been forming for some considerable time before it entered the ditch (*p 448*).

From its appearance, there can be little doubt that ***51026*** derived from an earthwork constructed of layered turf, whilst the fact that it had survived within the Vallum ditch in a coherent and recognisable form indicates that it had entered the feature as a large, and presumably heavy, block. This further implies that it had travelled no great distance prior to deposition, and also raises the question as to how it may have been transported. The earthworks closest to the ditch, the Vallum mounds, are one obvious possible source, but these were unlikely to have thick layers of turf within their make-up (*p 479*), and therefore deposit ***51026*** perhaps bore a closer resemblance to sections excavated through the Turf Wall (*pp 453-6*). It is tempting, therefore, to see this material as having been taken from the Wall and dumped into the ditch when the Hadrianic frontier system was temporarily abandoned in the early Antonine period, probably during the creation of one of the many secondary crossings of the Vallum that appear to have been constructed at this time (*p 452*; Breeze 2006, 87).

All the fills above deposit ***51026***, and probably, indeed, the upper part of ***51026*** itself, had been removed when the Vallum ditch was subsequently recut, though the fact that the turf block survived at all demonstrates that the recut was not as deep as the original ditch cut. Precisely when this took place is not known, since the site yielded no useful dating evidence, but it presumably occurred at or around the time the Wall was recommissioned following the abandonment of the Antonine Wall, in *c* AD 160. It should, however, be

*Plate 187: Laminated turf block (***50126***) deposited within the primary Vallum ditch (***50150***), looking south-east (following the collapse of the section recorded on Figure 218)*

noted that there has been very little (if any) indication elsewhere for a redefinition of the Vallum ditch after its initial construction (*p 453*), nor, indeed, for any other form of human intervention (Wilmott 2008, 121-2; 2009d, 52). That said, there is evidence that, in some places at least, the marginal mound may have been formed from silts cleared from the ditch when it was cleaned or recut (Heywood 1965; Breeze 2015), though this dating is not universally accepted (Wilmott 2008). What does seem certain is that it was not brought back fully into operation following the return from Scotland, since many secondary crossings were left in place, although some may have been removed as part of a reconditioning of the Vallum (Breeze 2015). It is possible that the recut ditch at Knockupworth represents one such event (*below*), though there is also some scepticism about the extent (or even the reality) of the putative reconditioning (Wilmott 2008).

Whatever the precise circumstances surrounding its creation, the new ditch (***51051***) was slightly to the south of, and somewhat wider than, the primary feature at the lip, up to 7.5 m, though it is possible that this was caused by weathering of the upper sides. Its southern edge was steeply sloping (similar to the northern edge of the primary ditch), but the north side appears to have been stepped. There, the upper 1 m or so sloped in similar fashion to the southern edge, but below this was a nearly level step above the turf block, 2.6 m wide, before the edge sloped steeply again to a slightly rounded base. At its deepest, therefore, in a 2.3 m-wide strip against the southern edge, the ditch was *c* 2.7 m deep, though on the northern 'step' it was no more than 1.5 m in depth.

The basal fill of the deeper, southern, edge (***51048***), a fine, purple-brown silty-clay, 0.35 m thick, had entered the ditch from the north, since it extended up the northern edge of the cut. This was overlain by up to 0.8 m of mixed, pink-brown silty-clay (***51041***/***51042***), containing streaks and lumps of dark brown 'peaty' material, probably decayed turf, that effectively filled the deeper area completely, though a thin deposit of pale grey-brown silt with patches of probable turf (***51025***) overlay it, filling the ditch level with the base of the northern step. The upper 1.5 m or so was ultimately filled with deposits of fine, sticky, grey or blue-grey sandy-silt, the lower (comprising sequential deposits ***51039*** and ***51020***) quite dark in colour, the uppermost (***51022***/***23***) becoming progressively paler, seemingly representing gradual silting. It is also apparent from a radiocarbon date that fill ***51039*** contained residual later Iron Age organic material (*p 448*). Following this episode of gradual silting, the northern lip of the ditch remained visible, until it was filled by a layer of pale orange-brown sandy subsoil (***51002***), 0.35 m thick, which accumulated over the entire feature. Even after this, the position of the ditch would have remained visible as a slight hollow, which only finally disappeared following the build-up of a further 0.5 m of grey-brown sandy-loam (***51001***), probably a late post-medieval agricultural soil, that was in turn overlain by modern topsoil.

Apart from a radiocarbon date from fill ***51039*** (*p 448*), the only other dating evidence from the Vallum ditch was provided by a sherd of Central Gaulish samian ware, probably a Dr 37 bowl from the Lezoux workshops (*Appendix 11*), which came from fill ***51041***/***51042***. This vessel was probably produced after AD 120 (Webster 1996, 14), but can otherwise only be assigned a broad second-century date. Additionally, two sherds in an oxidised fabric came from one of the upper fills of the ditch in the evaluation (CFA 2005a, 22), and an unstratified amphora fragment is also believed to have come from it (*op cit*, 13).

Assessment of the charred plant remains within deposits ***51020*** and ***51022***, in the upper part of the recut ditch, found only small quantities of grass stems, tuber fragments, and occasional weed seeds (OA North 2011a, 57), but micromorphological analysis of the same sediments, together with underlying fill ***51041*** (*Appendix 19*), suggests that some of this accumulation comprised fine, muddy silting and inwash indicative of material formed on, or adjacent to, a trackway. Indeed, above the level of the 'step' on the north, it is possible that the ditch itself may have been used as a track, with probable dung in the upper part of fill ***51041*** and, especially, in ***51039*** and ***51023*** (the latter was particularly 'muddy and trampled' in character, with significant phosphate enrichment), suggesting either the presence of livestock, or, perhaps, dumping or deposition of dung-rich waste into the ditch from elsewhere. The date at which this occurred is unknown, but, in view of the stratigraphic position of these deposits, a late Roman or even post-Roman context seems likely (*p 470*).

The north mound and the possible Military Way

In the evaluation, the north mound was found to be *c* 6.5 m wide, with a maximum height of 0.62 m, being constructed of layers of earth and probable turf, overlain by a deposit of compacted orange gravelly clay, the latter presumably upcast from the Vallum ditch. Material eroded from the top of the mound extended several metres to the north-east in some places (McCarthy *et al* 1997, 15-16, fig 5; CFA 2005a, 9, 15-16).

In one of the sections (Trench 1; Fig 217; *op cit*, 9), the remains of what was interpreted as a cobbled road or trackway, parallel with the Vallum, were found on the berm between the north mound and the ditch, adjacent to the inner (south-western) edge of the mound and *c* 3.45 m north of the lip of the ditch.

This was 3.35 m wide and had been constructed of compacted gravel and pebbles, 0.1 m thick, overlying a foundation of larger cobbles, also 0.1 m thick, that had been set into the underlying natural clay (*op cit*, 9). The surface was cambered to the south-west, towards the ditch. No trace of a similar feature was recorded elsewhere within the Knockupworth site, so its precise significance remains uncertain. The character of the metalled surface, especially the use of gravel and pebbles above a foundation of larger stones, would be broadly consistent with its identification as a surviving fragment of the Military Way, constructed around AD 160 (Breeze 2006, 89; *p 450*). However, west of the Irthing, the 'usual' position of the Military Way, relative to other elements of the frontier works, was between the Wall and the Vallum, not within the Vallum earthwork complex, though further east, the road had often been built along the top of the north mound (*ibid*). In addition to the Military Way itself, there is also limited evidence in some sectors for the existence of other trackways in various positions relative to the Wall and the Vallum (*ibid*), and it is therefore possible that the CNDR feature was one of these trackways, if it was not simply a localised patch of metalling (*p 452*).

The three sections excavated in 2009 through the north mound yielded contrasting results, which appear to reflect differences in the extent to which this feature had been disturbed. In all three areas, the mound had clearly been heavily truncated, since it was nowhere more than 0.5 m high, and generally lay directly beneath relatively recent agricultural soils. It was also found to seal the remnants of the pre-Roman land surface, which had been removed over most of the site (*p 448*). The base of the mound, comprising a redeposited glacial till (presumably upcast from excavation of this ditch), mixed with gravel and cobbles, was identified within the deep drainage trench on the southern edge of the site (***51016***), 9.25 m north of the Vallum ditch; there, it was 5.25 m wide and 0.3 m thick (Fig 218), and overlay a remnant buried soil (***51017***; *p 448*).

In the underpass trench, *c* 70 m to the north, the mound survived to a height of *c* 0.35-0.5 m (Pl 188; Fig 219), sealing a buried pre-Roman or early Roman soil horizon (***50097***). There, its base comprised a layer of medium-large cobbles in redeposited red-brown sandy clay (***50096***), 6 m wide and 0.12 m thick, which was overlain by a deposit of similar, though much less stony, clay (***50103***). The northern edge of the mound had seemingly been disturbed, perhaps by roots, which had led to the formation of a mixed deposit of dark grey silty sand (***50095***). However, what was clearly redeposited mound material (***50093*** and ***50094***, and ***50083***; Fig 216) was recorded north of this area, extending for *c* 8.5 m

Plate 188: The best-preserved section of the north mound of the Vallum

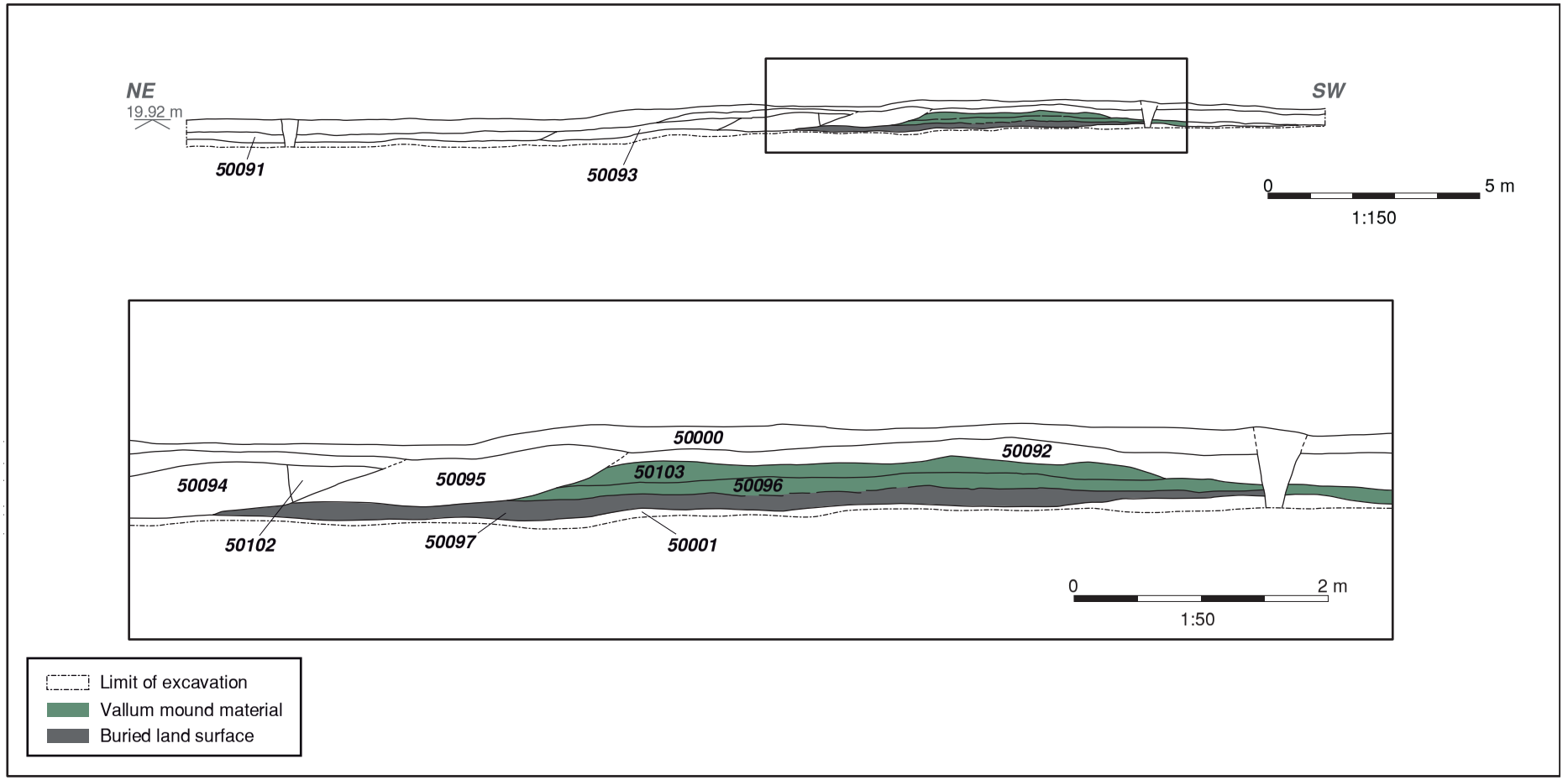


Figure 219: North-west-facing section through the north mound of the Vallum in the underpass trench

north of the basal mound deposit (***50096***). Beyond this, a layer of clean, red-brown sandy silt (***50091***), up to 0.25 m thick, was traced north for at least a further 8 m. This had probably formed largely naturally, but it may also have incorporated material weathered or spread from the north mound. Ultimately, the mound, and all other associated deposits, was sealed by an extensive accumulation of grey-brown soil (***50092***), probably a relatively recent agricultural soil, directly beneath the modern topsoil.

Although the north mound was largely preserved *in situ* within the footprint of the road, a section was cut through its deposits (Fig 217), and spreads of material that probably derived from the mound were partially removed in places. It proved difficult, however, to differentiate between *in-situ* mound material and redeposited (spread) mound deposits, which were up to 11.4 m wide in total, though this was clearly not the width of the mound as built, but the result of the spreading of deposits to the north, probably largely as a result of post-Roman agricultural activity. The surviving mound material was 0.35 m thick and largely comprised redeposited orange-brown gravelly clay (Fig 220; ***50053***, ***50056***, and ***50064***), within which was a distinct band of pale blue-grey sandy-clay (***50054***/***50055***), 0.2 m thick, perhaps the remains of a layer of earth and turf. What may have been a redeposited layer of mixed yellow-brown/grey-brown sandy silt (***50065***), 0.15 m thick, was also recorded to the north-east, extending north for at least a further 13 m. To the south, the mound deposits terminated *c* 6.4 m short of the projected line of the Vallum ditch, though this was a result of disturbance caused by the construction of the canal and railway (*Ch 14, p 520*).

The south mound of the Vallum, or possible marginal mound

Deposits representing the south mound of the Vallum, or material spread from it, were recorded in two areas during the evaluation of 2005 (CFA 2005a). In the south (in Trench 1; Fig 217), what were probably spreads of clay from the mound, rather than the *in-situ* remains of the mound itself, were recorded *c* 11.5 m south of the ditch, and extending for *c* 12.5 m (*op cit*, 10). Preservation was better to the north (in Trench 8), where deposits were found *c* 6.5 m south of the ditch (*op cit*, 14-15). There, the mound was *c* 10.5 m wide and 0.69 m high, and had been constructed from natural clay and silty sand, revetted along both edges by probable turf cheeks. One of the latter yielded two joining sherds from a Romano-British greyware vessel (*op cit*, 22). On the berm between the south mound and the Vallum ditch was a U-profiled pit or large posthole, *c* 0.71 m in diameter and 0.69 m deep. This had been dug into the natural clay and was filled with redeposited clays; it yielded no dating evidence, but could conceivably have been a Roman feature.

Remains possibly relating to a marginal mound were also recorded in 2009 within the drainage trench, though similar deposits were absent, within the underpass trench and the footprint of the road. In the drainage run, the remnant buried soil (***51056***; *p 448*) immediately south of the Vallum ditch was overlain by a layer of purplish grey-brown silty clay (***51055***; Fig 221), 0.1 m thick, that was in turn sealed by up to 0.25 m of pink-brown clay and cobbles (***51054***) and yellow-pink sandy deposits (***51052*** and ***51053***). These layers were cut by the recut Vallum ditch (***51051***; *p 467)* and, for that reason, had no stratigraphic link with the primary phase of the ditch (***51050***). They were traced in section for a distance of *c* 8 m to the south of the recut ditch, but petered out above the fills of a palaeochannel (***51057***; *p 448*), at the extreme south-western end of the drainage trench.

Though any interpretation must remain speculative, they appeared very similar in character to the remains of the north mound of the Vallum, whilst their stratigraphic position, directly overlying the early Roman land surface but pre-dating the recutting of the Vallum ditch, indicates that they are likely to have been broadly contemporary with the primary phase of the monument. If so, they could have been redeposited material spread from the south mound, which was not otherwise recorded during the project. It is possible, however, that they formed part of a marginal mound (Breeze 2006, 88; *p 452*), which would make the stratigraphical position, pre-dating the recut Vallum ditch, and its 'clean' appearance, significant, since they would imply that such a marginal mound was a primary (or near-primary) feature.

Whilst this hypothesis could be supported by data from other excavations (Wilmott and Bennett 2009, 135-6), the idea that the marginal mound was a primary (or near-primary) feature has been questioned (Breeze 2015), and may also be contradicted by evidence from elsewhere on the frontier (Heywood 1965; Hodgson 2009, 29; *p 467*). At other sites, the marginal mound is generally less (often considerably less) than 6 m wide (Breeze 2015), which may call into question such an interpretation at Knockupworth (*c* 8 m wide). It is possible, though, that these deposits had been spread by post-Roman ploughing, in which case their excavated extent would not correspond to the original width of the earthwork from which they derived. It is also the case that there is at least one place (Cawfields) where the marginal mound is recorded as 7.6 m wide (*ibid*), close to the width at Knockupworth.

Discussion

The Turf Wall

The excavation at Knockupworth provided a rare opportunity to investigate a relatively long (*c* 17.5 m) stretch of the turf phase of Hadrian's Wall, albeit a section selected for the line of the road, because it had

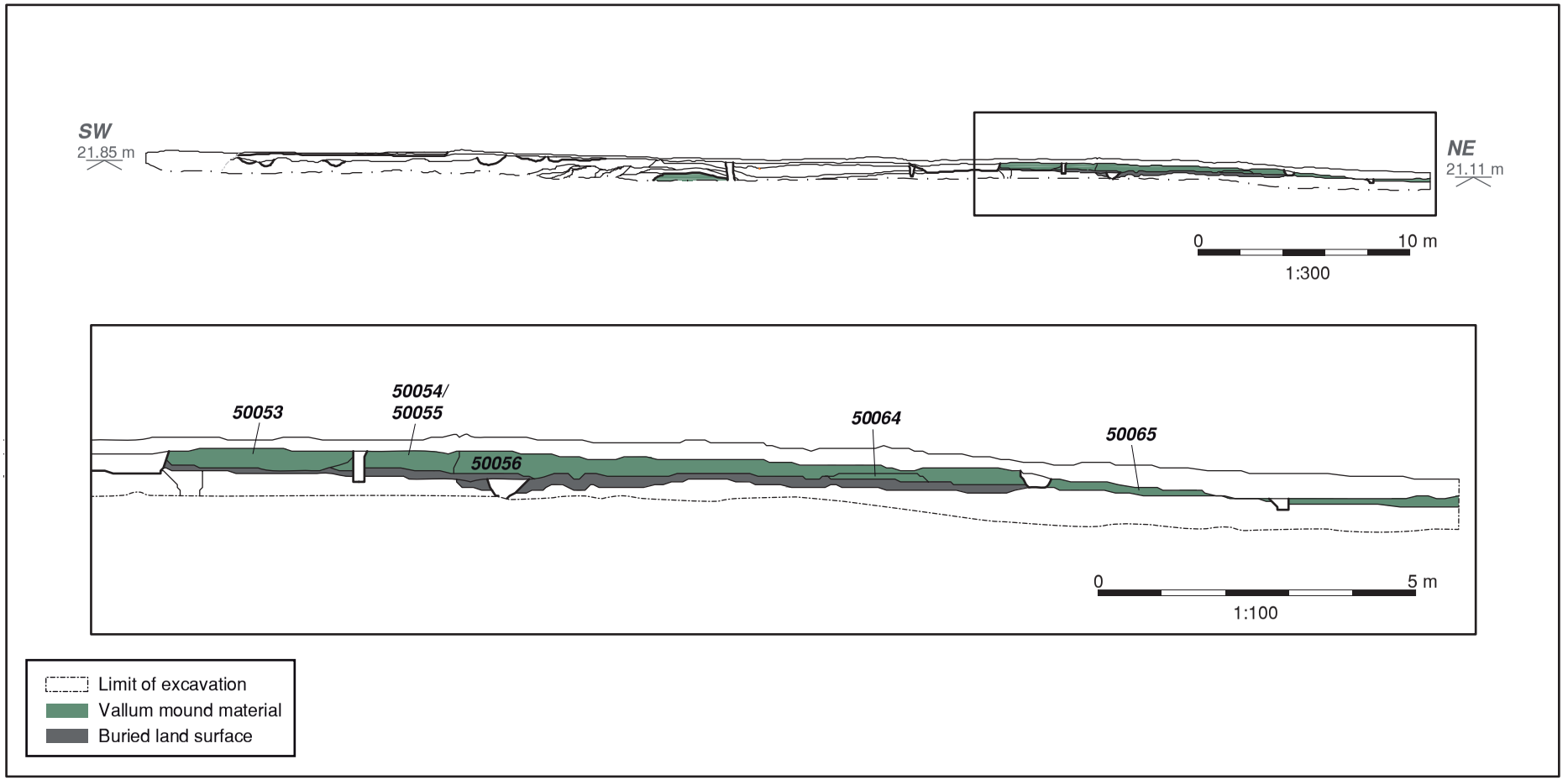


Figure 220: South-east-facing section through the north mound of the Vallum in the road-footprint trench

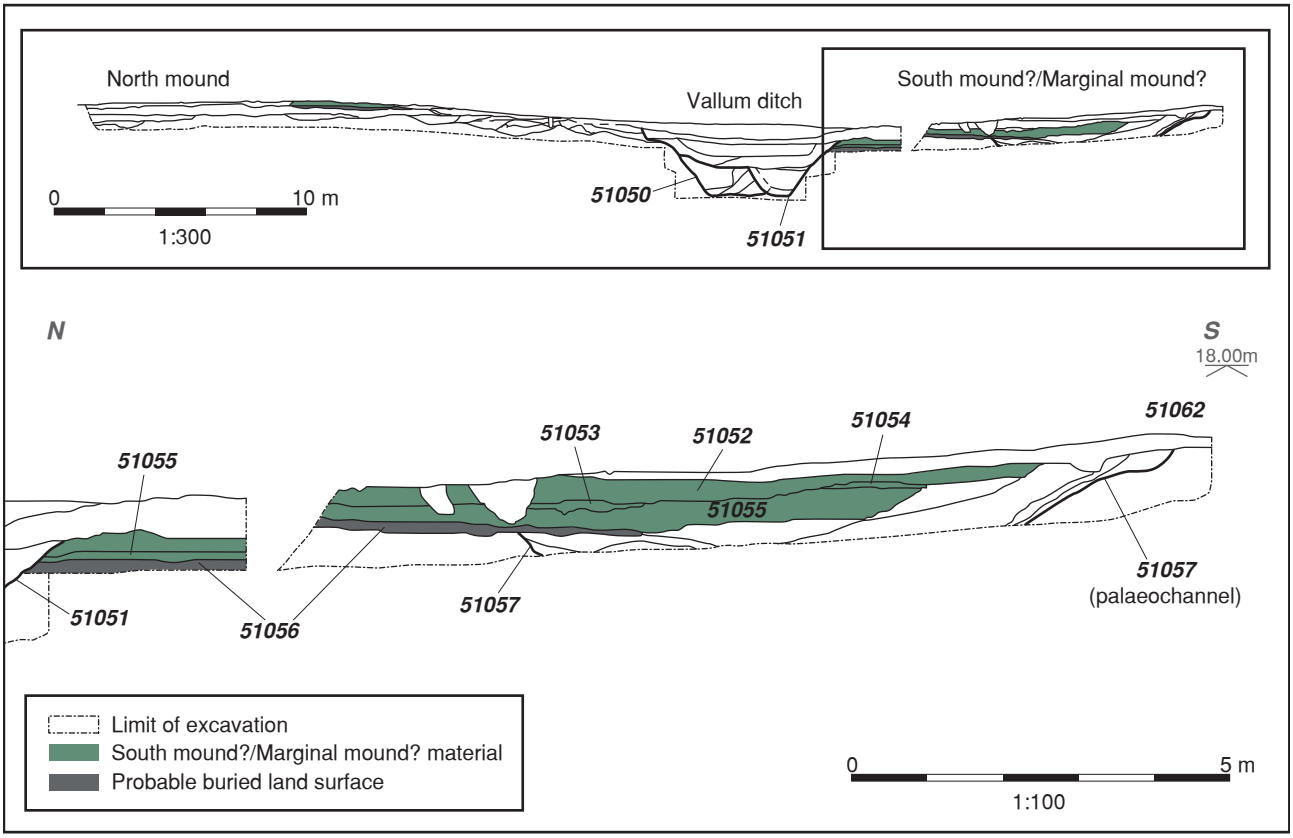


Figure 221: West-facing section through the south mound, or perhaps marginal mound, of the Vallum in the drainage trench

proved to be poorly preserved (Pl 189). The investigation is of particular significance because it adds to the relatively limited corpus of sites where the Turf Wall has been positively identified in the western 30 km or so of the frontier (Wilmott 2009a, 41). Since the Turf Wall was first excavated by Francis Haverfield at Appletree, west of the fort at Birdoswald, in 1895 (Haverfield 1897, 188-9), the great majority of interventions have taken place between its eastern terminus on the River Irthing and Castlesteads fort, *c* 15 km east of Carlisle (Fig 222). Most of this work was undertaken by the Cumberland Excavation Committee, from the 1890s to the early 1930s, and took the form of small-scale, exploratory investigations designed to trace the line of the Wall steadily westwards, primarily through the location of Turf Wall milecastles and turrets (Wilmott 2009a, 41).

Plate 189: The denuded condition of the Turf Wall, looking south-east, with the Stone Wall directly above

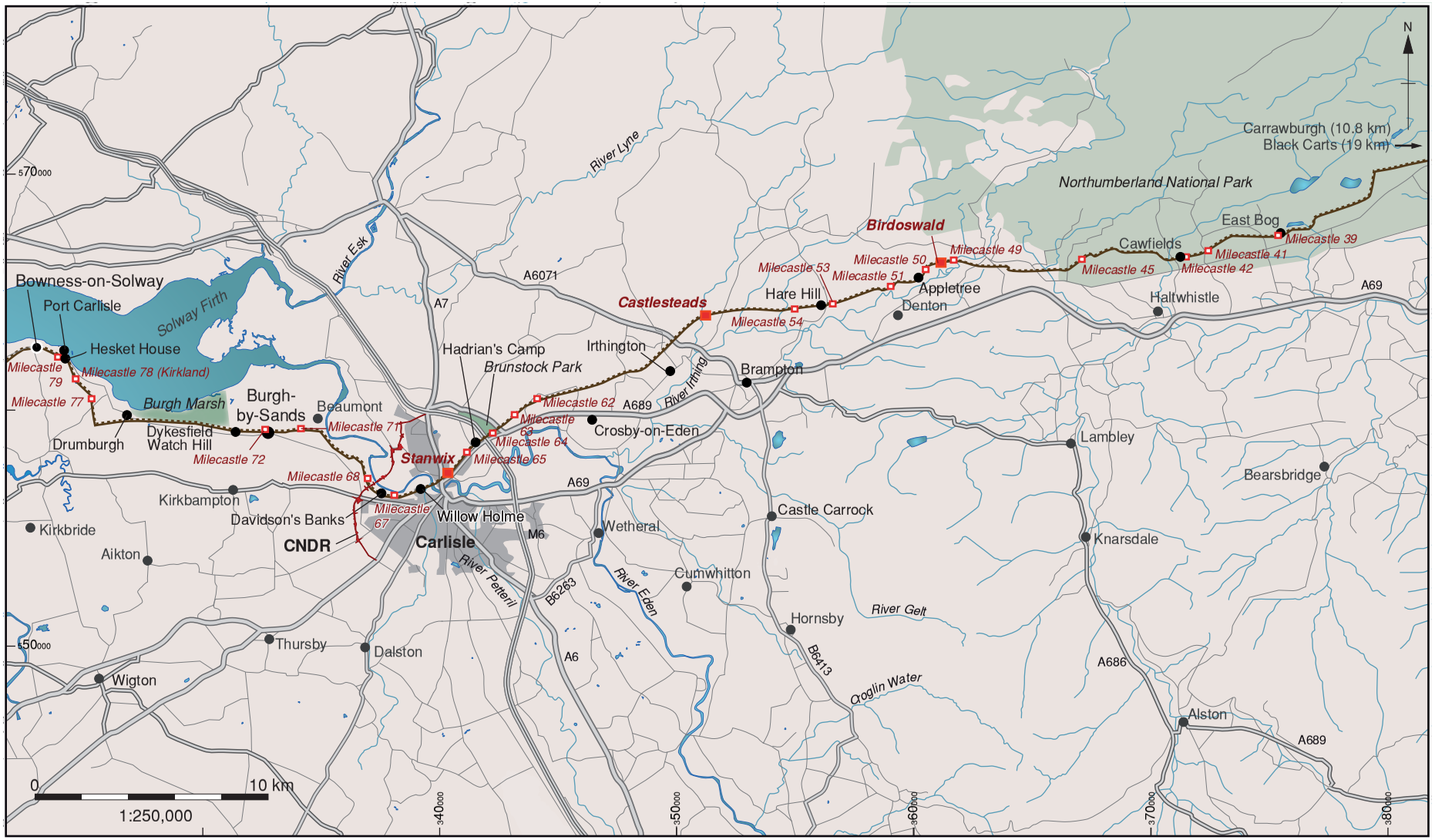


Figure 222: The western section of Hadrian's Wall, showing the CNDR and other sites mentioned in the text (Contains OS OpenData © Crown Copyright [and database right] (2022))

By 1934, this programme had progressed westwards as far as Turret 57a, immediately west of Castlesteads (*ibid*), when it was decided to adopt a new strategy, to prove once and for all that the Turf Wall had extended to the western terminus of the later Stone Wall. This was achieved in the same year through the identification of a Turf Wall turret (Turret 79b) at Bowness-on-Solway (Simpson *et al* 1935, 217-18), and the Turf Wall itself was recorded at Watch Hill, east of Burgh Marsh, during the same excavation campaign, where it was found to be in front of the Stone Wall, rather than directly beneath it (*op cit*, 214). However, this success effectively ended the methodical search that had been ongoing for the previous 40 years, with the result that the Turf Wall has since been observed only infrequently west of Castlesteads.

In the vicinity of Carlisle, it has been investigated east of Crosby-on-Eden, in Wall Mile 61, *c* 8 km to the north-east (Bennett 2009, 122, fig 228), where preservation was similar to that at Knockupworth, with the Wall surviving as a low bank of dark grey earth, up to 9 m wide but no more than 0.25 m high, containing visible lines of darker, organic material, the remains of individual turves (*op cit*, 123). Although no evidence for an associated drain was found at this site, a discontinuous gully, 0.8 m wide and 0.1 m deep, defining the back edge of the Turf Wall, was thought to have been formed by rainwater run-off from its rear face (*op cit*, 124). As at Knockupworth, the Turf Wall was directly overlain by the Stone Wall, and had clearly been demolished almost to contemporary ground level prior to the construction of the stone curtain. The Turf Wall milecastles also appear to have been subjected to programmes of demolition as thorough as that undertaken on the turf curtain (Wilmott 2009c, 186).

Closer to Knockupworth, the Turf Wall was seemingly observed in 1961 at Hadrian's Camp, then an army base, *c* 4.5 km north-east of the site and close to Milecastle 64 (Drawdykes), where it was directly overlain by the Stone Wall (Caruana and Fane Gladwin 1980, 19); no detailed description of the remains was made, however, while nearby, the Shell North-Western Ethylene Pipeline was routed through a disturbed area, where the Wall had been destroyed (Drury 1996). At Stanwix, *c* 3 km east of Knockupworth, the northern lip of a stratigraphically early ditch, possibly, but not certainly, that in front of the Turf Wall, was observed on two occasions beneath the later second-century, stone-built cavalry fort (Dacre 1985, 55-6, fig 3, 66-7; Zant 2011, 45). The Turf Wall was not certainly seen, but a spread of turf associated with a possible stack, seemingly the remains of an earthwork pre-dating the stone Wall fort, might have formed part of the Wall (Zant 2011, 45), though it might equally have been the remains of a rampart associated with the presumed Turf Wall fort, the existence of which seems probable (*op cit*, 43-5).

To the west, what were almost certainly the denuded remains of the Turf Wall were observed during improvements to the waste-water system in the roadway near Hesket House, Port Carlisle, in Wall Mile 78 (OA North 2007, 17-18, 26-7, fig 7a, pl 12; Zant 2009a), There, it survived as a spread of laminated turf and clay, 0.25 m thick and 8 m wide (*ibid*).

The most thorough modern investigation of the Turf Wall occurred in 1986 at Burgh-by-Sands, *c* 5 km west of Knockupworth, where it was exposed in two areas *c* 23 m apart (Austen 1994, 37-40). To the west, its remains appeared similar to those at Knockupworth, comprising a bank of dark brown sandy soil, *c* 5.8 m wide and up to 0.25 m high (*op cit*, 38). To the east, while no trace of a similar earthen bank was recorded, its position was marked by a cobble base or foundation, up to 5.8 m wide (*op cit*, 38-40). A similar feature has also been recorded at Beaumont, 2.3 km east of Burgh-by-Sands (Breeze 2006, 60), whilst the walls of the turf phase of Milecastle 72, *c* 500 m east of the 1986 excavation, had been placed on similar cobbled rafts (Austen 1994, 45-6). Considerably further east, the remains of the Turf Wall at Milecastle 53, between the forts at Birdoswald and Castlesteads, also seemingly rested on a cobbled raft (Simpson and McIntyre 1933, 269-70).

The evidence from Milecastle 72 suggests that the entire section of the Turf Wall between this installation and the easternmost part of the 1986 site may have been provided with a cobble base, whilst the discoveries at Beaumont and at Milecastle 53 indicate that this construction technique was not confined to a single location. However, the fact that a cobble raft is not attested at the majority of sites on the Turf Wall, including at Knockupworth and in the western of the two areas at Burgh-by-Sands, suggests that this was not a 'standard' feature but may, perhaps, be indicative of the work of one construction detail (*ibid*; Austen 1999, 179). Furthermore, the absence of a cobble base at Knockupworth, and also further west, at Milecastle 71 (Wilmott 2009c, 186), disproves the hypothesis that the five Wall miles west of Milecastle 67 (or possibly Turret 67a) formed a 'construction block', perhaps assigned to a single legion, characterised by the use of a cobble raft for the Turf Wall (Austen 1994, 90).

At Knockupworth, it was noted that traces of buried soil horizons, representing the contemporary ground surface at the time the Hadrian's Wall frontier system was constructed, survived only beneath the Vallum mounds, with a limited survival beneath the remains of the Turf Wall (*p 456*). Elsewhere, the turf and topsoil had seemingly been stripped down to the top of the boulder clay, presumably for use as a construction medium in the Wall itself and the Vallum earthworks. A similar phenomenon has been recorded at other sites in the frontier zone, including Appletree and Crosby-on-Eden, where it appeared that a strip of turf and topsoil had been deliberately retained to mark the line of the Wall (Wilmott 2009e, 117-18).

The Stone Wall

At Knockupworth, the stone phase of Hadrian's Wall had been built directly over the levelled remains of the Turf Wall. Whilst more extensively investigated than the Turf Wall, the Stone Wall has, nevertheless, been excavated relatively infrequently in the western sector of the frontier, especially west of Carlisle. One of the earliest exposures took place in 1854 at Willow Holme, in Carlisle, 1.7 km east of Knockupworth (Ferguson 1888, 168; Simpson 1932, 149), and it was again exposed there (in two places) in 1886 (Ferguson 1888, 171-2). The Wall had been reduced almost to its foundation, which rested on river gravels, but enough survived to demonstrate that it had been 2.36 m wide above foundation level, rather less than the 'normal' minimum width of 2.44 m (Breeze 2006, 54, table 2) for the Wall in this sector. In 1932, a further stretch, several metres in length, was found close to the 1854 site, during the construction of a new sewer (Simpson 1932). There, the foundation was 2.69 m wide, within the 'normal' range for this sector (Breeze 2006, 54, table 2), and it supposedly comprised a layer of rough sandstone flags, *c* 100 mm thick, bedded in clay and laid directly upon the natural gravel subsoil. No trace of the Turf Wall was recorded beneath, or in the vicinity of, the Stone Wall. Only two of the northern facing stones remained, offset by 163 mm from the outer face of the foundation (Simpson 1932, 150), and if the south face, nothing of which remained, had been similarly offset, the Wall would have been 2.36 m wide, precisely the same width as recorded in 1886.

At Crosby-on-Eden, *c* 8 km north-east of Knockupworth, the so-called 'Intermediate Wall' (*see* Breeze 2006, 53-4) was probably 2.75 m wide, though it had been extensively robbed (Bennett 2009, 124), whilst at Burgh-by-Sands it was *c* 2.35 m, on foundations 2.6 m in width (Austen 1994, 40, 43, fig 5). At both sites, as at Knockupworth, and probably also at Hadrian's Camp, near Milecastle 64 (Caruana and Fane Gladwin 1980, 19), it had been constructed directly over the levelled Turf Wall, but no trace of the latter was found beneath the Stone Wall adjacent to Milecastle 62 (Wilmott 2009c, 177). At Knockupworth and Burgh-by-Sands (Austen 1994, 40), and probably also at Hadrian's Camp, the Wall rested directly on top of the earlier earthwork, a characteristic of the Intermediate Wall west of the Irthing (Wilmott 2009a, 43) that is also found in the late Hadrianic Narrow Wall that replaced the Turf Wall for several miles west of the River Irthing (Breeze 2006, 60; as at Hare Hill, near Milecastle 53; Hodgson and McKelvey 2006, 47, 53, fig 4). At Crosby-on-Eden, however, the foundation had seemingly been set in a shallow construction trench, cut into the base of the Turf Wall (Bennett 2009, 124). What remained at Knockupworth, and probably also at Burgh, seems to have been levelled to provide a suitable platform on which to build the Stone Wall, as was certainly the case further east, at Hare Hill (Hodgson and McKelvey 2006, 47), and on the Solway at Drumburgh (Simpson and Richmond 1952, 13).

Where the Wall was built directly over the levelled Turf Wall, it was normally set back approximately 1 m from the front of the base of the earlier earthwork (Breeze 2006, 41-2). At Knockupworth, the Stone Wall was aligned at a slightly different angle from the Turf Wall, and the full width of neither had survived. However, if it is assumed that both approximated to their 'ideal' widths, 6 m at the base, in the case of the Turf Wall (*op cit*, 58), and 2.75 m for the Stone (Wilmott and Bennett 2009, 72), this would have been set back no more than 0.6 m behind the front of the Turf Wall, at the north-east corner of the area investigated, and the two may have been virtually contiguous further to the north-west.

Implicit in many of the publications on the Intermediate Wall is the idea that a foundation of thin stone flags was provided across its full width, for example at Watch Hill, Dykesfield, east of Burgh Marsh, where the work revealed 'the footing course of flags as 8 ft 8½ ins [2.65 m] wide' (Simpson *et al* 1935, 213). That this was considered to be normal is clear from excavations at Milecastle 78 (Kirkland), between Drumburgh and Bowness, where the flags did not extend across the full width of the foundation, extending 'about three feet [*c* 0.9 m] on each side only' (*op cit*, 217), but were absent from beneath the rubble core in the centre (a width of *c* 1 m). This was contrasted with the 'normally continuous flagging in the centre of the Wall' (*ibid*). However, as at Kirkland, at Knockupworth, only the south face of the Wall (the squared rubble facing stones) was underpinned by sandstone flags (Pl 190). It is highly probable that a similar

Plate 190: Flag foundation **50110** *underlying the south face of the Stone Wall, looking north*

foundation was provided for the north face, though this had been completely destroyed. If this was of similar width to that beneath the south face, then the central 2 m (at least) of the Wall core was not placed upon a flag foundation, but rested directly on the levelled remains of the Turf Wall.

Whilst it might be argued that this construction technique was a very localised phenomenon, perhaps idiosyncratic of a particular work party, a reconsideration of the evidence from other excavations in the western sector suggests that it may in fact have been a common (though perhaps not universal) practice for the Intermediate Wall. At Crosby-on-Eden, it was thought that the foundations had been largely removed 'except for a single row of clay-packed sandstone flags left *in situ* along and against the north side of the foundation trench' (Bennett 2009, 124, fig 231). In the circumstances, this was a reasonable supposition, since virtually all of the stonework, including the rubble core, had been removed by a robber trench. However, at Burgh-by-Sands, where a section of the Stone Wall, *c* 10 m long, was exposed (Austen 1994), it seems clear that the *in-situ* wall core did not overlie flagged foundations, which were found only in single-width courses along its southern and northern edges, beneath what remained of the facing stones (*op cit*, 36, pl 1, 43, fig 5). This also seems to have been the case at Drumburgh (Haverfield 1900, 85; Simpson and Richmond 1952, 12-13, pl I, 1), and was demonstrably so at Tarraby Lane, Stanwix (Smith 1978, 24-6, fig 8), close to Milecastle 65 (Tarraby).

Similar evidence has been recorded at two other sites east of Carlisle, one adjacent to Milecastle 63 (Crosby-on-Eden West), *c* 6.1 km north-east of Knockupworth, where the south face of the Wall comprised 'a single line of 140 mm-thick flagstones, tapered back into the wall core' (Wilmott 2009c, 176-7), the other at Hadrian's Camp, close to Milecastle 64 (Drawdykes), where the rubble Wall core 'was bounded by one course of flagstones' (Caruana and Fane Gladwin 1980, 19). A similar phenomenon was also seemingly recorded at Milecastle 71 (Wormanby), 3.9 km west of Knockupworth (Wilmott 2009c, 184, fig 283), though preservation there was extremely poor.

The situation at Willow Holme, in Carlisle, is less clear, though the published photograph of the foundations (Simpson 1932, fig 3) certainly shows large stone slabs only on the edges, with what is either rubble or smaller, broken, slabs in the centre. It is noteworthy that a reconsideration of the evidence for the foundations of the Stone Wall east of the River Irthing concluded that the use of flags, whilst unusual, was invariably restricted to underpinning the Wall faces (Breeze and Hill 2013; *see also* Hill 2006, 21, fig 2, 97, fig 51, 122).

At virtually every site where the Intermediate Wall foundations have been recorded, including Knockupworth, the flags had cracked in a straight line parallel with the face, marking the point of downward pressure from the offset facing stones above (*eg* Drumburgh; Simpson and Richmond 1952, 13, pl I, 1). This feature, which has been described as a 'virtual signature' of the Stone Wall in the Turf Wall sector (Wilmott 2009a, 43; 2009c, 177), was also evident in the foundations for the walls of the stone phase of Milecastle 72 (Fauld Farm) at Burgh-by-Sands (Austen 1994, 47), and also in Milecastle 79 (Solway House), east of Bowness (Richmond and Gillam 1952, 19).

At Hadrian's Camp, the Wall core was of mortared rubble (Caruana and Fane Gladwin 1980, 19). This is consistent with other observations made, for example at Cambeck, near Turret 56b (Breeze 2006, 328-9), and at Tarraby, Stanwix, where the core was of rubble and sandy mortar (Smith 1978, 24). However, at Milecastle 71 (Wormanby), the crushed and compacted sandstone rubble core showed no evidence for bonding with mortar or clay (Wilmott 2009c, 184), nor was any bonding seemingly evident in the sandstone core of the Wall at Milecastle 62 (Crosby-on-Eden West), 7.4 km to the east (*op cit*, 176). The evidence from these sites tallies with that from Knockupworth, where the rubble core of the Stone Wall (***50118***; *p 460*) was mixed with a loose, mid-red-brown clayey sand. It seems unlikely that all trace of mortar (or, indeed, clay) would have leached away at all of these sites, so the absence of any obvious bonding medium may be significant.

To complicate matters further, an observation in 1972 of a drainage trench not far from Hadrian's Camp recorded what was probably the remains of the Wall core as being composed of red clay and cobbles (Richardson 1972a, 330), and clay and rubble was also claimed for the 'foundations' (possibly the core?) of the Wall near Milecastle 77 (Raven Bank), north-west of Drumburgh (Breeze 2006, 362). The reason for these apparently conflicting records is not clear, but they may suggest that different sections of the Wall were constructed using slightly different techniques. Whether this is chronologically significant, or indicates the activities of different work parties, as has been suggested for the seemingly intermittent appearance of the cobble foundation for the Turf Wall (*p 474*), is not known.

The Stone Wall in the western sector is said to have been provided with drains at regular intervals of 6-7 m (*op cit*, 90), a consequence, perhaps, of experiences resulting from an under-provisioning in the original Stone Wall, where they seem to have been provided only irregularly (*ibid*). Certainly, drains or culverts are a common feature of the Antonine Wall (Keppie 1976, 74), built after the original construction of Hadrian's

Plate 191: Stone Wall drain **50109**, *looking north-west*

Wall but before the rebuilding of the Turf Wall in stone. However, that lessons had been learned before the Antonine Wall was built is evident from Hadrian's Wall itself, where the best evidence for drains is to be found in the late Hadrianic section of the Stone Wall between Milecastle 49 (Harrow's Scar) and the fort at Birdoswald (Breeze 2006, 293; Simpson 1913, 303). The evidence for the regular provision of drains on the later (probably Antonine) Intermediate Wall is, however, far less clear, largely due to a lack of excavation and the poor preservation of the Wall for much of its length. Two drains, 6 m apart, were claimed in the section of the Wall excavated at Burgh-by-Sands in 1986 (Austen 1994, 40), though these appear to have been evidenced only by unlined gullies, one seemingly very poorly defined. The remains of the drain at Knockupworth, *c* 0.3 m wide (Pl 191), seemingly represented a direct replacement for a Turf Wall drain (*p 460*).

If drains of this kind were indeed provided at regular intervals, a second drain would have been expected at Knockupworth, towards the north-west corner of the site, but there the Wall had been completely destroyed. Elsewhere, the only definite example of such a drain is well-preserved, 0.29 m wide, 0.45 m deep, and lined with two courses of facing stones, recorded at Hadrian's Camp (Caruana and Fane Gladwin 1980, 19). This was floored partly with flags and partly with 'puddled' clay, and appeared to be recessed *c* 0.5 m into the south face of the Wall (*ibid*). A 'culvert' though the Wall at Crosby-on-Eden was seemingly discovered in 1980 (Grew *et al* 1981, 323-4), though it is not mentioned in the publication of the excavations (Bennett 2009).

The Vallum

The Vallum has been described as the least explicable part of the Hadrianic frontier (Wilmott 2008, 119), though its chronological relationship with the other principal elements of the frontier is well understood, thanks to more than a century of archaeological research (*ibid*). The fact that the Vallum was diverted around some forts, together with the presence of unexcavated causeways across its ditch opposite the south gates of these forts, proves that it was conceived either at the same time as the 'fort decision', which seems to have been made one or two years after work on the Wall had begun (Breeze and Dobson 2000, 74), or soon after. The idea that its main purpose was to improve the army's ability to regulate and control movement of people across the frontier and within the frontier zone was advanced many years ago by Sir Ian Richmond, who saw the earthworks as a formidable and unmistakable obstacle defining the southern edge of a prohibited, militarised zone (Wilmott 2008, 126; Breeze 2015). However, whatever the Vallum's purpose, some sections may have been rendered obsolete at a very early date, since the segment obliterated to accommodate the Wall-fort at Carrawburgh, which appears to have been under construction in the early AD 130s (Breeze 2006, 216), was not replaced (Woolliscroft 1999, 53).

Like the Turf Wall, the Vallum has been infrequently investigated by modern excavation (Wilmott 2009d, 52), especially west of Carlisle, where only a handful of limited observations have taken place. The opportunity to excavate a complete section across this enigmatic monument therefore represented one of the most important research aims of the CNDR project. Traces of the Vallum survive as an earthwork on Davidson's Banks, east of the site, where the lines of the Wall and Vallum draw close together (Breeze 2006, 347), the ditch surviving as a shallow depression. The north mound is sufficiently well preserved for four or five secondary crossings, at intervals of *c* 41 m, to be identified (*ibid*; Simpson 1913, 396). The visible remains disappear on the steep eastern side of Knockupworth Gill, but traces can be seen further west (*ibid*).

At Knockupworth itself, the remains of the Vallum had been damaged in the early nineteenth century by the construction of the Carlisle Navigation Canal and, subsequently, by the Carlisle to Silloth railway line (*Ch 14, p 520*), and had probably also suffered denudation from centuries of agricultural activity. Despite this, evidence for all the principal components, including the ditch, the mounds, and (possibly) a marginal mound, was recorded, and a fragmentary cobbled surface, possibly the remains of the Military Way, was also observed. The primary Vallum ditch had been partly removed by a later recut, but it appeared to conform to the 'classic', square-cut profile (Wilmott 2008, 119), 6 m wide and in the region of 3 m deep, with steeply sloping sides and a flat base, features also recorded, for example, near Irthington, *c* 13 km to the east, where the ditch was *c* 6.4 m wide at the lip and 2.65 m deep (Richardson 1972b). At Burgh-by-Sands, *c* 5 km west of Knockupworth, the upper 1 m was found to contain a fill of rich organic material, overlain by mixed upper fills containing sandy gravel (Austen 1994, 41). There, a cobbled surface associated with green-glazed medieval pottery was constructed over the filled ditch (*ibid*). Observations elsewhere in Burgh-by-Sands found it to be approximately 2.6 m deep, with an 'almost sheer' north side, and a dark greenish organic fill (*op cit*, 49).

Initial silting at Knockupworth seems to have followed a similar pattern to that at other sites, including at Irthington (Richardson 1972b, 326-7), and east of Brunstock (Drury 1996, 85-6, fig 4:3), where the upper edges of the square-cut ditch had collapsed, creating a more rounded profile, the process continuing until a stable angle of repose had been achieved (Wilmott 2008, 121-2). At Knockupworth, this was evidenced, on the south, by deposit ***50144***, but similar material was seemingly absent on the northern edge. Elsewhere, the ditch had silted up very gradually, but at Knockupworth it appears to have been deliberately infilled, first with layers of redeposited natural clay (***51043*** and ***50124***), perhaps derived from one of the adjacent mounds, and then with ***51026***, a remarkable deposit comprising what was clearly a structured block of horizontally laid, laminated turf and earth (Pl 192), the presence of turves (laid grass to grass) being confirmed by thin-section analysis (*Appendix 19*).

In every respect, this deposit was characteristic of the materials and techniques routinely employed by the Roman army in the construction of military earthworks such as fort ramparts (Johnson 1983, 56-65; Webster 1985, 179-81), and were also used in the Turf Wall (Breeze 2006, 58-9). Indeed, some of the 'classic' sections, such as those at High House (Simpson 1928, 380-1, fig 1) and Appletree (Haverfield 1897, 188-9, pl III;

Plate 192: Turf block **51026** *in the primary Vallum ditch (***50150***), looking south-east*

FIG. 1.—THE TURF WALL AT HIGH HOUSE.

Plate 193: The Turf Wall, sectioned at High House in 1927, looking west (courtesy of the Cumberland and Westmorland Antiquarian and Archaeological Society)

Whitworth 1992; Wilmott 2009e, 106-10), are so similar in appearance to ***51026*** that it seems highly likely that this deposit did indeed derive from the Turf Wall, *c* 50 m north of the Vallum ditch. Indeed, at High House, the published photograph of the section excavated in 1927 (Simpson 1928, 380-1, fig 1) shows what seems to be a trapezoidal-shaped block or stack of turves within the core of the Turf Wall (Pl 193) that appears very similar in character to deposit ***51026*** at Knockupworth.

Whilst this is thought to be the most likely hypothesis, it is theoretically possible that ***51026*** had formed part of a turf 'cheek' or kerb for one of the Vallum mounds. The provision of such features was variable, being largely dependent upon local factors, such as the stability (or otherwise) of the material used in the construction of the mounds, and the availability of turf (Wilmott 2008, 119). At Hare Hill (Haverfield 1904, 245, fig 3), and adjacent to Milecastle 51 (Simpson and Richmond 1937, 159, fig 2; Fig 222), turves were used to revet both sides of the north mound, which was otherwise composed of redeposited natural clay. Closer to Knockupworth, turf cheeks have been attested in the north mound at Brunstock, 6 km to the east (Haverfield 1895, 457, pl II), in both the north and south mounds at Crosby-on-Eden (Bennett 2009, 125), and in the south mound at Kirkland (close to Milecastle 78), west of Burgh Marsh (Simpson *et al* 1935, 215); elsewhere, revetments of clay or stone have also been found (Wilmott 2008, 121).

However, only very limited evidence for the existence of such features was found at Knockupworth (CFA 2005a, 14-15), and a possible turf core was also recorded in a separate section (*op cit*, 9), sealed beneath dumps of redeposited clay. The single trench over the north mound in 1997 (McCarthy *et al* 1997, 15-16, fig 5) recorded traces of probable layered turf and earth in the north-east face, beneath a capping layer of clay, although the work was too limited for the precise significance to be determined. Despite these observations, excavation within the larger, open-area site found the north mound to be composed entirely of redeposited natural clay, with no trace of kerbs (the south mound was not certainly seen).

Whatever the precise origin of the turf block may have been, there seems little doubt that it, together with the dumps of redeposited clay beneath, were deliberate infilling of the Vallum ditch. Indeed, in all likelihood, these represent the remains of a secondary causeway across the ditch, similar to that at Crosby-on-Eden (Bennett 2009, 125-8; Wilmott 2008, 125). Similar features are visible elsewhere on the frontier, together with breaks in the Vallum mounds directly opposite (Simpson and Shaw 1922, 354-5). It is broadly accepted that, initially, the Vallum could have only been crossed at the Wall forts (Wilmott 2008, 124), although early crossings were claimed at Milecastles 50 (High House) and 51 (Wall Bowers) (Simpson *et al* 1936; Simpson and Richmond 1937, 162-4), the existence of which has since been questioned (Wilmott 2008, 120-1). Indeed, where primary causeways have been sought at other milecastles, they have not been found (Heywood and Breeze 2008).

The much more numerous secondary crossings are believed to mark a systematic slighting of the earthwork when Hadrian's Wall was temporarily abandoned following the reoccupation of southern Scotland, in *c* AD 140, and the construction of a new frontier system (the Antonine Wall) across the Forth-Clyde isthmus (Wilmott 2008, 124). There is plentiful evidence from all sectors of Hadrian's Wall that this involved the creation of crossings over the Vallum at regular intervals, with the mounds being breached and the ditch being wholly or partly infilled. Whilst the bulk of the material used in the causeways doubtless derived from the creation of the breaches in the adjacent mounds, the inclusion of a probable fragment of the Turf Wall at Knockupworth should occasion no surprise, since the Wall itself would have been breached at the same positions as the Vallum crossings, if, as was presumably the intention, free movement was to be facilitated across the redundant frontier works. If the Wall was breached to allow movement, however, then presumably the course of the River Eden would have been some distance to the north-east, probably flowing in one of the palaeochannels identified on the lower river terrace (Terrace 4; *Ch 2, p 45*) in Parcel 27B.

Gaps in the Turf Wall corresponding to breaks in the Vallum mounds are not unknown, being still apparent on the ground in some areas (Simpson and Shaw 1922, 355, 403), for example at Cawfields (Simpson 1913, 395). Indeed, it seems that the records of turves in secondary crossings are restricted to the Turf Wall

sector (Breeze 2015; *pers comm*), suggesting that the turf may, indeed, have come from the Wall, rather than from the revetments of the Vallum mounds. At Crosby-on-Eden, recognisable turves in the crossing material were interpreted as deriving from the cheeks of the mounds (Bennett 2009, 128; Wilmott 2008, 125), but there seems to be no reason why they might not have come from the Wall. At Knockupworth, the means by which the large fragment of putative Turf Wall material was transported the 50 m or so from the Wall to the Vallum is a matter for speculation, since it was evidently still a coherent, structural block when it went into the ditch. Clearly, it cannot have been moved piecemeal in baskets, or simply shovelled up, whilst it was probably too heavy to lift far off the ground. Perhaps, therefore, it was disengaged from the superstructure of the Wall at a sufficient height above the ground to allow it to be tumbled into a cart or wagon, as employed by the Roman army (Hill 2006, 89-92).

At Knockupworth, the spreading of material from the north mound predominantly to the north-east is consistent with evidence from other sites, where material spread when creating breaks in the mounds was frequently deposited beyond the Vallum (*ibid*). The deposits of clay on the south side of the ditch (***50152-5***) may perhaps have formed part of a denuded section of a marginal mound, a feature that can be traced for much of the length of the frontier (Wilmott 2008, 119), rather than the south mound *per se,* since, unlike the south mound, which, in an idealised cross-section, lay *c* 9 m south of the ditch (Breeze 2006, 85), the marginal mound was positioned immediately adjacent to it (Wilmott 2008, 119-20, fig 2). It was sometimes a substantial feature in its own right; at Appletree, for example, in Wall Mile 50, it was still 6.12 m wide and 0.51 m in height (Wilmott 2009e, 112-13).

Its purpose and chronology remain a matter for debate, since only limited excavation has been undertaken (Hill 2006, 36; Hodgson 2009, 29); of the six observations of the marginal mound up to 2009, three recorded it as clean redeposited subsoil, whilst the others identified mixed materials (Hodgson 2009, 29). At Appletree (Wall Mile 50) and Black Carts (Wall Mile 29), where the 'clean' marginal mound was recorded, the mound directly sealed the subsoil, and therefore lay at the same stratigraphic level as the main Vallum mounds (Wilmott 2009b, 102). This, together with the evidence for the clean nature of the material, has suggested that the marginal mound was a primary or near-primary feature (*ibid*). Where the marginal mound was seemingly composed of silt and other mixed material, it is suggested that this came from the cleaning of the ditch, and supports the idea that it was a later addition, formed, perhaps, when the Vallum was reconditioned as part of the recommissioning of Hadrian's Wall following the Antonine withdrawal from Scotland (Simpson and Shaw 1922).

The Knockupworth deposits could support either hypothesis. Given the material consisted of clean, redeposited clay that was stratigraphically contemporary with the main mounds (in that it sealed a pre-Roman/ early Roman buried soil; *p 470*), it suggests that it may have been primary. They were also seemingly cut by the recut Vallum ditch, suggesting that they pre-dated the removal of the putative crossing, and therefore were not associated with an Antonine reconditioning. However, at *c* 8 m, they seem too wide to represent a marginal mound (Breeze 2015), though this could have resulted from later ploughing causing the material to spread. It is, though, also conceivable that the relationship between the ditch and the adjacent deposits was the result of the upper edges of the ditch being weathered, and in fact both were contemporary, the 'mound material' representing upcast from the adjacent ditch. If this were the case, it could be argued that the material was actually created when the Vallum was reconditioned, presumably in *c* AD 160.

The recutting of the Vallum ditch at Knockupworth (***51051***) currently has few parallels. Until comparatively recently, the idea that the Vallum was reconditioned upon the Roman army's withdrawal from the Antonine Wall was generally accepted (Wilmott 2008, 125), which would have involved the cleaning or recutting of the ditch and the removal of at least some of the secondary causeways (Breeze and Dobson 2000, 131). There is, however, currently little unequivocal evidence for recutting or cleaning the ditch after its initial construction (Wilmott 2009b, 101-2), except at Knockupworth. That some secondary causeways were removed when the Wall was recommissioned seems probable, since there are places where breaches in both the north and south mounds of the Vallum are visible, but where no ditch crossing exists (Breeze 2015). The most likely reason for this is that the crossing had been removed by cleaning out the ditch, as at Knockupworth.

The evidence for the later use of the Vallum ditch as a track or droveway, perhaps associated with the movement of livestock (*p 467*), is of considerable interest, but the precise date of this activity could not be determined. A late Roman date cannot be ruled out, but since the deposits were towards the upper part of the recut ditch, it is perhaps more likely that the ditch was used in this way in the post-Roman period. Elsewhere, very little evidence for post-Roman activity within the Vallum ditch has been recorded. In Wall Mile 39 (East Bog), a radiocarbon determination of cal AD 560-670 (1420±35 BP; SUERC-2079) was obtained from a fine, pale silty clay in the upper half of the ditch (OA North 2005b), whilst determinations obtained from an underlying

deposit of peaty material suggested that the lower part of the ditch had probably begun to fill rapidly from at least the mid-second century onwards. The uppermost deposits at the same site may have represented the deliberate backfilling of the top of the ditch in the post-medieval period (*ibid*).

The Military Way and other trackways

The possibility that the metalled surface on the berm between the north mound of the Vallum and the Vallum ditch (*pp 467-8*) may have formed part of the Military Way finds some support from excavations at Burgh-by-Sands. There, a layer of sand and cobbles, found in a broadly analogous position on the berm (though not immediately adjacent to the edge of the north mound, as at Knockupworth), was tentatively interpreted as the remains of the Military Way (Austen 1994, 41). However, it has also been suggested that this was in fact part of a relatively minor patch of surfacing (Breeze 2006, 356).

The only other possible observation of the Military Way anywhere near Knockupworth occurred at Hadrian's Camp, where a spread of broken stone, including possible kerb stones, was recorded, *c* 5 m south of the Stone Wall (Richardson 1972a, 331). However, investigations nearby had exposed an area of rammed pebbles, overlying a layer of larger stones, which was also immediately south of the Wall, traced for at least 9 m further to the south (Caruana and Fane Gladwin 1980, 19). Although interpreted at the time as possibly part of a medieval road (*ibid*), there seems no reason why this surface could not have been of Roman date. Indeed, it was considered likely that the cobbling was related to a similar surface only a short distance further east, in the angle between the south face of the Wall and the west wall of Milecastle 64, which was there thought to be a Roman feature (*op cit*, 21). Whilst these surfaces were not interpreted as forming part of the Military Way, their position, between the Wall and the Vallum, is consistent with the 'usual' position of the Military Way west of the River Irthing (Breeze 2006, 89). Furthermore, the method of construction, comprising a layer of gravel or pebbles over a foundation of larger stones, is superficially similar to that recorded in the Military Way elsewhere (*ibid*), though no evidence for kerb stones, another frequently recorded feature of this road (*eg* Simpson 1913, 389-93), was recorded.

Whilst the Knockupworth surface was considerably narrower (3.35 m) than the 'classic' Military Way, which seems normally to have been around 6 m wide (Breeze 2006, 89), it is possible that the full width had not survived, and it is also the case that, where constrained by topography, the Military Way could be as little as 2-2.5 m wide (Bowden 1999, 137). The construction of the surface at Knockupworth was broadly similar to that of the Military Way, with a surface of gravel or pebbles overlying a layer of larger stones or cobbles (Breeze 2006, 89), though a stone slab surface and kerb stones have been recorded elsewhere (Carlton and Williams 2009). However, other Roman metalled tracks have been found in association with the Wall and Vallum at some sites, including at Benwell, where the Military Way and two lesser tracks were recorded (Hodgson 2009, 29), and at Denton (Bidwell and Watson 1996), so the Knockupworth deposit could relate to another such feature.

A cobbled track. 2.17 m wide, was also recorded in probable association with the Turf Wall at Appletree (Wilmott 2009e, 110-11), set 5.59 m back from the tail of the Wall, and an unmetalled hollow-way that must relate to the Turf Wall was found 10 m to the rear of the Wall at Tarraby Lane, Stanwix (Smith 1978, 23-4). It should also be noted that, whilst metalling has been found in association with the Vallum in a few other places, both on the north and south berms, similar deposits were absent at many other sites, suggesting both that the berms of the Vallum ditch were not routinely used as routeways (Bidwell 1999, 21-2) and that some of the surfaces may have been localised responses to short-lived conditions (Wilmott 2008, 122).

The Roman Environment

J Zant, M Rutherford, and E Huckerby

Evidence for the environment during the Roman period was also gained from the Knockupworth site, particularly from pollen in a monolith taken through the fills (***50085*** and ***50084***) of ditch ***50081*** (*p 456*). The pollen sequence (*Appendix 16*), which was consistent throughout the profile, indicates a landscape dominated by dense alder-carr with some hazel scrub, the latter probably growing on the drier soils. Stands of birch and oak in the vicinity are also suggested by low pollen counts from these taxa. Areas of disturbance or clearance were indicated by weeds and herbs such as ribwort plantain, daisies, dandelions, and buttercups, and by grasses, whilst the presence of a few large grass or cereal-type pollen grains in the upper fill (***50084***) hints at the possibility of small-scale cultivation nearby. Significantly, the fills were sealed by a spread of clay, earth, and turf (***50083***), perhaps deriving from denudation of the north mound of the Vallum (*p 463*). Analysis of the pollen from this sealing deposit found an increase in grass and cereal-type pollen, relative to the underlying ditch fills, and a concomitant decline in alder and hazel pollen, whilst fungal spores of a kind commonly associated with animal dung, though rare, hint at the possible presence of livestock.

Within the Vallum ditch, the sequence of fills included sediments containing waterlogged plant remains (*Appendix 17*). The sparse evidence from the primary fill (***51024***) of the ditch (***51050***; *p 464*) was largely indicative of wet ground, whilst that from the fills (***51041***/***51042*** and ***51025***) of the recut ditch (***51051***; *p 467*) was dominated by wet-ground plants, as well as fruits and seeds from plants that favour waste or cultivated ground, and those that grow within a broad range of habitats. The material within upper fill ***51025*** was indicative of an aquatic environment, suggesting that the ditch frequently contained standing water at this level. However, many grass seeds were also present, presumably derived largely from the fragments of turf within its matrix, suggesting open grassland in the vicinity, together with other taxa indicative of mires or heaths.

Other Romano-British Activity

J Zant

Perhaps surprisingly, the CNDR project recovered very little evidence for Romano-British indigenous settlement, or, indeed, for any other form of Roman-period activity other than that relating directly to the construction and development of the Hadrian's Wall frontier system. Indeed, the only positively identified, man-made feature to yield Roman material was a roughly north/south-aligned ditch (***200023***), recorded in a watching brief between Parcels 32 and 36, to the north of the River Eden (Fig 223).

This V-profiled feature, 1.25 m wide and 0.6 m deep, was traced for approximately 12 m, but can probably be equated with ditch ***32179***, which was recorded over an additional 11.5 m at the south-west corner of Parcel 32, *c* 40 m to the north. Its primary fill of grey silty clay, 0.2-0.35 m thick, contained no finds, but the upper fill, a dark grey silt, yielded a large mortarium rim sherd in a Carlisle/Scalesceugh-type fabric, broadly datable to the second century AD (*Appendix 11*). This is, however, not necessarily relevant to the date at which the ditch was first cut, which might have been significantly earlier.

Cropmark evidence suggests that ***200023***/***32179*** may have formed part of a track or droveway leading to a sub-rectangular ditched enclosure of approximately 0.4 ha, located little more than 60 m to the north-west of the site. This monument is known only from aerial photography (and is beyond the road footprint), but it appears fairly typical of many other sub-rectangular and sub-square enclosures known further west, on the southern side of the Solway, some of which at least have yielded Roman pottery (Bewley 1994, 32-4, 40-6, figs 3.12-3.18); indeed, enclosures of this kind are the characteristic site-type of the pre-Roman Iron Age and early Roman period across most of northern England (Haselgrove 2002, 59-60, *p 447*). Whilst it would clearly be unwise to place too much emphasis on a single potsherd, the presence of the large and unabraded mortarium fragment does suggest the likelihood of Romano-British occupation in the vicinity.

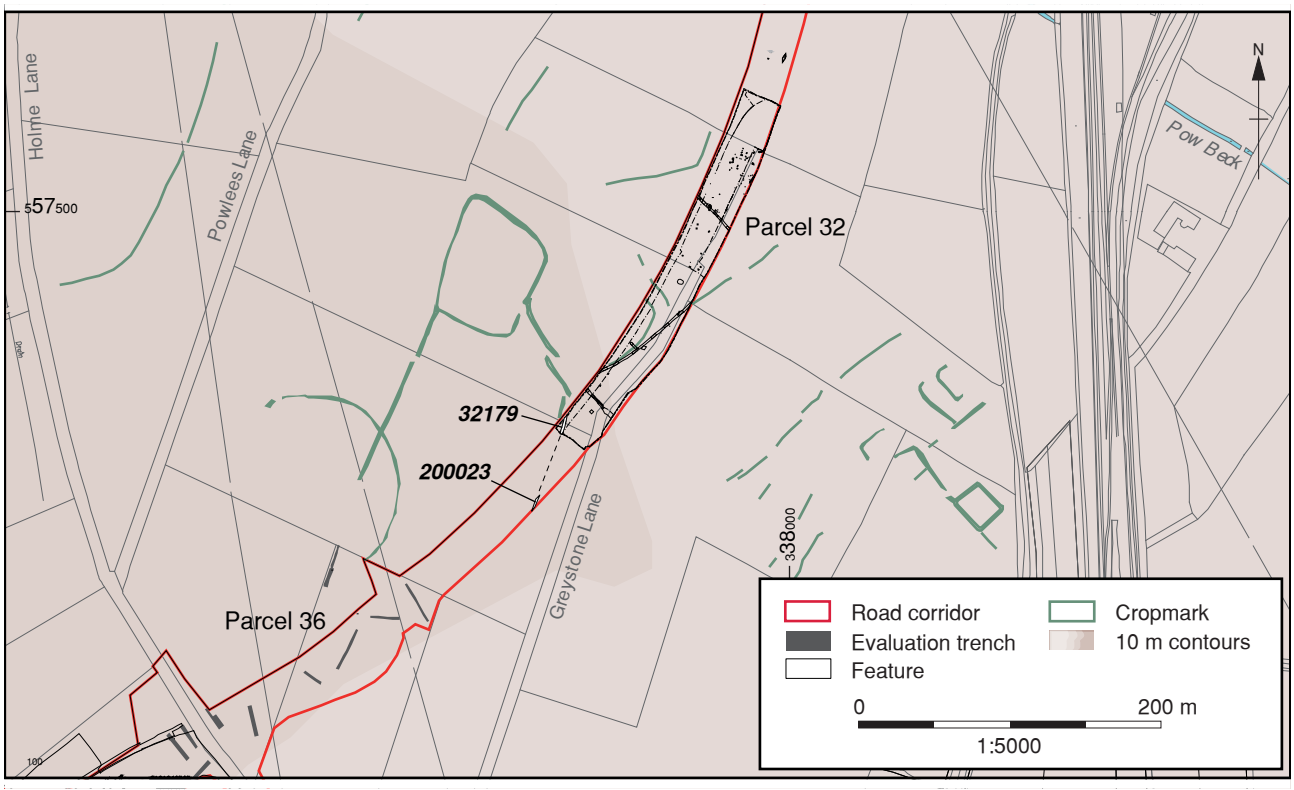


Figure 223: Ditches **32179** *and* **200023** *(Contains OS OpenData © Crown Copyright [and database right] (2022))*

Small assemblages of Romano-British pottery also came from two alluvial deposits on the floodplain north of the River Eden. At Parcel 27B, immediately north of the river and directly opposite the Knockupworth site, a group of 13 highly abraded potsherds and a few small fragments of ceramic building material were recovered from a layer of loose, grey alluvial gravel and sand (***200098***; Fig 224), which was cut by a meander of a palaeochannel (***200102***). The pottery (*Appendix 11*) may have derived from a single vessel, possibly a flagon, whilst the oxidised fabric resembles products of the military-controlled kilns at Brampton, *c* 14 km east of Carlisle (Hogg 1965), which were in use from the late first century AD to *c* AD 140 (Swan *et al* 2009, 591). The evidence therefore suggests that the gravel was accumulating no earlier than the early Roman period, and that the palaeochannel was of an even later date, though this feature was not otherwise independently dated. This was one of several palaeochannels that have been identified on the Eden floodplain north of the present river channel (Terrace 4; *Ch 2, p 45*).

Slightly further east, at Stainton West, a small assemblage of Romano-British pottery, comprising 22 sherds, was recovered from five different contexts (*Appendix 11*). The bulk came from a single vessel, a late second-century grey-ware jar, probably locally made, that came from deposits forming elements of the *Mesolithic overbank alluvium* (***90212***; *Ch 2, p 198*); this pottery therefore was clearly intrusive. The other fragments, from fairly modern soils, were mostly in a very similar (possibly identical) fabric, though two may have derived from a Black-burnished ware category 1 (BB1) vessel, which is unlikely to date much earlier than the mid-second century AD (Swan *et al* 2009, 591).

Together with two possibly Late Iron Age or Romano-British annular glass beads, that also came from these alluvial deposits (*Appendix 12*), the pottery from Stainton West provides limited evidence for activity on this part of the floodplain, to the north of Hadrian's Wall, during the Roman period, though its precise nature remains equivocal. In view of the large and unabraded character of the sherds from the overbank alluvium, it is possible that they had been deposited in a discrete feature, such as a pit, which had otherwise been largely destroyed, whilst the beads represent a somewhat unusual category of finds beyond an obvious settlement or funerary context. It is therefore just possible that these artefacts provide evidence for the continuation of some form of votive activity in a potentially liminal zone or 'watery place' at the boundary between wet- and dryland (*Ch 9, pp 317-18*).

Elsewhere, evidence for a human presence during the Roman period was even more sparse, being restricted to an assemblage of only 11 potsherds, all in the same, dark orange oxidised fabric as those from Knockupworth and Site 27B (*above*). Five came from two medieval ditches (***32014*** and ***32154***; *Ch 14, p 507*) in Parcel 32, whilst a single sherd was recovered from Bronze Age ditch ***21096***, in Parcel 21 North (*Ch 11, p 407*). The remaining five fragments came from modern backfill deposits or were unstratified.

Figure 224: Gravel deposit **200098**, *cut by palaeochannel* **200102** *(Contains OS OpenData © Crown Copyright [and database right] (2022))*

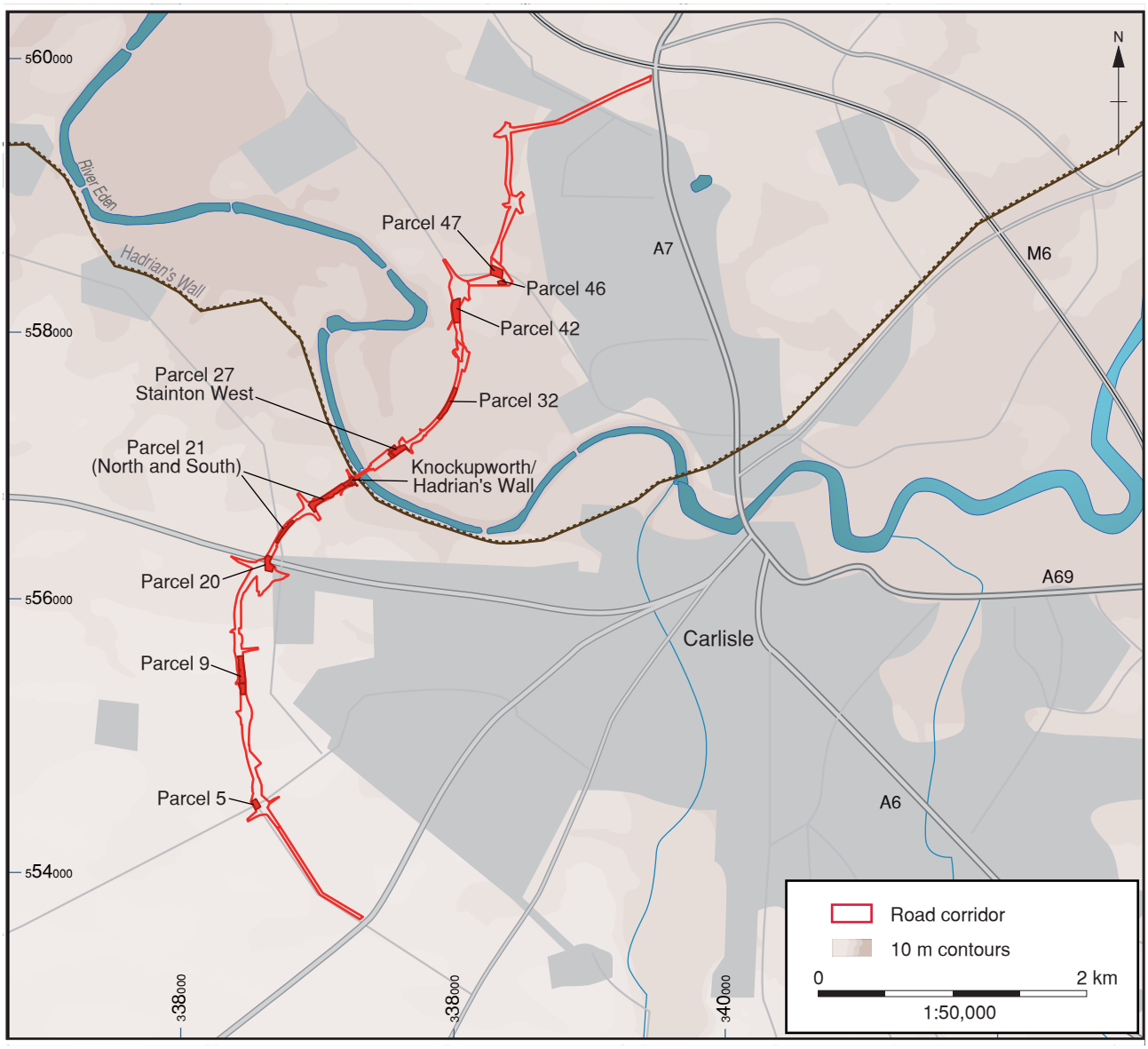


Figure 225: Areas on the CNDR containing early medieval, medieval, and post-medieval archaeology (Contains OS OpenData © Crown Copyright [and database right] (2022))

14

SETTLEMENT AND ENCLOSURE: THE POST-ROMAN LANDSCAPE

R A Gregory

One benefit of a large-scale archaeological investigation along a major infrastructure scheme, such as that associated with the construction of the CNDR, is the opportunity to uncover evidence relating to medieval and post-medieval rural activity which has led to the creation of the present-day pattern of rural settlement and land division. Indeed, the rural landscape crossed by the CNDR contains visible evidence of fossilised medieval field systems, areas of ridge and furrow, and post-medieval enclosure, as well as several small settlements, the origins of which are medieval. Furthermore, the landscape is adjacent to, and thus forms the immediate hinterland of, Carlisle, which was the pre-eminent settlement of the area throughout the medieval and post-medieval periods, the urban trajectory of which is closely intertwined with the wider history of northern Britain (*cf* Brennand and Stringer 2011). Given this, it was initially anticipated that buried features dating to the medieval and post-medieval periods would be present along the road corridor and that a proportion of these would offer significant insights into the development of the historical landscape surrounding Cumbria's capital.

The initial scheme of evaluation (McCarthy *et al* 1997; CFA 2003; 2005a; 2005b) suggested that several areas along the proposed route contained medieval and post-medieval remains (Parcels 5, 9, 20, 21, 32, and 42; Fig 225). A later evaluation was also undertaken across the site of an eighteenth-century formal garden traversed by the CNDR (Parcel 46), though this produced limited evidence for plantings and other features associated with this garden (OA North 2011a). On the basis of the evaluation results, all of these areas, apart from the site of the eighteenth-century garden, were subjected to open-area excavation, and organic materials from several features were also dated scientifically, to clarify the chronological dimension of specific sites (*Appendix 20*).

Importantly, the open-area excavations and post-excavation analysis clarified the nature and extent of the medieval and post-medieval remains in the targeted areas and also, unexpectedly, uncovered evidence for early medieval activity in Parcel 42. These remains hold particular significance as, at a regional level, they constitute a rare example (*cf* R M Newman 2006) of an early medieval hamlet, which was associated with timber houses, boundaries, and palaeoenvironmental remains. Other evidence dating to the medieval period was discovered in Parcel 21 North and Parcel 32, which, in the latter instance, related to a system of ditched fields or enclosures, probably in existence between the tenth and fourteenth centuries.

In addition, medieval sediments were present within the ditch of the Late Neolithic henge monument, examined during the watching brief (*Ch 10, p 323*). Significantly, these deposits provide an important insight into the character of the later medieval environment and also the fate of the earlier monument. Similarly, the Vallum ditch at Knockupworth, part of the Roman frontier (*Ch 13, p 448*), contained deposits which may well date to the post-Roman period. This site also contained post-medieval archaeology, recorded during a watching brief, in the form of the remains of the Carlisle Canal and Carlisle and Silloth railway, whilst other post-medieval features, predominantly relating to enclosure and agriculture, were recorded in Parcels 5, 9, 20, 21, and 42, and during the excavation of Stainton West.

The Environment

The Solway area has been the focus for numerous palaeoenvironmental studies (*Ch 1, p 27*) which allow a broad reconstruction of the environmental conditions that prevailed during the historic era. Several important palaeoecological sites have been examined to the north and east of the Solway (Fig 226), which contain proxy climatic information, including Bolton Fell Moss (Barber *et al* 1994a; 1994b; 1994c), Burnfoothill Moss (Tipping 1995b), and Rotten Bottom (Tipping 1999a). The data from these sites have been correlated with other pollen sites, and also allied to more general climatic models (*cf* Tipping 1997a, 17). Based on this work, it appears throughout the area, at the very end of the Roman period (*c* AD 400), that temperatures began to deteriorate from the warm and dry conditions that had prevailed in the early part of the first millennium AD (*ibid*). These conditions,

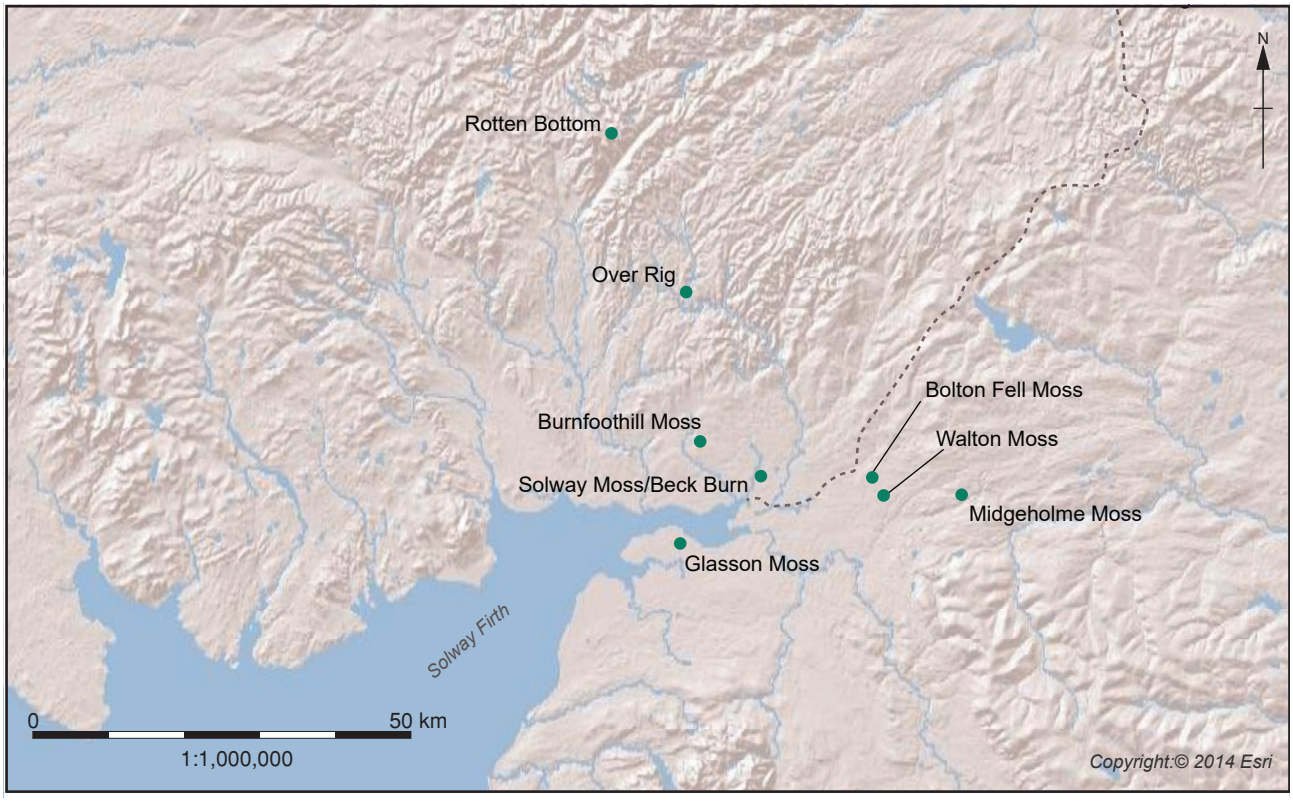


Figure 226: Early medieval and medieval palaeoenvironmental sites mentioned in the text

characterised by cooler summers and wetter winters, may well have continued until the eighth century, after which time summers became warmer and winters cooler (*ibid*; Lamb 1981). It is possible that the climate then became very arid in the tenth century (*cf* Dupont 1986; Heidinga 1987), marking the beginning of the 'medieval warm epoch', which continued until *c* 1350 (*cf* Lamb 1977; Mann 2002). It has been suggested (Tipping 1997a, 17) that climatic conditions across the region during this 'epoch' may have been both warm and wet, at least between *c* 1150 and 1300.

Between the mid-fourteenth and mid-sixteenth centuries, the climate progressively deteriorated, typified by wetter, cooler conditions, and increased glaciation, culminating in the 'Little Ice Age', which in Europe seems to span a *c* 330-year period, between the mid-sixteenth and late nineteenth centuries (Goudie 1983, 132-7; Matthews and Briffa 2016). This period was again characterised by wetter, colder climatic conditions, with summer temperatures in the Northern Hemisphere falling significantly below the 1961-90 mean (Matthews and Briffa 2016). A palaeoclimatic study of several cores extracted from Walton Moss indicated that, between *c* 1300 and 1800, only low levels of carbon accumulated within this raised mire, perhaps a result of lower spring/summer temperatures and shorter growing seasons (Mauquoy *et al* 2002). This study also identified a series of wet shifts in this period (*ibid*), and locally, one dramatic effect of the increased levels of rainfall was a bog burst, at Solway Moss in 1771, immediately north of the River Esk (Hodgkinson *et al* 2000, 121). Bog bursts appear to have been a feature in several of the mosslands in the North West at that time, that in the winter of 1771 being caused by a storm, which resulted in the Moss becoming hydrologically unstable, creating a mass inundation of liquified peat emanating from the north-eastern sector of this large mire (Pennant 1774; McEwen and Withers 1989).

Significantly, these numerous pollen sites surrounding the Solway Firth also enable some insight into the medieval and post-medieval vegetation history, and the pollen data relevant to these periods have been correlated, partially reinterpreted, and summarised for Scotland (Tipping 1997a, 21-2) and by the North West Wetlands Survey (Hodgkinson *et al* 2000, 120-2), whilst studies from Glasson Moss, Walton Moss, and Beck Burn (in Solway Moss) provide further details (Cox *et al* 2001; Mauquoy *et al* 2002; Rutherford and Gregory forthcoming). This work suggests that some areas, such as those around Over Rig, Dumfriesshire, and Walton Moss, Cumbria, witnessed a partial phase of woodland regeneration in *c* 550, which might be directly linked to the period of climatic deterioration postulated for the immediate post-Roman period (*above*). It is also possible that this regeneration occurred at Glasson Moss, on the southern Solway Plain, to the west of the CNDR, as the lower elements of a post-Roman peat extracted from this moss were dominated by arboreal pollen (Cox *et al* 2001). Indeed,

the same may also be true in the environs of Solway Moss, just north of the CNDR, as a decrease in grass pollen and a slight regeneration of tree pollen, from the later Roman or early medieval period, was recorded in a pollen core from Beck Burn (Rutherford and Gregory forthcoming).

This was followed by a phase of agricultural intensification, identified at several sites in the region. However, the timing of this intensification differs slightly in different areas, suggesting that local factors played a significant role. For example, at Burnfoothill Moss in southern Scotland, this intensification dates to around 600 and may relate to the possible establishment of a British bishopric at Hoddom, in Annandale (Thomas 1971, 18), whilst at Beck Burn, on Solway Moss, just to south-east, and close to the modern English/Scottish border, agricultural activity seems to have been much more limited, with low-level cereal cultivation, including rye, as well as evidence for pastoral farming and expanding heather moorland, dating to *c* 800-900 (Rutherford and Gregory forthcoming). Further to the east, at Midgeholme Moss, to the north-east of Carlisle, agricultural intensification appears to begin in *c* 700 (*cf* Tipping 1997a, 22), and at the nearby Walton Moss, tree-pollen values were low and human-impact indicators present during the period *c* 795-830 (Mauquoy *et al* 2002).

On the southern side of the Solway, at Glasson Moss, clearance of the immediate post-Roman woodland also occurred, which was associated with an increase in pastoral farming and the cultivation of both cereals and hemp (Cox *et al* 2001). A series of small natural pools was also identified, used for hemp retting, which form direct evidence for the cultivation of this plant (*ibid*). These pools lay at the centre of the raised moss and were connected by a series of man-made channels, designed to regulate the water levels within these features. Radiocarbon dating suggests that this retting began in cal AD 660-970 (1220±60 BP; WK-5479), which probably corresponds to the identified phase of woodland clearance and agricultural intensification.

At Burnfoothill and Glasson Mosses, the pattern of farming established during the seventh century appears to have continued, with the landscape at the latter site becoming more open (Tipping 1997a, 22; Cox *et al* 2001). However, in other areas around the Solway there appears to have been some woodland regeneration during this period. For instance, at Walton Moss, there is evidence for this regeneration during the tenth century, whilst at the adjacent site of Bolton Fell Moss, woodland clearance and agricultural intensification is dated to *c* 900, and appears to have followed a period of earlier agricultural recession dating to the eighth century (*cf* Tipping 1997a, 22; Hodgkinson *et al* 2000, 120; Mauquoy *et al* 2002).

Hemp retting continued at Glasson Moss into the late twelfth/early thirteenth century, implying that the landscape surrounding this moss was still fairly intensively farmed during this period (Cox *et al* 2001). At this time, forest clearance also appears to have occurred at Bolton Fell Moss, though this was followed by a rapid decline in agricultural activity that may well date to the fourteenth century (*cf* Hodgkinson *et al* 2000, 121). Similarly, at Walton Moss, a phase of forest clearance is demonstrated over the first centuries of this millennium, followed by woodland regeneration in the late fourteenth century (Mauquoy *et al* 2002), whilst at Beck Burn, it seems that cereal cultivation ceased during the later medieval period (Rutherford and Gregory forthcoming).

At all three of these sites, increased clearance and cultivation is reported from the early post-medieval period, suggesting that the worsening climate, associated with the 'Little Ice Age' (*p 486*), was not particularly detrimental to the communities in the vicinity of these mosslands. Indeed, this pattern of continued agricultural exploitation, with an absence of woodland regeneration, appears to be a feature of the wider region and it, in turn, reflects the existence of a stable agricultural economy between the end of the fourteenth and nineteenth centuries, that was little affected by climatic deterioration (Tipping 1997a, 22; 1998).

Archaeological and Historical Background

The early medieval period

It is clear from summaries of the early medieval archaeology of Carlisle, Hadrian's Wall, and the wider North West, that the transition from the 'Roman' to 'post-Roman' period was a protracted process (R M Newman 2006, 91; 2011, 71; Wilmott 2009f). Indeed, this process may well have extended from sometime in the fourth century to the latter part of the fifth century, or possibly beyond, with 'Roman' lifestyles and traditions continuing to hold sway over British culture following the collapse of Roman governance in *c* 410. Along Rome's northern frontier, although Hadrian's Wall probably became defunct following the removal of centralised Roman authority, excavation suggests that at least some of the Wall's forts continued to be occupied well into the fifth century, if not beyond (Wilmott 1997; 2009f, 169). At Birdoswald, for example, a large post-built structure, of possible early fifth-century date, was constructed over one of the fort's earlier stone-built granaries. This was replaced by a free-standing timber-framed building, set on post-pads, which may have been in use until the early sixth century (*op cit*, 168). Superficially, both buildings appear to have functioned as halls and it is possible that they housed, or acted as a meeting place for, a group, which had become a small independent

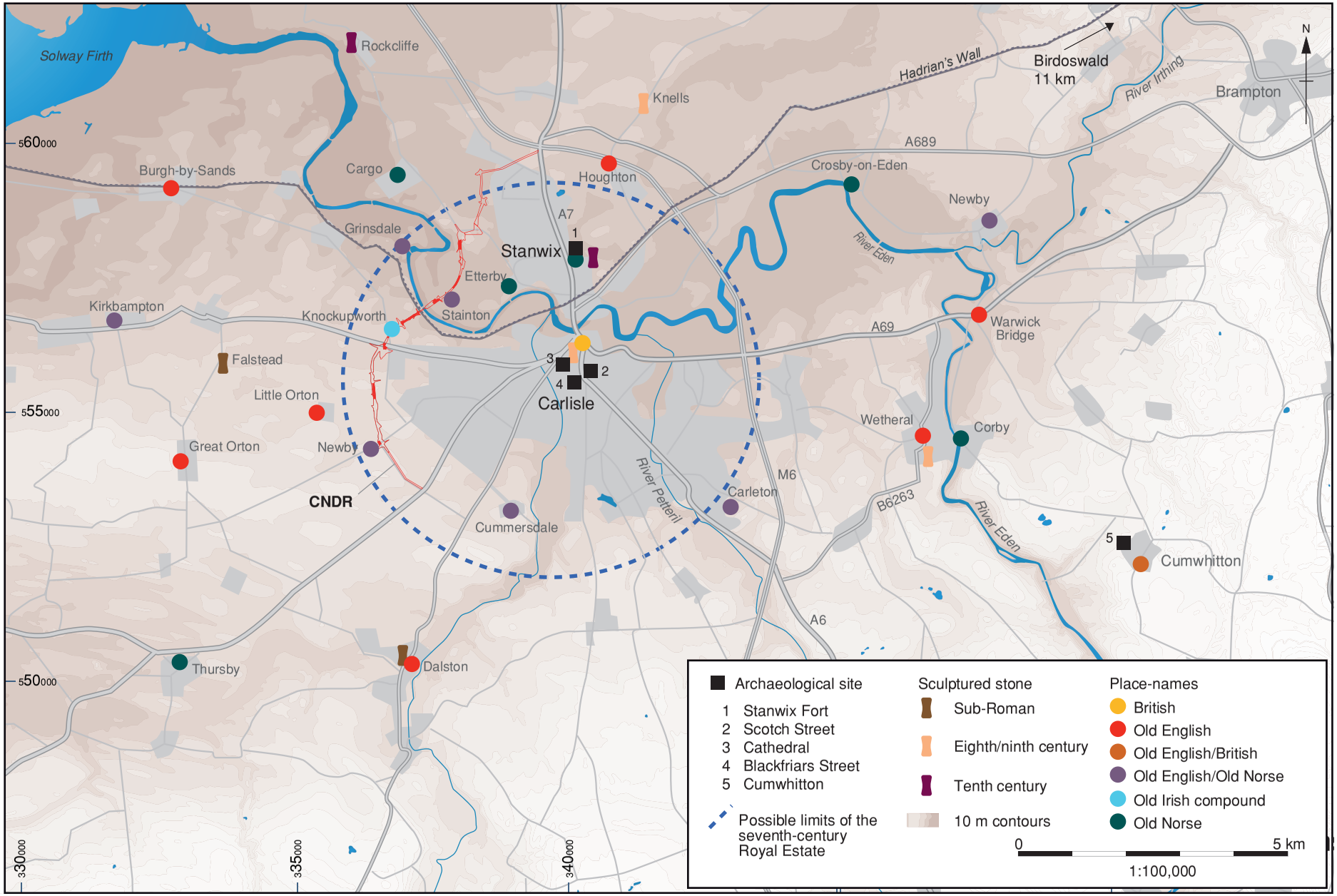


Figure 227: Early medieval sites in the vicinity of the CNDR (Contains OS OpenData © Crown Copyright [and database right] (2022))

military unit, presumably having mutated from the Roman garrison (Wilmott 1997; termed *limitanei* at the close of the Roman period), continuing to operate following the collapse of Roman central governance, and that this unit was continued by their descendants (*cf* R M Newman 2006, 97).

Closer to the CNDR, in the Wall fort of Stanwix (Fig 227), immediately north of Carlisle, several large timber buildings have been identified, constructed over demolished Roman stone buildings (R M Newman 2011, 71). These might again tentatively be dated to the fifth century, reflecting a similar type of occupation to that at Birdoswald.

Similarly, within Carlisle, archaeological evidence (*cf op cit*, 73-4) suggests that parts of the Roman fort functioned in some manner until the mid-fifth century. After this time occupation may have become more focused on the area of the Roman civil settlement, which seems to have become a formally recognised town, as a *civitas* capital, by the early third century (Edwards and Shotter 2005), and also contains evidence for possible fifth- and sixth-century occupation. Along Scotch Street, this evidence includes the fifth-century use of a substantial Roman building, with a hypocaust, and the construction of two successive timber buildings (*ibid*; Fig 228), the latter seemingly constructed in the same manner as the timber-framed hall at Birdoswald (*p 487*).

Another potential fifth-century timber building was also located close to the cathedral, whilst it is possible that the Roman road underlying Blackfriars Street was maintained during the immediate post-Roman period (McCarthy 1990). Moreover, during this period, it is known that this route was fronted by stone buildings that were later replaced in timber. These in turn were replaced by further timber buildings that did not respect the line of the Roman road (*ibid*). Although the date of these buildings is not entirely clear, dendrochronological dates from a timber-lined well cutting one of the later timber buildings indicates that this was constructed after 655 (R M Newman

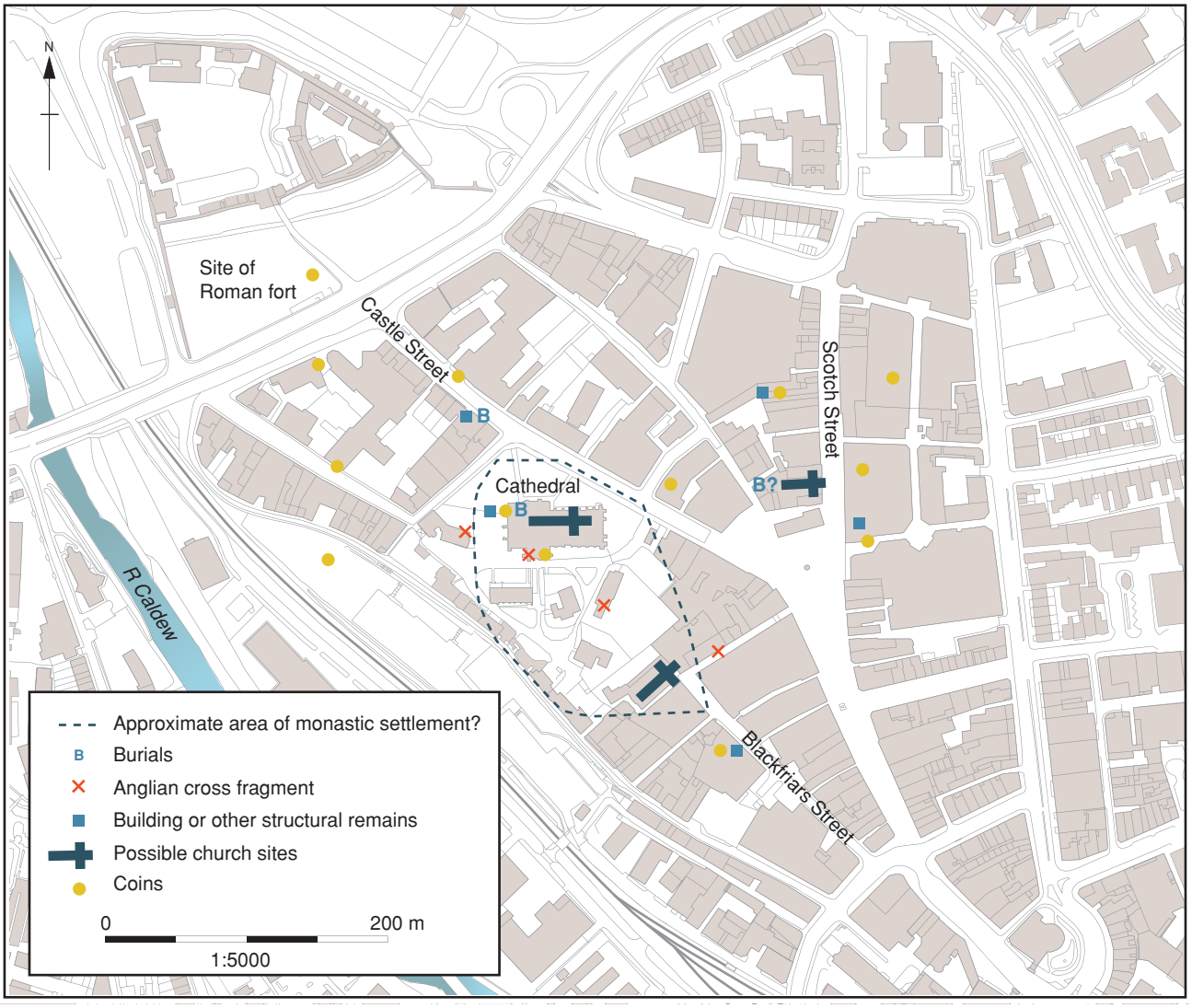


Figure 228: Early medieval sites and finds in Carlisle (Contains OS OpenData © Crown Copyright [and database right] (2022))

2011, 74-5). This sequence, therefore, suggests the continuous early medieval occupation of this part of Carlisle (*ibid*).

Although the evidence is far from clear, one possible scenario is that, in the fifth and early part of the sixth century, the North was controlled by small warrior groups, the leaders of which may represent the 'tyrants' mentioned by the sixth-century cleric Gildas (Winterbottom 1978). These groups probably controlled comparatively small territories, procuring resources from the agricultural communities contained within, and offering well-needed security, which was vital to the success of these communities (*cf* Higham 1986, 251). Warfare and conflict between these groups may well have been endemic, and it is likely that some were based within, or at least utilised, former Roman military installations, and some may also have been direct descendants of the Roman auxiliaries stationed in the frontier zone (Casey 1993, 74). In addition, it appears that an urban lifestyle was at least partly maintained within Carlisle's former Roman town, an hypothesis that is perhaps strengthened by the apparent use of the Roman water-management system during the late seventh century, the continued functioning of which was observed by St Cuthbert in 685 (R M Newman 2011, 78; Webb 1998).

The rare historical evidence suggests an evolving pattern of social structure and organisation during the first centuries of the early medieval period. It is clear, for example, that the warrior bands occupying north-west England and south-west Scotland were gradually coalescing to create the British kingdom of Rheged. Although the precise extent of this kingdom is difficult to define, one possibility is that its heartland encompassed the pre-Roman and Roman tribal areas occupied by the *Carvetii* and *Anavionenses* (Higham 1986, 253; Birley 2001), extending between the lower reaches of Annandale, in Dumfriesshire, and Tebay, in Cumbria. As with the other proto-historic kingdoms in northern Britain, Rheged was ruled by a king, who would have been acclaimed by the elite that had grown from the warrior groups, the most famous ruler being Urien, whose rule is celebrated by Taliesin, a Welsh poet (Higham 1986, 255). Urien ruled Rheged in the late sixth century, dying during the siege of Bamburgh in 593, during a time of increased instability brought about by warfare and raiding, of which the Battle of Armterid, which may have occurred to the north of Carlisle at Arthuret in 573, became a byword for ferocity (Miller 1975, 97, 101-4; Higham 1986, 254).

Archaeological and historical evidence from southern Scotland and Northumberland suggests that the early medieval kings of northern Britain were often associated with a citadel or fort, termed an *urbs* (Higham 1986, 263). In the case of Rheged, it is quite possible that the former Roman settlement at Carlisle performed such a function, particularly as it appears to have been occupied throughout the fifth and sixth centuries (*p 489*). It has also been suggested, on the basis of place-name evidence, that Dunragit, close to Stranraer, was the 'fort of Rheged' (Watson and Taylor 2011). This, in turn, suggests that, at one stage during its history, the influence, or perhaps the wider territory, of Rheged extended much further westwards, beyond its suspected heartland, and encompassed much of Dumfries and Galloway.

In the Carlisle area, there is other evidence of British activity. For instance, British place-names are concentrated in an area of rising ground to the north and east of Carlisle (Armstrong *et al* 1952), although it is possible that a considerable proportion of these relate to a reintroduction of the British language in the late ninth and tenth centuries (Higham 1986, 318). Two fragments of sculptured stone have also been discovered fairly close to Carlisle that have been ascribed a 'sub-Roman' date (Bailey and Cramp 1988): an architectural fragment from Falstead; and a stone trough from Dalston, 5 km to the south-west of Carlisle (Fig 227). Significantly, both pieces share an identical style of carving and may have been derived from the same building, perhaps an early church somewhere in the vicinity (*ibid*).

In the late sixth and early seventh centuries, events were set in motion that would radically alter the political landscape of northern Britain. During this time, the Anglo-Saxon kingdoms of Deira, between the rivers Humber and Tees, and Bernicia, the land north of the River Tyne, were amalgamated under the Bernician king, Aethelfrith (592-616), creating the kingdom of Northumbria (Rollason 2003, 6-7).

Aethelfrith pursued a ruthless campaign of expansion across northern Britain, and this culminated in the Battle of Chester, in 615, which witnessed the defeat of a combined Welsh and Mercian army (Higham 1986, 261). It is therefore possible that Cumbria and those lands west of the Pennines, down to the River Mersey (Higham 1992, 21), were incorporated into Northumbria at this time, with the kingdom of Rheged possibly being integrated through the marriage of Oswy (a younger son of Aethelfrith and later King of Northumbria) to princess Rieinmellt of Rheged (Faull 1981, 171-2; Rollason 2003, 88).

Following Aethelfrith's death in 617, the supremacy of Northumbria within northern Britain was maintained throughout most of the seventh century and, at its height (642-70; Fig 229), its territories

> extended from the Humber in the south, northwards on the east side of the country to

the Firth of Forth, westwards to the Irish Sea and southern coastlands of the Solway Firth, and northwards of that, at least transiently, to take in modern Ayrshire (Rollason 2003, 8-9).

According to the Venerable Bede, at certain times during the seventh century, Northumbria also had dominance over the peoples of southern England and controlled the Isle of Man (Colgrave and Mynors 1969, bk 2, ch 5, bk 4, ch 26). However, from the beginning of the eighth century, the power of Northumbria gradually waned as a result of political instability and factionalism (Rollason 2003, 9).

Although the evidence for social organisation in what is now Cumbria under Northumbrian control is sparse, it is likely that the area was divided into a series of large territorial units. These have been termed 'multiple estates' (Jones 1971), 'extensive lordships' (Faith 1997), or 'small shires' (Offler 1996), and they probably encompassed both lowland and upland areas within their boundaries, to enable the exploitation of a range of resources. It has been suggested that these may well equate with the later Cumbrian secular wards and ecclesiastical deaneries, the boundaries of which closely correlate (Winchester 1987, 14-16; 2008), even

Figure 229: The kingdom of Northumbria during the seventh/eighth century

though it was not until the thirteenth century that the wards were first documented, during the reign of Edward I (1272-1307). Similarly, the Cumbrian deaneries are first recorded in the thirteenth century, though again their boundaries may well have followed older secular divisions (*op cit*, 14). The CNDR straddled the wards of Cumberland, south of the River Eden, and Eskdale to the north, and it is therefore possible that these represent two separate early medieval estates. Perhaps more probably, together these wards might have formed a single large estate, its territory being reflected in the boundaries of the deanery of Carlisle (*below*).

It has been suggested that the early medieval estates in Cumbria would have contained groups of small settlements, forming hamlets or isolated homesteads, the territorial boundaries of which are perhaps reflected in some of the townships (Winchester 1987, 4, 29; Higham 1986, 293). The inhabitants of these settlements owed certain allegiances and services to an overlord, who controlled a central place of high status, which acted as a centre or focus (*cf* Winchester 1985, 97; Roberts 2008, 158). The estate centre formed a seigniorial seat, sometimes a royal vill, and contained the overlord's hall and court (Winchester 1985, 89). His demesne was probably concentrated around the estate centre, and contained those tenants under his immediate lordship (bondmen), whilst the remaining townships were held by free tenants (*op cit*, 97-8; 1987, 4, 29). The bondmen were responsible for erecting the lord's hall and court, construction and transport across the wider estate, and cultivating the demesne lands (Roberts 2008, 162). It has been suggested that this latter activity was supervised by the reeve, who resided in his own separate settlement, also normally located near, or within, the demesne lands (*ibid*).

Unsurprisingly, given its Roman and post-Roman occupation, it is likely that an estate centre was established in Carlisle, which was surrounded by its demesne land. This, in turn, formed the hub of the wider estate that was, perhaps, later formalised as the Carlisle deanery. This probable estate centre and its associated demesne, mentioned by a late seventh-century source as forming a royal vill, may have been contained within a 15 mile (24 km) circumference (Colgrave 1940; Summerson 1993, 10; R M Newman 2011, 78; Fig 227). King Ecgfrith granted this land to St Cuthbert in *c* 685 and it subsequently became a monastic holding (Colgrave 1940).

Although the precise location of this monastery is difficult to pinpoint, one possibility is that it was in the area surrounding the present-day cathedral (Fig 228). This area contains St Cuthbert's church, the alignment of which accords with the Roman, rather than later, street pattern, and its dedication suggests that it may

be pre-Conquest in origin. Also, fragments of cross-heads and a cross-arm of eighth-/ninth-century date have been found in this area, one, significantly, with an inscription (Bailey and Cramp 1988, Carlisle 1-3; R M Newman 2011, 80). In addition, early medieval Christian burials have been identified west of the cathedral (McCarthy 2014), which imply that an early church was in the vicinity (R M Newman 2006, 107). Other evidence for early activity surrounding this potential enclave includes the site of another possible early church on Scotch Street, which later became St Alban's chapel, and timber-lined pits dating to the late eighth/early ninth century west of the cathedral, which may have served an industrial purpose (McCarthy 1993; 2002; Weston 2011, 111). In addition, the distribution of early to mid-ninth-century stycas concentrates on Carlisle's medieval core, and these imply that a monetary economy was in place by that date (McCarthy 2002, 153-4; R M Newman 2011, 80, fig 5.1).

Although such evidence exists for early medieval activity in Carlisle, prior to the archaeological investigation along the CNDR, direct evidence for activity dating to this period within its immediate environs was sparse and largely reliant on place-name evidence and fragments of stone sculpture. A proportion of the place-names incorporating the element *-tun* are probably Anglo-Saxon in origin, including Houghton, to the north of Carlisle, and Dalston to the south-west (Sedgefield 1915; Armstrong *et al* 1950; Institute for Name Studies 2013). Other place-names exist which appear to be solely English in derivation, including Wetheral and Warwick, to the east of Carlisle, and Burgh-by-Sands, to the west (Sedgefield 1915; Institute for Name Studies 2013). Other place-names fuse British and Old English names (*ibid*), whilst places also exist which contain Old English elements combined with old Norse, which may therefore be indicative of later settlement (*p 493*). Two sites containing early medieval stone sculpture have also been documented within the immediate environs of Carlisle: a late eighth-century grave cover is known from Knells (Fig 227), to the north-east of Carlisle (Bailey and Cramp 1988); and a fragment from an eighth-/ninth-century cross-arm came from Wetheral, to the east (*ibid*).

By the ninth century, Northumbria's control over the Solway area had seemingly begun to disintegrate. This was partly a result of dynastic problems, and perhaps also the progressive loss of royal land-holdings (*p 491*), but the collapse was brought to a head by Scandinavian incursions into the North. This culminated in the capture of York in 866, which led to the effective collapse of the kingdom of Northumbria, and was followed in 875 by a campaign across northern Northumbria (presumably including southern Scotland), under Halfdan (Rollason 2003, 215). There is a tradition that Carlisle was sacked during this period, although no physical evidence has yet been found for this potentially destructive episode (R M Newman 2011, 80-1). It is likely, however, that following this campaign, this part of western Northumbria may have been considered a fairly safe haven, at least for the Northumbrian church. Most tellingly, the historical sources record, during the late ninth century, that a group of monks arrived in western Northumbria, with St Cuthbert's corporeal remains, having fled from Lindisfarne via Norham upon Tweed (Bailey 1980, 35; Higham 1986, 310). Once these monks had arrived in the area, they were joined and then led by Eadred, the abbot of Carlisle (Higham 1986, 310).

In the tenth century, the political situation in the North remained dynamic, with power passing between the Vikings and English on numerous occasions. For example, King Athelstan, of the expansionist Wessex dynasty, succeeded in removing the Viking king in York in 927, though the city was recaptured in 939 (Rollason 2003, 265). There followed a fairly protracted period of turmoil and warfare that culminated in the death, in battle, of Eric Bloodaxe, the last Viking king of York, on Stainmore in 954 (Collingwood 1902). After this date, the kings of Wessex, now increasingly controlling what was becoming England, used elite appointees to rule this area, and hence brought it back under English control (Downham 2007, 121).

During this time, the political situation in the Solway area became even more confused, but, although potentially volatile in nature, it is likely that initially at least it remained largely 'Northumbrian' in character. However, in the tenth century, the Solway area appears to have seen further Scandinavian settlement, and the British kingdom of Strathclyde seems to have expanded its influence southwards (Edmonds 2015). Direct evidence for the presence of cultural groups is, however, sparse and their respective influences on this and the wider area are open to debate (*inter alia*; Higham 1985; Richards 1991; Rollason 2003). Physical evidence for the period exists in the form of the cemetery to the west of Carlisle Cathedral (McCarthy 2014), many of the Christian burials seemingly interred in clothing accompanied by ornate personal items of dress, such as belt buckles and toggles, which can be dated to the ninth or tenth century. Perhaps the most telling evidence is the number of furnished Viking burials in northern Cumbria, particularly those at Aspatria (Rooke 1792), Hesket-in-the-Forest (Hodgson 1832), and the small cemetery at Cumwhitton, which can be dated to the first quarter of the tenth century (Paterson *et al* 2014).

In the area surrounding Carlisle, further evidence for Scandinavian settlement in the form of place-name

evidence and stone sculpture, and indeed in the wider North West, largely dates to the tenth century (*ibid*). Perhaps significantly, there are numerous place-names surrounding Carlisle which contain both Old English and Old Norse elements, such as Carleton to the south-east, Orton (Great and Little) to the west, Grinsdale and Stainton to the north-west, in the direct vicinity of the CNDR, and Newby, a place-name found both to the south-west and north-east of Carlisle (Sedgefield 1915; Armstrong *et al* 1950; Institute for Name Studies 2013). In addition, the place-name, Knockupworth, the farm immediately adjacent to the CNDR, on the southern bank of the Eden, contains Old Irish and continental Germanic elements, and perhaps reflects the presence of a settlement from people moving around the western seaboard of Britain (Armstrong *et al* 1950, 141). The place-name Cummersdale also occurs immediately to the south of Carlisle, which is a fusion of Old English and Old Norse, translating as the 'valley of the Cumbrian Britons' (Institute for Name Studies 2013). As such, it may well represent evidence for the settlement, or at least the influence, of groups derived from the British kingdom of Strathclyde.

Other comparable British place-names and, indeed, other evidence for tenth-century British influence are largely absent from Carlisle's immediate environs, though those place-names to the north and east, in Eskdale ward, may relate to British expansion into the region in the tenth century (Armstrong *et al* 1952). Similarly, Cumwhitton, to the east of Carlisle, is a British/Old English place-name (referring to Hwita's farm/settlement; Institute for Name Studies 2013), and this may also reflect the tenth-century expansion of influence from the British kingdom of Strathclyde (Paterson *et al* 2014, 171).

Whilst the fusion of Old English and Old Norse names may suggest that these places were initially named by English-speaking peoples and later settled by Scandinavian groups, it is also possible that they represent a Viking settlement that was named by English-speaking neighbours, or represent a subtle attempt by the new settlers to integrate more closely into the pre-existing cultural milieu. Other place-names in the vicinity of Carlisle seemingly relating to Viking settlement include those place-names which are solely Old Norse in derivation. These include Stanwix to the north, and Cargo and Etterby to the north-west; Crosby-on-Eden to the north-east; Corby to the east; and Thursby to the south-west (*ibid*). Of these, Etterby is close to the CNDR.

The tenth- and eleventh-century stone sculpture in the immediate vicinity of Carlisle also allows some insight into the Christian sites that had been established by this period. These are fairly limited in number compared with the rest of Cumbria, in that there are only two examples: a ring-headed cross at Rockcliffe; and a cross-head from Stanwix, both to the north of Carlisle (Bailey and Cramp 1988). It is therefore probable that Carlisle acted as the main focus for Christian worship at this time and, given this, it is perhaps not surprising that part of a tenth- or eleventh-century cross-head has been discovered at the cathedral (*op cit*, Carlisle 4).

Later medieval historical background

The later medieval period in northern Cumbria is largely characterised by political turmoil, as this strategic area crystallised into a frontier zone between competing medieval realms. The political history of the area south of the Solway in the eleventh century is open to debate (*cf* Kapelle 1979; Summerson 1993), though it does appear that, after 1018, the kingdom of Strathclyde was subsumed into the Scottish kingdom, following the death of its last British king, Owen the Bald, at the Battle of Carham, and the marriage of his daughter to the grandson of the Scots king, Malcolm II (RCAHMS 1997, 187). By the mid-eleventh century, Carlisle and the adjacent lands south of the Solway were once again under English control, under the protection of Siward, the earl of Northumbria (Summerson 1993, 14). As has been convincingly argued (*op cit*, 15), English control seems to have been short-lived, and it appears that, after the death of Siward in 1055, Malcolm Canmore recovered Cumberland, and at some point placed the area under the control of Dolfin, a son of Gospatric, the Northumbrian earl of the early years of Norman rule, who fled to Scotland in *c* 1074 (*op cit*, 47).

In 1092, the Norman king of England, William II (Rufus), campaigned in the North and ejected Dolfin from Carlisle, thereby incorporating northern Cumbria into the Anglo-Norman kingdom (Kapelle 1979, 150). This Norman conquest resulted in the construction of a castle at Carlisle, to garrison this newly conquered area, which was progressively enlarged throughout the course of the later medieval period (Summerson 2011, 85). The Conquest also led to the reconfiguration, or perhaps re-establishment, of the town, and the introduction of peasant settlers from the south, who inhabited both Carlisle and the surrounding area (Summerson 1993, 16).

The consolidation of Norman control of the Solway area was then completed under Henry I, who appointed Ranulf Meschin as Lord of Carlisle, giving him the task of securing English Cumbria (Kapelle 1979, 206). During this period, Carlisle's urban core was enclosed by a defensive wall, and St Mary's Priory was established within the town, its church forming the cathedral for the newly created diocese of Carlisle in 1133; St Cuthbert's church was also perhaps rebuilt (Summerson 2011, 88; Weston 2011, 104-5, 110; Fig 230).

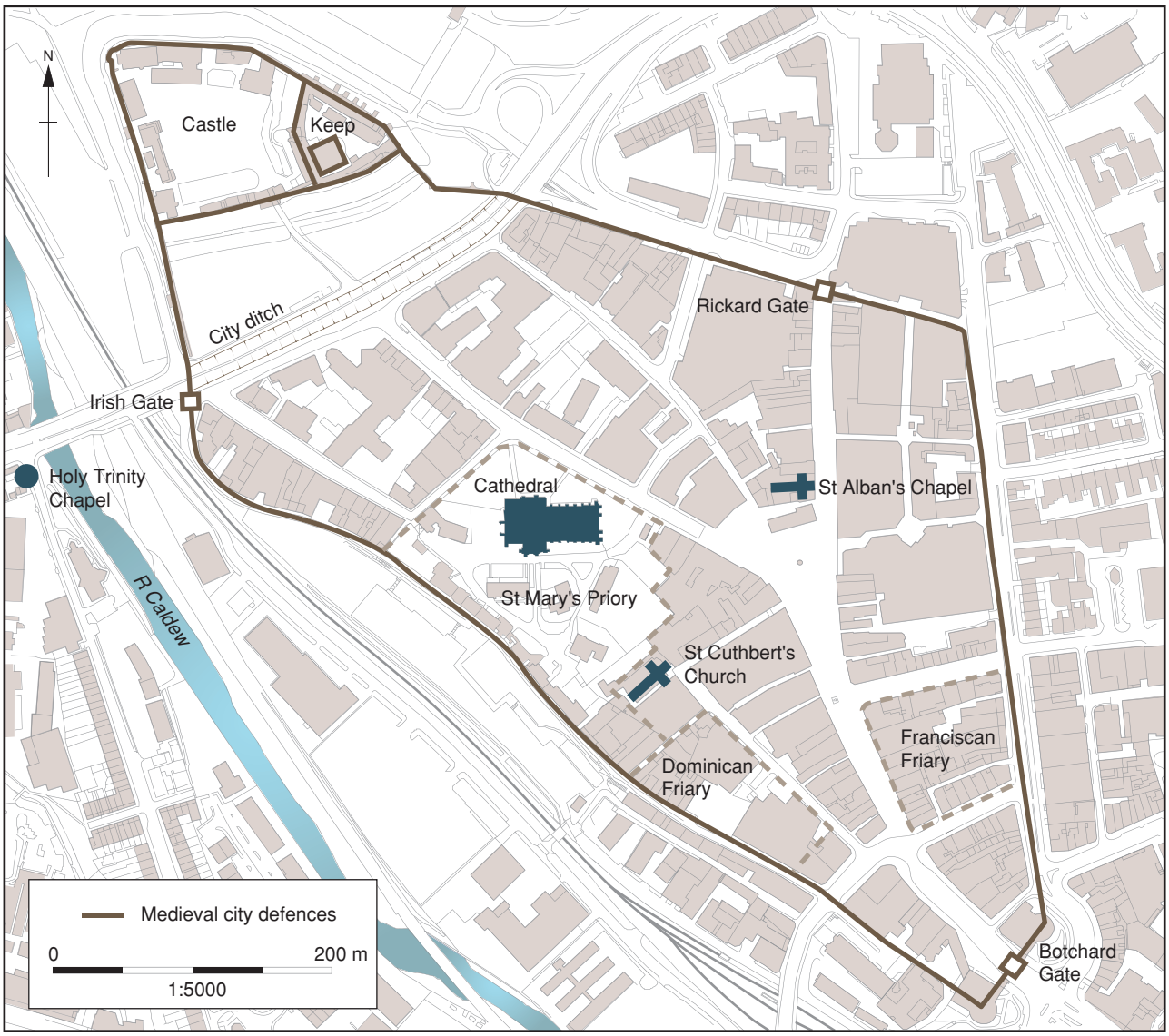


Figure 230: Later medieval Carlisle (Contains OS OpenData © Crown Copyright [and database right] (2022))

Beyond Carlisle, significant advances were made in the Norman settlement of Cumberland, including the creation of the Barony of Burgh-by-Sands, to the west of the CNDR, controlling the fords across the Solway (Summerson 1993, 19; RCAHMS 1997, 188). The northern side of the Firth was under the control of David, later king of Scotland (1124-53), who also held the English Earldom of Huntingdon, and was Henry I's brother-in-law. In 1124, he installed the Norman Lord, Robert de Brus, as Lord of Annandale, thereby introducing lords who, like him, held land in both England and Scotland (Kapelle 1979, 206-7). Other territorial areas created at this time included the Royal Forest of Inglewood, to the south of Carlisle and west of the River Eden. The boundaries of this forest were increased dramatically under Henry II, to encompass the Barony of Allerdale, though by 1300 the area had been reduced. However, it was still extremely large in extent, extending between Carlisle, the northern slopes of the Lake District, the River Eden, and the Chalk Beck (Winchester 1987, 22).

Following the death of Henry I in 1135, David I of Scotland occupied northern England, including Carlisle, on behalf of Henry I's daughter, Matilda, who had been nominated his successor, though, in the event, the crown was seized by her cousin, Stephen of Blois (Stringer 1993; Oram 2004). Indeed, following his occupation of Carlisle, David improved its defences, and this may well have resulted in the construction of the keep at Carlisle Castle in 1139 (Wilson 1905, 242). David's underlying ambition appears, however, to have been to establish a Scoto-Northumbrian kingdom and in 1139 he made a treaty with Stephen, which gave him control of Cumberland and Northumberland (RCAHMS 1997, 188). After the death of Stephen, Matilda's son, now Henry II, quickly regained control of the North, by 1157, and from that time, Carlisle remained English (Kapelle

1979). The area continued to form disputed territory, however, and it was not until 1237 that the Treaty of York affirmed that Northumberland and much of Cumberland (including Carlisle) were firmly part of England (Summerson 2011, 85), settling the border as it is to this day.

During the late twelfth and early to mid-thirteenth centuries, significant religious institutions were established within the walls of the city, two friaries being founded, by the Franciscan and Dominican orders (Weston 2011, 113-14). Further hostilities between Scotland and England began in 1296, with the Scottish succession crisis, leading to the invasion of the English monarch, Edward I (1272-1307). Following Edward's death in 1307, at Burgh-by-Sands, whilst *en route* to engage Robert the Bruce, who had claimed the Scottish crown (Penman 2014), the area was effectively 'at the centre of a war-zone for over 250 years' (Summerson 2011, 85) and this appears to have curtailed Carlisle's growth into a major urban centre (Giecco 2011, 123).

Although Carlisle was subjected to political turmoil for the majority of the later medieval period, it was surrounded by communities that cultivated land lying between areas of waste (Fig 231). Many of the later medieval settlements probably date to the earlier part of the twelfth century, when Anglo-Norman lords brought peasant farmers from the south (*p 493*), and these settlements would have supplemented, or in some cases, replaced, the pre-existing settlement of the area. Several of these Norman settlements can be identified from the place-name evidence, close to Carlisle. These contain Norman prefixes, followed by Old Norse suffixes, which may reflect the local dialect or language spoken at the time (R M Newman 2011, 82), and include Tarraby (the farm/enclosure of Teodhere), Rickerby (the farm/enclosure of Richard), Aglionby (the farm/enclosure of Agyllun), Botcherby (the farm/enclosure of Bochard), Harraby (the farm/enclosure of Henricus), and Upperby (possibly the farm/enclosure of Ulbert), to the north, east, and south of Carlisle (Sedgefield 1915). Of these, Harraby and Upperby formed part of the royal demesne, as they were within the Royal Forest of Inglewood (Winchester 1987, 18; *p 494*). In addition, it has been suggested that the place-name Scotby, to the east of Carlisle, dates to the twelfth century and is a reference to the area being under the control of King David I (Sedgefield 1915).

Manorial records are also a valuable source of information and allow other later medieval settlements, or at least townships (*p 496*), to be identified close to Carlisle, which may on the evidence of place-names have earlier origins. Those in the vicinity of the CNDR include, from south to north, Newby, Stainton, Grinsdale, Etterby, Cargo, and Houghton (*ibid*; Armstrong *et al* 1950). It is also possible that a later

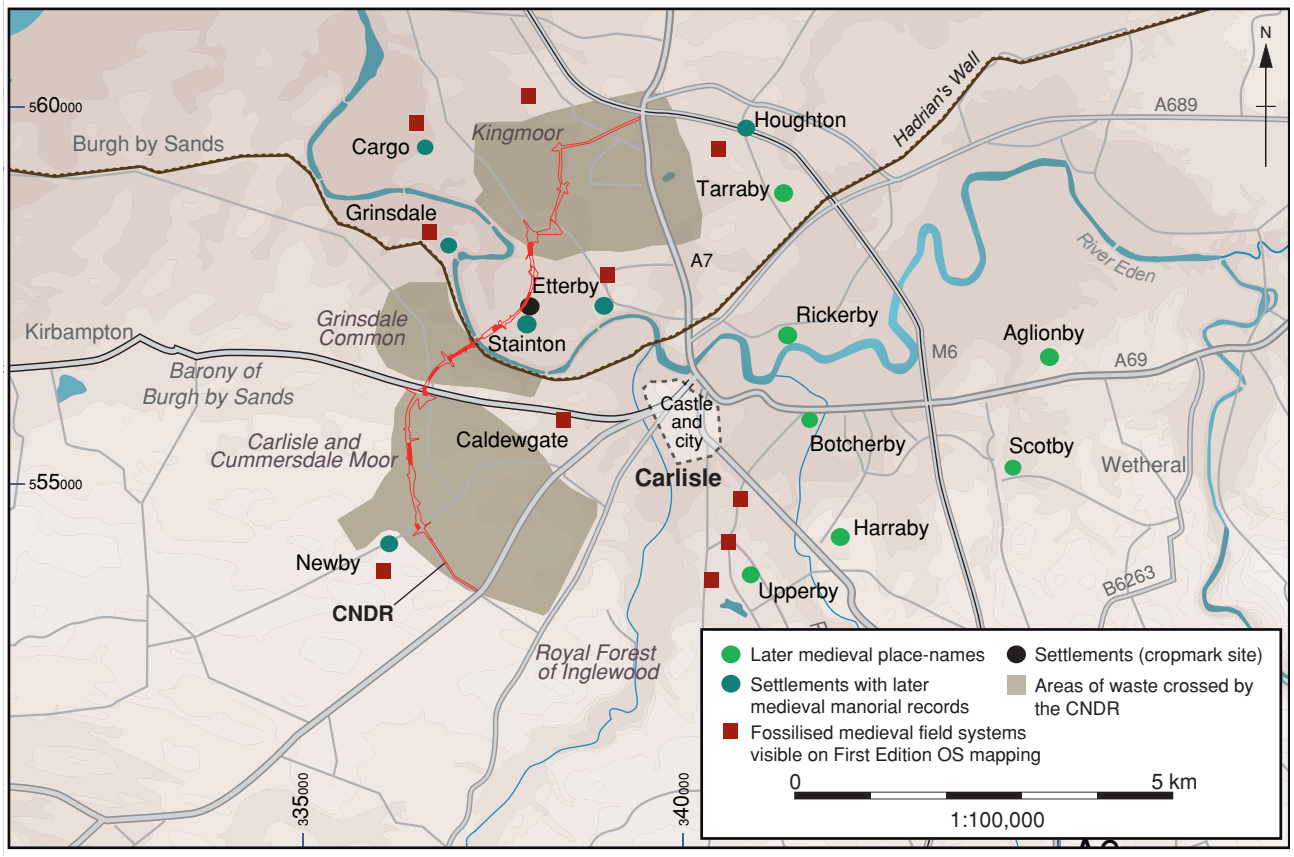


Figure 231: Later medieval sites in the vicinity of Carlisle (Contains OS OpenData © Crown Copyright [and database right] (2022))

medieval settlement existed immediately to the east of the CNDR and to the north of Stainton. In this area, aerial photography has revealed a series of cropmarks, the morphology of which appears consistent with the remains of an abandoned medieval settlement, perhaps the later medieval precursor to Stainton.

Further evidence for the antiquity of some of these settlements, and also areas of early farming, is evident from nineteenth-century mapping, particularly the First Edition Ordnance Survey (OS) 6":1 mile maps dating to the late 1860s (Cumberland Sheets XVI and XXIII; OS 1868a; 1868b). In certain areas, these maps depict narrow linear fields with a reverse S-shaped morphology, which reflect the later enclosure of strips within a medieval open-field system (*cf* McOmish 2011, 5).

It has been argued that, across lowland areas of medieval Cumbria, fields of this type formed part of an infield-outfield system of cultivation, whereby a core of permanently cultivated arable land was maintained (infield), which was supplemented by outfield areas that were cultivated in rotation (Winchester 1987, 74-5). Close to the CNDR, these characteristic reverse S-shaped fields are concentrated around the settlements at Newby, Grinsdale, Cargo, Etterby Hill, and Houghton, perhaps representing areas of infield, whilst the First Edition OS mapping also depicts similar fields immediately west of Carlisle, in an area surrounding Caldewgate, and immediately north of the Kingmoor Park Central Industrial Estate, which is at the far northern end of the CNDR. In addition, close to the CNDR route, numerous areas of both surviving and levelled ridge and furrow have been identified on aerial photographs, analysed as part of the *Hadrian's Wall National Mapping Programme* (Boutwood 2005), and a proportion of these may well relate to medieval ploughing within open fields.

These settlements and fields lay within particular townships, themselves being grouped into manors, within either the later medieval baronies or the Royal Forest, it being quite possible that the administrative and feudal structure of these baronies was directly based on the pre-Conquest structure (Winchester 1987, 18). Within this system, the townships defined the limits of the resource base of a particular later medieval rural community, and their boundaries often reflected earlier territorial divisions (*op cit*, 27, 29). Those crossed by the CNDR are the townships of Cummersdale, Caldewgate, and Grinsdale, to the south of the Eden, and Stainton and Kingmoor to the north of the river. The rural community within such lowland townships was largely formed of bovate holders (unfree villeins), who held shares in a core area of township land and also paid rent, and in some cases owed labour services, to the lord of the manor (*op cit*, 64-5).

Apart from the medieval settlements and areas of identifiable agricultural land, the route of the CNDR also crossed and was adjacent to several areas of medieval waste. These formed less agriculturally productive areas of moss or moorland, and later medieval communities normally used them for rough grazing or turbary (collection of peat/organic soils for fuel). To the north of Carlisle, one such area was Kingmoor. The waste covered much of the Kingmoor township, as evidenced by a nineteenth-century enclosure award (Q/RE/1/99), which during the later medieval period was vested in the Crown, though the citizens (Corporation) of Carlisle had the right to pasture cattle and cut turves, as confirmed in a fourteenth-century charter issued by Edward III (Hutchinson 1794, 583). Another area of waste partly crossed by the CNDR was Grinsdale Common, which prior to the nineteenth century formed a wet and unproductive tract of land (Whellan 1860, 168). The last area of waste partly crossed by the CNDR lay at the far southern end of the route. This was known as Carlisle and Cummersdale Moor and it formed a large tract of agriculturally unproductive land on the western side of Carlisle (Q/RE/1/90).

Archaeological sites on the CNDR

Parcel 42: early medieval settlement

In its northern section, the CNDR crosses a small valley (Parcel 42) that originally contained a watercourse flowing north-westwards into the River Eden. Significantly, this valley and its immediate environs acted as a focus for early settlement, as evidenced by the unenclosed Bronze Age settlement on its southern crest (*Ch 11, p 411*), which was perhaps supplanted in the Iron Age by a larger enclosed settlement, now known as the Grinsdale Camp earthwork (*Ch 15, p 557*). This lies on the northern side of the valley, on a small rise immediately east of the River Eden (Fig 232).

Given this, it is perhaps not surprising that another early settlement was present, the remains of which were discovered within the road corridor. These related to a small settlement which, on the basis of radiocarbon assays obtained from charcoal and charred plant remains from five features, dates to the early medieval period (Table 39). When subjected to Bayesian analysis (*Appendix 20*), these radiocarbon dates suggest that the settlement was occupied for *0-150 years*, between *cal AD 710-880 (Start settlement*) and *cal AD 780-950 (End settlement*). Historically, this chronological span largely covers the era when the region fell within the Northumbrian cultural sphere, during the eighth and ninth centuries, although, it also encompasses the early tenth century, when

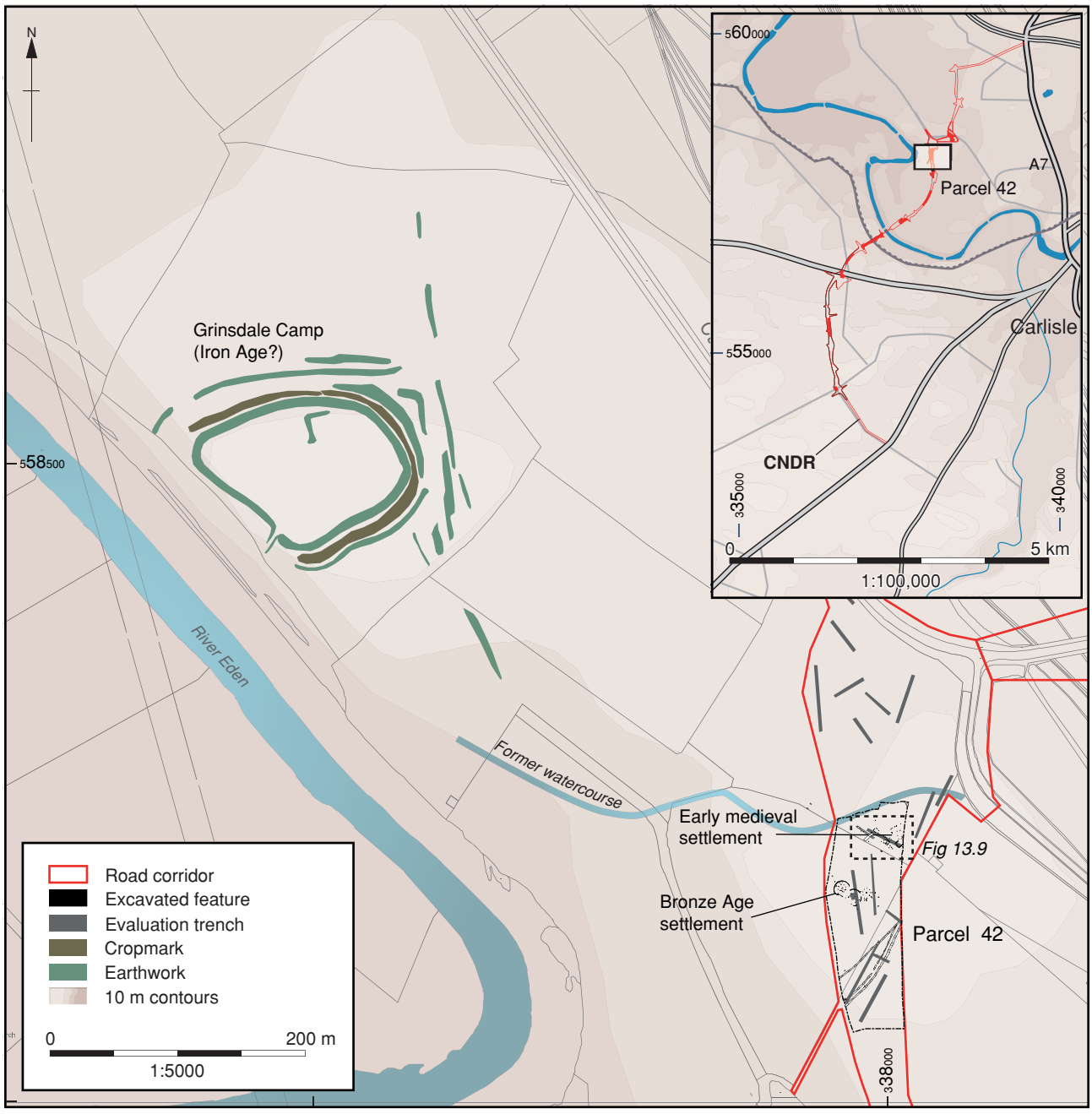


Figure 232: Parcel 42 and its environs (Contains OS OpenData © Crown Copyright [and database right] (2022))

the area seemingly came under the influence of the British Kingdom of Strathclyde, and was also affected by Viking activity (*pp 492-3*).

The settlement lay on the southern slope of the valley, below its crest, and was partly sealed by deposits of alluvium and colluvium. Excavation revealed that it principally consisted of five rectangular buildings (Buildings 1-5) that all utilised earthfast posts in their designs (Fig 233).

Two of these buildings (Buildings 1 and 2) were aligned north-west/south-east and hence were parallel with the watercourse that would originally have flowed along the valley bottom. The smaller of these buildings (Building 1) was *c* 6.2 x 3 m and its wall-lines were defined by ten sub-circular postholes (Fig 234; Pl 194). These had diameters ranging between 0.2 m and 0.5 m, and all were fairly shallow, as none exceeded 0.2 m deep. They were also concentrated at the north-western end of the building, suggesting that later activity had destroyed the majority of the postholes once present to the south. Indeed, at that end, only one posthole (***42270***) was identified, which appears to have formed part of the south-eastern wall-line. It is possible that this posthole, along with a similarly positioned feature (***42292***) at north-western end of the building, secured gable posts, which assisted in supporting the roof.

Context	Laboratory code	Material	Bulk sample	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal AD	χ^2 test		
Building 5 Posthole ***42502*** (fill ***42501***)	SUERC-32734	Indeterminate charcoal	42187	1240±35	-27.0	680-890	Statistically consistent with good agreement (T'= 0.01; T' (5%)= 3.8; υ= 1; A_{comb}= 116.4% (An= 50.0%))		Statistically consistent with good agreement (T'= 9.36; T' (5%)= 14.1; υ= 7; A_{comb}= 51.8% (An= 50.0%))
	SUERC-42038	Charred grass-family (Poaceae) seed	42187	1227±23	-25.9	690-885			
Building 2 Gully ***42274*** (fill ***42275***)	SUERC-42046	Willow/poplar (*Salix/Populus*) charcoal	42096	1227±26	-26.5	690-890	Statistically consistent with good agreement (T'= 0.01; T' (5%)= 3.8; υ= 1; A_{comb}= 101.8% (An= 50.0%))	Statistically consistent with good agreement (T'= 5.11; T' (6%)= 3.8; υ= 2; A_{comb}= 41.9% (An= 40.8%))	
	SUERC-42045	Charred barley (*Hordeum* sp) grain	42096	1183±26	-24.7	760-950			
Pit ***42260*** (fill ***42262***)	SUERC-42044	Charred oat (*Avena* sp) grain	42090	1137±23	-26.2	775-985	-		
Building 4 Posthole ***42410*** (fill ***42411***)	SUERC-32733	Indeterminate short-lived charcoal	42154	1190±35	-27.9	710-970	Statistically consistent with good agreement (T'= 0.08; T' (5%)= 3.8; υ= 1; A_{comb}= 115.3% (An= 50.0%))		
	SUERC-42039	Alder/hazel (*Alnus/ Corylus*) charcoal	42154	1178±25	-27.5	770-950	Statistically consistent with good agreement (T'= 0.08; T' (5%)= 3.8; υ= 1; A_{comb}= 115.3% (An= 50.0%))		
Posthole ***42444*** (fill ***42445***)	SUERC-42595	Charred barley (*Hordeum* sp) grain		1194±29	-24.3	720-950	-		
	SUERC-42040	Charred wheat (*Triticum* sp) grain	42166	236±25	-26.9	1530-1955	-		

Table 39: Radiocarbon dates from the early medieval settlement in Parcel 42

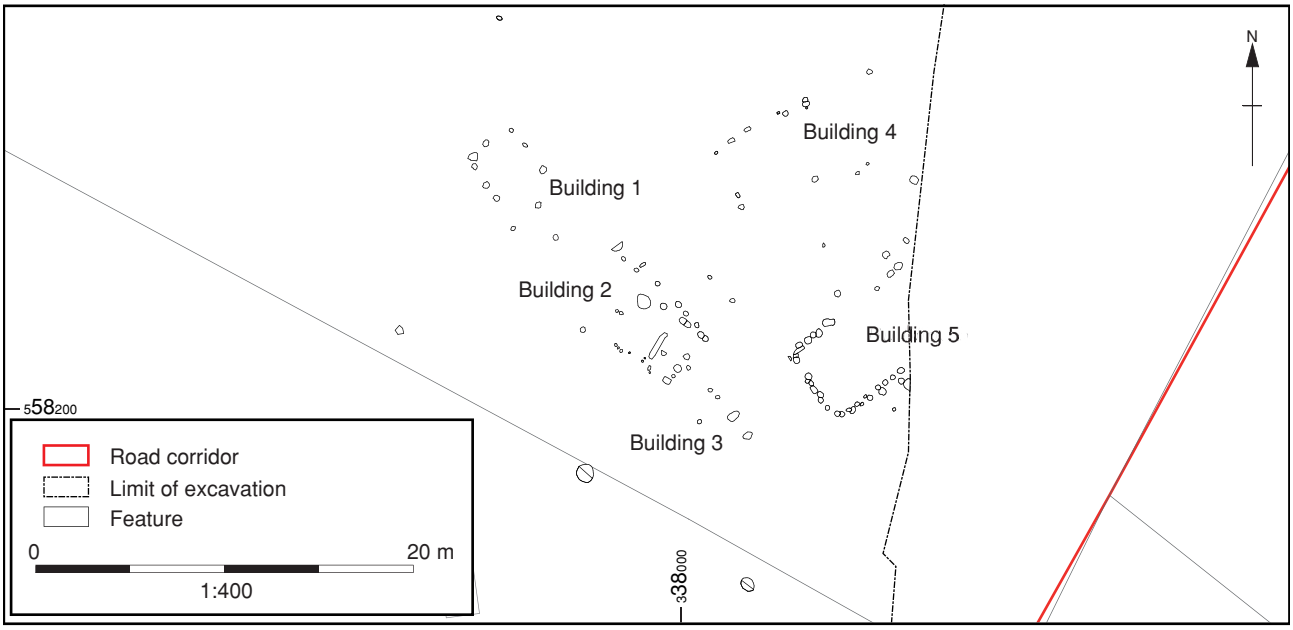


Figure 233: The early medieval settlement in Parcel 42

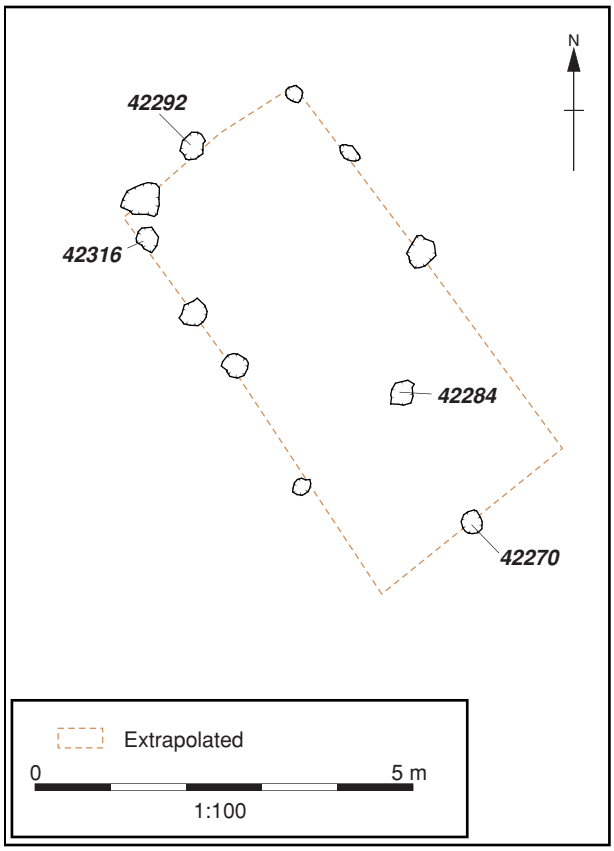


Figure 234: Building 1

All of the postholes contained deposits of sand and silt, and one (***42316***) was associated with oak charcoal and grass-family seeds. The form and positions also indicated that, once constructed, the building's wall-lines were neither replaced nor refurbished, which may suggest that its lifespan was comparatively short. One posthole (***42284***) was found within the building, with a diameter of *c* 0.35 m. This might have aided in the support of the roof, or perhaps formed part of an internal division. If the latter. one further possibility is that a *c* 1.6 m-wide cell had been constructed at the south-eastern end of the building.

The larger of the north-west/south-east-aligned buildings (Building 2) was *c* 2.5 m to the south-east of the smaller (Building 1) and appears to have measured approximately 6.9 x 3.5 m (Fig 235). It was delimited by 24 postholes forming elements of its north-eastern, south-eastern, and south-western wall-lines (Pl 195). The postholes associated with the north-eastern and south-eastern sides of the building were sub-circular, with diameters ranging between *c* 0.5 m and *c* 0.2 m, and depths not exceeding 0.3 m, though a larger pit (***42457***), with a diameter of *c* 0.7 m and a depth of *c* 0.4 m, secured a post at the north-eastern corner, the impression of which was visible

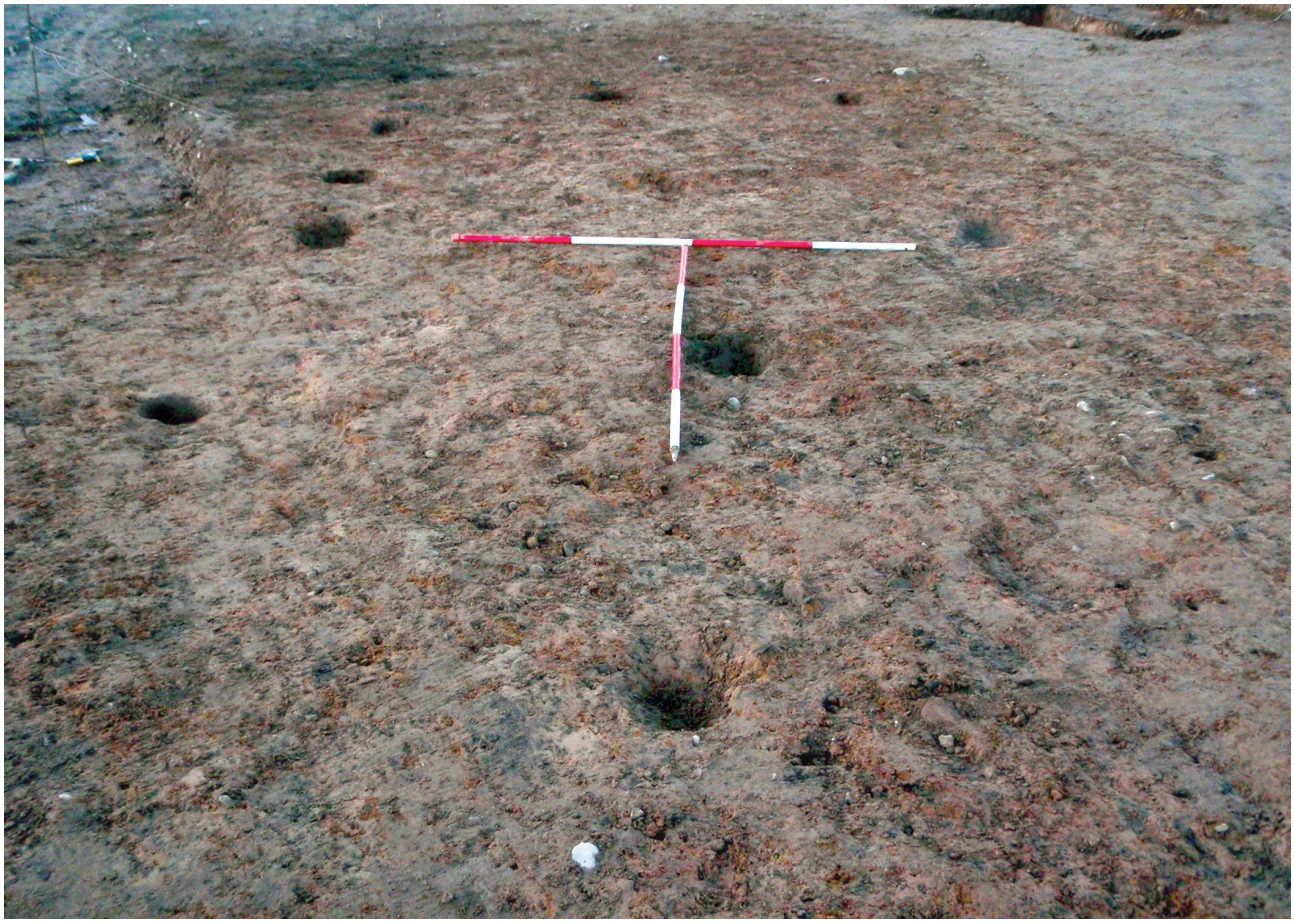


Plate 194: Building 1, looking north-west

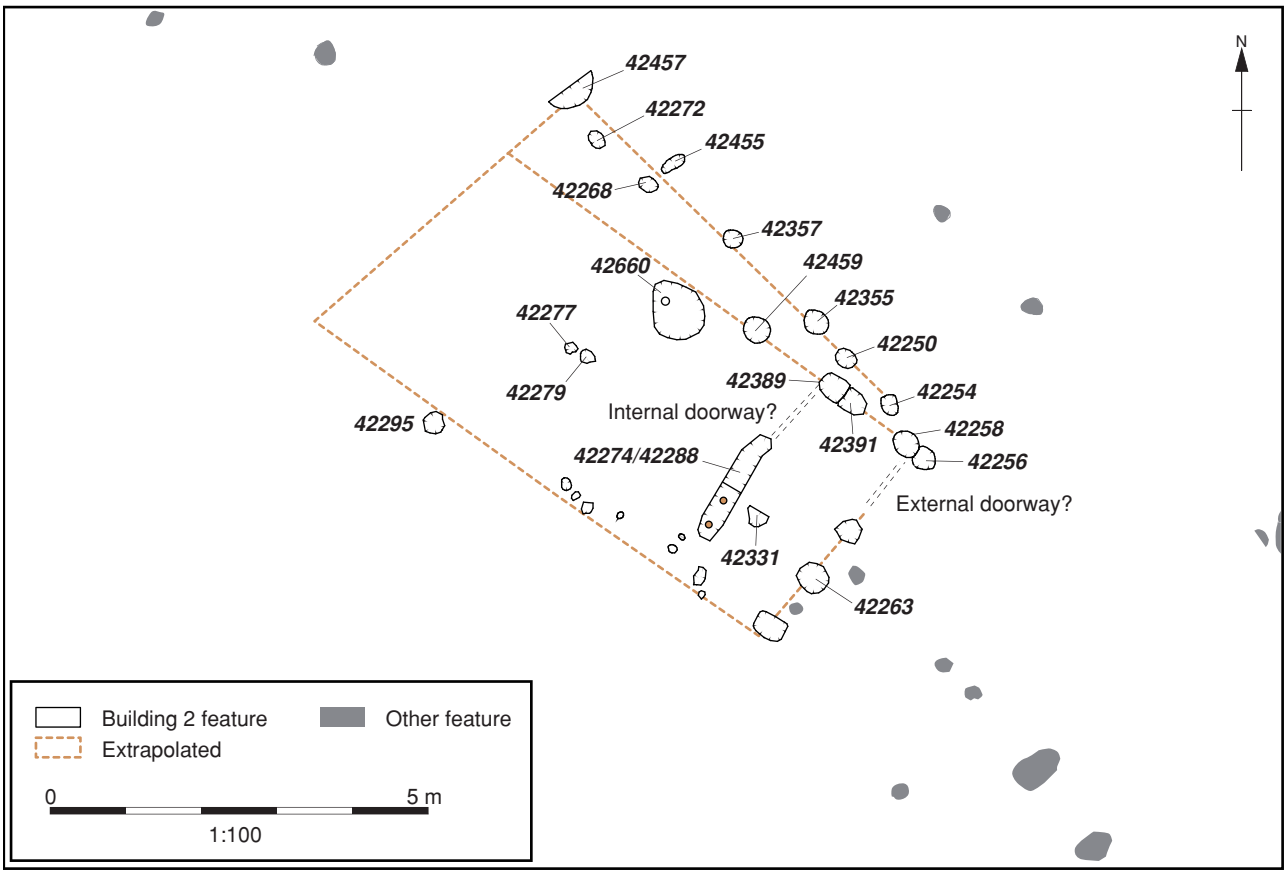


Figure 235: Building 2

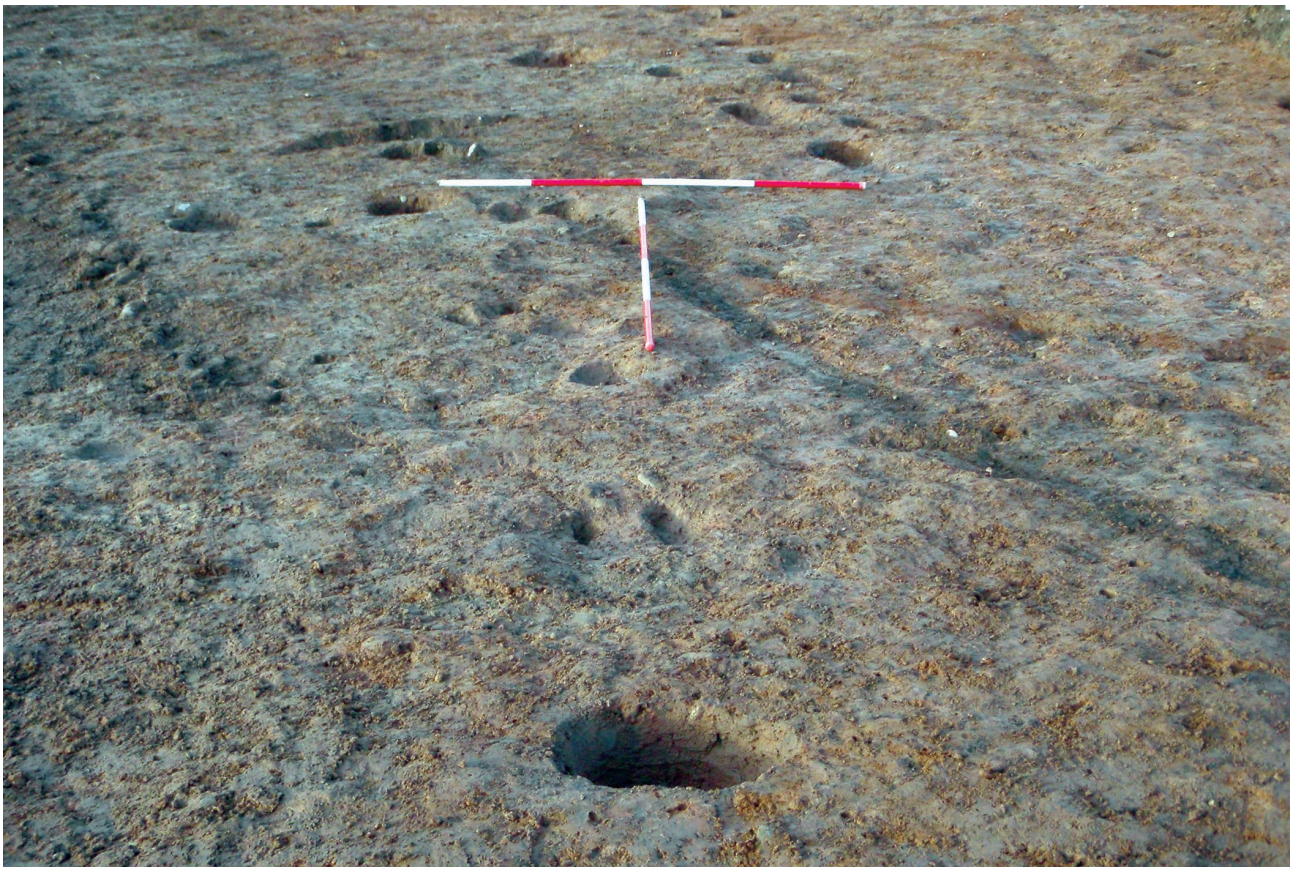


Plate 195: The eastern end of Building 2, looking north-west

Plate 196: Post-pit **42457**, *following half-sectioning, looking north-west*

in section (Pl 196). A gap in the line of postholes in the south-eastern end wall might indicate the position of a *c* 1 m-wide doorway, next to the corner of the building. In contrast, the postholes forming the south-western wall-line were smaller in scale, with diameters that were, in most cases, less than 0.2 m, and it is possible that this reflects a higher degree of disturbance in this area. However, although there was clearly some variation in scale, all of the postholes forming the walls contained deposits of sand and silt. Charred plant remains and charcoal were also recovered from several of the postholes (***42263***, ***42295***, ***42355***, ***42389***, and ***42457***), including alder/hazel and oak charcoal, along with charred grass-family weed seeds.

Significantly, the positions of these postholes indicate that this building was repaired or modified on several occasions and this, in turn, implies that it was occupied for a comparatively extended duration, perhaps several generations. This was clearly evident along the northern side, where two different episodes of refurbishment could be discerned. In this area, the original wall-line was defined by three postholes (***42256***, ***42391***, and ***42459***), one of which (***42391***) had subsequently been replaced by posthole ***42389***. Another later wall-line was orientated at a slightly different angle, which indicates that this phase of refurbishment entailed the complete rebuilding of the north-eastern side of the structure. This was defined by nine postholes (***42258***, ***42254***, ***42250***, ***42355***, ***42357***, ***42455***, ***42268***, ***42272***, and ***42457***), with the largest (***42457***) at the presumed corner of the building (*p 499*).

Several features were also present in the interior, including a gully (***42274***/***42288***), some 0.3 m wide, that had clearly secured a partition wall. This created a *c* 1.3 m-wide cell at the south-eastern end of the building, which appears to have been entered from the rest of the building through a *c* 0.9 m-wide gap adjacent to the northern wall. The gully contained silty sand and, given its date (*below*), a regionally significant assemblage of plant remains and charcoal. The latter (*Appendix 18*) indicated that it was dominated by heather/heath charcoal, with lesser amounts of alder, hazel, alder/hazel, birch, oak, and willow/poplar. Some of the charred plant remains were presumably associated with nearby cultivation, as they included chaff and charred grains, suggesting the cultivation and processing of barley and oats. Charred weed seeds were derived from the grass, wild cabbage, and pea families, and also from sedges and common spike-rush. Two radiocarbon assays from a charred barley grain and a fragment of willow/poplar charcoal within gully fill ***42272*** returned dates of cal AD 770-950 (1183±26 BP; SUERC-42045) and cal AD 690-890 (1227±26 BP; SUERC-42046), which are statistically consistent (Fig 236).

The other features within the building consisted of three small postholes (***42277***, ***42279***, and ***42331***) and a pit (***42260***). Whilst it is possible that the postholes aided in the support of the roof, perhaps creating an aisle, the function of the pit is less clear, though it was perhaps used for storage, and later had been backfilled. It was a comparatively substantial feature, with a diameter of *c* 0.8 m and a depth of *c* 0.4 m, and its position indicates that it was probably contemporary with the rebuilt wall-line on the north-eastern side of the building (*above*). This pit contained two deposits of sandy silt and produced a selection of plant remains and charcoal (*Appendix 18*), the latter being derived from alder, hazel, alder/hazel, oak, willow/poplar, and holly, whilst small amounts of chaff and grain associated with the processing and cultivation of oats and barley was also present. In addition, it contained a fairly large and diverse range of charred weed fruits/seeds, which appear to have been the waste generated from the processing of locally cultivated cereals, and/or plants gathered for other uses.

A radiocarbon date of cal AD 775-985 (1137±23 BP; SUERC-42044) was obtained from a charred oat grain from the primary fill. Although the dated material from this pit and the internal gully to the south (*above*) are statistically consistent (Table 39), with good overall agreement, of the three dates in this group, that from the pit does have a poor agreement value (A=35% (A'c=60.0%)). This may indicate that it was dug at a slightly later date, adding to the suggestion that it was created after the northern side of the building had been rebuilt (*above*).

Immediately to the south-east, another building (Building 3) was again aligned north-west/south-east (Fig 233). Significantly, based on the positioning of its postholes, this could either have pre- or post-dated Building 2, though given its fragmentary remains, it seems likely that it represents an earlier structure.

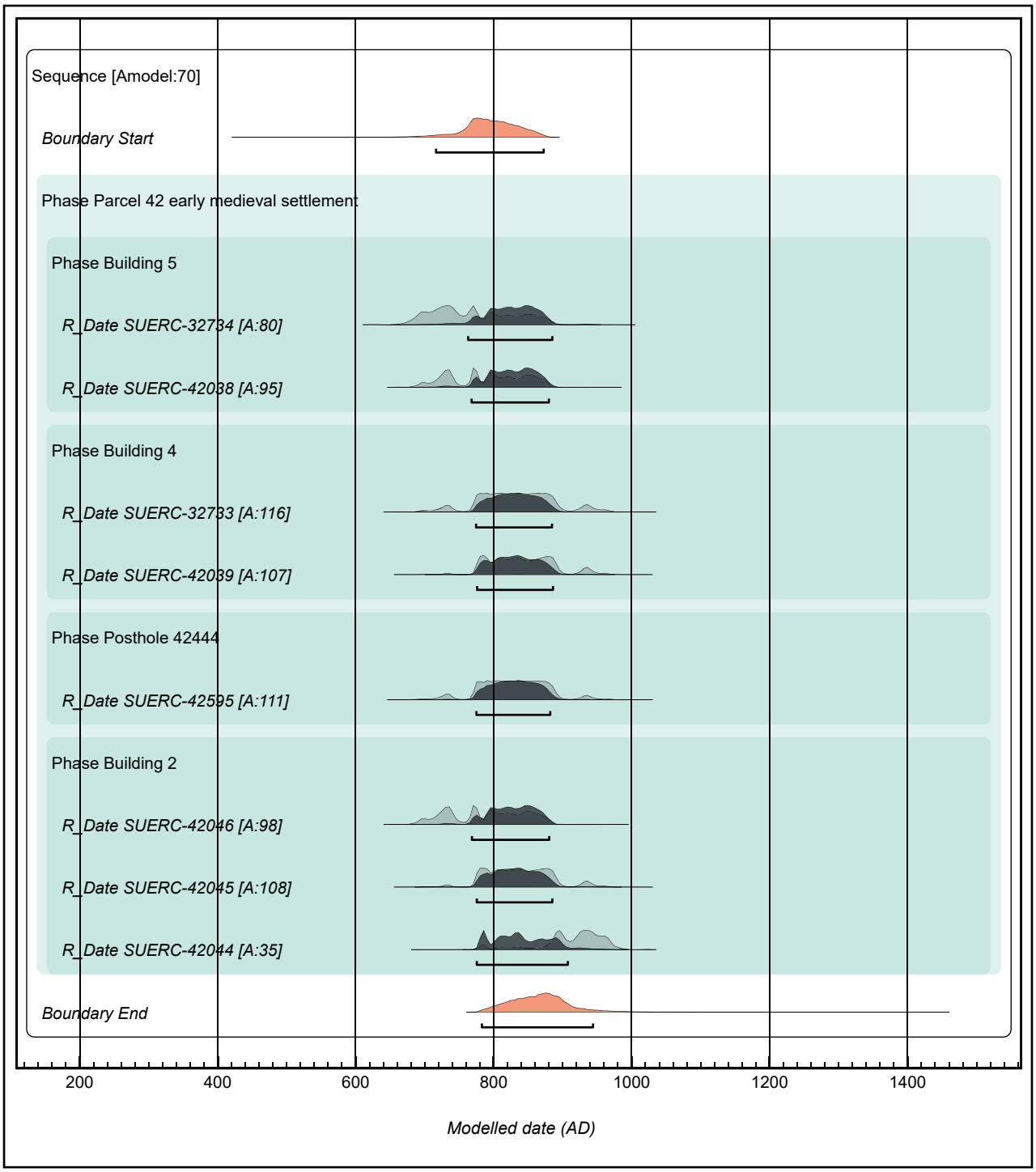


Figure 236: Modelled radiocarbon dates from the early medieval settlement

As only partial remains survived, there is little information regarding its precise form or size, although they appeared to define its north-eastern corner (Fig 237). These comprised a right-angled wall-line which extended for *c* 4.8 m north-west/south-east and 1 m north-east/south-west. This was defined by four postholes, with diameters of *c* 0.25 m and depths no greater than 0.3 m, and two truncated pits, presumably also once holding posts. All contained deposits of silt and sand, and one (***42248***) also contained a charred wheat seed. An additional posthole (***42318***), with a diameter of *c* 0.2 m, was found within the interior, and may have supported its roof.

The two other buildings (4 and 5) lay immediately to the north-east of Buildings 1-3. These were essentially similar in form and construction, though they differed in that they were aligned north-east/south-west and were thus set perpendicular to the watercourse that had originally flowed through the small valley.

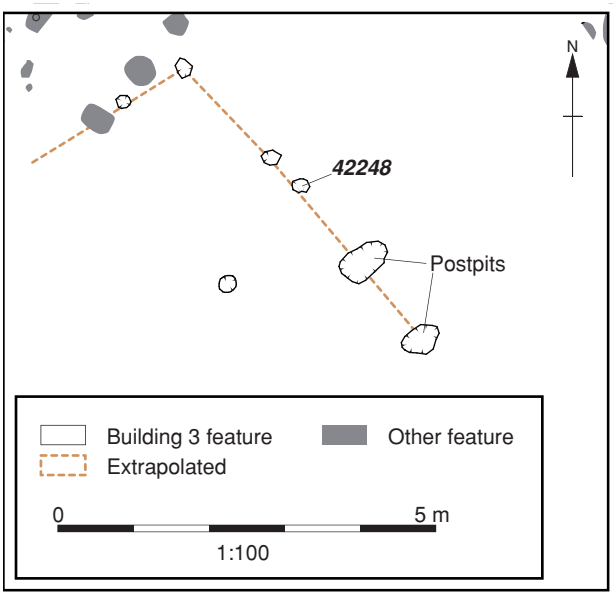


Figure 237: Building 3

The southernmost (Building 5) was *c* 4.2 m wide and, although the north-eastern end was beyond the limits of excavation, it was at least 8.4 m long (Fig 238). Its surviving wall-lines were defined by 31 postholes, and these indicated that the corners of the building were rounded. It also appears that a *c* 0.7 m-wide doorway existed in its south-western gable wall, adjacent to the northern corner. The relationships of certain postholes also indicated that many had been replaced and the wall-lines had clearly been progressively repaired.

The posts defining the south and north sides of the building suggested at least two, perhaps three, phases of replacement or repair, indicating that it had been maintained for a fairly extended period of time. Moreover, it appears that portions of its southern side were probably completely rebuilt. For instance, on this side, two separate wall-lines could be discerned, the earlier defined by a line of six postholes (***42541***, ***42349***, ***42363***, ***42393***, ***42408***, and ***42373***) and the later by a row of eight (***42482***, ***42351***, ***42361***, ***42396***, ***42406***, ***42433***, ***42400***, and ***42353***). Beyond the building's northern side, three additional postholes (***42431***, ***42437***, and ***42447***) were set some 0.5 m from, and parallel with, the wall-line; these probably formed further elements, rather than being part of an earlier or later wall, it being quite possible that they supported angled posts (raking timbers) which buttressed, and thus supported, the wall defining this side of the building. This technique seems relatively common and has been noted at other early medieval sites, such as at Thirlings in Northumberland (O'Brien and Miket 1991).

The majority of the postholes associated with Building 5 were sub-circular in form, with diameters ranging between 0.2 m and 0.5 m, and with depths not exceeding 0.3 m, although several had a rectangular plan, measuring *c* 0.3 x 0.6 m, and with average depths of *c* 0.2 m. All contained silt and sand, and many also oak and alder/hazel charcoal, and charred weed seeds, largely from the grass family, as well as charred barley and oat grains that probably derive from cultivation in the vicinity of the settlement (*Appendix 18*). A sample of carbonised twigs and a charred grass-family seed, from a posthole (***42502***) in its south-western wall, returned statistically consistent dates of cal AD 690-885 (1227±23 BP; SUERC-42038) and cal AD 680-890 (1240±35 BP; SUERC-32734; Table 39; Fig 236).

The most northerly of these buildings (4; Fig 239) was *c* 3.7 m wide and at least 9.1 m long, though the remains of its wall-lines were fragmentary and incomplete. Its north-western side was defined by nine shallow postholes, which were either sub-circular or rectangular in plan, each some 0.3 x 0.3 m, which all contained deposits of sand and silt. There was also some evidence for repair, as one of the posts (posthole ***42410***) had been replaced by a post set in posthole ***42412***. It is also possible that a small post in an adjacent posthole (***42423***) provided additional support for this repaired section of walling.

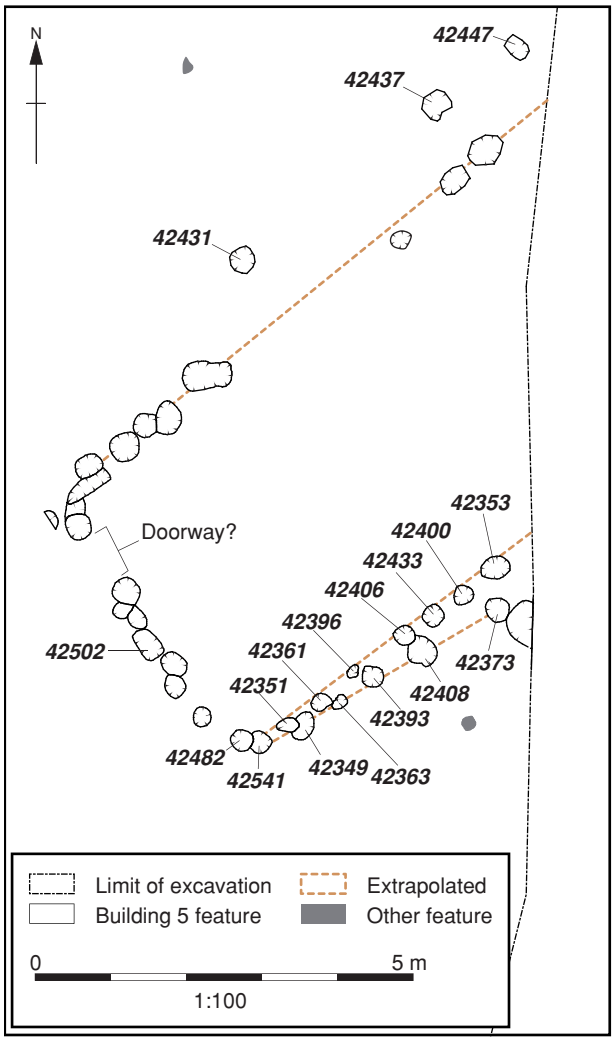


Figure 238: Building 5

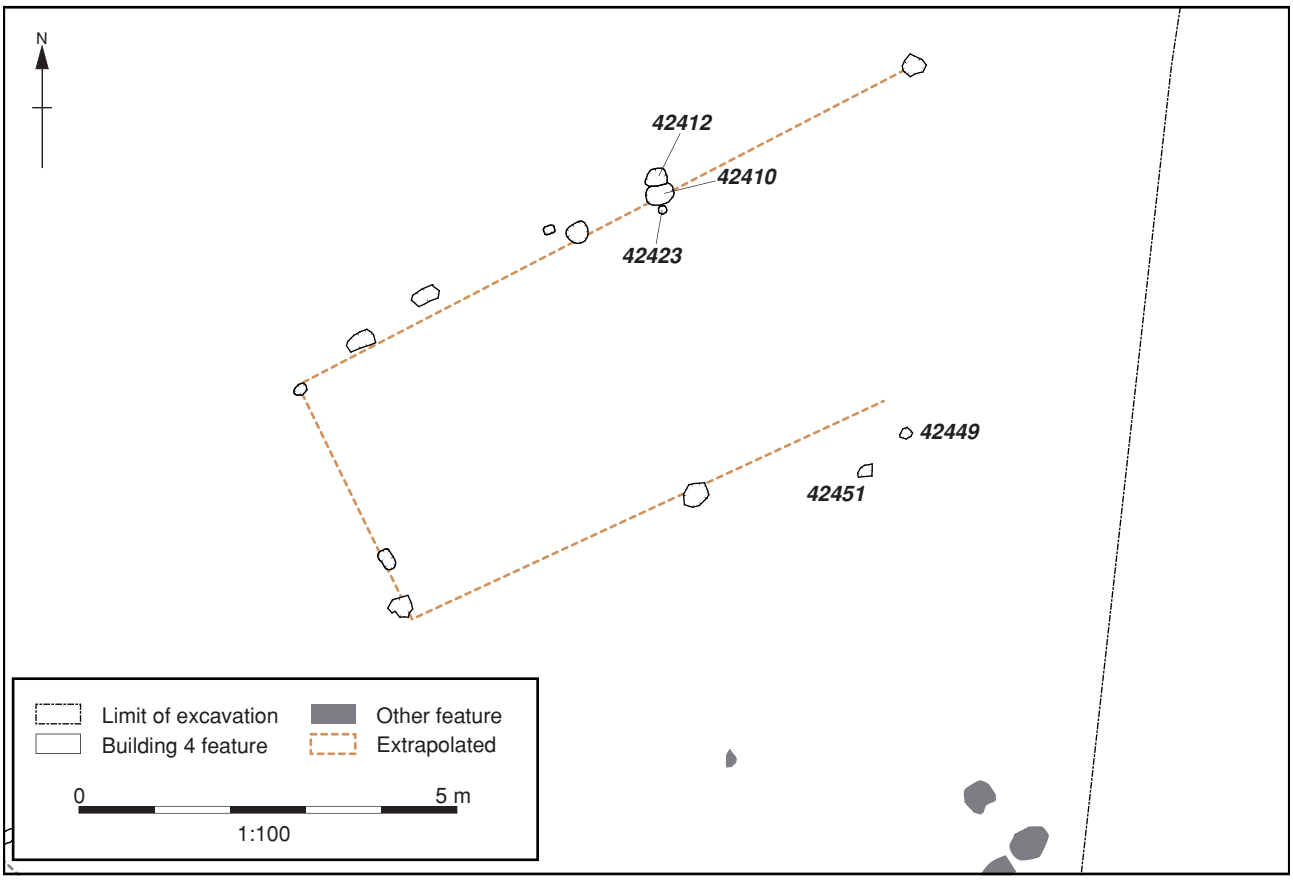


Figure 239: Building 4

Posthole ***42410*** contained oak and alder/hazel charcoal, as well as weed seeds, and two charcoal fragments from this feature returned statistically consistent dates of cal AD 710-970 (1190±35 BP; SUERC-32733) and cal AD 770-950 (1178±25 BP; SUERC-42039; Table 39). Five other postholes formed elements of the building's

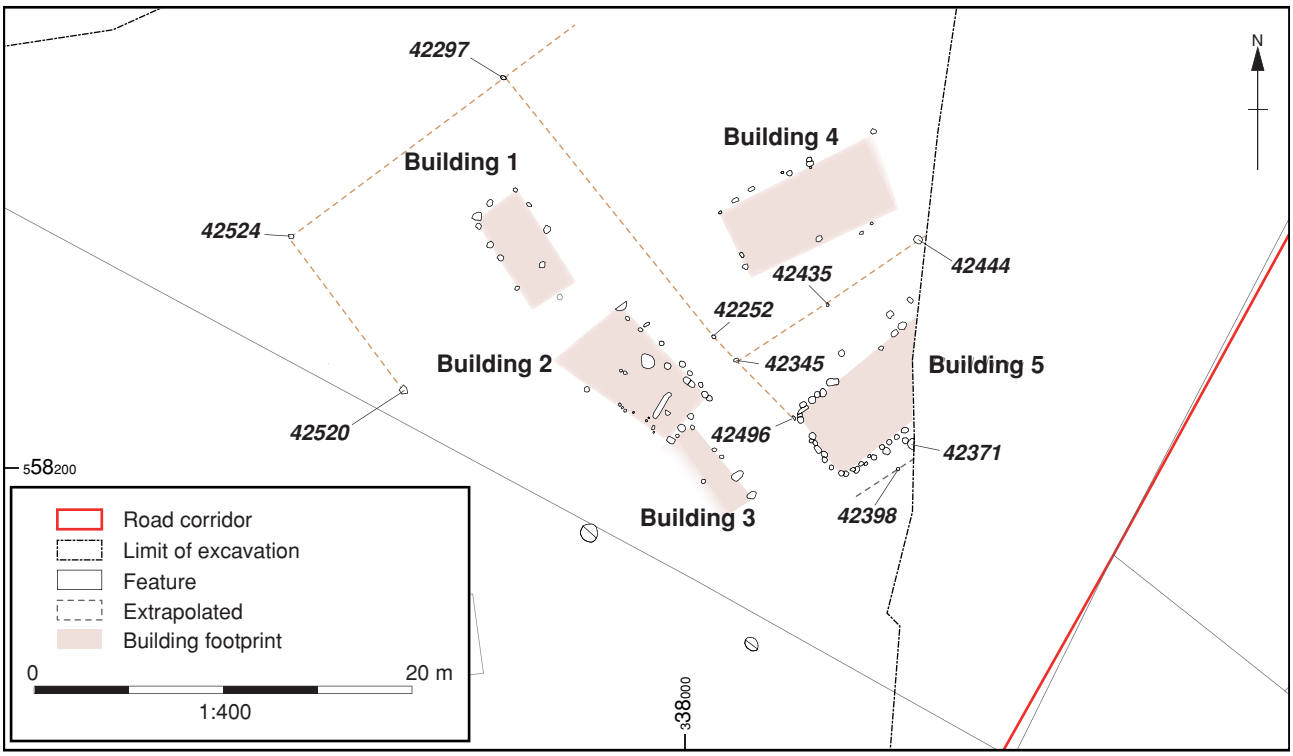


Figure 240: Possible early medieval fencelines

south-western and south-eastern wall-lines, and this limited number, when compared with the adjacent wall-line and the other buildings in the settlement, suggests that many of the postholes originally associated had been destroyed by later activity. The five remaining postholes were comparable in size and form to those defining the north-western side, and again were filled with sand and silt. It is also possible that two (***42449*** and ***42451***), based on their positioning, had been for external raking timbers, designed to provide the south-eastern wall-line with additional support.

Apart from these five early medieval buildings, several pits and postholes were located within and close to the settlement area (Fig 240). Several were within a triangular area sandwiched between Buildings 2, 4, and 5, consisting of three small postholes (***42252***, ***42345***, and ***42496***), which seemingly formed a fenceline parallel with Buildings 2 and 3, that also abutted the north-western corner of Building 5. This appears to represent a boundary that separated areas associated with those buildings aligned north-west/south-east and those at right-angles. To the north-east were two further postholes (***42435*** and ***42444***), and these again may have formed elements of a fenceline parallel with Buildings 4 and 5, also designed to divide them. The larger of the postholes (***42444***) was *c* 0.45 m in diameter and 0.35 m deep, and contained two deposits of sandy silt, packing stones, and also a small assemblage of plant remains. These included oak and alder/hazel charcoal, charred barley, oat, and wheat grains, as well as charred grass seeds. Radiocarbon assays of one of the barley grains, and also the single wheat grain from the lower fill of this feature, provided firstly a date of cal AD 720-940 (1194±29 BP; SUERC-42595) for the barley grain, consistent with the occupation of the adjacent buildings. However, the wheat grain returned a much later date of cal AD 1635-1955 (236±25 BP; SUERC-42040), suggesting that it was intrusive.

A posthole (***42398***) and pit (***42371***) were close to the south-eastern side of Building 5. It is possible that the posthole formed part of a fenceline, perhaps parallel with this building. The function of the pit is less clear, though it contained plant remains which included oak and alder/hazel charcoal, and charred barley and oat grains, as well as grass seeds.

Other associated features included three postholes (***42520***, ***42524***, and ***42297***), one of which (***42524***) contained alder/hazel charcoal. One possibility is that these formed elements of a right-angled fenceline, following the alignment of the early medieval buildings, defining the outer boundary of the settlement. If this was the case, this was *c* 8 m distant from the south-western side of Building 1 and *c* 5 m from this building's north-western end. The enclosed area within was perhaps subdivided by the fenceline that was parallel with Buildings 2 and 3.

A final feature that might tentatively belong to the early medieval period was a routeway in the southern half of Parcel 42 (Fig 241). The remains of a ditched

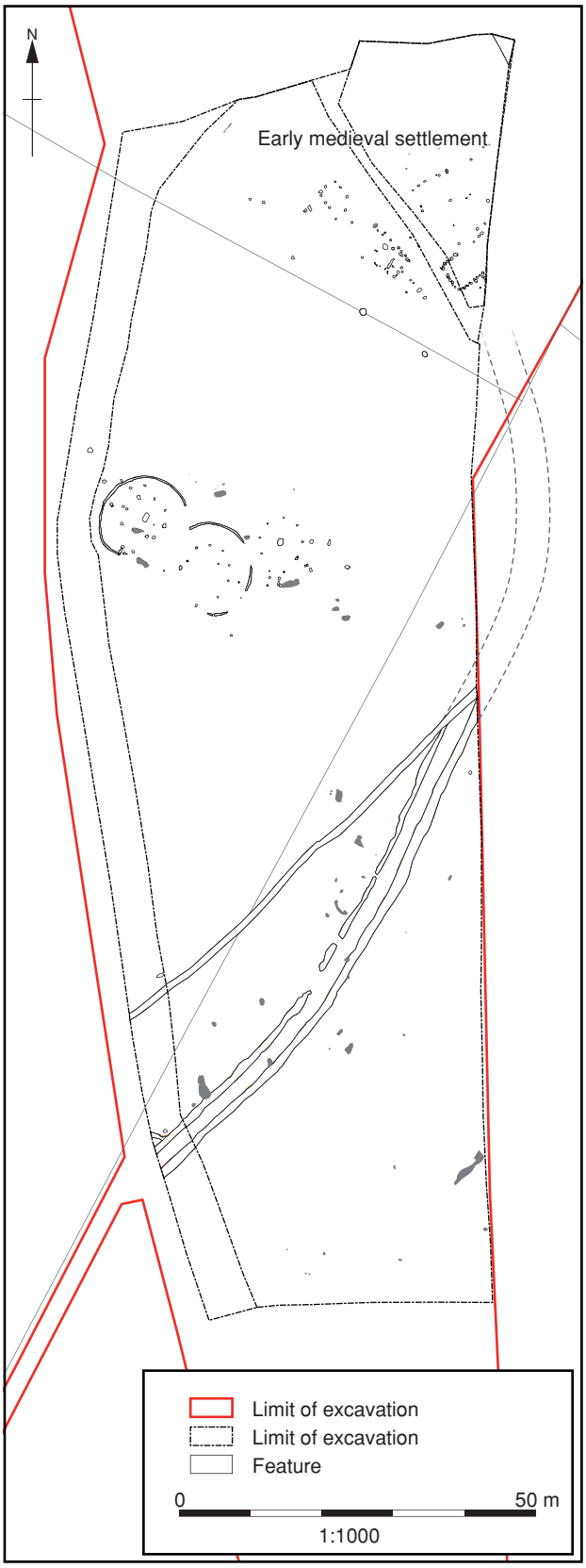


Figure 241: The possible early routeway serving the Parcel 42 early medieval settlement

trackway were uncovered and, whilst these ditches were of post-medieval date (*p 526*), it is possible that they followed an earlier route leading directly to the early settlement.

Stainton West beads

At Stainton West, although no features or deposits were present that could be dated to the early medieval period, two small and irregular annular glass beads were recovered (Pl 197). These could be dated to the early medieval period (Guido 1978), although they represent a long-lived artefact type, in use from the late Iron Age into the period. These were intrusive within late Mesolithic deposits.

Plate 197: Late Iron Age to early medieval beads from Stainton West

Parcel 21 North

Slight evidence for early medieval activity was present in Parcel 21 North, to the south of the River Eden. This consisted of a charred barley grain from a posthole associated with a possible structure dating to the last centuries of the third millennium BC (*Ch 11, p 407*; ***21390***). This grain returned a date of cal AD 760-940 (1186±25 BP; SUERC-42035; Table 40). No other features dating to this period were identified in this area, though presumably it witnessed some form of activity, which was broadly contemporary with the settlement in Parcel 42 to the north-east.

Parcel 32: early/later medieval boundaries

During the course of the project, several features were identified which appear to relate to occupation dating to the late tenth- to fourteenth century. Historically, this was a dynamic period, at least in terms of the region's political and social architecture, with changing political dominance up until the settlement of the border between England and Scotland in 1237, though at the end of the thirteenth century, the Scottish War of Independence brought renewed turmoil (*p 495*).

The tenth- to fourteenth-century remains were principally confined to Parcel 32 (Fig 242), which covered two fields some 430 m north of Stainton. Significantly, this parcel was traversed by several linear cropmarks, which appear to have formed the vestiges of enclosures/ditched fields associated with a possible medieval settlement (*p 496*), also visible as cropmarks, *c* 140 m to the east of this site. On the evidence of place-names, this might tentatively have its genesis in the tenth century and be a product of Northumbrian/Viking-influenced settlement close to the mouth of the Eden (*pp 492-3*).

Site	Context	Comment	Laboratory code	Material	Bulk sample	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal AD	χ^2 test
Parcel 21 North *House 3*	Posthole ***21390*** (fill ***21392***)	Late third millennium cal BC feature containing intrusive charcoal	SUERC-42035	Charred barley (*Hordeum* sp) grain	21038	1186±25	-23.9	760-940	-
Parcel 32	Ditch ***32014*** (fill ***32032***)	-	SUERC-32725	Charred grass-family (Poaceae) seed	32008	995±35	-23.1	980-1160	-
Henge monument	Ditch ***200108*** (fill ***200106***)	-	SUERC-37828	Hazel (*Corylus avellana*) charcoal	250001	905±35	-27.6	1030-1210	Statistically inconsistent with poor agreement (T'= 43.49; T' (5%)= 3.8; υ= 1; A_{comb}= 0.0% (An= 50.0%)
		-	SUERC-37827	Charred wheat (*Triticum* sp) grain	250001	560±35	-22.5	1300-1440	

Table 40: Early medieval and medieval radiocarbon dates from Parcels 21 North, 32, and the henge monument

The medieval remains comprised two parallel ditches (***32014*** and ***32154***), set *c* 143 m apart, aligned north-west/south-east. The southernmost (***32154***) was the more substantial feature, with a maximum width of 3.5 m and depth of 0.8 m. Excavation indicated that it had been actively maintained as a boundary, as it was apparent that following its initial silting it was subsequently recut, on at least one occasion (Fig 243).

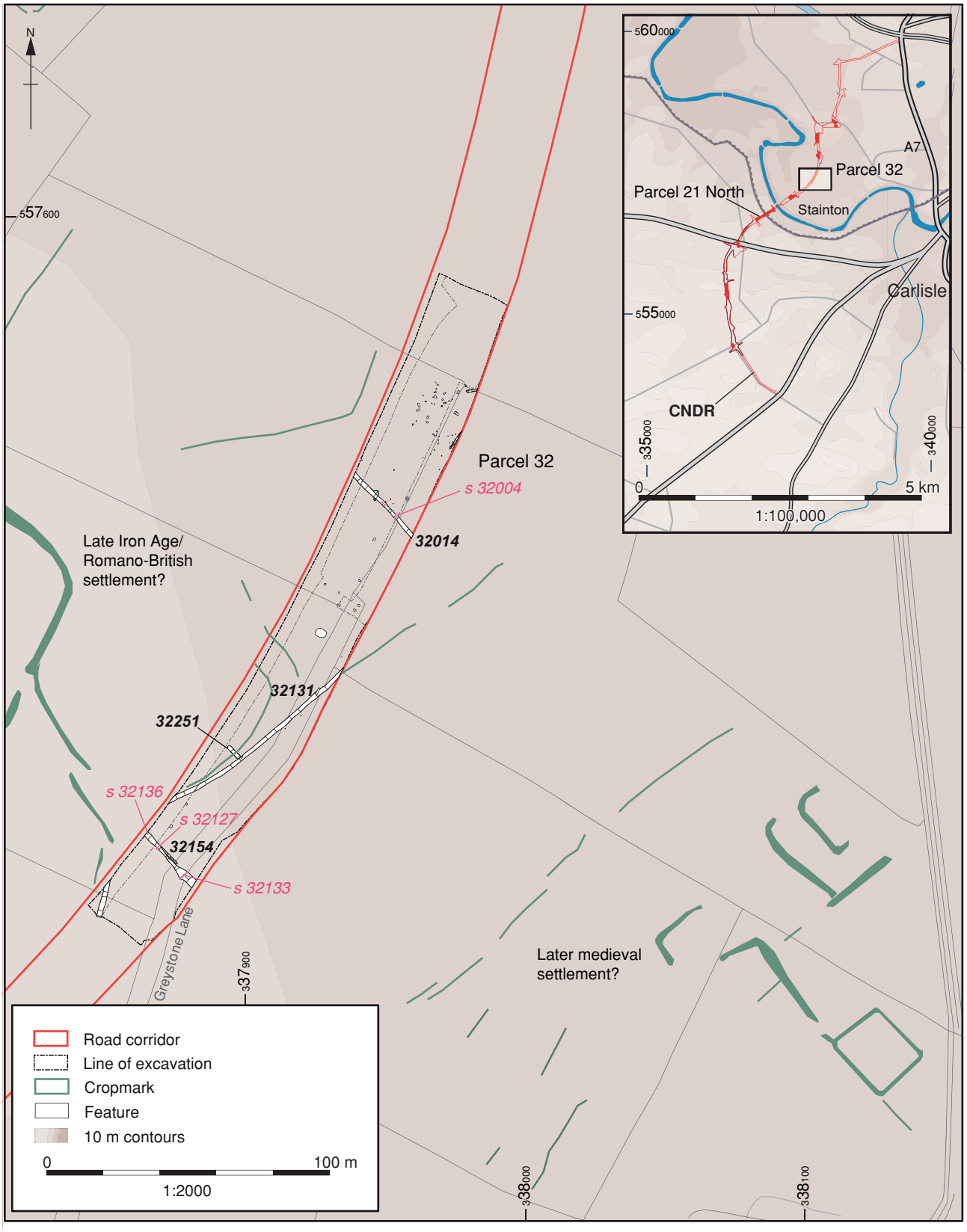


Figure 242: Parcel 32, and a transcription of the cropmarks close to Stainton, possibly relating to a later medieval settlement
(Contains OS OpenData © Crown Copyright [and database right] (2022))

This recut also contained silt, from which four sherds of Romano-British pottery were retrieved (*Appendix 11*), although these are probably residual, perhaps reflecting activity associated with a late Iron Age/Romano-British rectilinear enclosure to the west (*Ch 13, p 447*).

The northernmost ditch (***32014***; Pl 198) had a maximum width of 1.7 m and depth of 0.5 m, and, in a similar manner to its counterpart, it had been recut following an initial period of silting. It again contained a single, presumably residual, sherd of Romano-British pottery (*Appendix 11*), but the medieval date of this feature was confirmed by a charred grass seed within the basal fill, which returned a radiocarbon date of cal AD 980-1160 (995±35 BP; SUERC-32725; Table 40). Additional dating evidence was also provided by sherds of medieval pottery, of twelfth- to fourteenth-century date, from

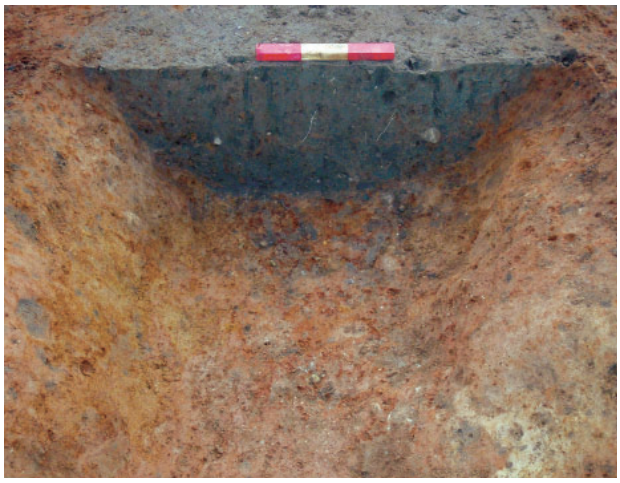


Plate 198: Ditch **32014**, *following partial excavation, looking south-east*

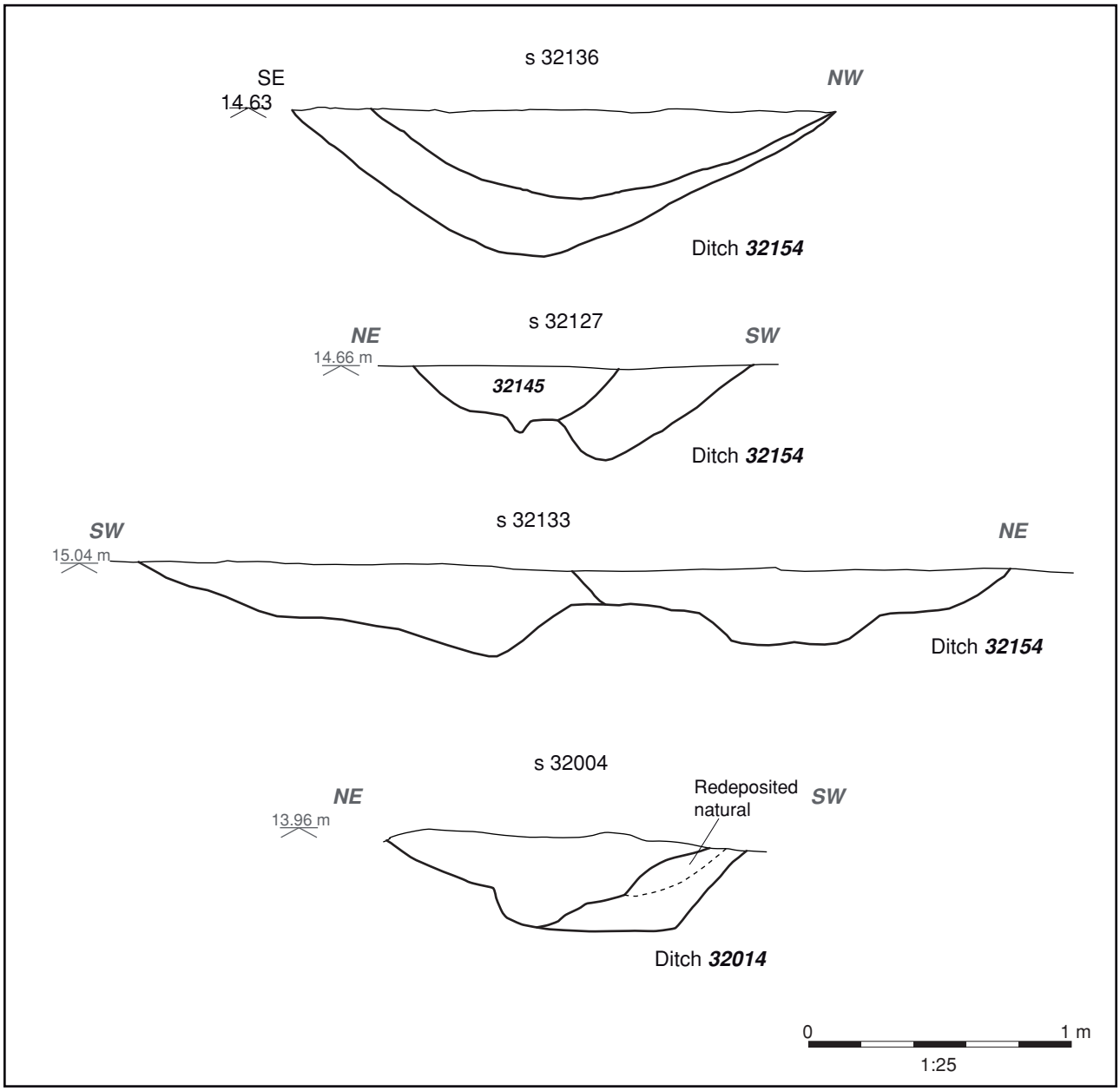


Figure 243: Sections across ditches **32154** *and* **32014**

the secondary fill, implying that the recut ditch was filling during this period (*Appendix 11*). Apart from the artefacts, it also contained a small assemblage of charred plant remains, which allow some insight into the types of crops cultivated within, or adjacent to, this system of fields/enclosures. These included charred oat and barley grains, and a probable bread-type wheat grain. Significantly, this latter grain derives from a type of free-threshing wheat, which, due to its higher yield, became the dominant variety grown during the medieval period (Carruthers 2010a; 2010b).

A third possible medieval ditch (***32131***; Pl 199) was also uncovered between, and perpendicular to, ditches ***32014*** and ***32154***. This was aligned north-east/south-west and was also visible as a cropmark, demonstrating that it extended for a distance of at least 75 m to the north-east of Parcel 32 and formed a principal boundary within the medieval system of fields/enclosures. It was up to 1.8 m wide and 0.7 m deep and contained several deposits indicating that it had gradually filled with sandy silt. Pollen from a soil monolith demonstrated that it was situated within a landscape which was largely given over to grassland, with a potential for grazing and arable use (*Appendix 16*). Other potential resources seemingly exploited included hazel, for coppicing, alder/hazel/birch, for building work, as well as heather, which has a variety of potential uses (*cf* Dickson and Dickson 2000; Milliken and Bridgewater 2004). Cereal pollen was also identified, confirming the evidence of the charred plant remains in ditch ***32014*** (*above*), in that it indicated that the cultivation of oats/wheat and barley occurred within, or close to, the site.

Plate 199: Ditch **32131**, *looking north-east*

A further short ditch (***32251***) was contemporary with ditch ***32131***, abutting its northern side. It was *c* 5.9 x 15 m and *c* 0.25 m deep, and presumably formed part of the medieval land allotment. Other evidence for medieval activity in the general vicinity of Stainton included two sherds of medieval pottery from the Stainton West site (*Appendix 11*). These probably date to the later twelfth or thirteenth century and were perhaps deposited during agricultural activity close to the River Eden.

The use and degradation of earlier monuments

The only other evidence for medieval activity on the CNDR was confined to deposits contained within earlier features, indicating that during the medieval period certain earlier earthworks were reused, or infilled and perhaps levelled as a result of medieval ploughing and cultivation. Some evidence for this process was recovered from the ditch (***200108***; Fig 244) of the probable later Neolithic henge (*Ch 10, p 323*), examined as part of the watching brief. Two deposits were apparent within this ditch, one primary, perhaps derived from the eroding bank of the monument, and associated with residual charcoal dating to the ninth millennium cal BC (*Ch 3, p 64*). This was sealed by a secondary fill (***200106***), which probably accumulated during the medieval period as a result of nearby cultivation. This contained a charred wheat grain and a fragment of hazel charcoal, which returned radiocarbon dates of cal AD 1300-1440 (560±35 BP: SUERC-37827) and cal AD 1030-1210 (905±35 BP; SUERC-37828). These are not statistically consistent (Table 40) and suggest that the ditch gradually filled between the mid-eleventh and early fifteenth centuries. Pollen from a monolith from this fill indicates that the landscape surrounding the earlier monument had been cleared and contained arable areas where cereal cultivation was undertaken, but also open and waste places.

The section of the Vallum ditch at Knockupworth Farm (*Ch 13, p 463*) also contained potential evidence of medieval activity, since it was evident that the earthwork had been used as a track or droveway following its partial filling, perhaps associated with the movement of livestock. A precise date for this could not be discerned, however, and, whilst it may have formed an element of the post-Roman landscape, it is equally possible that it relates to late Roman activity.

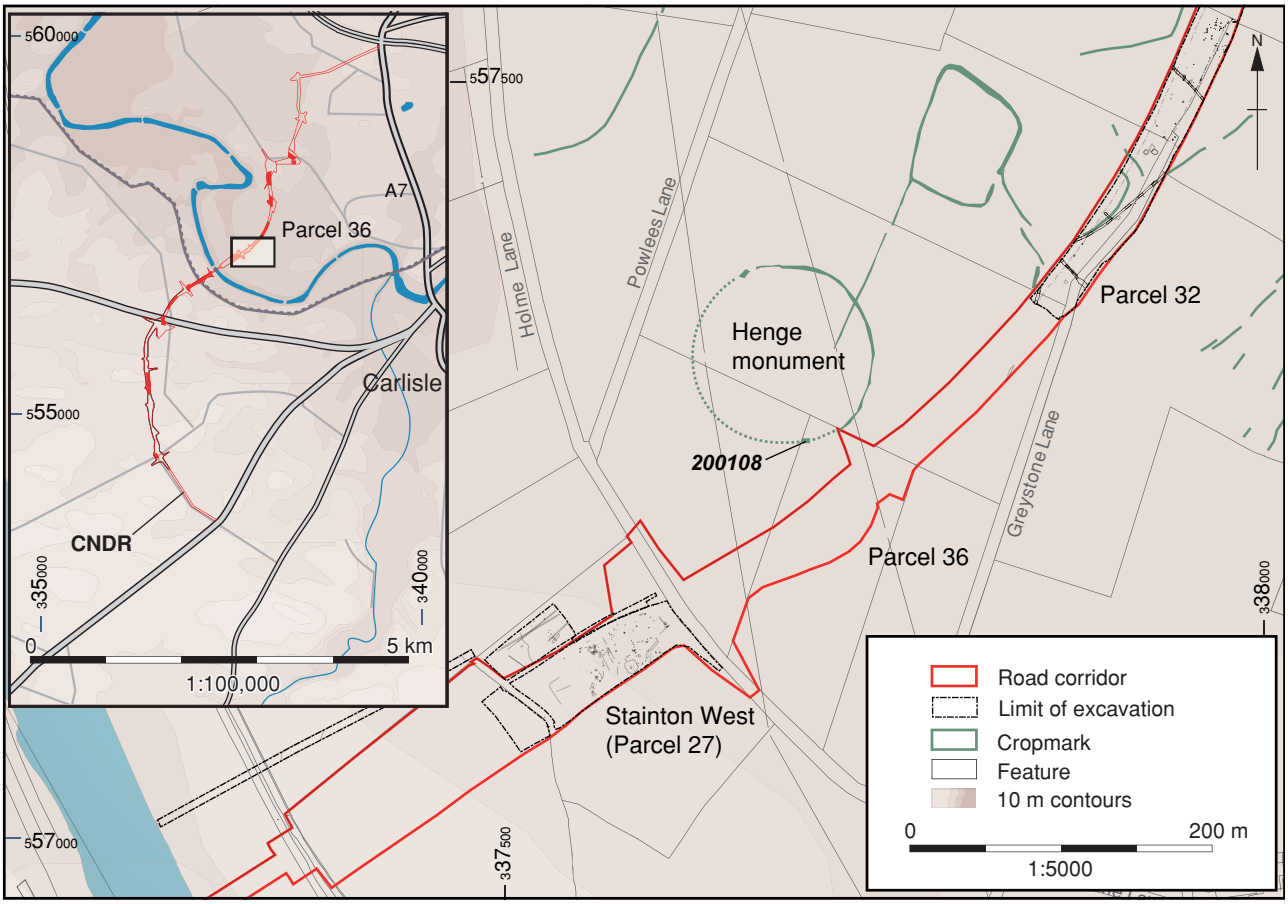


Figure 244: The henge ditch containing medieval-period deposits (Contains OS OpenData © Crown Copyright [and database right] (2022))

Discussion: Early Medieval Settlement

By far the most significant results brought to light by excavation along the CNDR in terms of later material relate to the early medieval settlement in Parcel 42. The dating evidence suggests that this was occupied at some point between the eighth and earlier tenth century (*p 496*).

The buildings

The settlement contained five timber buildings and, based on their spatial positioning and dating evidence, it appears that four were contemporaneous (Buildings 1, 2, 4, and 5). Another building (3) was seemingly earlier, perhaps representing the predecessor of Building 2. It is unclear, however, whether this structure originally stood in isolation, later to be replaced during a possible phase of settlement expansion, or whether Buildings 1, 4, and 5 existed from the outset, and Building 3 was replaced after a comparatively short period of time by Building 2.

Whatever the case, these five buildings shared some basic similarities. For instance, all had a rectangular ground plan and their external wall-lines were constructed using earthfast posts, set within individual postholes, which in two of the buildings (2 and 5) were closely spaced. It is also evident that one (Building 5) had slightly rounded corners, though this is not an unusual feature of early medieval buildings, as many had hipped ends (*cf* James *et al* 1984). The close spacing of the posts also provides some indication as to the form of the external walling employed.

In the Solway area, during the later medieval and post-medieval periods, a building tradition using 'clay dabbins' was common, whereby solid walls, built of clay and straw, supported by cruck frames, were used in the construction of many vernacular buildings (*cf* Jennings 2003; Brunskill 1962). This solid-wall technique normally resulted in a ground plan typified by widely spaced postholes/post-pads, marking the positions of cruck blades or other roof supports (*p 511*), as seen in other early medieval buildings in Cumbria (*eg* Heawood and Howard-Davis 2002). In contrast, it is likely that wattle panels were attached to the closely spaced wall posts in these Parcel 42 buildings (*cf* Mills 1999). In line with later vernacular building traditions in southern Scotland, the wattle panels might then have been covered with daub, perhaps formed of loamy subsoil that had been mixed with a large quantity of chopped straw (*cf* Walker 2006, 184).

The wall posts would also have supported the main load of the roofs of the Parcel 42 buildings, a common design feature of other early medieval buildings (*cf* James *et al* 1984, 194). Indeed, this was confirmed, in some measure, at Buildings 4 and 5, the designs of which appear to have included buttresses, or external raking timbers, probably in the form of angled posts, which may well have provided additional support to the main wall posts, to assist in carrying the roof load. Based on theoretical reconstructions of early medieval architecture, and also later regional vernacular building traditions, one possibility is that some (if not all) of the Parcel 42 buildings employed light cruck blades, which assisted in supporting the roof (*op cit*, figs 7 and 8; Jennings 2003). This technique was widely used in northern England (Jennings 2003) and Scotland, where the blades are termed 'Celtic couples', 'formed using two curved principal rafters (*syles*) linked by three horizontal timbers known as (from bottom to top) the *jest* (joist), the *balk* or *bauk* (baulk) and the *wee-bauk* (small baulk)' (Walker 2006, 184; Fig 245). It has further been suggested that, with early medieval buildings, these elements were probably lashed together using rawhide or rope and that 'the *pans* (purlins) rest on the external intersection between the curved principal (*syle*) and the collars. The lowest of the purlins at each side of the roof is likely to have been utilised to provide a head restraint for the wall-posts' (*ibid*).

Archaeologically, the presence of cruck blades would be visible as matched postholes on a building's wall-lines, and such matching postholes are readily apparent in the footprints of Buildings 1, 4, and 5. If crucks were employed, gable posts and also internal posts may have provided additional support, and, significantly, both of these features appear to be associated with Building 1, whilst internal reinforcements were present in Building 2, which may lend support for the use of light cruck blades with wall plate and tie beams. However, an alternative possibility, perhaps more so in the case of Building 2, is that the buildings' wall posts supported tie beams and wall plates without the need for crucks, which in turn supported their roofs (*cf* Dixon 2002, 97).

Although there is no direct evidence for the form of the roof of each building, they were presumably covered by thatch, perhaps held down by ropes, or even covered by turf, both techniques being known historically from Cumbria (Jennings 2003, 110-18; Lowe 2006, 61). Alternatively, in line with later vernacular traditions in Cumbria and south-west Scotland, it is possible that the roofs may have been covered with both turf and thatch (Jennings 2003, 111). This form of roofing is known as staple thatching and is characterised by the use of overlapping turf slabs laid on timber rafters, grass-side down, which were then covered by bunches of straw (the staples) that were inserted into the turf (*ibid*). Given the probable use of thatch, in some capacity, it is interesting to note that several of the buildings at Site 42 produced abundant grass and sedge stems and culm nodes, which were perhaps derived from such thatched roofs (*Appendix 18*).

The various smaller rectangular buildings (Buildings 1-3) were all aligned north-west/south-east, and were fairly equally spaced. Buildings 1 and 2 had the more complete ground plans, measuring *c* 6.2 x 3 m and 6.9 x 3.5 m respectively, and thus possessed a length to width ratio of approximately 2:1. Significantly, this two-square model seems characteristic of early medieval buildings, certainly in an Anglo-Saxon context, as it appears to have been widely used across southern, eastern, and central England, though it is also known in Roman and later medieval buildings (James *et al* 1984; Marshall and Marshall 1991; Fernie 1991). This style generally had doors in the centre of a long wall, and may have been provided with an additional doorway at one end (James *et al* 1984, 187-8). Although, for Buildings 1 and 2, the positions of doorways are difficult to determine, it is possible that Building 2's south-eastern gable contained a *c* 1 m-wide doorway at the corner of the building.

Although it is not possible to ascertain the original dimensions and form of Building 3, Buildings 4 and 5 were clearly the largest in the excavated settlement, with widths of 3.7 m and 4.2 m respectively. Based on the two-square model, Building 5 would be expected to have been 8.4 m in length, equating exactly with the postulated length of the building derived from the surviving postholes along its north-western side. In addition, it is possible that the south-western gable contained a narrow, 0.7 m-wide, doorway, close to its north-western corner, therefore being similar in design to Building 2 (*above*).

In contrast, the postholes along the north-western side of Building 4 extended for a length of 9.1 m, indicating that this had a different width to length ratio. This might have followed a three-square model, as was sometimes employed in early medieval buildings, though far less frequently than the two-square model (*cf* Marshall and Marshall 1991, 41). If this were the case, this building would have had an original length of 13.2 m, which is certainly feasible, as early medieval timber buildings generally range from 3.5 m to 14 m long (*op cit*, 37). Indeed, in Britain, only a few buildings exceeded 14 m in length, such as those at the royal site of Yeavering, Northumbria, Springfield Lyons, Essex, Cowdery's Down, Hampshire, and closer to the CNDR, in Dumfriesshire, timber halls from Kirkconnel and Lockerbie Academy, and several timber barns and buildings at Hoddom (Hope-Taylor 1977; Tyler and Major 2005; Millett and James 1983; Clough and Laing 1969; Kirby 2011; Lowe 2006).

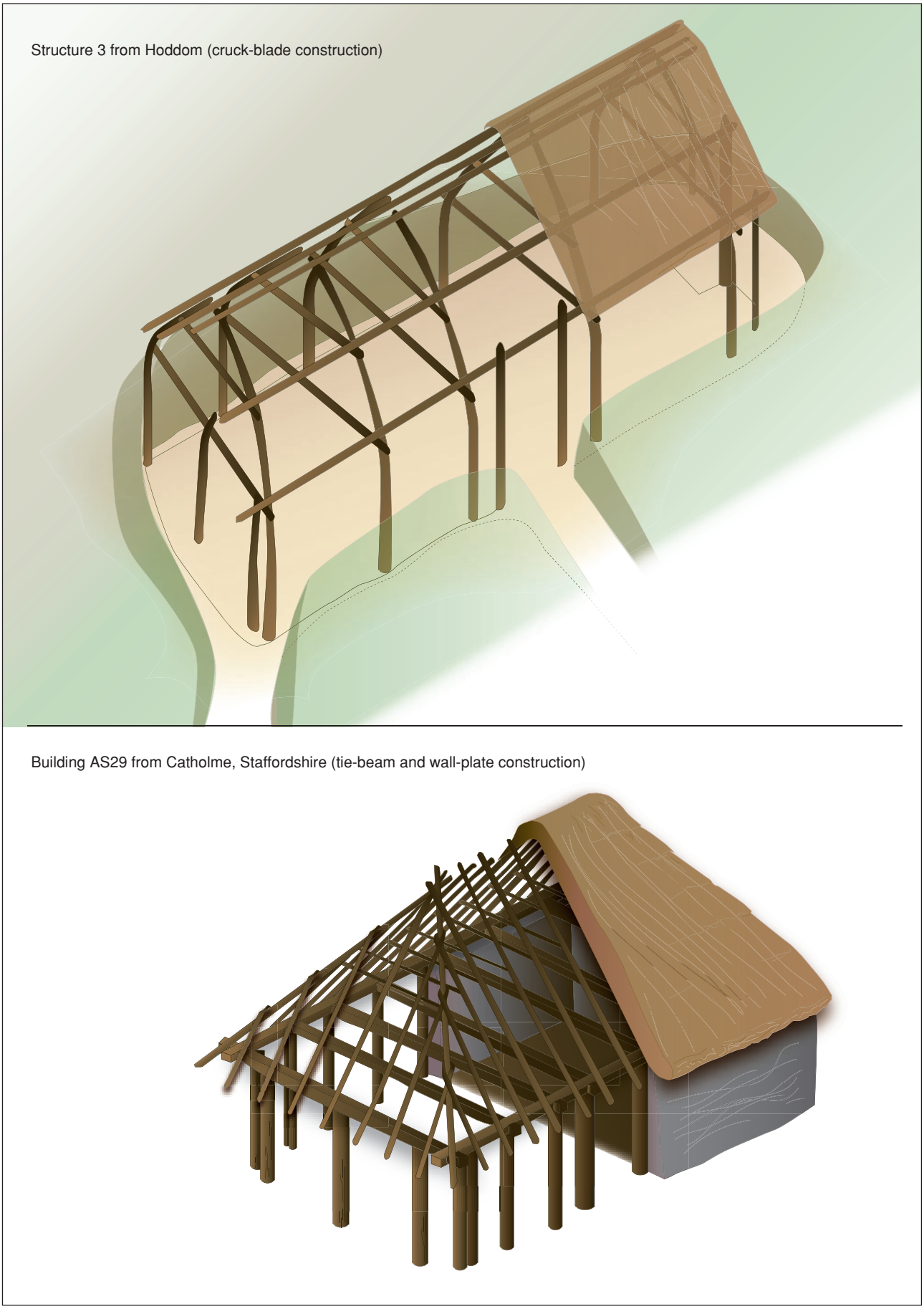


Figure 245: Different building techniques used in early medieval buildings

Another aspect of the Parcel 42 buildings worthy of comment is that three (Buildings 2, 4, and 5) had been repaired, perhaps indicating that they were significant structures that were thought worthy of use over a fairly extended length of time. This process of repair is most striking in Buildings 2 and 5, as the original walls appear to have been repaired and partly replaced, implying that a concerted investment was made towards the upkeep of these structures. This process of repair was obviously essential if these buildings were to survive, as a timber post within an earthfast setting would have been susceptible to damp and would have eventually rotted. This, in turn, would have resulted in the collapse of the structure if the affected posts were not replaced.

Although determining how long the original posts might have lasted in these buildings is impossible, estimates have been given for the duration of other early medieval buildings in the wider region. For example, at the early medieval site at Whithorn, along the coast of Galloway to the west, it has been suggested that the earthfast timbers began to rot after about 30 years, and their bases were subsequently cut away and supported by stones that were slid beneath them (Hill 1997, 139, 165-6). However, it has also been argued that the posts in other early medieval houses, such as those at Buiston Crannog, would have needed replacing every 5-17 years (Crone 2000). Closer to the CNDR, the Roman buildings in the fort at Carlisle demonstrated that the species of timber used was important for longevity: the alder first used was failing after about ten years, being replaced by oak, which had a much longer lifespan (Zant 2009b). It may be that Building 4 was in use for anything up to 20 years, whilst the potential three phases of repair/replacement in Buildings 2 and 5 may tentatively suggest a 60-year plus lifespan for each.

There is little evidence for the internal layout and function of the Parcel 42 buildings, although it is likely that they were designed with specific functions in mind as, given their relatively small size and the clear absence of a cross-passage, they were probably not multifunctional (*ie* housing both people and animals), as was the case with later longhouses in the Solway area (*cf* Jennings 2003, 33). Given this, presumably one, or more, of the buildings may have been for domestic purposes, whilst agricultural buildings were probably also present, presumably next to the dwellings. The lack of internal features associated with domestic occupation, such as heaths or artefacts, was probably a result of later erosion, and this, in turn, makes it difficult to pinpoint which buildings might have been used for such a purpose, as opposed to agricultural structures, though some suggestions can be made on the basis of the external fencelines (*p 516*).

Buildings 1-3 did contain internal features, though these merely comprised a single posthole (Buildings 1 and 3), which probably acted as an additional roof support. Building 2 possessed a greater selection of features, including a partition wall, indicating that it was subdivided into two cells, the smaller of which was at the south-eastern end of the building. This is a common feature of many early medieval buildings (James *et al* 1984, 188-9), generally allowing one end of the building to be separated off, the smaller cell normally having a floor area less than a quarter of the total building. These areas were accessed by a door often placed in middle of the partition wall (*op cit*, 189). However, in the case of Building 2, access into the smaller cell appears to have been both externally, through the potential doorway in the gable of the building (*p 511*), and also internally, through a similarly positioned doorway.

Building 2 was also associated with a pit, which had been backfilled with material containing small amounts of charred cereal grains and chaff, and a large range of charred weed seeds that were probably waste generated from the processing of cereals or other plant remains. These, along with comparable charred plant remains from within the partition wall, perhaps suggest that it functioned as a barn. The pit also contained holly charcoal, whilst the partition wall contained heather charcoal. Apart from their use as fuel and bedding, both plants are known to have been used as a source of winter fodder during the later medieval period (Spray 1981; Greig 1991) and this may, in turn, strengthen the argument that Building 2 was a barn.

The other charred plant remains from the site provided additional evidence for the nearby cultivation of wheat, barley, and oats. One possibility is that bristle oat was a favoured variety, as this is a hardy crop, which tolerates poor soil conditions, and is commonly found on medieval sites in Scotland and Wales (Carruthers 2010a).

Context and parallels

At a national level, and based on the construction techniques and size, the Parcel 42 buildings fit comfortably into the broad tradition of early medieval rectangular timber buildings, known from north-eastern, eastern, and central England, which are often associated with Anglo-Saxon settlements (*inter alia*; Hope-Taylor 1977; West 1985; O'Brien and Miket 1991; Hamerow 1993; Powlesland 1999; Losco-Bradley and Kinsley 2002; Muncaster *et al* 2014). A large corpus of excavated early medieval timber buildings now exists, indicating that many such buildings were constructed using earthfast posts set within individual postholes or construction trenches, with the latter technique being employed in many of the larger timber buildings

(*ie* substantial timber halls; *cf* Hope-Taylor 1977; Kirby 2011), although post-pads are also quite common in the area (R M Newman 2011). Indeed, more widely, either stone or gravel footings were used more frequently to raise the timbers (probably cruck blades) above the ground and protect them from the moist conditions which would accelerate rotting (Gardiner 2004).

Although, in national terms, the Parcel 42 buildings are a common type, at a regional level they represent a significant addition to the small corpus of excavated early medieval structures (Fig 246). For instance, in eastern Dumfriesshire, a post-built structure at Kirkconnel was interpreted as a hall (Clough and Laing 1969), several sunken-floored and post-built structures were associated with the Anglian monastic settlement at Hoddom (Lowe 1991; 2006), and a post-defined building at Lockerbie Academy was replaced by a more substantial building, defined by postholes and construction trenches (Kirby 2011).

Several early medieval timber buildings have been excavated in eastern and northern Cumbria. These primarily comprise the possible fifth- and sixth-century timber halls and buildings from Carlisle, Stanwix, and Birdoswald (R M Newman 2011; Wilmott 1997); a seventh-/eighth-century post-built building from Fremington, which had stood next to four sunken-featured buildings of similar date (Oliver *et al* 1996); four post-built rectangular buildings from Whinfell, of probable early medieval date (Heawood and Howard-Davis 2002); a post-built building from Parker's Croft, Shap, which seemingly dated to the early medieval period, and which was possibly associated with two further timber structures (*ibid*); and two post-built buildings from Dacre, one with a rectangular plan, the other possibly sub-circular, or at least with a rounded eastern end, which were clearly pre-Norman in date (Leech and Newman 1985; Newman *et al* 2022).

Those with the strongest parallels to the buildings in Parcel 42, in terms of size, morphology, and construction technique, are those from Parker's Croft, Shap, Dacre, and one structure from Hoddom (Fig 247). The Parker's Croft building probably dates to the seventh-eighth century on the basis of three clay loomweights from a nearby tree-throw, and its use may therefore have overlapped with the Parcel 42 buildings (Heawood and Howard-

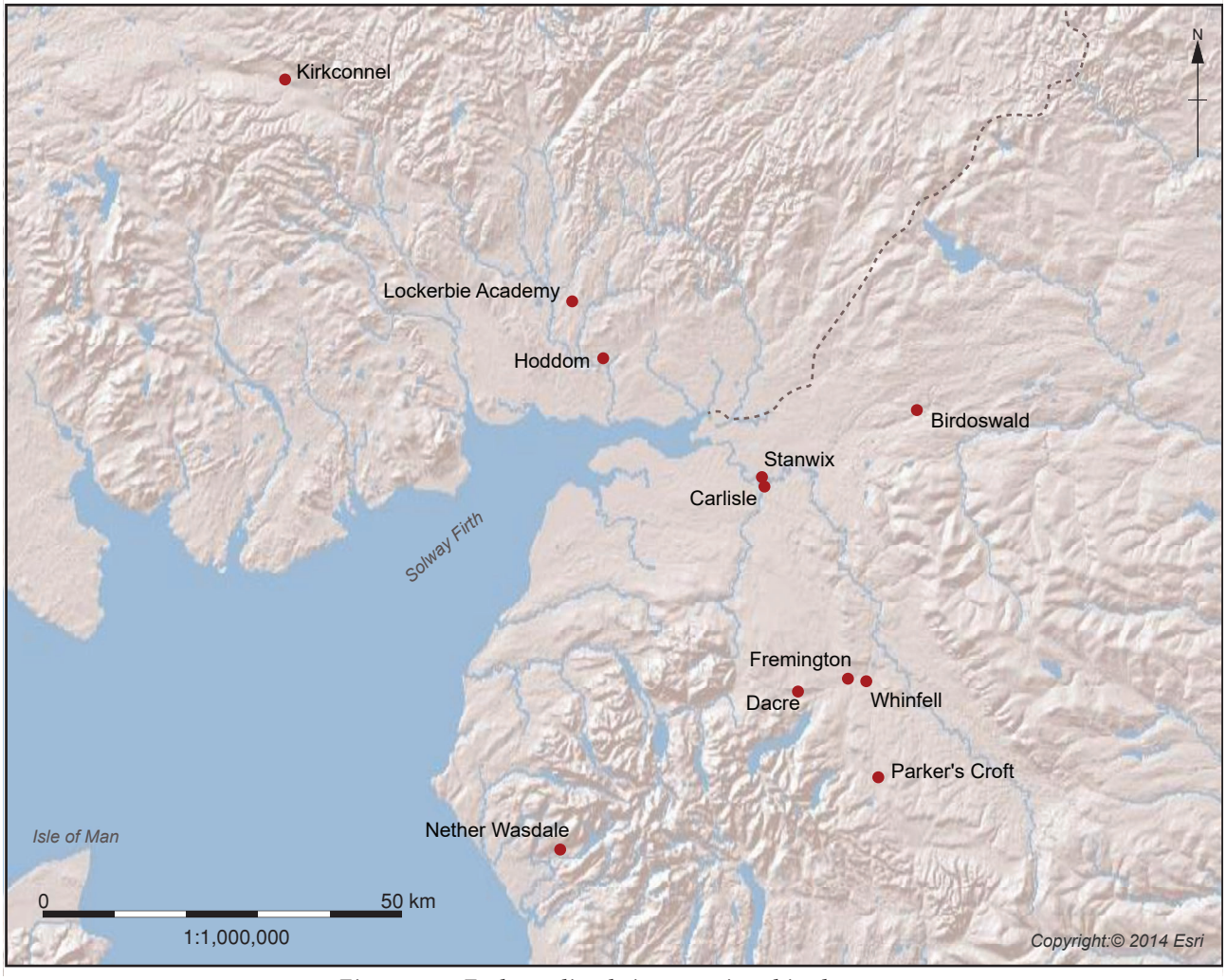


Figure 246: Early medieval sites mentioned in the text

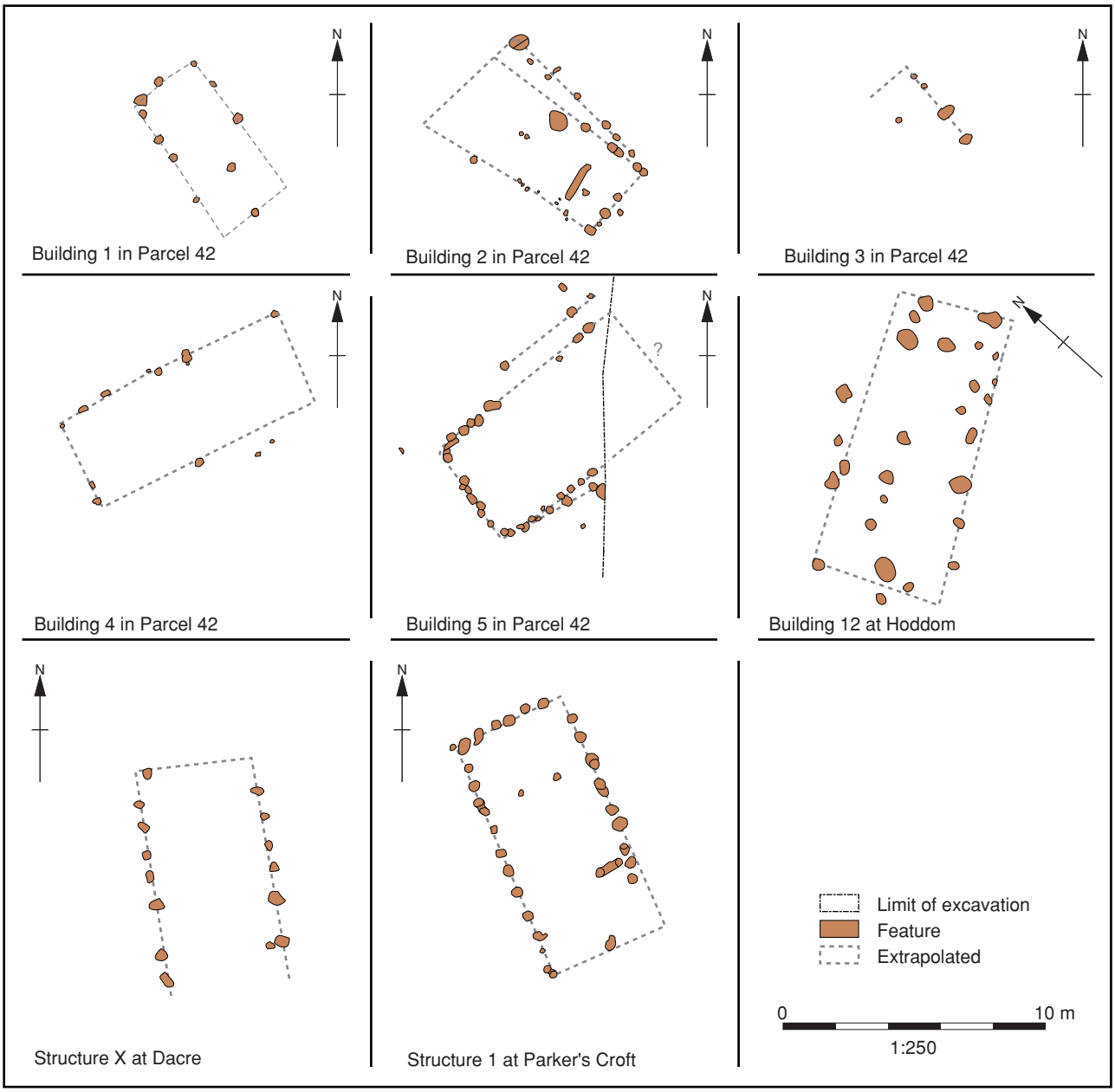


Figure 247: Early medieval buildings in the wider environs of the CNDR

Davis 2002, 155). Similarly, it had a rectangular form and was defined by closely spaced posts set in earthfast postholes. It was just slightly larger than Building 5 at Parcel 42, at 4.8 x 9.5 m, though its dimensions similarly followed the 2:1 length to width ratio (*op cit*, 149). This building also possessed internal partitions similar to that in Building 2, though it was suggested that it may have contained three, as opposed to two, cells (*op cit*, 151).

A rectangular building (Structure X; *c* 8.5 x 5 m) at Dacre was on a terrace to the north of the church (Leech and Newman 1985; Newman *et al* 2022). Although this remains undated, its position relative to the early monastic site suggests strongly that it was associated (Newman *et al* 2022). As with the buildings in Parcel 42, it was defined by closely spaced postholes; however, it differed in one major respect in that, based on their spacing, it may have contained a cross-passage (*ibid*).

One seventh-eighth-century rectangular timber building (structure 12) at Hoddom also shared some similarities, in terms of size and design, with the Parcel 42 buildings (Lowe 2006). This was *c* 9 x 5 m and was reminiscent of Building 2, in that it was defined by a scattering of postholes (*op cit*, 93).

Two comparable rectangular timbers buildings have been excavated at Nether Wasdale. These were also defined by postholes, although the lengths of these buildings could not be ascertained (OA North 2016; Evans 2020; buildings 2 and 3). Material from the postholes of both buildings produced early medieval

radiocarbon dates, spanning the eighth and ninth centuries cal AD, along with quantities of metallurgical waste. However, both buildings also contained material dating to the fifteenth/early sixteenth century cal AD, and it has therefore been argued that they were actually later medieval timber buildings, that had been cut through a dump of early medieval metallurgical waste (Evans 2020), though, if so, they clearly continued a ubiquitous building tradition.

Several other post-defined seventh-eighth-century buildings at Hoddom were of a similar form and general design to those at Parcel 42, although they were larger and have been interpreted as agricultural buildings (Lowe 2006). Of these, structure 2 may have functioned as a conjoined byre and barn (*op cit*, 47-9), whilst structure 8 was also interpreted as a barn, though there is a possibility that it was actually a domestic building (*op cit*, 72-3). Other buildings contained ovens/kilns and were interpreted as kiln-barns (*op cit*, 56-64, 75-9, 79-82).

Other large post-defined early medieval buildings have been excavated in the Solway area, possibly functioning as halls, which were not permanently occupied domestic buildings, but instead were periodically visited by the ruling elites (*cf* Alcock 2003). These sites include a post-defined building at Lockerbie Academy, which was *c* 5 m wide by at least 12 m long, and was built in the sixth/seventh century, and another post-defined hall at Kirkconnel, *c* 16.8 x 5.5 m (Kirby 2011; Clough and Laing 1969). The structure at Lockerbie Academy appears to have been destroyed and replaced by a substantial timber hall, defined by posts and construction trenches, which may suggest that this later building was more 'Anglian' in design than its predecessor (Kirby 2011). Indeed, it has been suggested that it was constructed 'during a time of conflict, when a clearly visible display of Northumbrian dominance was deemed necessary' (*op cit*, 54).

It also appears that the Parcel 42 buildings were set within three separate compounds defined by fencelines. Based on the position of these, Buildings 4 and 5 might have been two dwellings, as each was set within its own fenced area, preventing livestock from entering. Indeed, it may also be significant that these were the largest buildings and that they also shared identical alignments. If they were contemporary, and for domestic use, the three smaller buildings (1-3) within a larger compound may have been ancillary agricultural buildings, one (Building 3), perhaps being replaced by another (Building 2) after a comparatively short period of time. This hypothesis is, to some degree, confirmed by the palaeobotantical evidence from Building 2, which suggests that it may have been used for the processing of grain, and thus functioned as a small barn (*p 513*).

Conclusion

The early medieval remains on the CNDR, when taken together with the evidence from the wider region, suggest that from at least the seventh century up until the Norman Conquest, the Solway area may have contained a scattering of small settlements of one or more rectangular houses. Indeed, the evidence from Parcel 42 suggests that when this area was under the sway of the Kingdom of Northumbria, and perhaps also as the area was becoming increasingly complex politically, settlements containing more than one household existed, that may also have contained dedicated agricultural buildings. Prior to the discovery of the settlement at Parcel 42, relatively little was known concerning the character of early medieval settlement on the southern side of the Solway (*cf* R M Newman 2006), but the evidence now suggests that a rectangular timber-building tradition characterised this area, as seen in other parts of lowland Cumbria, such as Whinfell, Fremington, and Shap (*p 514*). These buildings complemented an upland tradition of stone-founded rectangular buildings, typified by buildings excavated at Bryant's Gill, upper Kentmere (Dickinson 1985). When taken together, these shed important light on early medieval settlement in Cumbria, as well as being important additions to the growing corpus of buildings of the period from northern Britain.

The Post-medieval Period

Historical background

The post-medieval period is normally taken as starting with the Dissolution of the Monasteries in *c* 1540. Its end witnessed the adoption of industrialisation, a process which began in the 1750s and continued throughout the late eighteenth and nineteenth centuries, transforming both rural and urban communities across the wider North West (*cf* McNeil and Newman 2006a; 2006b). During the earlier part of the period, Carlisle continued to function as a strategic garrison town, given its border position, and the continued political tensions between England and Scotland (R Newman 2011, 137). Although these appear to have curtailed Carlisle's growth, it remained a regionally significant town, particularly when compared with other contemporary urban centres in north-west England (*op cit*, 141).

The military tensions between England and Scotland came to a dramatic conclusion in 1745/6 during the Jacobite uprising, led by Charles Edward Stuart, which resulted in the capture of Carlisle in November 1745 (*op cit*, 143). According to the First Edition OS map (Cumberland Sheet XVI; 1868a), immediately prior to the capture, the Jacobite forces were camped to the north-west of the city, within the confines of the defended Iron Age settlement known as Grinsdale Camp, which is immediately west of the CNDR. Contemporary mapping

also indicates that it was close to this camp that the rebel forces forded the River Eden (Fig 248; marked as 'Rebels (*sic*) Ford'; Smith 1746, DX/334/1). The Jacobite occupation of Carlisle was short-lived, however, and in December 1745 the Duke of Cumberland recaptured the city, *en route* to his defeat of the Jacobite army at Culloden in 1746. This period marked the end of Carlisle's role as a garrison town (R Newman 2011, 144), although the construction of the Military Road, linking Carlisle and Newcastle, as a result of the uprising, hugely improved communications (*op cit*, 152).

These improvements in transport allowed late eighteenth-century Carlisle to flourish, developing factory-based textile production and finishing (C Newman 2011, 155-60). This industry continued to form a significant element of the city's economy in the nineteenth century, along with factory-based hat making, brewing, food production, and engineering, which had also originally been developed during the late eighteenth century (*op cit*, 160-8). The economic capabilities of these industries were then enhanced through further improvements in communications during the nineteenth century, firstly through the building of the Carlisle Canal (Ramshaw 1997), followed by the construction of an extensive network of railways (Robinson 2011). The railways had a particularly marked impact on Carlisle's economy, which emerged as a pre-eminent centre for such operations, and also resulted in the dramatic spread of its urban area to the south and west of its historic core (C Newman 2011, 170; Robinson 2011, 173).

Beyond urban Carlisle, it seems that many of the medieval open-field systems (*p 496*) and areas of common moorland were enclosed during the earlier post-medieval period, concomitant with a slight expansion in rural settlement. An impression of the post-medieval rural landscape can be gained from several large- and small-scale maps which were produced between 1746 and 1787. Of these, Thomas Donald's 1770-1 map of Cumberland (CA/6/19; Fig 249) indicates that by that time the areas to the west and north of Carlisle contained a scattering of small rural settlements, comprising hamlets and isolated farmsteads, many of which had been established in the medieval period (*pp 495-6*). These were linked to Carlisle by a network of roads and lanes, those settlements/dwellings adjacent to the CNDR being depicted as Broomhill (*sic*), Knockupwards (*sic*), Stainton, Kingmoor House,

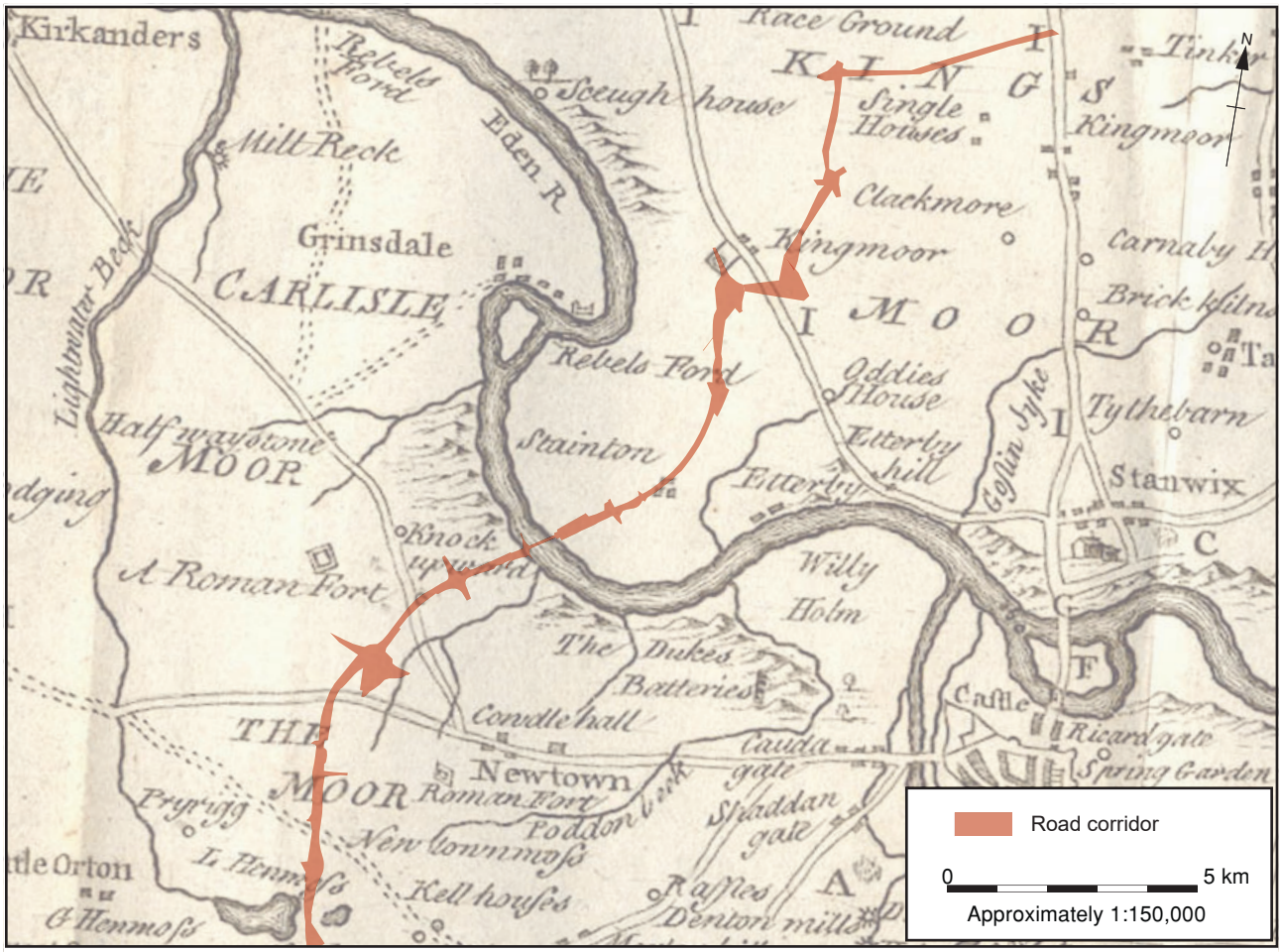


Figure 248: Extract from Smith's map of 1746, showing the landscape and settlement to the north and west of Carlisle (CA DX/334/1)

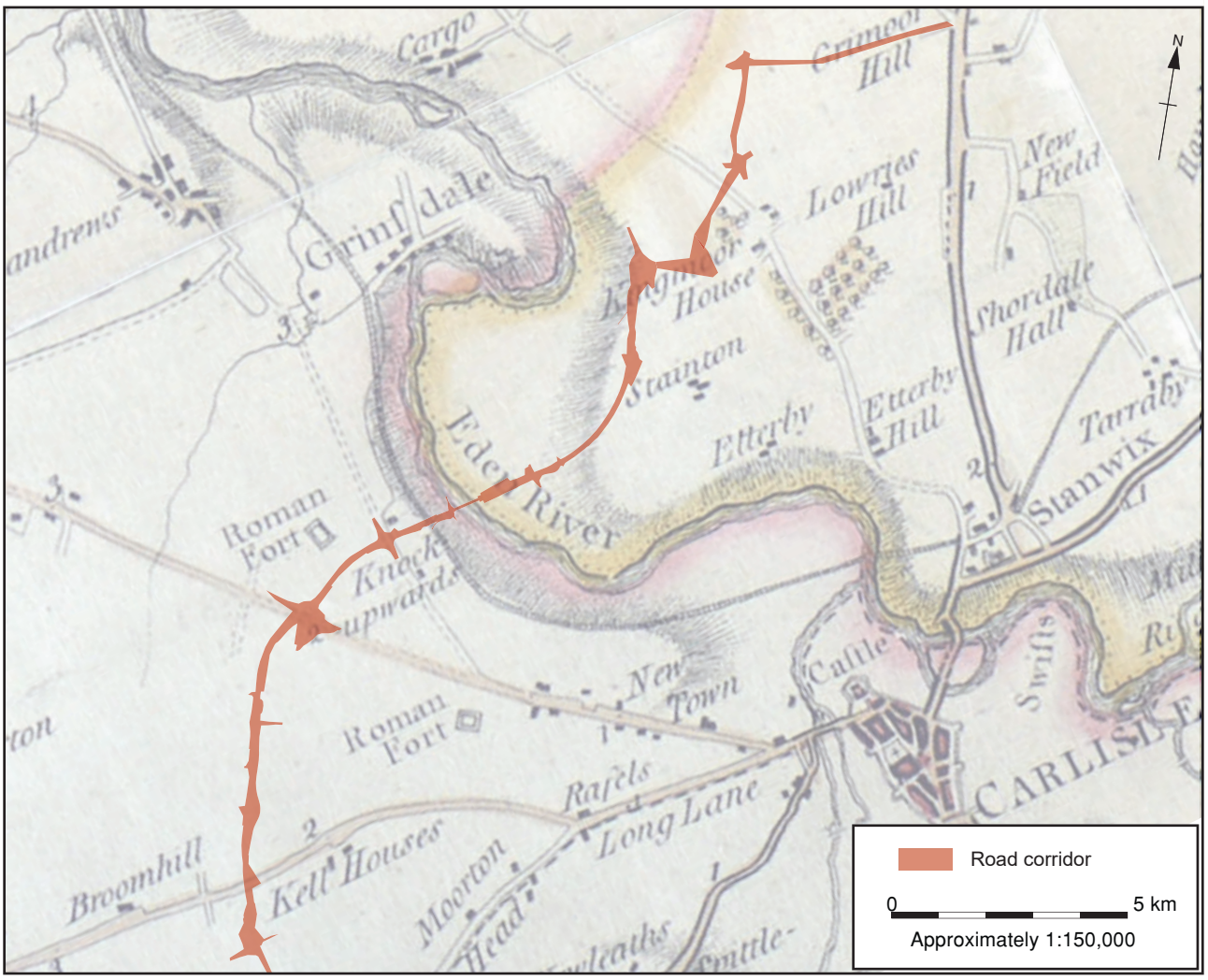


Figure 249: Extract from Donald's map of 1770-1, showing the landscape and settlement to the north and west of Carlisle (CA/6/19)

and Grimoor Hill (*sic*), of which Knockupwards (*sic*), Stainton, and Kingmoor are also depicted on Smith's 1746 map of Carlisle (DX/334/1; Fig 248).

More specific details concerning this post-medieval landscape can be gained through reference to the smaller-scale estate maps and enclosure awards and maps, which date to the mid- and late eighteenth century. An Act of Parliament was passed in 1767 to enclose Carlisle and Cummersdale Moor, at the far southern end of the CNDR (*p 522*), and an enclosure map dating to 1770 sets out the form of this enclosure (Tate 1978, 85; Q/RE/1/90). Another enclosure award indicates that the area crossed by the CNDR immediately north of the River Eden, to the west of Stainton township, was enclosed in 1788 (DX 1461).

Several maps and documentary sources are relevant to the portion of Kingmoor crossed by the CNDR (Perriam 2008). It is clear from these that, from 1682, the Corporation began to lease out parts of the moor for private use and it was then that the process of enclosure began (Whellan 1860, 167). This process was, however, gradual, as is evident from an enclosure map dating to 1750 (D/Lons/L/Plans/C4), which indicates that by this date the former moorland of Kingmoor had been largely enclosed, although unenclosed areas were still present to the north of Kingmoor House, along the CNDR. This map also indicates that at this time the Corporation had established a racecourse immediately to the east of Kingmoor House.

Kingmoor House was certainly in existence by 1712, built on land leased, in 1682, to Joseph Read, the mayor of Carlisle (Perriam 2008). The 1750 map indicates that it was the residence of George Pattinson, who was mayor of Carlisle in 1751 (*ibid*), and that it had a formal garden on its southern side, which may well have also been in existence in 1712. This garden contained four square *parterres* of moderate size, which could have been box-edged, enclosing spaces filled with herbs, flowers, and possibly vegetables, whilst a second larger area of hedging, to the south-west, enclosed eight compartments on a plan mimicking the Union flag before the Act of Union with Ireland in 1801, which may possibly have

formed a 'wilderness' (Fig 250). A gardener's house and a summerhouse are also depicted on this map, whilst the garden could be approached from the east along a hedge-lined avenue.

Maps of Kingmoor dating to 1750 and 1787 (D/Lons/L/Plans/C4; D/Lons/L/Plans/C9) also provide details of the small estate associated with Kingmoor House, which continued to be in the hands of the Pattinson family (Perriam 2008). The estate, to the north and east of Kingmoor House, was partly bounded by the racecourse, and to the north by two separate areas of moorland known as High Moor and Out Moor. At the end of the eighteenth century, the estate passed into the hands of Joseph Lamb (*ibid*) and the contemporary antiquarian William Hutchinson describes both the estate and the formal garden at Kingmoor House, commenting that,

> The estate of Mr Lamb, which contains about 400 acres, is kept in complete cultivation by the farmer, Mr Ivison: on this estate, is a garden of above four acres, well laid out, and kept in excellent order, in which is an elegant summer-house, commanding very extensive prospect; much frequented by parties from Carlisle and the neighbourhood in the summer season. On Mr Lamb's estate, are also about 25 acres of plantations, mostly of Scotch firs; great part of which have attained a good growth: the rest of the moor has very little wood (Hutchinson 1794, 584).

The early nineteenth century witnessed the enclosure of the remaining areas of moorland to the north and

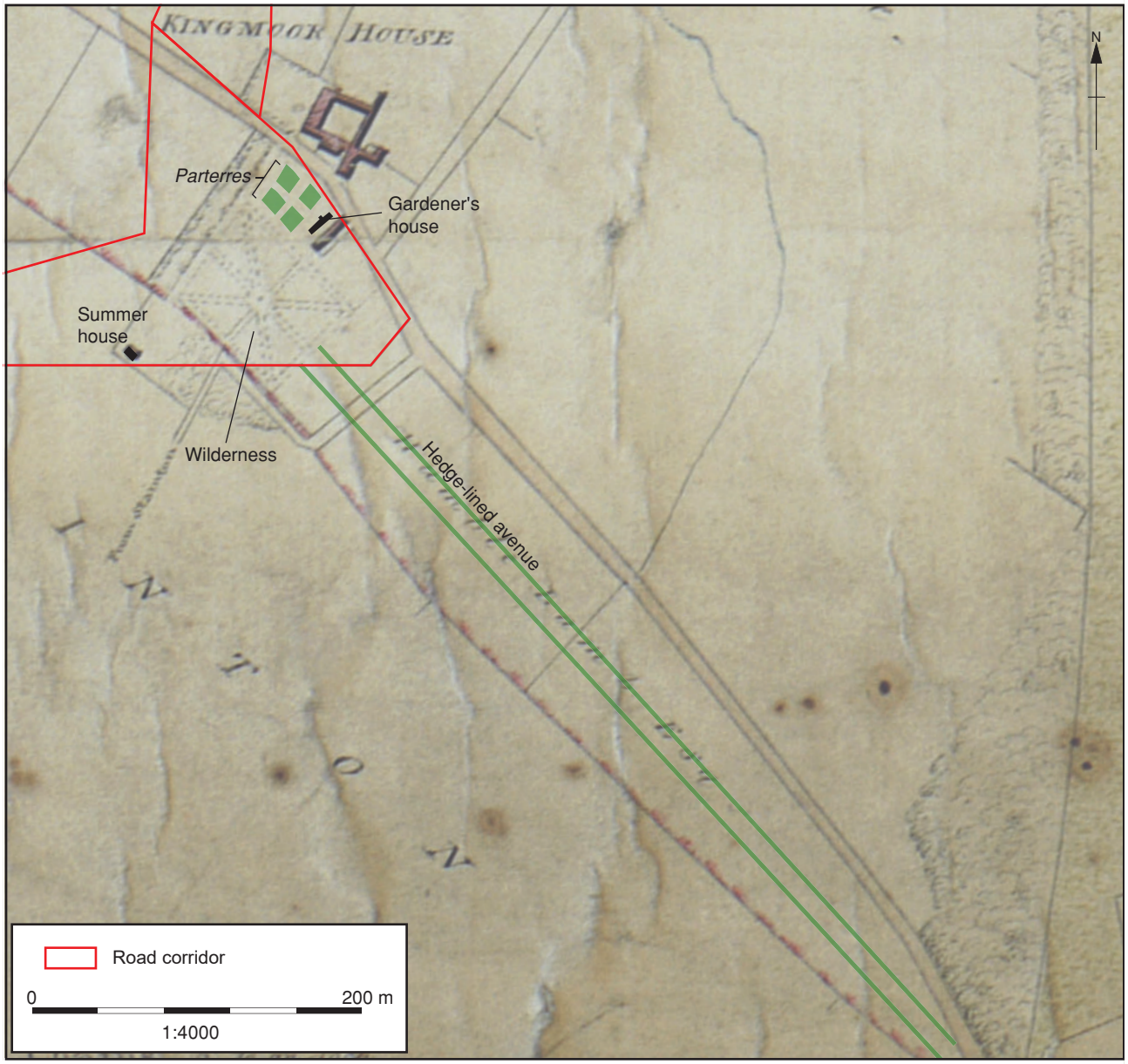
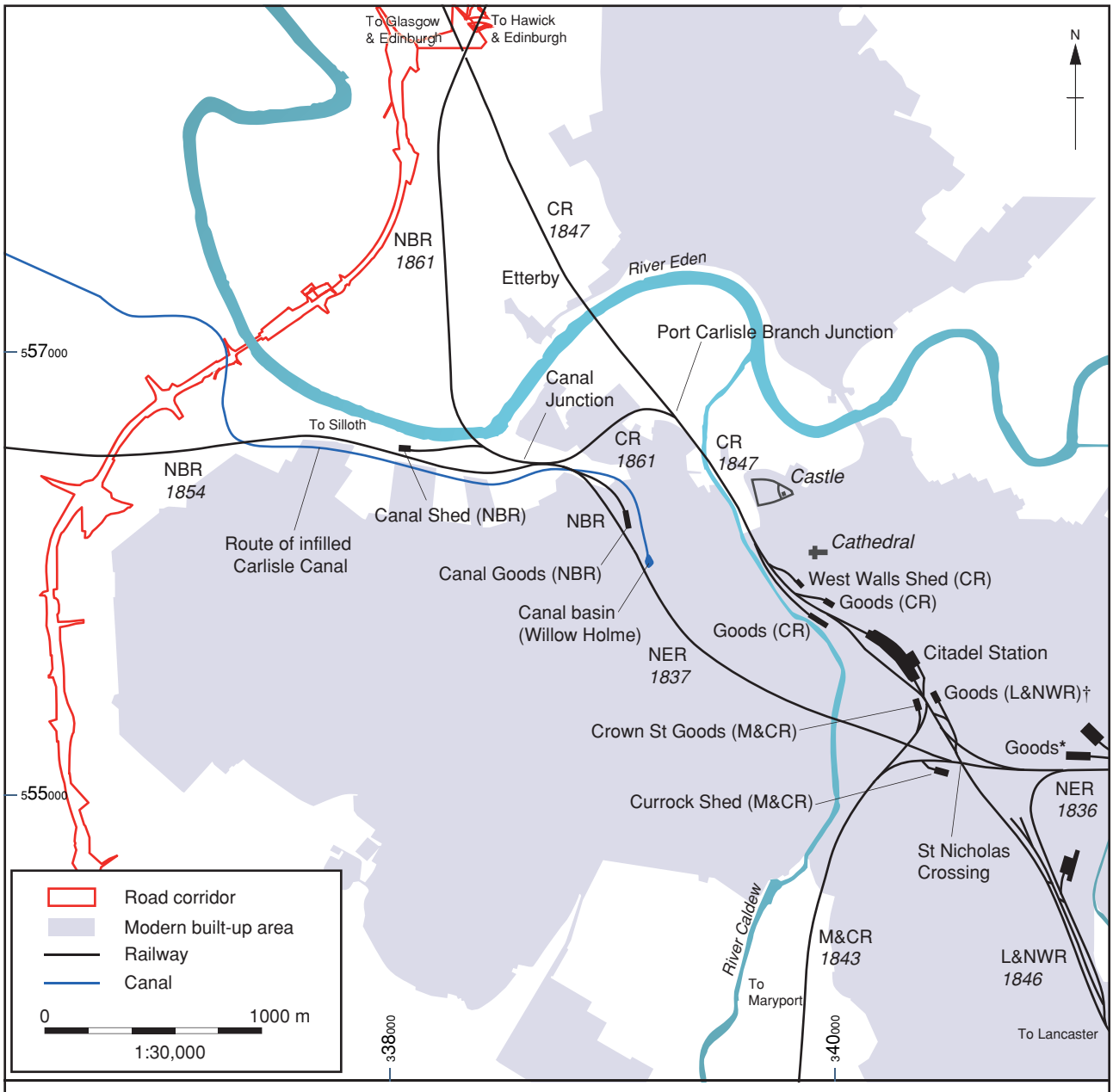


Figure 250: Extract from an 1823 enclosure map of Kingmoor, showing Kingmoor House and its formal garden (garden features depicted on earlier mapping are also annotated) (CA Q/RE/1/99)

west of Carlisle. Initially, this entailed the enclosure of Grinsdale Common (*p 522*), on the southern side of the River Eden, in 1808 (DMBS/1/22), which was then followed by the remaining sections of moorland in Kingmoor township in 1823 (Q/RE/1/99). This latter act marked the last phase of enclosure in the vicinity of the CNDR, and the pattern of field boundaries present by this date, as evidenced by the tithe maps for the townships of Cummersdale (DRC/8/57), Caldewgate (DRC/8/37), Stainton (DRC/8/180), and Houghton (DRC/8/95), and nineteenth-century OS mapping (1868a; 1868b), has been largely retained in the present-day rural landscape.

Following the complete enclosure of the landscape, new routes of communication, specifically the canal and railway network, had a major influence (Fig 251). The Carlisle Canal was opened in 1823 (Ramshaw 1997), and created a link, crossed by the CNDR, between Carlisle and Port Carlisle, allowing sea-going vessels to be unloaded and their cargo brought to a canal basin at Willow Holme, thus serving the city's nineteenth-century industrial complexes (*ibid*). However, its success was quickly curtailed as a result of silting around Port Carlisle, and it was superseded by the establishment of the railway network from the late 1830s onwards, which would come to dominate life and industry in



Abbreviations: CR = Caledonian Railway; L&NWR = London and North Western Railway; M&CR = Maryport and Carlisle Railway; NBR = North British Railway; NER = North Eastern Railway
Opening dates of principal lines given in italics
† Site of Crown Street Station (M&CR), 1844-9 * Site of London Road Station (Newcastle and Carlisle Railway), 1836-63

Figure 251: The nineteenth-century canal and railway network (Contains OS OpenData © Crown Copyright [and database right] (2022))

the nineteenth- and twentieth-century city (Robinson 2011, 175). An Act of Parliament allowed the canal to be infilled and converted into a railway, which ran between Carlisle and Silloth (*op cit*, 178), and opened in 1854. To the north of Carlisle, the CNDR crosses two other nineteenth-century railway lines. One of these, opened in 1847, was operated by the Caledonian Railway, which linked Carlisle with Glasgow and Edinburgh, whilst the other, owned by the North British Railway, opened in 1861 and provided a link between Carlisle and Hawick, and on to Edinburgh (*op cit*, 178, 180).

Post-medieval Archaeology along the CNDR

Enclosure, cultivation, and land management

Along the CNDR, several features and deposits were identified in Parcels 5, 9, 20, 21, and 42, and at Stainton West, which relate to rural activity to the north and south of the River Eden. Generally, these features formed elements of post-medieval enclosure relating to cultivation and land management.

In Parcel 5, unmistakable evidence for post-medieval enclosure was detected during evaluation trenching, when the remains of a several intercutting ditches were exposed. On this basis, open-area excavation led to a more detailed examination of these remains (Fig 252). The earliest feature identified comprised a boundary ditch (***5274***) which was oriented north-west/south-east, and following filling, had been replaced by an L-shaped ditch (***5105***), forming the corner of a large enclosure. This had been recut on numerous occasions, and contained pottery suggesting that it was established in the latter half of the eighteenth century. The early cartographic sources demonstrate that its position approximately corresponds to a boundary depicted on the map accompanying the

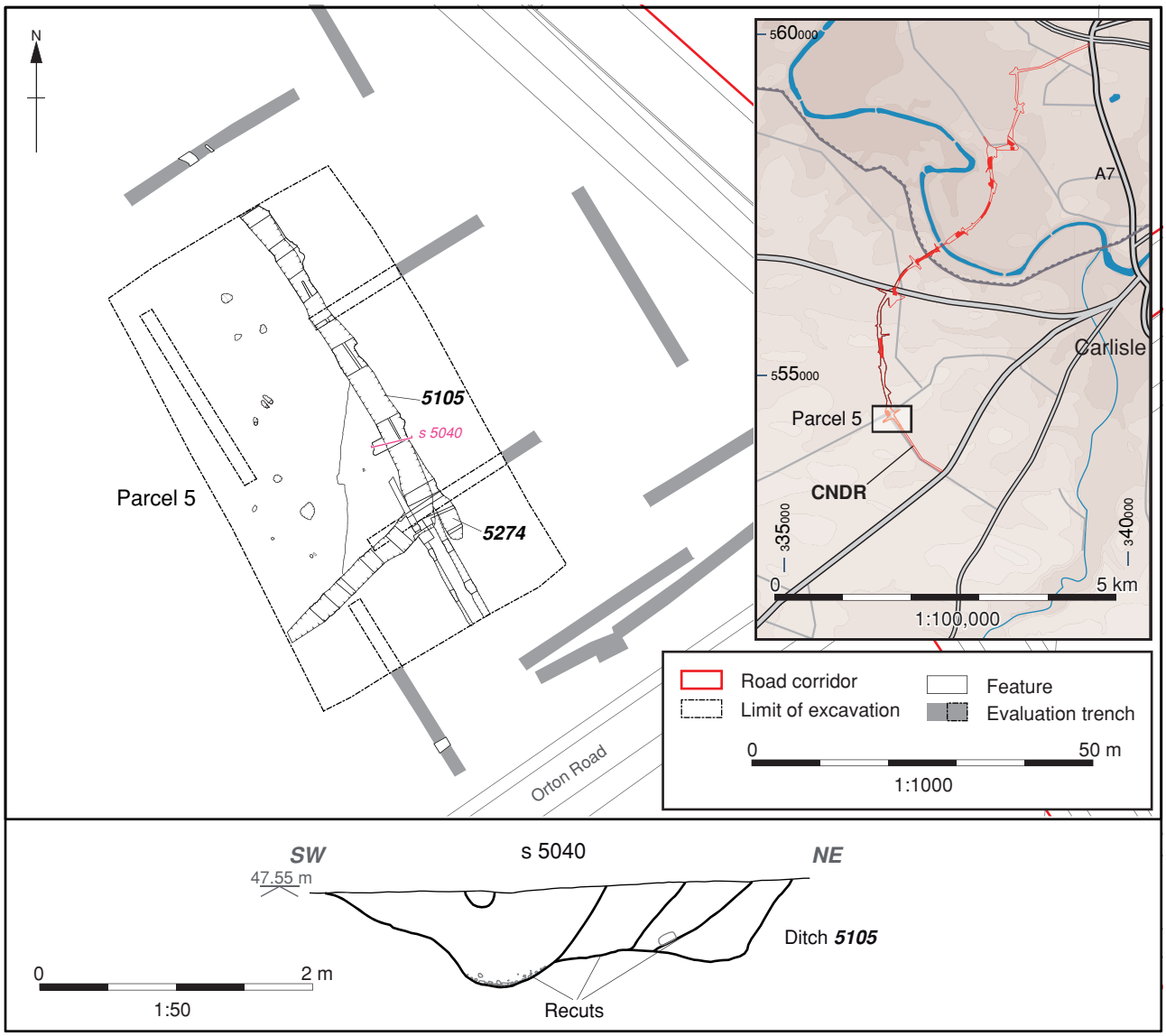


Figure 252: Post-medieval remains in Parcel 5, with a section across ditch **5105** *(Contains OS OpenData © Crown Copyright [and database right] (2022))*

Figure 253: Parcel 5 features superimposed on the 1770 enclosure award map (CA Q/RE/1/90)

1770 enclosure award for Carlisle and Cummersdale Moor (Q/RE/1/90; Fig 253), indicating that the L-shaped boundary (***5105***), and probably also the earlier ditch (***5274***), formed elements of the eighteenth-century enclosure of Cummersdale Moor. Furthermore, it is clear that, in 1770, the L-shaped boundary defined the limits of the moorland that had been enclosed to the west of Orton Road, and contained plots owned by both John Milbairn and Robert Karmichael. However, by the early nineteenth century, the unenclosed area to the west had been enclosed, creating a series of irregular-shaped fields which are depicted on the 1841 tithe map for Cummersdale (DRC/8/57).

Other ditches which might be associated with post-medieval enclosure included two, undated, intersecting ditches (***9089*** and ***9090***) in Parcel 9 (Fig 254). One of these (***9090***) was parallel with extant field boundaries, the positions of which are depicted on the 1842 tithe map of Caldewgate (DRC/8/37), and it might therefore have formed an earlier enclosure boundary. However, the map accompanying the enclosure award for Carlisle and Cummersdale Moor (Q/RE/1/90) indicates that this area had yet to be enclosed in 1770, forming moorland that was 'part of the Manor of John De Chapple', and this implies that these boundaries date to the late eighteenth or early nineteenth century.

Several features associated with post-medieval enclosure were identified to the north, probably associated with the enclosure of Grinsdale Common in 1808 (DMBS/1/22). In Parcel 20, these comprised a boundary ditch, surviving in two segments (***20015*** and ***20017***), which were parallel with the B5307 Moorhouse Road, whilst in Parcel 21, various early nineteenth-century boundary and drainage ditches were present (***21008***; ***21272***; ***21273***; ***21242***; ***21040***/***21039***; ***21029***; ***21216***; ***21205***; ***21204***; ***21115***; and ***21119***; Fig 255), several of which correspond to the positions of field boundaries depicted on the 6":1 mile OS map, surveyed in 1865-7 (1868b). These boundary or drainage ditches contained a small assemblage of eighteenth-nineteenth-century artefacts, including pottery and metalwork.

Slight evidence for post-medieval enclosure was also present to the north of the River Eden at the Stainton West site. This included the remains of a boundary ditch (***90599***/***70223***; Fig 256), which was probably a product of the enclosure of this area, after 1788 (DX 1461). A field drain (***90186***/***90024***/***70203***) was later inserted into this ditch and it was sealed by a post-medieval trackway extending south from Holme Lane. A small collection of late post-medieval pottery was recovered from the site *Appendix 11*), along with three post-medieval beads (*Appendix 12*). In addition, several samples of charcoal and charred plant remains from prehistoric hearths (***90434*** and ***90593***), a tree-throw (***90448***), and a spread of stones (***90396***) returned post-medieval dates (Table 41).

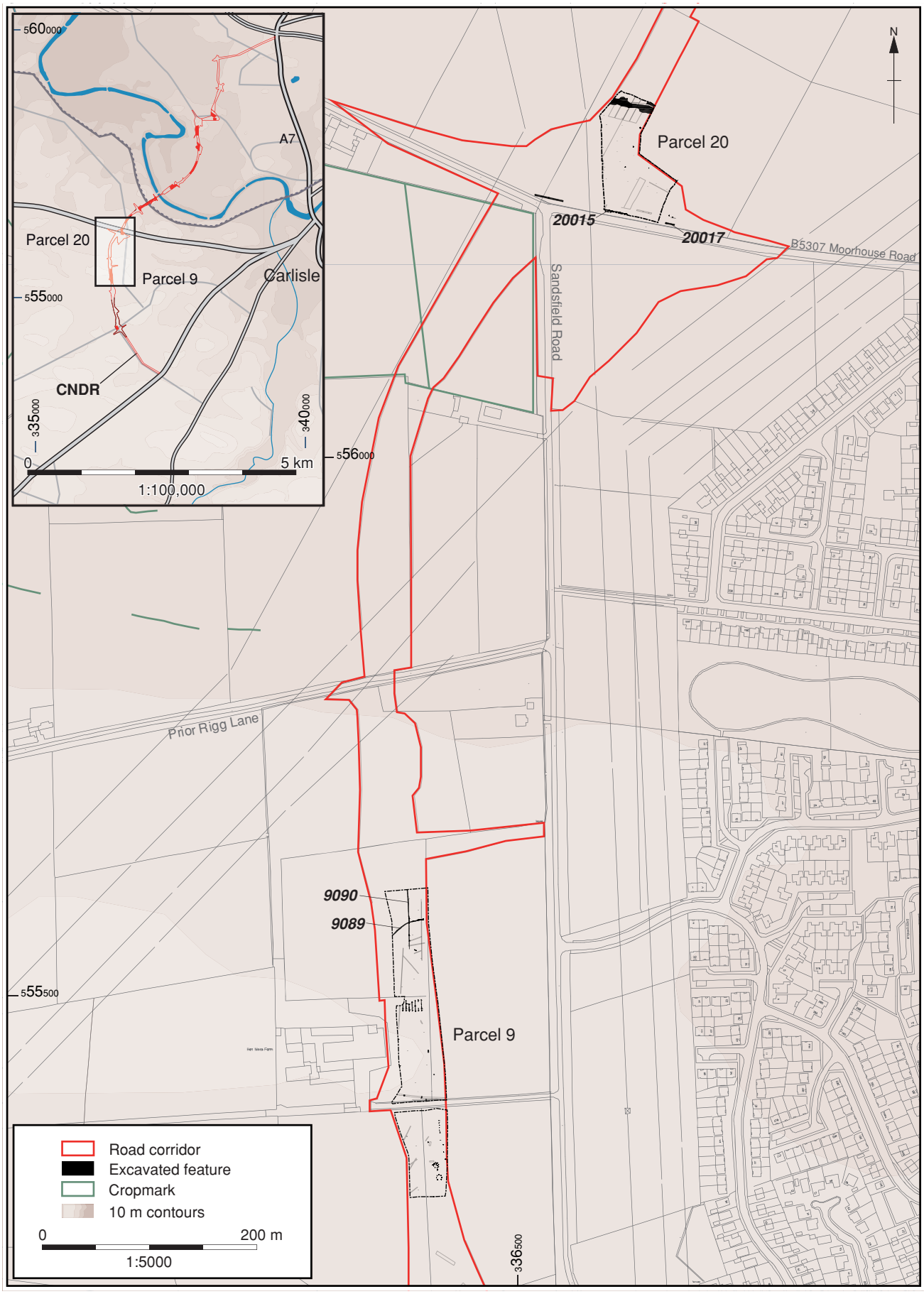


Figure 254: Post-medieval remains in Parcels 9 and 20 (Contains OS OpenData © Crown Copyright [and database right] (2022))

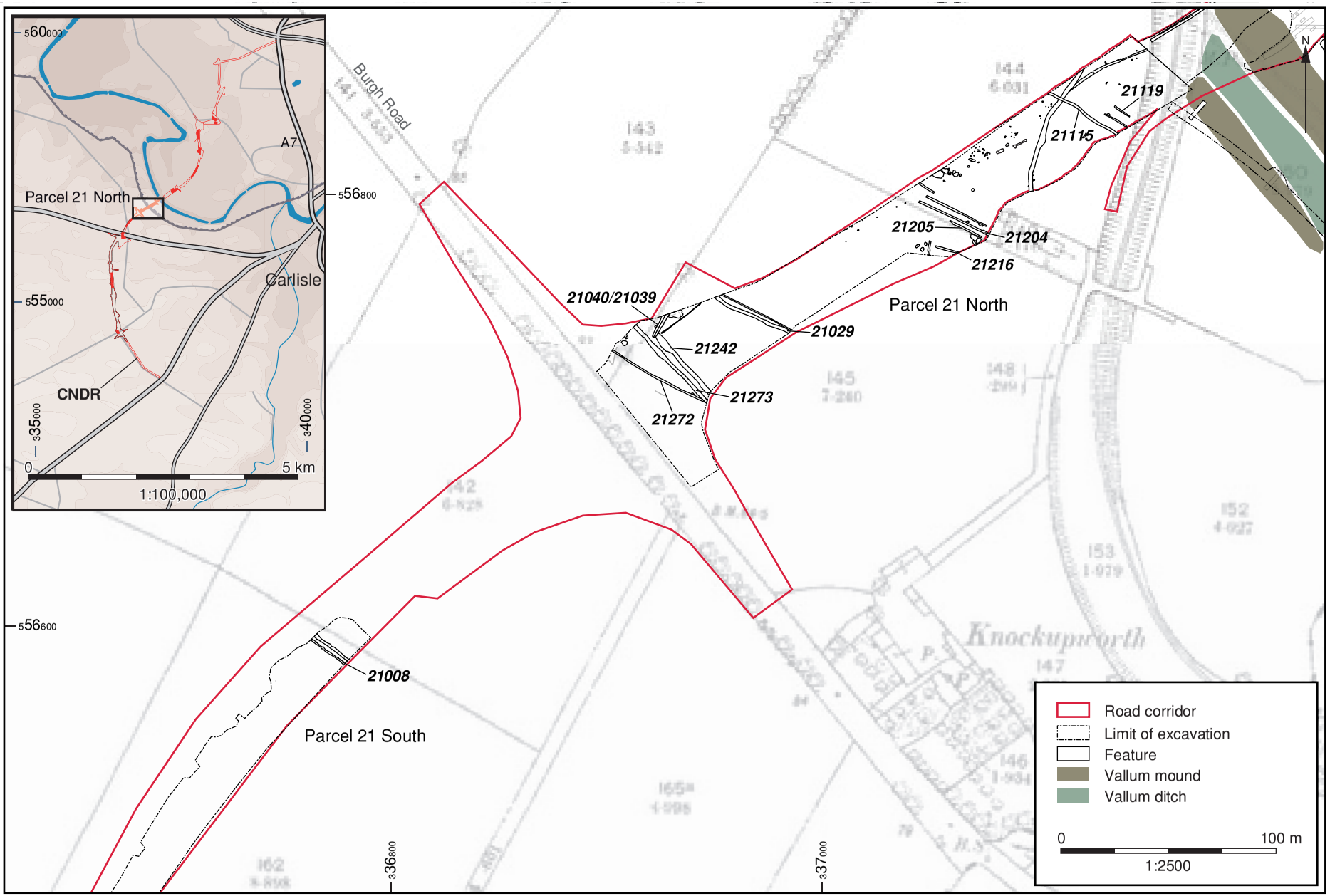


Figure 255: Post-medieval remains in Parcel 21, superimposed on the First Edition Ordnance Survey map (1868b) (Contains OS OpenData © Crown Copyright [and database right] (2022))

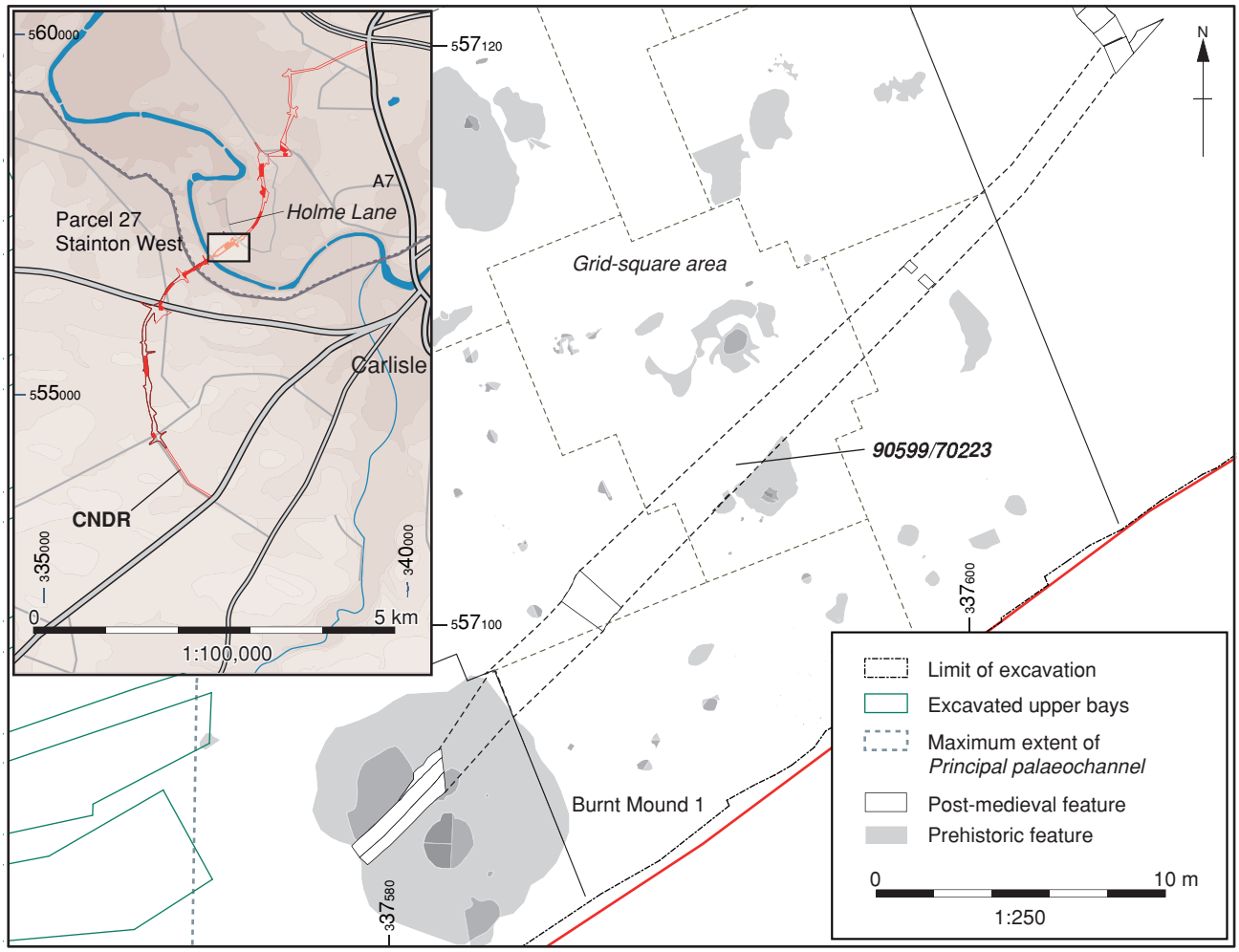


Figure 256: Post-medieval remains at Stainton West (Contains OS OpenData © Crown Copyright [and database right] (2022))

Context	Comment	Laboratory code	Material	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence) cal AD
Hearth ***90434*** (fill ***90445***)	Late Mesolithic feature containing intrusive charcoal	SUERC-41996	Blackthorn-type (*Prunus* sp) charcoal	232±25	-25.5	1640-1955
Hearth ***90593*** (***90349***)	Late Mesolithic feature containing intrusive charcoal	SUERC-32642	Charred grass-family (Poaceae) seed	175±35	-25.8	1650-1955
Tree-throw ***90448*** (fill ***90459***)	Late Mesolithic feature containing intrusive charcoal	SUERC-59309	Willow/poplar (*Salix*/*Populus*) charcoal	183±26	-26.1	1650-1955
Stone-spread ***90396*** (deposit ***90397***)	Late Mesolithic deposit containing intrusive charcoal	SUERC-41998	Charred barley (*Hordeum* sp) seed	368±26	-24.9	1440-1640
Stone-spread ***90396*** (deposit ***83716***)		SUERC-42005	Willow/poplar/ birch (*Salix*/ *Populus*/*Betula*) charcoal	122±26	-27.0	1670-1940

Table 41: Post-medieval radiocarbon dates from the Grid-square area, *Stainton West*

All of these features and the stone spread appear to relate to late Mesolithic activity at the site (*Ch 4*) and thus the post-medieval ecofacts were clearly intrusive.

In Parcel 42, one ditch (***42461***) respected the line of an early nineteenth-century field boundary, whilst to the south three ditches (***42002***, ***42003***, and ***42215***; Fig 257) extended on a north-east/south-west alignment across the site. One (***42215***) certainly formed part of the post-medieval enclosure of the Stainton area, as it followed the line of a field boundary plotted on the 1840 tithe map for this township (DRC/8/180). In addition, it contained a sherd of post-medieval pottery. The other two ditches are more intriguing, however, as they appeared to define a ditched trackway, *c* 2 m wide, which was cut by, and hence earlier than, field boundary ***42215***. Although one of these ditches (***42003***) contained a piece of clay tobacco-pipe, indicating that it was open in the post-medieval period, significantly, it does not appear on any historical mapping and hence it may have pre-dated the eighteenth-early nineteenth-century enclosure of this area. Given this,

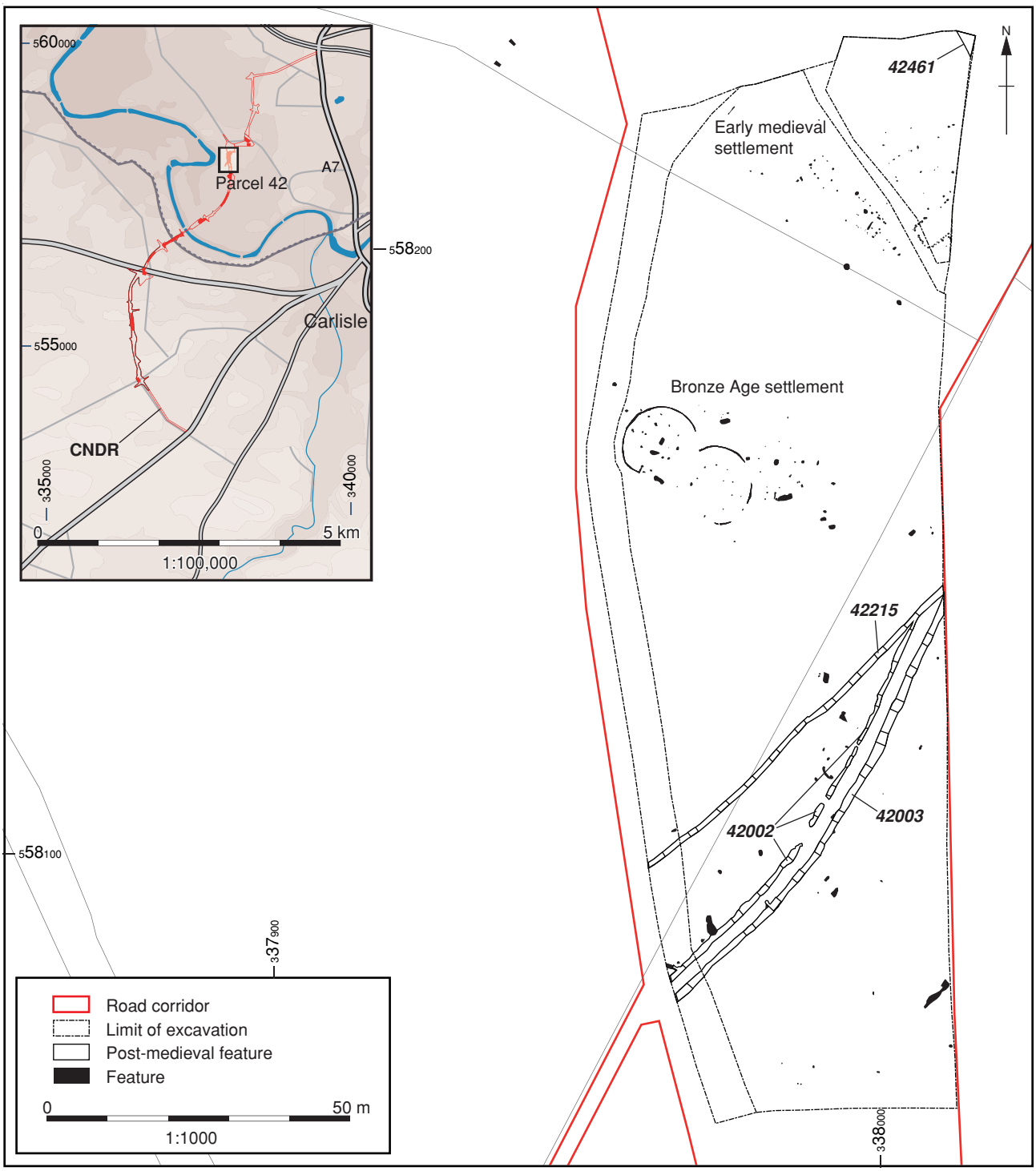


Figure 257: Post-medieval remains in Parcel 42 (Contains OS OpenData © Crown Copyright [and database right] (2022))

one possibility is that it was a fairly early routeway through the landscape that might potentially have its origins in the early post-medieval or even medieval period. It may, for example, be significant that this track heads towards the early medieval settlement to the north (*p 496*), and it may be suggested tentatively that it represents a contemporary route used throughout the medieval period, eventually provided with drainage ditches in the post-medieval period.

In addition to late boundary/drainage ditches, several other features were a product of post-medieval agriculture and associated activities. These included numerous cultivation features, including plough furrows, planting beds, and recent land drains, as well as numerous pits and postholes. Generally, these features relate to small-scale rural activity, such as rubbish disposal, quarrying, and the erection of fencelines, within the late eighteenth- and nineteenth-century enclosed landscape. One of the more notable groups was in Parcel 21, where clusters of large pits (*eg* ***21209***, ***21308***, ***21318***, and ***21232***; Fig 258) were present on either side of a field boundary. These were probably dug to extract sand and gravel and had then been intentionally backfilled with post-medieval refuse, which included ceramics and glass, and, in one pit (***21318***), butchered animal bone (OA North 2011a).

Kingmoor House: the eighteenth-century planned garden

A series of evaluation trenches was excavated in Parcels 46 and 47 (Fig 259), across the site of the

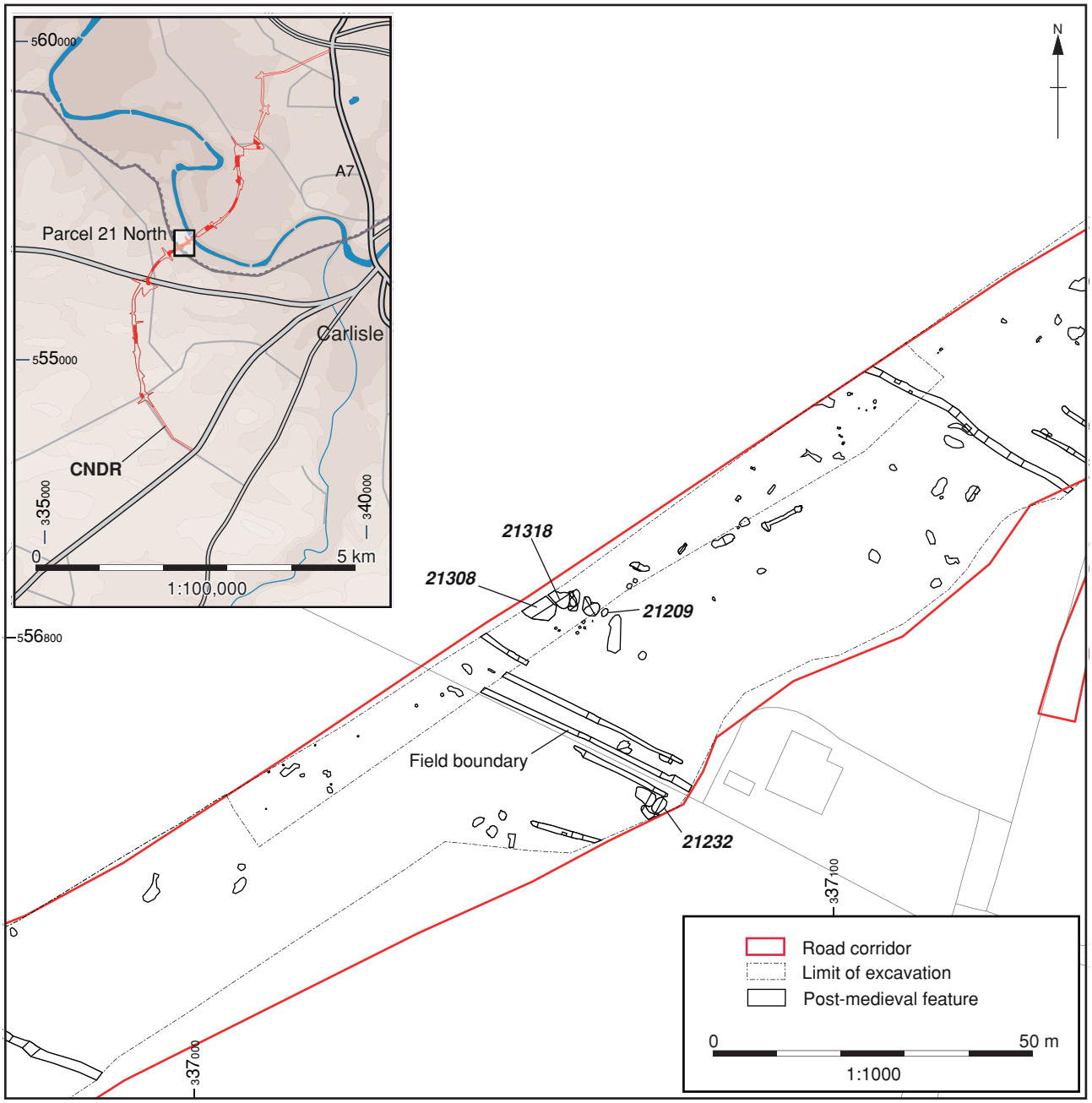


Figure 258: Post-medieval remains in Parcel 21 North (Contains OS OpenData © Crown Copyright [and database right] (2022))

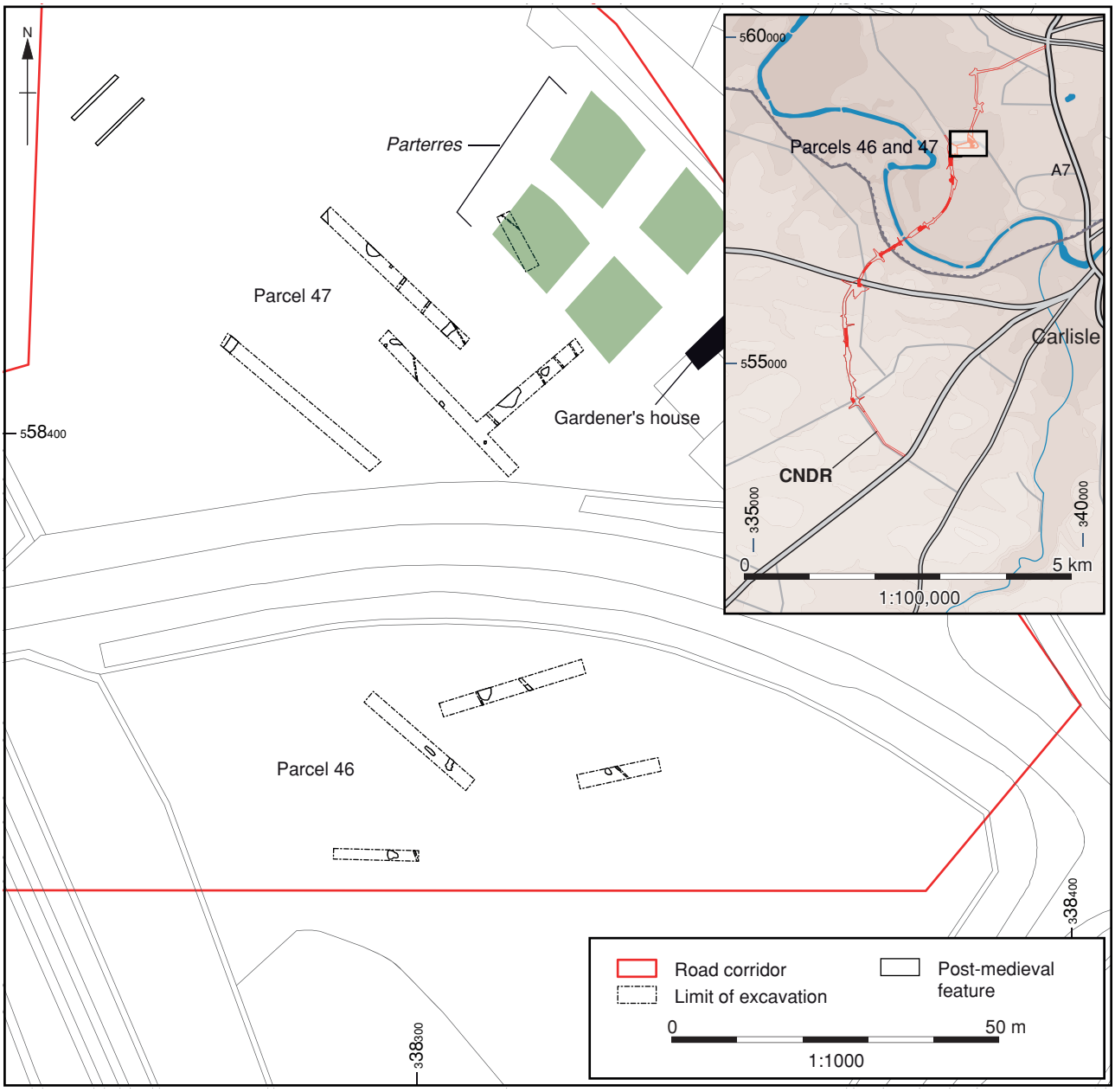


Figure 259: Evaluation trenches with post-medieval features in Parcels 46 and 47, overlain on garden features from the 1823 enclosure map (CA Q/RE/1/99) (Contains OS OpenData © Crown Copyright [and database right] (2022))

eighteenth-century formal garden forming part of Kingmoor House (*p 518*). This evaluation indicated that the survival of below-ground remains and artefacts associated with this garden was minimal. Those that were present included several shallow throws and areas of bioturbation caused by the trees and shrubs that had once grown in the garden, but none corresponded in any meaningful way to the known garden plan. Land drains were also identified in all but one of the trenches, some on the same alignment as the former garden paths, so they were presumably eighteenth century in date. A fragment of pale yellow sandstone (Pl 200) from the topsoil in Trench 47.1 has been identified as a quiver of arrows, perhaps once adorning a statue of Cupid or Eros, or some other such figure, used to decorate the formal garden (*Appendix 12*). The only other finds were

Plate 200: The sandstone fragment from Trench 47.1, seemingly a quiver

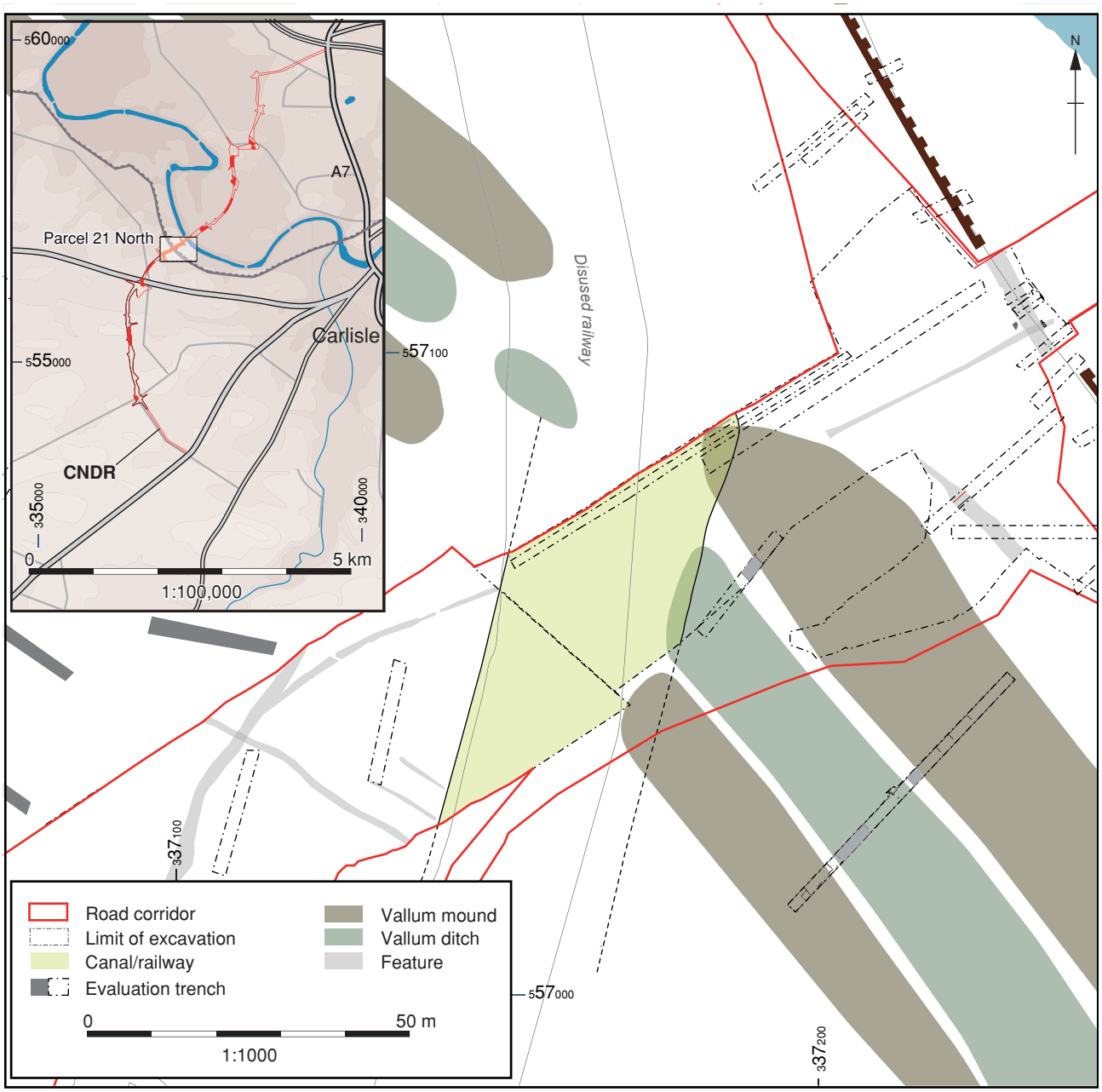


Figure 260: Canal and railway features cutting through the Vallum at Knockupworth (Contains OS OpenData © Crown Copyright [and database right] (2022))

sherds of eighteenth-century pottery, from either the topsoil or land drains, which may again relate to the use or laying-out of the garden.

Canals and Railways

The partial remains of the Carlisle Canal and the Carlisle and Silloth railway (*p 521*) were identified at Knockupworth (Fig 260), cutting through the Vallum of Hadrian's Wall (*Ch 13, p 478*). Only the uppermost backfills were excavated, given the relatively shallow construction impact of the new road in this area, and these were shown to comprise dumps of mixed building debris, one of which contained post-medieval pottery (*Appendix 11*). However, no coherent structural remains of either the canal or the railway were observed.

The watching brief undertaken during the construction of the road also recorded the remains of the 1847 line that was operated by the Caledonian Railway, linking Carlisle with Glasgow and Edinburgh (*p 521*). These remains related to its foundations and comprised a pair of linear, parallel deposits of stone and cinder, containing large numbers of metal bolts.

Plate 201: The CNDR crossing the River Eden, with Hadrian's Wall at Knockupworth to the south, and Stainton West to the north

15

ANCIENT EDEN AND BEYOND: LANDSCAPE DEVELOPMENT AT THE HEAD OF THE SOLWAY FIRTH

F Brown, R A Gregory, and J Zant

From the CNDR's initial conception, it was understood that the Hadrian's Wall frontier system (*Ch 13*), which is inscribed on the World Heritage List as part of the transnational *Frontiers of the Roman Empire* World Heritage Site, was going to present a major archaeological challenge for the scheme. It soon became apparent that the construction of a desperately needed new road bridge over the River Eden would require the excavation, and therefore controlled destruction, of part of the Wall. There were some benefits to this, however, as it would also provide a rare and keenly awaited opportunity to investigate a transect across this western stretch of the frontier works (Symonds and Mason 2009a; 2009b). In terms of the scheme at large, it was also recognised that archaeological monitoring of the road construction would evaluate systematically an extensive corridor through the lowland landscape, at the head of the Solway Firth, which would, hopefully, aid greatly with its characterisation (Pl 201).

What was not anticipated at the outset was the quality and quantity of the early prehistoric remains that would be unexpectedly identified, at Stainton West, on the floodplain north of the river. This can perhaps be excused, as the site was then nationally unprecedented in terms of its scale, complexity, and importance (Pl 202). There, a huge and extensive *in-situ* Late Mesolithic lithic assemblage was revealed, associated with encampment features, on a preserved land surface sealed beneath

Plate 202: The partially excavated Principal palaeochannel *and Mesolithic encampment at Stainton West*

alluvium (*Chs 3-5*). The encampment was adjacent to a palaeochannel containing a Mesolithic to Bronze Age waterlogged sequence, including well-preserved palaeoenvironmental remains, wooden structures, and other artefacts. Constraints to the construction programme meant that there was no opportunity for redesign and preservation *in situ*, even though excavating the site would be expensive and challenging. Ultimately, however, the outstanding, nationally important, results have provided ample justification for the excavation and research programme.

The time depth provided by these prehistoric discoveries has enabled a detailed investigation into the development of the landscape surrounding Carlisle. The pastoral fields, through which the road was built, were not always there, being an artefact of the changing relationships between humans and their environment. It was a very different landscape that would have confronted the first people to recolonise the area, probably several centuries after the end of the last Ice Age (Reynier 2005; Conneller *et al* 2016; Conneller 2022). Following deglaciation, warmer climates encouraged reforestation and the return of various animal species, as well as the humans who relied upon them for sustenance. During the millennia that preceded the arrival of the Roman Empire and the construction of Hadrian's Wall, firstly, prehistoric hunter-gatherers and then farmers did much to shape this environment and adapt it to their needs and tastes (*Chs 3-12*). Throughout the Roman period, this process was continued by those who grazed and tilled the clearances, and managed the woodlands, in the surroundings of the Wall and the military fort at Carlisle (*Ch 13*). There seems to have been some further reorganisation during the poorly understood time that followed the withdrawal of the Roman army from the British Isles, at the beginning of the fifth century AD (*Ch 14*), whereas the wide-scale enclosure of the medieval and post-medieval periods was a precursor to the modern landscape.

The Mesolithic Period: Enculturing the Eden Valley

Early Mesolithic activity

The early Holocene River Eden and its terraces were formed by the dynamic geological processes that attended deglaciation, when the climate warmed dramatically, towards the beginning of the tenth millennium cal BC (*Ch 2, p 39*). At this time, the river was probably relatively fast-flowing, conceivably in a series of anastomosed (braided) channels across its floodplain (Pl 203). Eventually, as various tree and

Plate 203: An anastomosed river system (Waimakariri River) in the South Island of New Zealand (photograph by I Gobeirne; Attribution 2.0 Genric (CC BY 2.5), https://commons.wikimedia.org/w/index.php?curid=2437562)

plant species recolonised from the Continent (Birks 1989), the valley would have become densely wooded, and by the eighth millennium cal BC, deciduous late boreal woodlands would have comprised taxa such as hazel, oak, and elm. These would have been populated by sylvan game, including aurochs, deer, and wild pig, and the rivers would have been well stocked with fish and wildfowl. People too would have almost certainly colonised the Solway Firth area, and evidence for hunter-gatherer activity, from the first few millennia of the Holocene, has been recovered from both Cumbria and southern Scotland (*Ch 3, p 59*).

The evidence from the CNDR for this early Mesolithic period was slight, and no material culture was recovered. A ninth millennium cal BC radiocarbon date (*Ch 3, p 63*) was obtained from residual blackthorn-type charcoal in the ditch of the henge monument (*Ch 10, p 323*), on the (Pleistocene) river terrace (Terrace 1; *Ch 2, p 40*) on the northern side of the Eden. If this was not due to lightning, or another natural occurrence, then it might indicate either a campfire or the deliberate burning of local vegetation. Some possible further, corroborative, evidence for human activity, although this has not been precisely dated, was detected in the form of fine charcoal and burned minerals within a lower subsoil at the Stainton West site. To the north of the CNDR, the early Holocene river terrace (Terrace 2; *Ch 2, p 40*) was visibly fluted by palaeochannels, and it is possible that the watercourses that once flowed at the edge of the contemporary floodplain acted as foci for humans.

Late Mesolithic activity at Stainton West

The earliest hunter-gatherer encampments

It is not entirely clear when in the Holocene the river terrace formed on which the Stainton West site was found (Terrace 3; *Ch 2, p 41*). It was, however, certainly before the end of the seventh millennium or the beginning of the sixth millennium cal BC, when a hunter-gatherer encampment (Structures 1 and 2; *Ch 3, p 65; p 68*), confirmed by the presence of hearths and at least one bivouac, or tent-like, dwelling (Structure 1), was established there, on an island between two river channels (the *Backwater channel* and the *Principal palaeochannel*; *Ch 2, p 43*). This encampment (Fig 261) provides the first unequivocal evidence for human activity from the project and signals the beginning of what was to be an extremely prolonged history of occupation, and other activity, focusing on this island (*Ch 5*).

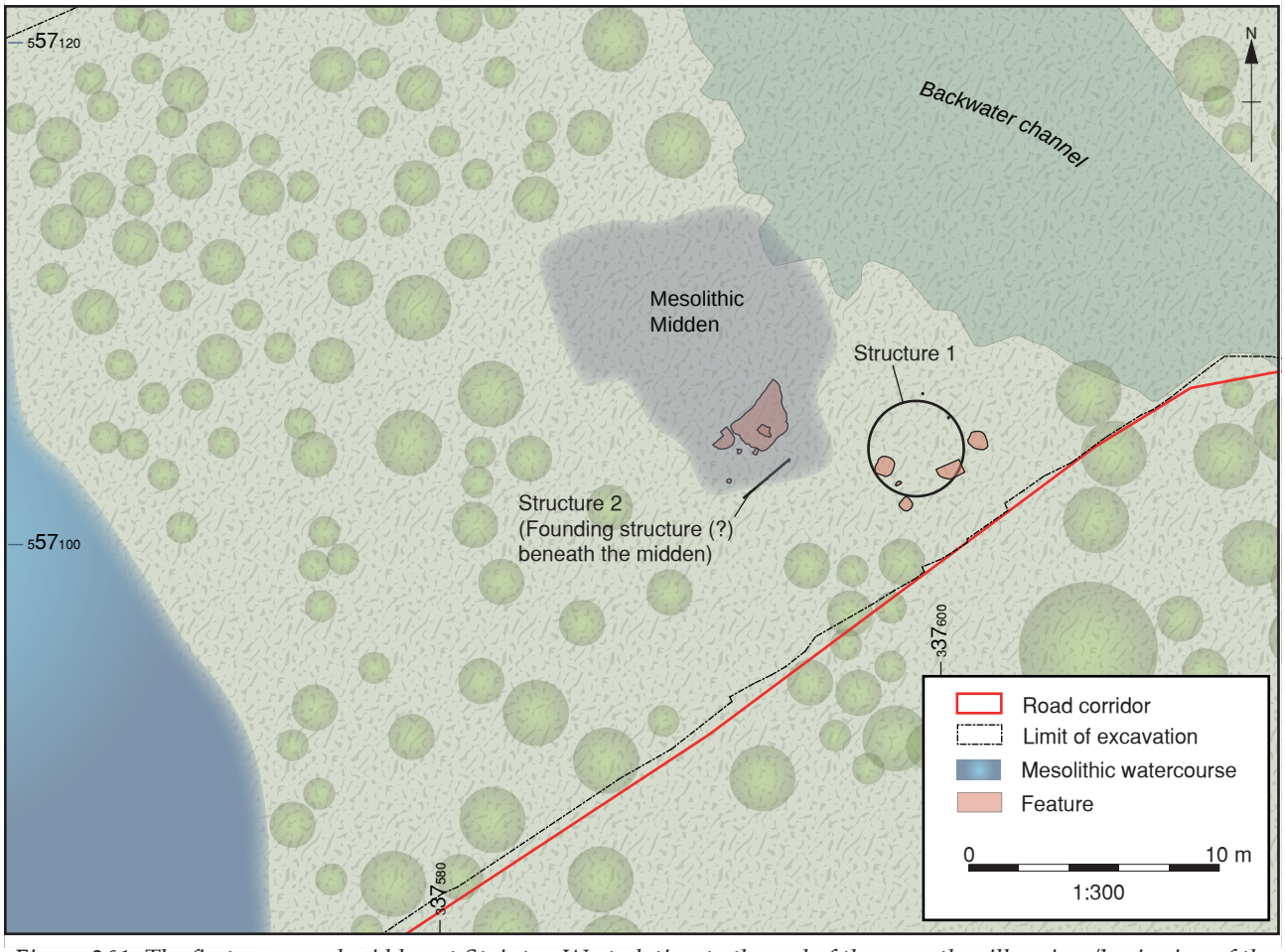


Figure 261: The first camp and midden at Stainton West, dating to the end of the seventh millennium/beginning of the sixth millennium cal BC

Prior to this time, any evidence of human activity may have been eroded by river action, in a dynamic floodplain environment. It may be no coincidence, however, that activity apparently intensified during the period of climatic amelioration that followed the 8.2 ka (*c* 6200 cal BC) climatic event (*Ch 3, p 100*). Hitherto, the near-glacial conditions may have meant that game was scarce, especially if the Gulf Stream had been disrupted or diverted (Hoffman *et al* 2012) and with it migrating fish and bird species (Tipping 2010, 69).

A large, *in-situ*, flaked-lithic assemblage was associated with these structures, pieces seemingly lying where they had been produced, or last used and dropped. Being dominated by narrow-blade geometric microliths (*Ch 3, p 56*), this was typical of a Late Mesolithic technology (Conneller 2022, 25; *Appendix 10*). A midden (*Ch 3, p 100*), indicated by a distinctive depositional signature in the lithic distribution (but once also presumably comprising organic materials), probably first started to form in association with this phase of encampment. This was superimposed on the former site of Structure 2 (one of the camp's founding dwellings; *Ch 3, p 68*), and may have been broadly contemporary with the adjacent Structure 1. The midden then apparently acted as a landmark for many centuries after this, as it was a focus for activity indicated by lithic distributions and archaeological features (*Ch 4, pp 120-2*). Associated radiocarbon dates were indicative of firstly intermittent and then, subsequently, more intensive hunter-gatherer activity, up until the middle of the fifth millennium cal BC (*Ch 4, p 141*; *Ch 5, p 149*).

After the abandonment of Structure 1, specific episodes of activity, particularly tree-throws associated with lithic assemblages, focused on the edge of the *Backwater channel* (*Ch 3, p 96*). These were radiocarbon-dated to the end of the sixth millennium or beginning of the fifth millennium cal BC. The incomplete lithic reduction sequences are more consistent with logistical visits to the site than prolonged residence, although there was a sense that dwellings were still being erected in the area immediately adjacent to the midden. Indeed, although not confirmed by radiocarbon dating, some of the structural traces identified there (*Ch 4*) could conceivably have dated to this period. The midden may also have continued to accumulate, being added to by material cleared away from this domestic area.

The distribution of the dated tree-throws, and of the *in-situ* lithic assemblages, suggests that, whilst domestic activity appears to have been tightly focused on the midden, other forms of activity were not, as they possibly extended over the full expanse of the excavated *Grid-square area*. Whether the entire island, and the others presumably adjacent to it, were used to a similar degree of intensity is unclear, though, for no archaeological investigations took place beyond the road corridor.

So, for over a millennium, there may have been contrasting episodes of, variously, unintensive use, associated with resource procurement/foraging, and intensive residential visits, where the site may have functioned as a more permanent camp. Whether, this was linked to different seasons or longer cycles, or shifts, in patterns of settlement and mobility is not known.

Waterlogged remains

In the *Principal palaeochannel*, organic preservation was much better than on the dry land because of permanent waterlogging. There was therefore a wealth of information about the surrounding environment, but also some organic cultural material too. Because of acidic conditions, however, just as was the case on the adjacent dry land, bone did not survive. Despite this, there was some evidence for larger animals, as much of the wood in the channel had been gnawed by beavers (Pl 204), whilst one large trunk also bore the traces of claw marks (Pl 205), left by what was either a lynx or, perhaps more probably, a young brown bear (*Ch 3, p 82*).

Plate 204: Beaver-gnawed wood from the Principal palaeochannel

Plate 205: Probable brown bear or lynx claw marks on an oak trunk from the Principal palaeochannel *(scale 200 mm)*

Significantly, a beaver-built dam and lodge constructions were also identified, indicating that this industrious species would have had a profound effect on the riverine and adjacent landscape, perhaps in a kind of synergy with humans (Fig 262). Indeed, the dam incorporated large pieces of charred wood, possibly indicative of hunter-gatherer manipulation of the woodland by fire setting, and the lodge appeared to have been constructed around a tree that had fallen into the channel after having been axe scarred, possibly girdled (*Ch 3, p 82*).

Lithic finds indicate that the lodge was also used by humans, presumably after the beavers had vacated it, perhaps because it formed an island or handy promontory into the river. Radiocarbon and dendrochronological evidence show that this anthropogenic activity in the channel took place between the middle and the end of the sixth millennium cal BC (*Ch 3, pp 76-82*), providing further confirmation that the encampment on its banks was occupied during this period (*p 534*). No evidence for any earlier activity had been preserved because, formerly, the channel flow had been too fast for organic sediment or materials to accumulate.

A significant place

Other pieces of wood from the channel also indicated coppicing and tree felling (*Ch 3, p 92*), again demonstrating that the woodlands were manipulated to some degree. Despite this, pollen evidence suggests that, generally, human impact on the woodland was fairly minimal and not sustained: certainly, there was no evidence for widespread clearance. As such, and given the lithic evidence for settlement (*p 534*), it is probably best to imagine that the island between the channels (albeit that, by this time, the *Backwater channel* may have been more like a bog than a stream) acted as a focal place, and, although it was still wooded, this woodland may have been thinned and coppiced, with the canopy being interrupted by a small glade or clearing, in which the midden stood.

There are many possible reasons why this place should have been returned to time and again (*Ch 4, p 147*). It may simply have been because it was at a distinct and convenient place at the edge of the floodplain, perhaps even a fording point, and, once the midden had accumulated and the woodland been altered, this distinction was amplified. Additionally, strong mythic

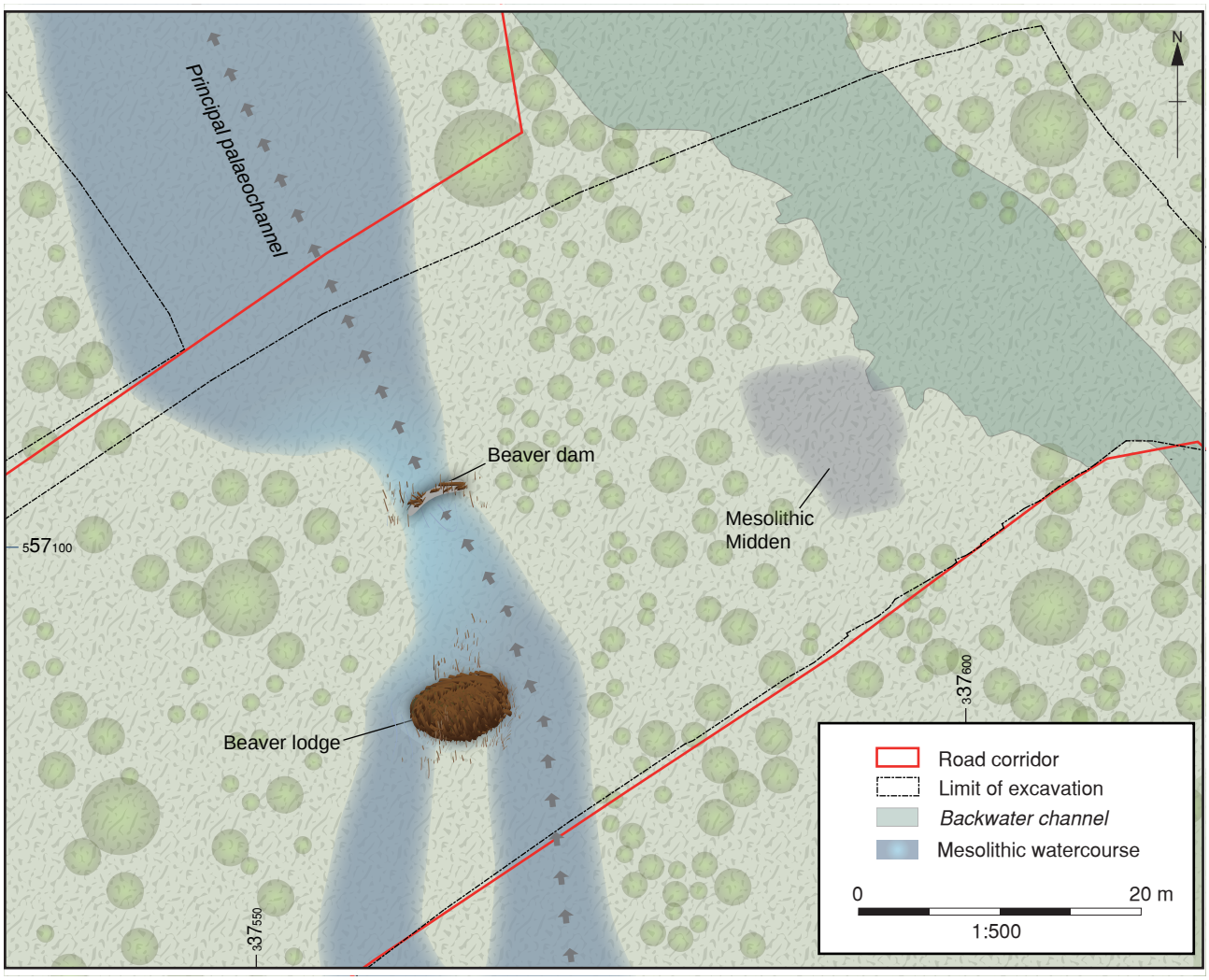


Figure 262: The beaver lodge and dam, and midden, at Stainton West, during the middle and late sixth millennium cal BC

and cultural associations may have developed with use, drawing people back to what had become a significant place for them. Indeed, by analogy with other similar island locations, it may even have been where funerary rites of passage took place (Cummings 2017, 15).

A Residential Camp

The enduring significance of this place might help to explain why, during the second quarter of the fifth millennium cal BC, the encampment seems to have flourished, becoming, if anything, more intensively used (*Ch 4, p 145*). The extent and intensity of activity and the high degree of spatial organisation suggested that it acted as a residential or base camp (Binford 1980), either for a hunter-gatherer band or, assuming that the entire island was occupied, an aggregation of different, but related, bands (*ie* loosely speaking, a clan).

Lithic technology

The lithic use-microwear study (*Appendix 7*) supports this interpretation, providing evidence for the wide range of activities that might be expected at a base camp. It identified impact damage, hide working, butchery, antler/bone working, woodworking, and plant cutting. Much of this would have been related to the manufacture of hunting gear and other equipment, and there are indications that a good proportion of the activity at the settlement was spent in craft production. Other wear traces may have been associated with food processing, but many of the numerous microliths (particularly scalene triangles, crescents, and rods), which often showed impact damage, were probably used as armatures in hunting weapons.

Settlement economy

The lack of faunal remains means that a detailed reconstruction of the site's subsistence base is not possible from the evidence, but, given its position on the floodplain, it is probable that many of the microliths would have been used in fishing gear, perhaps as barbs in leisters to hunt salmon and other fish. Analysis of use-wear on the tools to establish this is difficult, though, as fish skin, being thinner than hide (Hurcombe 2014, 89-90), does not always leave wear traces, and any surviving signature might so resemble that left by meat or hide as to be indistinguishable. That at least some fishing was undertaken at the site was, however, demonstrated by a waisted pebble, probably used as a line or net weight (*Ch 4, p 140*). If fishing was important, then the intensification of encampment activity (*Ch 4, p 145*) may have been encouraged by the yearly return of migrating salmon to the Eden (Pl 206), an important salmon river both historically and today (REDFA 2014). In addition, it is quite likely that other fish, such as European smelt, would be another important aquatic food source,

Plate 206: Salmon migrating up-river (photograph by Ingrid Taylar; Attribution 2.0 Generic (CC BY 2.0))

which may have entered the Eden to spawn in large numbers (Galloway Fisheries Trust nd; *Ch 4, p 108*). The position of Stainton West, at a point just beyond the tidal head, where the estuary was constrained into a series of channels, would have been well-suited from a practical fishing perspective (*Ch 5, p 159*).

There are some reasons to believe that the site was not permanently occupied all year around (*Ch 5, p 149*), with it perhaps mainly being visited in the spring. The lack of evidence for drying racks, structures for smoking fish, or storage pits may be significant in this regard, suggesting that preservation for storage was not a major concern. Salmon may then have been consumed rapidly in spring feasts, rather than being stored for winter consumption (Warren 2001, 167). This might also imply that fishing was part of a mixed economy, rather than a semi-sedentary, salmon-specialist economy, such as those recorded ethnographically on the north-west coast of the USA and Canada (*op cit*, 162-5).

If salmon, and other migratory fish, were a subsistence mainstay, a wide variety of other nutritional resources would also have been seasonally available near to the camp. The lithic evidence suggests that bone/antler and hide were harvested and worked, although the extent to which the diet and economy was dependent on large game (aurochs, deer, and pig) is unclear. Indeed, the rarity of use-microwear traces of wet-hide working on lithic pieces might suggest that the bone, antler, and hide were curated materials, primarily collected at different places, at other times of the year. As such, it has been argued (*Ch 5, pp 180-1*), that although these species may have been hunted when encountered in the woods around Stainton West, they may have been more important during late summer/autumn, when the community would have relocated to a residential camp further up the Eden Valley.

During late autumn, nuts would have been abundant in the hazel-dominated woodlands, and burnt hazelnuts were recovered from the site, suggesting that they were eaten. Oaks could have yielded acorns in plenty and many other edible plant species (providing berries, fruits, leafy plants, seeds, tubers, and rhizomes) would also have been available throughout the summer and autumn (Simmons 1996, table 4.1, 164), so it is likely that plant foods provided some nourishment, variety, and flavour to the diet. However, these resources would have been widely available, and it is not clear that Stainton West was necessarily occupied when they were all ripe.

The large amounts of beach-pebble flint in the lithic assemblage (*p 539*) suggests time was also spent on the coast, or the raised beaches of the Solway Firth, so coastal resources, including marine fish, seaweed, shellfish, and marine mammals, for instance seal and dolphin, may also have been important. Birds would have been prolific around the Firth, particularly during seasonal migrations, with sea birds, and their eggs, being available in the late spring, and waterfowl during the winter and early spring months (*cf* Bonsall 1981, fig 11, 466).

Population

The actual number of people who may have camped at Stainton West can be estimated in several ways (*Ch 5, p 157*). Much depends, though, on whether it was the core of an entire settlement that was revealed within the excavation (Fig 263), or whether this was only a fraction of a much larger settlement, with the whole island being inhabited to a similar degree of intensity. This is difficult to determine, given the restricted area of excavation, although there are some subtle hints that the latter situation was perhaps more likely. In the case of the former scenario, perhaps a band of less than 30 individuals might be posited, whereas, in the case of the latter, a clan (several bands) comprising over 100 individuals is possible.

A consideration of the lithic raw-material evidence (*p 539*; *Appendices 2-6*) suggests that the Stainton West band's/clan's territory was focused on the Eden Valley (it was possibly only one of many such groups associated with this area). The presence of Scottish chert and Arran Pitchstone within the assemblage also suggests contact with other clans that may have been concentrated on the valleys of the Nith, Annan, and Esk, which also drain into the Solway Firth. As such, it is possible that, at certain times of the year, the estuary was populated by an influx of hunter-gatherers who were at other times dispersed along these river-valley systems. Such a fertile ecotone would have been seasonally abundant in resources and could thus have sustained a large hunter-gatherer population (*cf* Bonsall 1981, 467-8). It follows, therefore, that Stainton West may have been only one aggregation or base camp amongst many around the Solway.

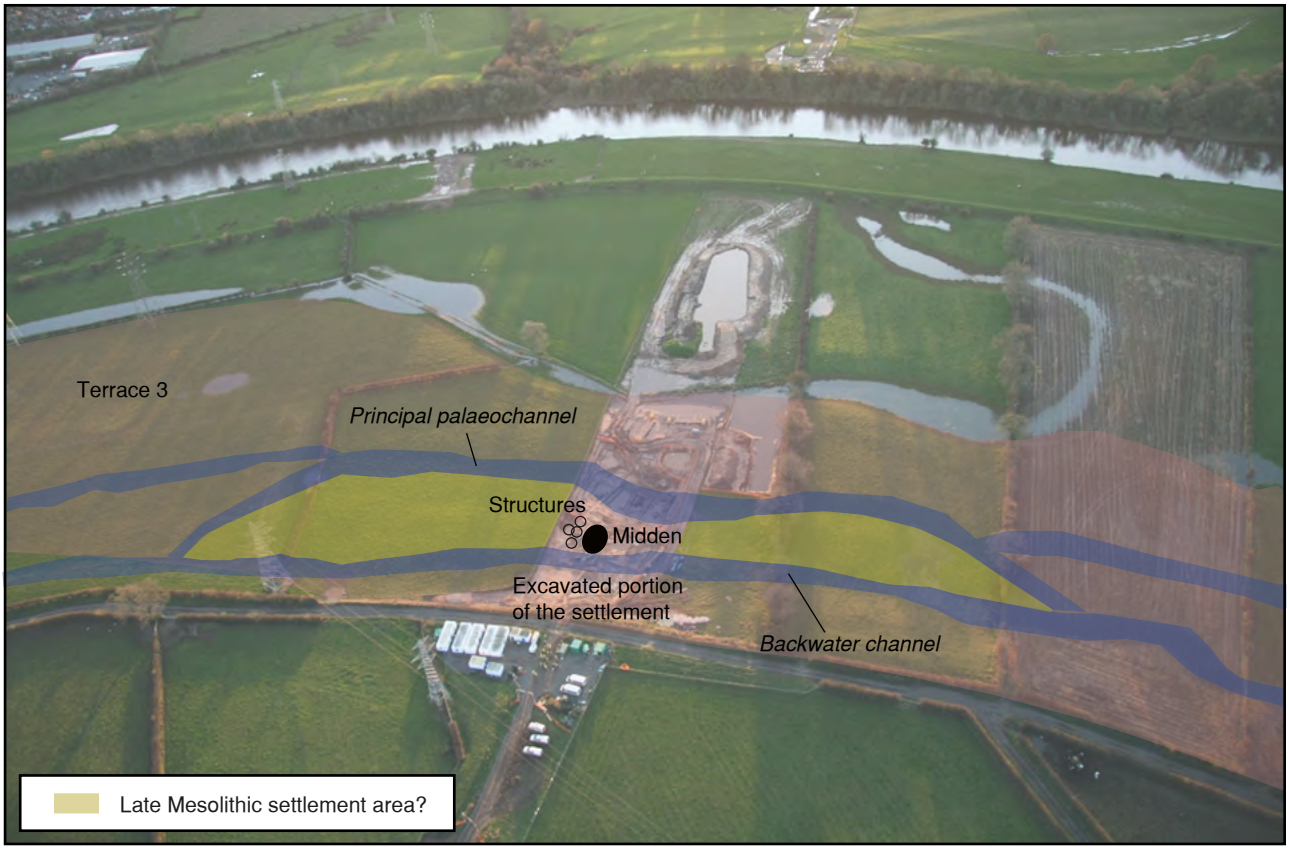


Figure 263: The possible extent of the fifth millennium cal BC encampment at Stainton West

Settlement organisation

The Stainton West encampment was occupied in one form or another, in varying degrees of intensity, for *c* 1500 years or more (*Ch 5, p 149*). The encampment space seems to have been used conservatively, in the sense that there appears to have been a concern with respecting past traditions of spatial practice (*Ch 5, p 150*). This was largely indicated by the patterning of various attributes of the lithic assemblage, the distribution of which evinced a remarkably coherent structure (*Ch 5, p 154*). Various analyses (*Ch 4, p 112*) revealed consistent patterns of deposition, which implied that the site was zoned (Fig 264), and that certain zones were more strongly associated with certain activities (*Ch 4, pp 112-14*), for, if the occupation and the use of space had been more casual and haphazard, or if the organisational scheme had changed and activity foci had shifted over time, then the lithic signature would have blurred into homogeneity.

After activity at the camp intensified, the midden provided a central focus for, respectively, areas of habitation, tool production and maintenance, butchery, hide working (perhaps associated with the manufacture of skin boats), and the reduction, production, and maintenance of polished-tuff axes. It is possible, however, that these zones had already been associated with such activities for centuries beforehand, as was the case with the midden and the habitation area (*pp 533-4*). Even if zonation originated, or became more pronounced, with settlement intensification, the zones appeared to have been used in similar ways for at least a century, and feasibly much longer, until the encampment was finally abandoned, probably at *c* 4300 cal BC, or at some point in the century preceding this (*Ch 4, p 145*). If it was the entire island that was inhabited, then occupation may have been modular, with various domestic foci clustering in association with related middens, separated by areas that were more closely associated with other activities (*Ch 5, p 158*).

Despite the surprising longevity of the Stainton West encampment, its organisational complexity, and the apparent persistence of this scheme, it still seems that this community subsisted through foraging and had a residentially mobile lifestyle. Even in its late phase, the encampment does not seem to have been

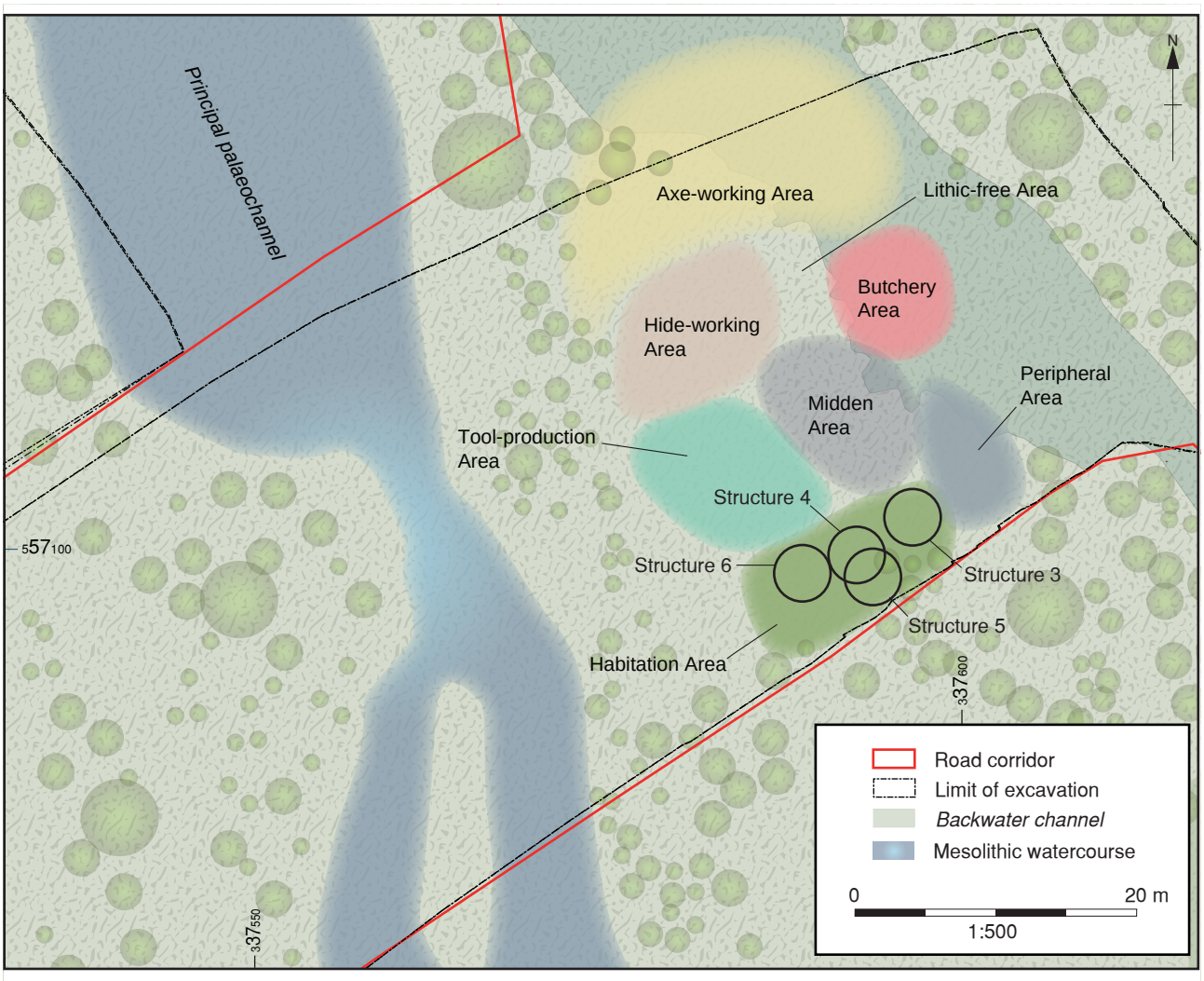


Figure 264: The layout of the fifth millennium cal BC encampment at Stainton West

a permanent settlement for a sedentary community. This impression is based on the restricted nature of the lithic evidence, particularly the minimal microwear evidence for wet-hide processing (*Appendix 7*); the lack of key seasonal-activity indicators (such as storage pits, drying racks, and quantities of hazelnut-processing residues); the wide variety of lithic materials at the site (*Appendices 2-6*); and the general patterns of lithic raw materials distributed along the Eden Valley (Dickson *et al* in prep).

As such, each visitation to the site was probably undertaken within living memory of the last, and although exactly the same people may not have been present from one visit to the next, there was likely to have been some overlap. The observed degree of spatial continuity is hard to explain otherwise, even allowing for certain topological, hydrological, or vegetational formations acting as functional prompts, encouraging how the space was used (*Ch 5, p 150*). So, it seems likely that the knowledge of how to use the space appropriately was preserved and passed on directly. Indeed, the site may well have been perennially reoccupied, with the still-visible remnants of former camps being cleared away and deposited on the midden, and new dwellings being built on, more or less, the same footprints of the old (*Ch 5, p 152*).

Lithic raw materials and wider connections

The wide range of lithic material types represented within the assemblage suggested a degree of residential mobility, perhaps travel over long distances, and integration into extensive exchange networks (*Ch 5, p 166*). Most of the assemblage comprised beach-pebble flint and various kinds of local chert, which were all obtainable from the nearby coast or the Eden Valley and its tributary systems. As such, it can be suggested that the Eden's catchment formed the habitual range (*Ch 3, p 54*; *Ch 5, p 174*) for this hunter-gatherer band (or clan). However, a minority, but still significant quantities, of other, more exotic, types, including Arran Pitchstone, Scottish chert (probably from the Southern Scottish uplands), central Lake District tuff, Pennine chert, and good-quality Yorkshire flint from Flamborough Head, demonstrated a much larger social range (the area over which this community had connections and knowledge; *Ch 3, p 55*; *Ch 5, p 174*), extending for as much as 200 km from the site, possibly in all directions (Fig 265).

It is interesting to note that many of these stone types can be identified confidently within the assemblages associated with the earliest phase of encampment, although they did become more common by its latest phase. Furthermore, geochemical analysis points to the use of a restricted range of very similar lithic sources over the encampment's entire history. So, in terms of lithic procurement, access to these, often distant, sources appears to have been maintained throughout. This points to a preference for specific outcrops, and resilient and enduring relationships maintained between communities living great distances apart.

Illustrative of this, as well as being highly significant in its own right, was the geochemical identification of the utilisation of Group VI (*sensu stricto*) Langdale tuff for ground-stone axe and adze manufacture (*Ch4, pp 110-11*). It is highly improbable that this material could have been identified amongst, and selected out from, the mass of ostensibly similar glacial erratic rocks or river pebbles that would have been available in the Eden Valley, and it is much more likely that it was obtained directly

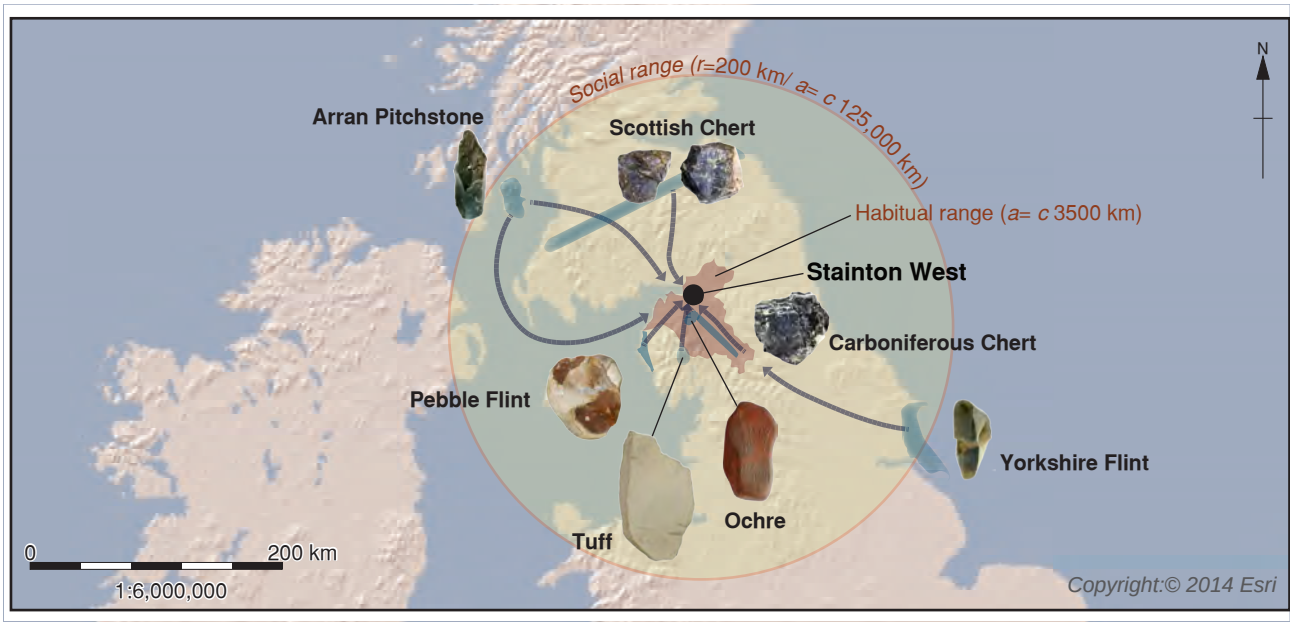


Figure 265: Habitual and social ranges of the Stainton West hunter-gatherers, and the source areas for the worked stone from the site

Plate 207: Great Langdale, looking south, with the screes (left) largely composed of axe-working waste (Mick Knapton; Attribution 3.0 Genric (CC BY-SA 3.0), https://commons.wikimedia.org/w/index.php?curid=6051246)

from its parent strata in the immediate area of Great Langdale (Pl 207). There was compelling evidence for the use, reduction, and, possibly, manufacture, or maintenance, of ground-tuff axes and adzes during the fifth millennium cal BC at Stainton West (*Ch 4, pp 110-11*). One piece of Group VI (*Ch 4, p 111*) even bore the trace of what seemed to be a side facet, a common feature of Cumbrian Neolithic polished-stone axes made from this material (*cf* Darbishire 1874, figs 1 and 3) and known on at least one other Mesolithic adze (*cf* Little *et al* 2016, figs 5 and 6).

So, taken together, it would seem that the polished-stone axe and the exploitation of central Lake District tuff, and specifically Group VI, was an aspect of Cumbrian Late Mesolithic hunter-gatherer technology and material culture, at least during the fifth millennium cal BC. This may have been part of a wider phenomenon of Mesolithic polished-stone axe and adze use around the Irish Sea (David and Walker 2004, 325-7; Saville 2009; Woodman 2015, 146-9; Little *et al* 2016) and may not, therefore, have anything to do with continentally inspired Neolithic innovation (*cf* Bradley and Edmonds 1993; Sheridan 2010; Thomas 2013, 279-83; Cummings 2017, 51-7), although there may have been stylistic cross-fertilisation during this later period.

In addition, there was an assemblage of worked coarse stone, including hammerstones, large non-portable anvils, and grinding stones, and the net weight (*Ch 4, p 108*); ochre (*Ch 4, p 112*); two stone beads (*Ch 4, p 112*); and a pebble that had been incised with three parallel lines, which was possibly of some symbolic significance (*Ch 4, p 124*). The ochre may have been used for caulking boats, or as an adhesive for hafting, but also as a pigment, and, along with the beads and incised stone, suggests that ornamentation, physical appearance, and embellishment were likely to have expressed individual and group identity.

It is worth remembering that the stone tools from Stainton West, many of which were probably used during craft activities, would, on the whole, have been used to make other items, procure materials to make other objects, or were composite parts of other artefacts, which will have included an organic component. As such, the stone assemblage only represents the tip of the material iceberg, there being a wide range of other organic, and therefore perishable, materials which

did not survive (Hurcombe 2014). Wooden, skin, and bone artefacts, hide, fur, and feather apparel, cordage, and basketry, as well as canoes/boats and building superstructures, can be assumed, but have left no trace. It is some of these that would probably, most evidently, have signalled identity and kin relations (*op cit* 126-8; Cummings 2017, 20).

Patterns of mobility

The Stainton West encampment has been considered in detail, in terms of the existing models for Late Mesolithic society, settlement, and seasonal mobility (*Ch 5, p 173*). The scenario put forward suggests migration between hunter-gatherer aggregations, at several seasonal base camps, with intervening periods spent in smaller, familial or task-specific, groups, either in transit or at other places associated with logistical procurement. Although activity can be seen as largely contained within the Eden Valley, excursions into the Lakeland uplands and the Pennines also seem to have taken place. At least two seasonal base camps can be proposed: Stainton West forming that of a spring fishing camp, at the estuary mouth; whereas activity in late summer/early autumn may have been focused further up the Eden Valley, around the confluences with other rivers, such as the Eamont and the Lowther (*Ch 5, p 179*). Visits to the uplands may have taken place in association with the latter and when journeying between the two Eden settlement foci. Winter, it is suggested, may have been spent on the coast, in dispersed settlements, or at a third base camp.

It should be emphasised that deeply held attitudes towards different parts of an encultured landscape (Zvelebil 2003), and the social relations maintained between remote groups of hunter-gatherers, are thought to have been important motivating factors encouraging these patterns of mobility (*Ch 5, p 166*). Although they undoubtedly would also have had some economic basis, linked to strategies of resource procurement and scheduling, it is felt that these alone would have been insufficient to explain human behaviour. These social networks are indicated by the range and distribution in the landscape, including at Stainton West, of certain utilised lithic materials (*p 539*; *Ch 5, p 166*). The continuation of these Mesolithic patterns of lithic distribution into the fourth millennium cal BC is taken to indicate that these social networks endured into the Neolithic period. However, this does not necessarily mean that the situation was static, and there was some evidence that changes may have been afoot towards the last quarter of the fifth millennium cal BC.

Stainton West and Late Mesolithic society

Excavations of the Early Mesolithic lakeside settlement and timber platforms at Star Carr (Milner *et al* 2018a, 272) found evidence for activity and revisitation, taking place over centuries. The excavators have concluded that this hunter-gatherer community had a sense of its history and of the significance of that place, and that some commonality of belief, and an awareness of auspicious acts undertaken there, was retained over the centuries. This too is the impression gained from the excavations of the later site at Stainton West, with earlier phases of occupation being acknowledged by later ones, and it may have been characteristic of the British Mesolithic experience in general. Rather than being ahistorical, Mesolithic societies seem to have had deep social memories, bound in with their understanding of the landscape, while subtle changes in practice, detectable archaeologically, hint at a dynamism that textured this history and show that the situation was not static.

Instead of being stranded and isolated in pockets of clearance within a primeval forest, groups were interconnected to other, at times distant, communities by extensive and persistent social networks. Life was not an aimless quest expectant on a chance encounter with game; travel appears to have been inspired, in accordance with nature's seasonal rhythms, by various factors, including the desire to meet up and interact with other groups. Against the constraints imposed by the rugged and varied Cumbrian terrain, places, routeways, and landscape zones, through practice and tradition, gained certain associations and derived significance, becoming encultured. It was this geography that was passed down to subsequent generations.

Excavating palimpsest lithic sites

Salutary lessons can be learned from the excavation of Stainton West. The conservative use of the encampment space and its organisation into zones means that archaeologists should be optimistic about disentangling other palimpsest lithic sites, even when the assemblages are numerous and the sites have been occupied for long durations. Complete recovery, spatial analytical techniques, and other detailed analytical methodologies, such as refitting analysis, geochemical analysis, and use-microwear analysis, can be beneficial for this. This has obvious implications for site-sampling strategies, resourcing, and management. It can be concluded that unless there are very good reasons to believe the contrary, sites should not be partially excavated; indeed, they should not be excavated at all unless the resources are available (which are likely to be significant) to understand them effectively. The project has demonstrated that complex lithic sites can be understood, and given the lack of knowledge about early prehistoric life, and the rarity of known and intact *in-situ* sites, it is important that all management strategies and schemes of investigation are devised with due regard to their integrity and research potential.

A Deluge and an Hiatus

The chronological modelling of radiocarbon-dated materials from the Stainton West encampment (*Ch 1, pp 30-1; Ch 5, p 149*) indicates that it was probably abandoned in *c 4440-4330 cal BC*. At approximately the same time as this, alluvium (*Mesolithic alluvium* and the *Mesolithic/Neolithic alluvium*; *Ch 5*) seems to have started to accumulate over the site, filling in the *Principal palaeochannel*, the *Backwater channel*, and sealing the archaeological settlement deposits within the *Grid-square area*. Within the alluvial sediments filling the channel were numbers of large oak boughs and trunks (Pl 208), that, ruling out human agency, could only have been deposited by major flooding events. The oaks create a dendrochronological sequence (Cluster 2; *Ch 6, p 195*), and the difference between the measured ages of death of the trees shows that they were probably deposited over a period of something like 170 years. Moreover, the date of death of the oldest tree was consistent with the date for the abandonment of the encampment and the inception of alluviation. Therefore, it is possible that the encampment was abandoned, after 1500 years, or more, of occupation, because increased flooding meant that this part of the floodplain was no longer suitable.

After abandonment, there is some scant evidence, in the form of radiocarbon-dated charcoal and the odd piece of flaked-lithic material (*Ch 6, p 196*), that the site was still occasionally visited and used in an unintensive way. It may, as such, still have been important for foraging, as a ford, for river transport, or have even acted as a cultural/symbolic focus, but if any more permanent or large-scale encampment took place there, there was no evidence for this in the CNDR corridor.

*Plate 208: Excavating a Cluster 2 oak timber (**75648**) in Bay C, Stainton West*

Whilst it is possible that the Stainton West site, and the island it occupied, was relinquished in favour of another site nearby on the floodplain, or overlooking it, and that life continued much as before, it may alternatively have been that it was the social tradition of the Solway Firth aggregation (*p 541*) that collapsed. If so, this might also have been symptomatic of other social transformations, such as the disruption or realignment of communication networks, and/or relationships between different hunter-gatherer clans, or other shifts in ideology (but see *pp 550-1*). Hunter-gatherer groups would obviously still have needed to sustain themselves, but this may have been achieved via other, possibly less-intensive or aggregative, strategies, and different parts of the landscape may have been favoured. Ultimately, however, the reason for the site's marginalisation will have to remain a question for future research, perhaps when other parts of the Eden floodplain and terraces can be investigated.

Why alluviation should have increased at this time is also a matter of some interest. Sea levels seem to have been falling from their post-glacial maximum (Lloyd *et al* 1999), and although the evidence from this part of the *Principal palaeochannel* sequence was slightly contradictory, it did not indicate a dramatic increase in salinity (*Ch 6, p 192*). So, it does not seem likely that the tidal head had moved further inland, although some ponding up behind it is possible. Deforestation could have led to greater run-off and input into the Eden, along with increased sediment mobility and changes to the flow regime (Goldberg and Macphail 2006, 72). However, this would need to have been extensive to have had any such effect (R Tipping *pers comm*), and the pollen spectra (*Appendix 16*) do not indicate deforestation of the Eden catchment.

Alternatively, increased alluviation might ultimately have been linked to climatic fluctuations, and it is also possible that these may have been implicated in any changes in hunter-gatherer practices (*Ch 6, p 185, p 204*). Perhaps in support of this, evidence for decreasing temperatures, disruptions in vegetational cover, and phases of soil erosion have also been noted at a variety of late fifth millennium cal BC sites (*Ch 6, p 204*). The picture is complex, but there is also some evidence for increased storminess and dune mobility around the Irish Sea zone by *c* 4200 cal BC (Tipping 2010, fig 7.1, 67), and lower summer temperatures may also have led to wetter ground conditions (Tipping *et al* 2012, 12). In addition, there are suggestions that generally increased rainfall (a 'pluvial event') persisted in *c* 4300-3850 cal BC (Tipping 1994b, 14-5; Simmons 1996, 157). However, relatively drier climatic conditions seem to have returned at *c* 4100 cal BC (Bonsall *et al* 2002, 14-15), which is broadly coincident with the age of death (4144 cal BC) of the last flood-deposited oak in

dendrochronological Cluster 2, within the alluvium at Stainton West (*Ch 6, p 195*).

The Neolithic Transition: Channelling the Ancestors

Sometime during the middle of the fortieth to the first half of the thirty-ninth century cal BC, a light wooden structure (*Ch 8, p 236*), possibly a fish trap, was lost, abandoned, or deposited in the *Principal palaeochannel* at Stainton West (Pl 209). This was associated with the highly organic sediments (*Earlier Neolithic organic deposit*; *Ch 8, p 233*) that had started to accumulate above the alluvial deposits covering the settlement (*p 542*), as flow rates slowed down. By this time, the channel was largely silted and may have been little more than a ponded backwater or an oxbow with, ordinarily, little more than a stream trickling through it. Generally, the site seems to have been less susceptible to flooding than it had been during preceding centuries.

It is not clear if this fish trap represented the resumption of activity focused on the channel after a sustained lacuna or whether the evidence for any earlier episodes of activity had been eroded by flooding events. In either case, the fish trap was not associated with any other material that could be closely dated to this time, and it hence may simply indicate unintensive foraging in the area by hunter-gatherers, or could have been placed in the channel by the first farming communities in the surrounding area. The pollen data (*Ch 8, p 287*; *Appendix 16*) within this part of the channel sequence do not contradict this interpretation, providing no indications of vegetational disturbance, and all the other environmental proxies also point to conditions similar to those of the preceding millennium.

Relatively suddenly, as far as can be ascertained from the radiocarbon dates and the archaeological stratigraphy, this situation seems to have changed. At some point during the thirty-eighth century cal BC, and possibly more towards the middle or second half of this, a rudimentary wooden platform and other, post-built, structures were constructed in the channel (*Ch 8, p 240*), wooden and stone artefacts being associated. Some of these appeared to have been incorporated into the fabric of the platform (*Ch 8, pp 250-71*); some had been dumped (*Ch 8, pp 268*) and, on occasion, obviously placed (*Ch 8, p 275*) within the channel; and others seem to have been left where they

Plate 209: Fish-trap **75935**, *Stainton West (scale 300 mm)*

had been used (either in apparent association with the stream (*Ch 8, p 278*) or higher up along the channel banks; *Ch 8, pp 262-3*). This activity seems to have been tightly focused on the channel, as, apart from several radiocarbon-dated tree-throws (*Ch 8, p 279*) and a few flint tools, such as leaf-shaped arrowheads (*Ch 8, p 283*), the adjacent *Grid-square area* contained little evidence that was potentially contemporaneous.

Within the site, the platform extended along the channel's northernmost two-thirds (Fig 266), and was formed of a loose-lattice of what were often straight, pole-like lengths of unworked roundwood (Pl 210). These had been laid directly on top of the massive oak trunks and boughs, which had been deposited by flooding episodes several centuries earlier (*p 542*), and may have been recently re-exposed by an erosive event. The overall impression was that this wood derived from stands of hazel and alder adjacent to the channel, as well as anything else that could have been opportunistically sourced, and had been thrown down, possibly with lighter brushwood, to consolidate the gently sloping channel bank. The pole-like form of much of this wood means that it could have come from managed coppices. The other wooden structures comprised several stake settings and a hurdle fence, further west within the channel (Pl 211). The latter probably originally extended across its width at a point just upstream of where it broadened out into a pond. It is possible that this was used to guide fish or eels into baskets; alternatively, it may simply have been to subdivide the channel into different zones. Likewise, the other stake settings seem to have acted as markers of some kind in the channel.

Two distinct woodworking techniques could be discerned. The hurdle fences and post-settings were made of coppiced roundwood (usually hazel or alder), whereas the other artefacts, usually from mature oak or elm trees, were of an entirely different technology, which was not used in the stake settings or fence. These objects comprised the residues of felling, splitting, and planking and, in a few cases, finely carved artefacts, such as the paddle and two tridents made from the planks (Pl 212). These had variously been incorporated into the platform, or placed in the channel.

The stone artefacts within the channel also represented contrasting technologies, and their character and distribution suggest that they were representative of various different activities and practices. Firstly, there were quantities of large coarse stones, often types of

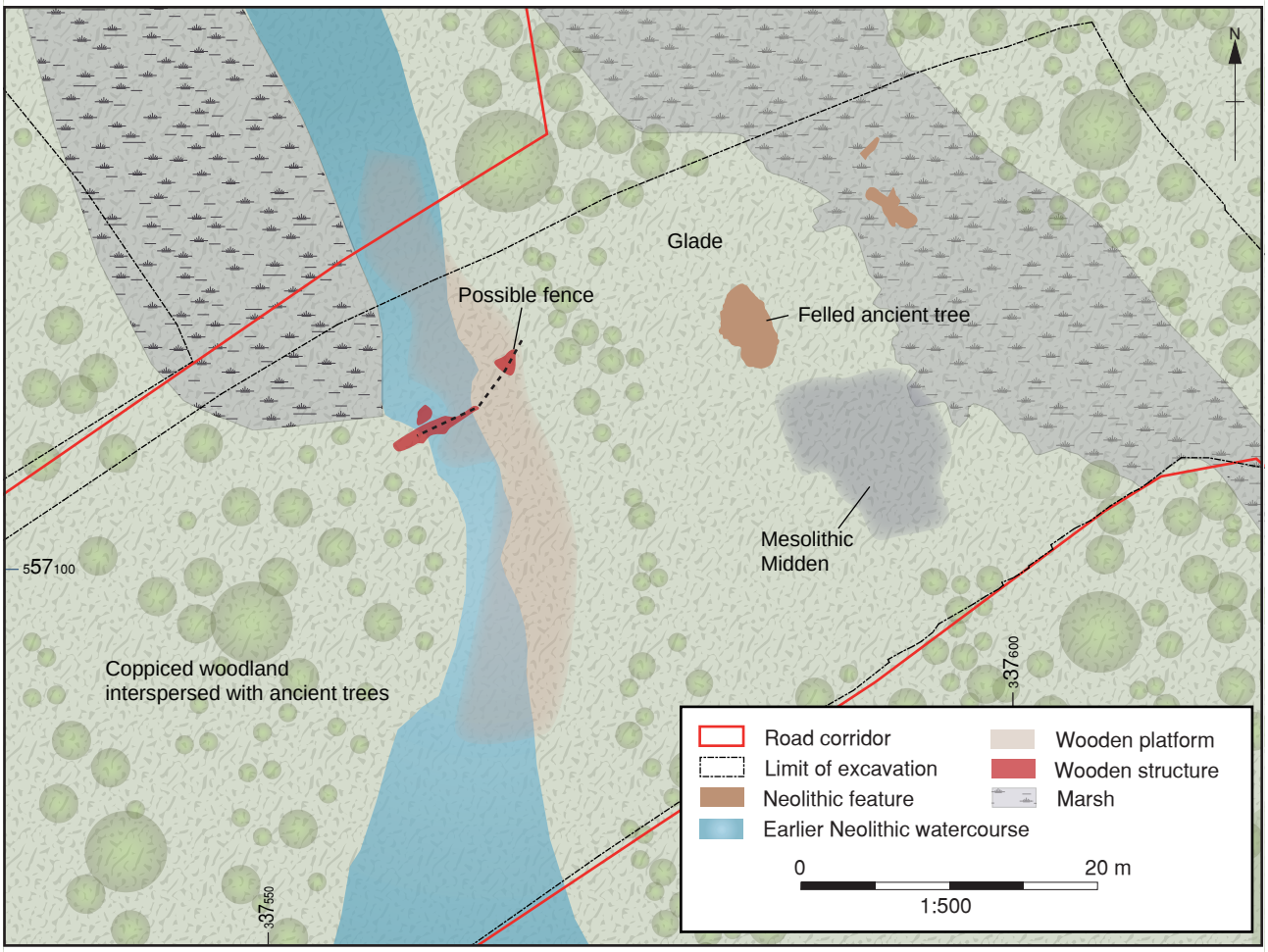


Figure 266: Stainton West in the earlier Neolithic period

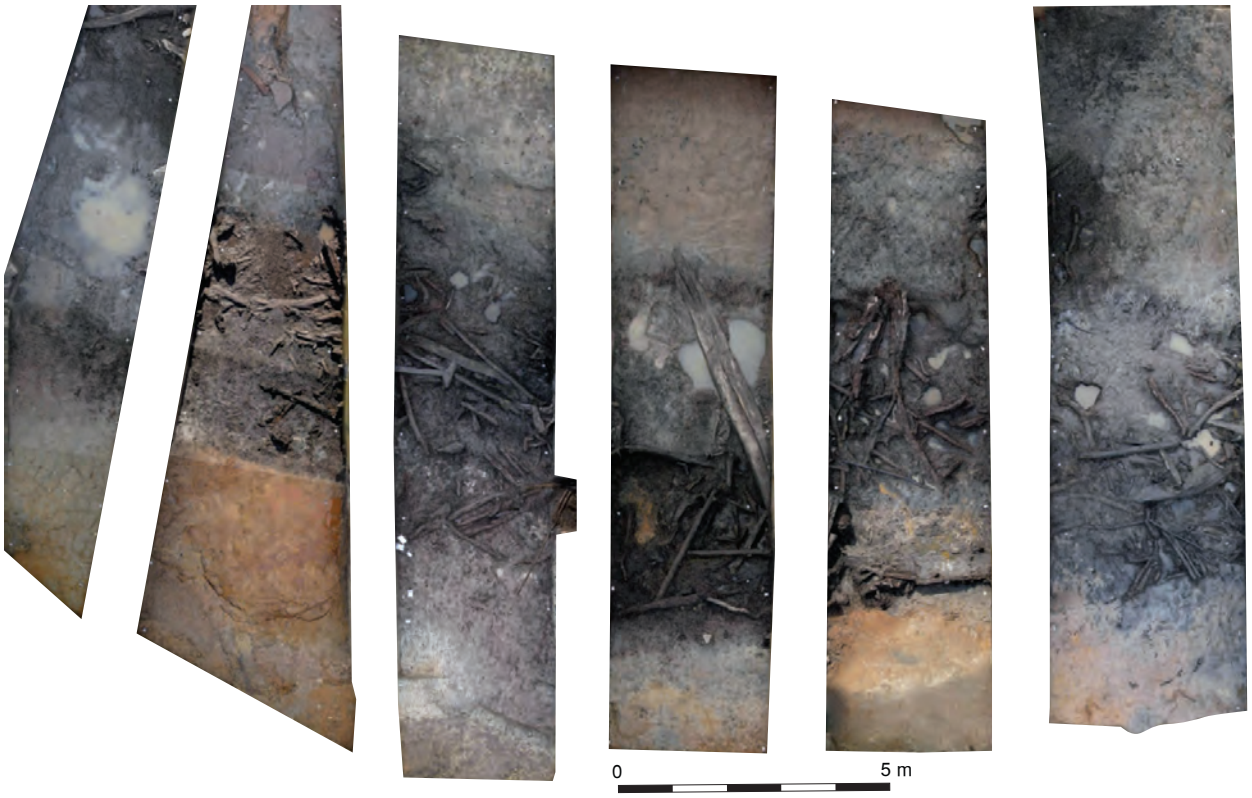


Plate 210: The Early Neolithic timber platform within the Principal palaeoechannel

Plate 211: Stakes forming elements of a fenceline (Structure 1) within the Principal palaeochannel *(scale 300 mm)*

Plate 212: Trident 2, with the broken tine beneath (scale 500 mm)

tuff, that had been dumped into the channel along its whole excavated length, but in varying concentrations. Some of these had been crudely worked, and some were obviously cores or tools, but the clear majority had not been. They were much too thinly distributed to be structural (a pavement or suchlike); did not occur in the geology of the site or in the lower deposits in the channel sequence; and, given their size and sedimentary association, had to have been deposited by humans rather than fluvial action.

The worked element of this assemblage included various tool types, occurring in different distributions. Notable were crude flake-like tools, which, tentatively, might have been used for butchery, bone-splitting, or dismemberment, and which seemed to have been associated with the stream flowing adjacent to the wooden platform. Cores and core tools were more numerous and had a different, more-generalised, distribution. These had often been formed into wedge-like choppers, which sometimes bore evidence, on the blunter end, of having been hammered into place. These have been interpreted as having been used for heavy-duty work, such as woodworking. Other tools included hammer and anvil stones used for grinding, polishing, smoothing, and pecking, and these tended to be found towards the edges of the channel, possibly indicating stone working took place there. Three fragments of a large sandstone *polissoir* (an object used to polish or sharpen stone axeheads) were probably originally part of this latter group, which had been burnt, smashed, and deposited in different parts of the channel, around the edges of a pond, in the Late Neolithic period (*p 552*).

Significantly, two polished-stone axeheads, one complete and one nearly complete, were also recovered from the *Earlier Neolithic organic deposit* (Pl 213). These came from either end of the platform. The complete axe, at the northern end, seemed to have been deliberately deposited with respect to one of the large Mesolithic oak trunks, and in association with other coarse-stone tools, and, as such, could either have been a foundation deposit associated with the platform or a later deposit referencing it. The other,

Plate 213: The two polished-stone axeheads from the Earlier Neolithic organic deposit

at its southern end, also occurred in an area where worked and unworked coarse stones clustered, also apparently a depositional focus. Both axeheads seem to have been removed from their hafts prior to deposition.

There was also a relatively small flaked-lithic assemblage (*Ch 8, p 266*), comprising a range of materials, which included (in decreasing proportion) chert (including Scottish chert), good-quality Yorkshire flint, beach-pebble flint, tuff, quartz, and Arran Pitchstone; in other words, although the relative proportions were now different, a similar range of materials to that present within the Mesolithic (microlithic) assemblage (*Ch 4, pp 104-7*). Two microliths were found, but it is possible that they were residual. This tool type may now have been replaced by novel armature forms, given that a leaf-shaped arrowhead, made from Yorkshire flint, was also recovered (*Ch 8, p 270*). Some traces of birch-bark tar glue survived, on the dorsal face at the base of this, showing where the arrowhead had once been attached to its shaft. So, like the axes, it is possible that it had been deliberately decapitated and then formally deposited, rather than having been lost. Broad blades were overly represented amongst the assemblage, and, of these, a disproportionate number were made of Yorkshire flint, although examples were identifiable in each material type, except for quartz.

The flaked-lithic distribution was reminiscent of that of the coarse stones, clustering in similar areas along the channel, although the flaked lithics tended towards its central line (*Ch 8, p 262*). This was particularly true of the broad-blade distribution, which, like the coarse-stone flake tools, conformed to the line of the flowing stream. One quarried nodule of brown chert had been smashed up, with a large proportion of the nodule material, some of it further worked, being apparently deposited around one of the tridents (Trident 1; *Ch 8, p 268; p 275*).

A single small fragment of a rim of traditional Carinated-Bowl pottery (Sheridan 2007a) was recovered from the *Earlier Neolithic organic deposit*, on the western side of the southern part of the channel (*Ch 8, p 271*). It was found within a loose cluster of worked and burnt wood and may have been deliberately deposited in association with this, or accidentally incorporated as a component of a dump, which also included the wood.

There is no reason to suspect more than one major phase of structural activity associated with the *Earlier Neolithic organic deposit* in the channel, and it is possible that the wooden settings, fence, and platform were all broadly contemporary, or even part of a single constructional event. It is clearly the case that some of this material, including the paddle, several split planks, and some of the other worked pieces of wood, as well as possibly one of the axeheads and probably the tridents, were deposited when the platform was first constructed. They may, as such, have been foundational deposits. Other acts of deposition then seem have taken place subsequently, referencing the structures, although this does not preclude that much of this material was also associated and broadly contemporary with the platform's construction.

It is also probably significant that the radiocarbon dates associated with many of the tree-throws in the adjacent *Grid-square area* (Pl 214) suggest that these were formed at broadly the same time as construction and deposition was taking place in the channel,

Plate 214: Early Neolithic tree-throw **90262** *in the* Grid-square area*, following excavation*

particularly as much of the deposited wooden debris and many of the coarse-stone tools were likely to have been associated originally with tree felling and timber procurement. A lack of stumps, small wood chips, and stone refits suggests that tree felling and splitting did not take place in the channel, so it is possible that the woodworking residues had been dumped, or more probably deposited with some formality, into it. As such, the activity that created the tree-throws, platform/fence/setting construction, and many of the acts of deposition all might have formed one contemporary suite of inter-related practices.

After this initial dramatic phase of construction, depositional activity, as well as presumably other types of endeavour, seems to have continued in association with the wooden platform, or the channel, at any rate, for at least a century, and, quite possibly, as many as two. This is apparent in the radiocarbon dating and sedimentary association (*Earlier Neolithic alluvium*; *Ch 8, p 233*) of certain artefacts, including one of the two tridents (Trident 2; *Ch 8, p 271*) that had evidently been carefully laid into the channel adjacent to the stream. At the same level and very near to this, was another complete polished-stone axe *(Ch 8, p 274*), and several sherds of Carinated Bowl pottery *(Ch 8, p 274*). These artefacts may constitute a discrete depositional event, but it is likely that some of the other flaked stone (including a chisel-headed arrowhead; *Ch 8, p 270*), and worked and unworked coarse stone retrieved from the channel, had also been deposited over this period (thirty-seventh to thirty-sixth century cal BC).

By this time, flow rates within the channel had increased slightly, and whilst sediments were still organic, they had become more alluvial in nature, so wetter conditions may have been returning to the floodplain. There was also other evidence for changes in the wider environment. Pollen values for elm had been steadily declining, from the time that cultural activity had resumed in the channel and Trident 1 was deposited. By the time Trident 2 had been deposited, elm had almost disappeared. Simultaneously, hazel values also fell, being replaced by alder, indicating the development of an alder carr and, possibly, the colonisation, by this taxon, of the ecological niches that became available as elm and hazel declined (Tipping 1994b, 10). Oak pollen remained fairly stable, although at slightly lower levels than it had been formerly. Over this same period, grass pollen and ribwort plantain rose, which, with the presence of herb pollen (meadowsweet, buttercup, docks/sorrels, and cinquefoils), suggests some opening up of the woodland canopy (*Appendix 16*). Fungal spores, indicative of decaying wood, perhaps linked with increasing numbers of injured or dying trees, were also detected (*Appendix 16*). Dung-beetle frequencies amongst insect faunas also increased dramatically (Pl 215; *Appendix 14*). This provides some evidence for increased numbers of grazing animals, with

*Plate 215: One of the species of dung beetle (*Aphodius fimetarius*) present in the Neolithic deposits in the* Principal palaeochannel *(photograph by Boris Loboda; Attribution NonCommercial-NoDerivs 3.0 Unported (CC BY-NC-ND 3.0))*

the most likely explanation being herds of domesticated livestock grazing or browsing locally for the first time. Small numbers of cereal-type pollen grains were also increasingly detected, as part of a rising trend, when they had not been present formerly. Together with the evidence for limited woodland clearance, the latter probably denoted small-scale cultivation plots being created (*Appendix 16*).

Overall, the picture painted by the palaeoenvironmental proxies presents a compelling case for the introduction of farming into this part of the Eden Valley, probably in the middle of the thirty-eighth century cal BC to the mid-thirty-seventh century cal BC. That this should have coincided with the constructional and depositional activity in the *Principal palaeochannel* (*c* 3750-3500 cal BC; *Ch 8, p 275*) seems too coincidental, particularly as the materiality deposited also seems to have been markedly different from that of the Mesolithic hunter-gatherers who had previously occupied the encampment adjacent to the channel, during the fifth millennium cal BC. Pottery was present for the first time, along with 'classic' Cumbrian-style polished-stone axes of Group VI tuff (*p 540*), leaf-shaped arrowheads, and a plank-based woodworking technology exemplified by the tridents. The evidence can be read in two ways: either the area had been colonised by farmers utilising the classic 'Neolithic package'; or that hunter-gatherers had adopted agriculture (domesticated plants and animals), as well as the other cultural forms and practices that seem to have been associated with its spread in the British Isles (Whittle *et al* 2011; Thomas 2013; Cummings 2017). Indeed, it is also possible that indigenous hunter-gatherers and migrating farming groups were in contact with each other, and even intermingling.

The Lower Eden in Transition

These contrasting perspectives have generated much debate in British archaeology (*Ch 6, p 185*), but the present consensus (Brace and Booth 2023; Cassidy 2023) tends to accept that hunter-gatherers were, to an

extent, actively involved in the process of neolithisation, rather than, initially at least, being completely displaced and eradicated, by migrant farmers; equally, that the domesticates, technologies, knowledge, and practices of farming must, ultimately, have been transmitted from the Continent, probably by pulses of population migration, along with certain cultural traits (for instance, ceramic traditions). So, it then becomes a question of establishing, in various contexts, the conditions that enabled the accommodation of these materialities and practices (Barrett 2005). It must also be borne in mind that there was probably never one clear end goal in sight, that the history that enfolded and is retrospectively perceived (eventually a cleared and settled agricultural landscape later in prehistory) was never actively sought. To put it another way, whereas hunter-gatherers may have understood that rearing cows would have dramatic and fundamental implications for their societies, they did not set out to become Iron Age chieftains.

Along the Atlantic façade, there is an extended history (throughout the fifth millennium cal BC at least) of regional interaction, including, potentially, with the Continent (Garrow and Sturt 2011; Anderson-Whymark and Garrow 2015; Garrow *et al* 2017; Brace *et al* 2018; 2019; Thomas 2022; Whittle *et al* 2023). Beyond the immediate North West region, other zones of interaction existed along the east coast and the Solent. By the fourth millennium cal BC, immigration started to be significant, but perhaps as pulses rather than an overwhelming wave, conceivably comprising movements of individuals and small communities. It also seems increasingly likely that the 'Neolithic', when it arrived, was not gifted as a parcel, but, rather, was variously assembled by hunter-gatherers and farmers interacting with each other in ways shaped by their wider connections; political and ideological circumstances; whims and choices; traditions; social and cultural practices; and ecological constraints.

In Cumbria, this may help to explain why monuments, such as long mounds and cairns, were not (based on current information; Evans 2008) as important, during the earlier stages of the process over much of the county, as they seem to have been in adjacent areas, such as Dumfries and Galloway, or Yorkshire, whereas, as Stainton West has helped to demonstrate, polished-stone axes may have already been part of the Mesolithic stone-tool repertoire (*p 540*); indeed, Langdale and the central Lakeland peaks may already have loomed large in regional hunter-gatherer mythologies and cosmologies.

How then might the structural elaboration and deposition within the *Principal palaeochannel* be understood in the context of this debate? Firstly, it is a matter of timing. The resumption of activity in the channel occurred at what seems to have been, regionally, a significant, even climactic, juncture. For example, radiocarbon dating shows that just up the road, at Lockerbie, a large Neolithic house (Kirby 2011) had been founded, and, as far as it is presently possible to tell, appears to have been contemporary with the platform at Stainton West. Similarly, this also seems to be the time when quarrying at the Langdale axe-procurement sites intensified (Edinborough *et al* 2019). There is also a wealth of other evidence (Whittle *et al* 2011; Griffiths 2011) that points to the thirty-ninth to thirty-eighth centuries cal BC being the time when Scotland, Wales, Ireland, and the North of England 'went over' (Whittle and Cummings 2007). So, the conditions may have been ripe for change, and the activity associated with the palaeochannel at Stainton West can be seen as part of this. Retrospectively, and taking a narrative (over)view, it can be suggested that this was when the 'Neolithic transition' was critically accelerating or reaching the point of no return (*Ch 9*, *p 320*).

Tree felling as a transformational act

The cutting down of large trees, the structural elaboration of the channel, and the foundational acts of deposition that accompanied this do not constitute routine clearance. They stand out as concerted and explicit actions, interventions that went beyond the everyday. That is to say that they were discursive practices (Barrett 1994, 72-81), involving an element of performative ceremony, rite, explication, and collective introspection. There is a sense that this place was being singled out because of its *genius loci*, as were the trees that grew there.

Timber was harvested from a grove of probable ancestral significance (*Ch 9*, *p 316*) in a momentous act requiring propitiation. Such an important resource was presumably procured with a specific intention in mind and this did not seem to be for use at the riverside site. Performative acts of deposition are consistent with hunter-gatherer religious practices and constructing a brushwood platform along the channel bank did not constitute a rupture with the past or with traditional and widespread Mesolithic practice (*cf* Bamforth *et al* 2018b; *Ch 9*, *p 317*).

There is also increasing evidence for an understated kind of Mesolithic monumentality (*Ch 3*, *p 55*), so it is possible that this was what the wood was intended for. On the other hand, given the date of this activity and the evidence from elsewhere, it is possible that it was instead for either the construction of a house, like the one at Lockerbie (Kirby 2011), a shrine or tomb (*Ch 7*, *p 216*), or a formal trackway like the Sweet Track (Coles and Coles 1986; Coles and Orme 1984).

It has been suggested that houses and monuments were implicated in the process of transition, as

communities adopted farming (*Ch 9, p 314*; Thomas 2013, 296), and if the channel activity was linked to the foundation of such a construction, it can be seen as representative of changes taking place in daily life and across the wider landscape (Barrett 1994, 146; Jordan 2003, 282-3). There was plenty of evidence from fifth millennium cal BC deposits in the channel that Mesolithic hunter-gatherers were cutting down and girdling trees, and perhaps encouraging and harvesting coppices (*p 535*; *Ch 3, p 92*). However, the scale of the felling and splitting activity represented in the channel deposits of the fourth millennium cal BC seems to have suddenly stepped up. This is also reflected in the pollen assemblages from this part of the channel sequence, which suggest that clearance was widespread. Together, the palaeoenvironmental proxies (pollen, spores, and beetles; *p 548*) put forward a convincing case that farming (herding and cultivation in clearings) was being practised nearby (or at least it was in the following decades), presumably on the better agricultural land on the higher river terraces.

The decision to harvest an ancestral grove and use the timber from its trees for a new building can be seen as incorporating the properties connoted by those trees into that structure, perhaps to ensure future success. In the process, certain values were transplanted (from one significant site to another), which is indicative of a realignment of the underlying moral order embedded in the landscape (*Ch 4, pp 147-8*; *Ch 6, p 186; pp 204-5*). Where once the onus had been on the forests and rivers as providers, now it was the new means of economic and social production: farming land; and the houses and monuments (Barrett 2011, 75). These structural types would have been synonymous with the community that built them, whose collective identity was redefined and reinforced, not only by their construction (and subsequent presence), but also by the linked foundational actions undertaken at the ancestral grove and channel.

That the channel played this role seems to have added another layer of significance to it as a place. This was demonstrated by the secondary acts of deposition, and other activities, that were undertaken there (*pp 546-7*). It may have retained generative power, hence why it was used for the production or finishing of axes (*p 546; p 552*), and, possibly, for treating animal or even human carcases, perhaps connected with sacrifices or rites of passage that echoed hunter-gatherer mortuary and propitiation practices (*Ch 5, pp 170-1*; Ingold 2000, 67; Jordan 2003, 100-2; Cummings 2017, 25). Similarly, such conceptions might have inspired the deposition of pottery sherds (and possibly other substances) there: token residues of domestic life and consumption offered back to the waters of the channel. In this way, an axis could have been established, or re-established, between the channel and the ancestral grove on the floodplain, and the posited house or monument and gardens on the terrace, which formed just one strand in a local web connecting encultured places of varying but complementary identity (*cf* Jordan 2003, 228-9).

It might be expected that Stainton West, just above the estuary of the Solway Firth, would have been well connected and, as such, been at the forefront of innovation (if this was not resisted). The activity in the *Principal palaeochannel* and the construction of a house or monument was perhaps the moment of substitution (Zvelebil 1986; rather than this being a drawn-out process), when a community explicitly expressed a self-aware commitment to a different way of being. In our terms, they started to become 'Neolithic'. They were making a political statement, which resituated this group within a wider (regional) social milieu (*Ch 9, p 321*), and acknowledged a radical reformation of their subsistence economy. At Stainton West, however, this did not require a total rejection of indigenous cultural practices, indeed almost the opposite seems to have been true, with these being repurposed at a place of persistent significance.

This does not mean that this community had never been exposed to, or had never practised, farming in some form or another previously; after all, they would have needed to possess the skills and materials to subsist this way and, practically speaking, this must have involved interactions and exchanges with those who already practised farming. Indeed, there are several radiocarbon dates associated with Neolithic materiality and domesticates in Cumbria that were probably a generation or more earlier (*Ch 7, pp 211-13*), though these earlier sites perhaps belonged to the final stages of agricultural availability (Zvelebil 1986), and the tail-end of a tradition of interaction between hunter-gatherers and farmers that may have been going on for some time, even centuries (*p 548*). Regionally, there may have been a build-up, unfolding over several generations and in response to external influences, to an internal reformulation of hunter-gatherer society. This is not to imply slow diffusion, however, and the take-up of agriculture, as a subsistence practice by each individual community, was, for economic and practical reasons, likely to have been rapid, committed, and, ultimately, irreversible (*Ch 9, p 320*; Barrett 2005; 2011; Rowley-Conwy 2011). This is not to suggest, however, that hunting and foraging ceased to be important as part of mixed economies.

In light of the chronological consistency between the dating of the Stainton West channel activity and corresponding radiocarbon dates for the widespread appearance of Neolithic cultural and economic signatures, regionally (in the thirty-ninth to thirty-eighth centuries cal BC; *p 549*), the adoption of farming by this community should perhaps be seen as only one domino falling in a rapid cascade. Over a generation or two, this could have rippled throughout the enduring networks of

communication (Barrett 2011, 84-5) that existed between geographically distant communities across the north of Britain, and was evidenced by the persistence of access to the exotic lithic types, which were utilised at Stainton West in both the Mesolithic and the Neolithic periods (*p 539*; *Appendices 6* and *10*). This may have been stimulated by the flow of personnel between bands and clans (*Ch 5, p 169; p 180*) and, due to the degree to which these northern British Mesolithic societies were apparently integrated, it may have been that centralised decision making, or trend setting, guided or catalysed this process, although this is emphatically not to argue for uniformity of practice: an 'off the peg' Neolithic, and, as always, unintended consequences may have belied the expectations of any influential authority or trend-setter. So, as is hinted at Stainton West, the propagation of farming and other cultural practices, rather than requiring the accommodation of a new and foreign ideology, may have been achieved, within a totemistic or animistic world-view, by restructuring existing indigenous hunter-gatherer practices: identities; mythologies; tenurial routines; and moral and authority structures (Barrett 2005).

Given the similarities between Stainton West and Ehenside Tarn, further south on the west coast (*Ch 9, p 318*), Stainton West should not be seen as an anomaly. Instead, it might be one such site of many, with a wide geographical spread, that, in the earliest part of the Neolithic period, were instrumental in Cumbrian hunter-gatherers' transition into Neolithic farmers. However, although this process may, in such sites, have had a recognisable and momentous inception, the process of consolidation (Zvelebil 1986) was far from over.

The Neolithic Period: A Monumental Landscape

Over the next few centuries (*c* 3500-*c* 2800 cal BC), slightly drier conditions seem to have resumed, and the *Principal palaeochannel* at Stainton West became increasingly infilled with peaty organic material (*Later Neolithic organic deposit*; *Ch 10, p 328*) and choked with vegetation, as alder carr encroached upon it (Fig 267; *Ch 10, p 334*). The wider landscape remained

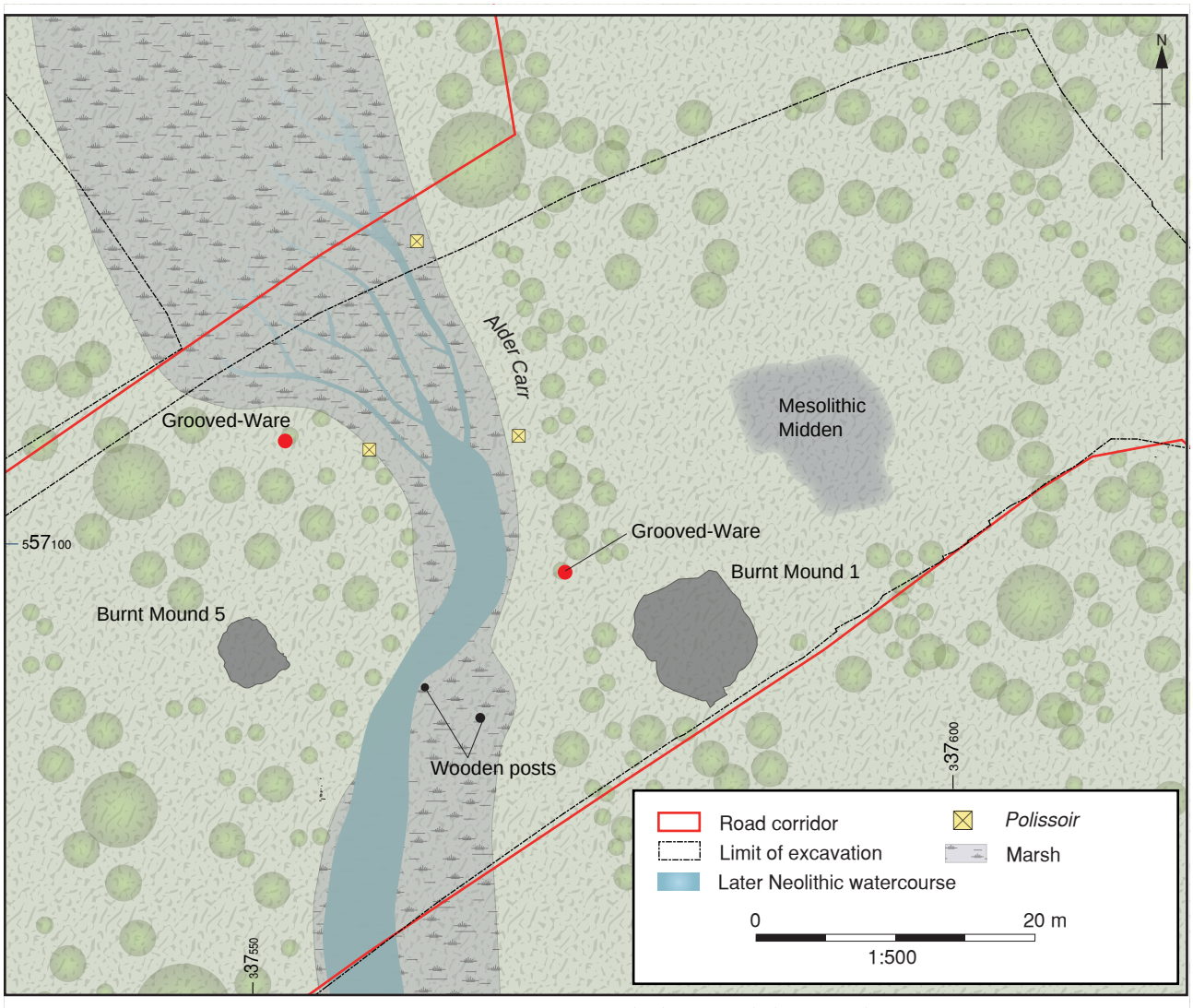


Figure 267: Stainton West in the later Neolithic period

largely wooded, punctuated by limited clearings, and the evidence for farming was much the same as previously. There was a single radiocarbon-dated tree-throw adjacent to the *Backwater channel* (*Ch 10, p 341*) that probably dated to this time; otherwise, the only evidence for activity in the *Grid-square area* was a few lithic objects (*Ch 10, p 342*), which might, typologically, be diagnostic of the Neolithic period, although it is not impossible that they were actually deposited at an earlier date. There were certainly no indications that the landscape was intensively farmed and settled, which, in accordance with the evidence nationally (Stevens and Fuller 2012; 2015), may point to a fairly transient, transhumance-based economy.

A limited number of *in-situ* stakes in the channel, as well as other pieces of woodworking debris (*Ch 8,p 277*), indicated that it remained the focus for activity, and it is possible that worked and unworked coarse stone continued to have been deposited there. This included a polished-stone axe that had been made on a glacial erratic (*Ch 10, p 339*), which, if not residual, may relate to this phase. Additionally, the *polissoir* (*p 346*), which was probably originally associated with earlier axe-polishing activity alongside the channel, was burnt, smashed, and deposited at some point during this period, as its fragments occurred within the *Later Neolithic organic deposit* (*Ch 10, p 328*). This is likely to have been a significant object, which, not being particularly portable, may have lain in the general area for centuries, so this act seems to have been intended to make a dramatic statement. This may have been to mark the channel as a place that was no longer appropriate for axe working and/or for stone deposition. More generally, it might also have been linked to the diminution of Langdale as an axe-procurement site, a change in its status (*Ch 10, p 359*), and wider social change. As such, it could have signalled the end of a chapter of use and perception of the channel, which had commenced with its structural elaboration (*Ch 10, pp 346-8*), and the beginning of a new chapter where it was viewed and treated differently.

This most evidently started with the erection of two (or more) large oak stakes in the channel (*Ch 10, p 357*). Although perhaps not truly monumental in scale, these were reasonably substantial and could have formed prominent markers. Dendrochronology suggests that one of the trees died in *c* 2870 cal BC (*Appendix 20*). Possibly within a few decades of the stakes being erected, but potentially a century or more later, numerous fragments of a decorated Grooved Ware pottery vessel were deposited, seemingly in a pit or scoop, on the channel's eastern edge (*Ch 10, p 354*). A large proportion of the vessel was represented, but no rim sherds, so it appears to have been broken prior to deposition, with some sherds selectively being removed. Carbonised residues on the pottery suggest that it was in use at some point between the beginning of the twenty-ninth to the end of the twenty-seventh century cal BC.

Two burnt mounds (Burnt Mounds 1 and 5; *Ch 10, p 345; p 350*) developed on either side of the channel, flanking the positions of the large stakes and the Grooved Ware. Radiocarbon dating provided very similar results to the measurement obtained from the Grooved Ware, suggesting that these were all broadly contemporary. Burnt Mound 1, on the eastern edge of the channel, appeared to comprise the residues of multiple episodes of use, whereas Burnt Mound 5, on the western side, may have only been used on a single occasion. There was nothing to suggest that these mounds were associated with food production or consumption, or any other agricultural, craft, or industrial process, so their function is somewhat mysterious. However, they marked the start of a tradition of burnt-mound use at the site that was to continue for at least another millennium (*p 554*).

There is some suggestion that the later mounds may have been associated with bathing and/or purification, so a similar role can also be posited for these earlier monuments. That this spot had been a focal place in the landscape from time immemorial may have been one reason why it was selected for this practice, and this, alongside the fact that the burnt-mound tradition was so long-lived at the site, might suggest that, far from being everyday in character, it too was of some higher, religious or ceremonial, significance.

The enduring importance of the *Principal palaeochannel* and its immediate environs is perhaps explained by cropmark evidence (English Heritage 2014) from the higher gravel terrace (Terrace 1; *Ch 10, p 323*). There, aerial photographic analysis has identified several large ring-shaped features, which have been interpreted as a complex of prehistoric monuments. The largest of these, although incomplete, relates to a later Neolithic henge monument, which may have had a diameter of *c* 100 m. Significantly, this henge was positioned a mere 150 m from the Stainton West site and, given the Late Neolithic currency of henge monuments and the well-known association between henges and Grooved Ware pottery (Sheridan 2003a), it is probable that the burnt-mounds adjacent to the channel were associated with a wider suite of activities connected to this ceremonial monument (Fig 268), enacted in the nearby landscape. Purification at the burnt mounds at the edge of the River Eden floodplain may have been linked to ceremonies conducted at the henge. Such rites may have drawn from the ancestral significance of this spot, howsoever this was now understood, the Eden perhaps being referenced as a source of power or as a supernatural entity, which may, in turn, also have influenced the siting of the henge and the ceremonies that were undertaken there.

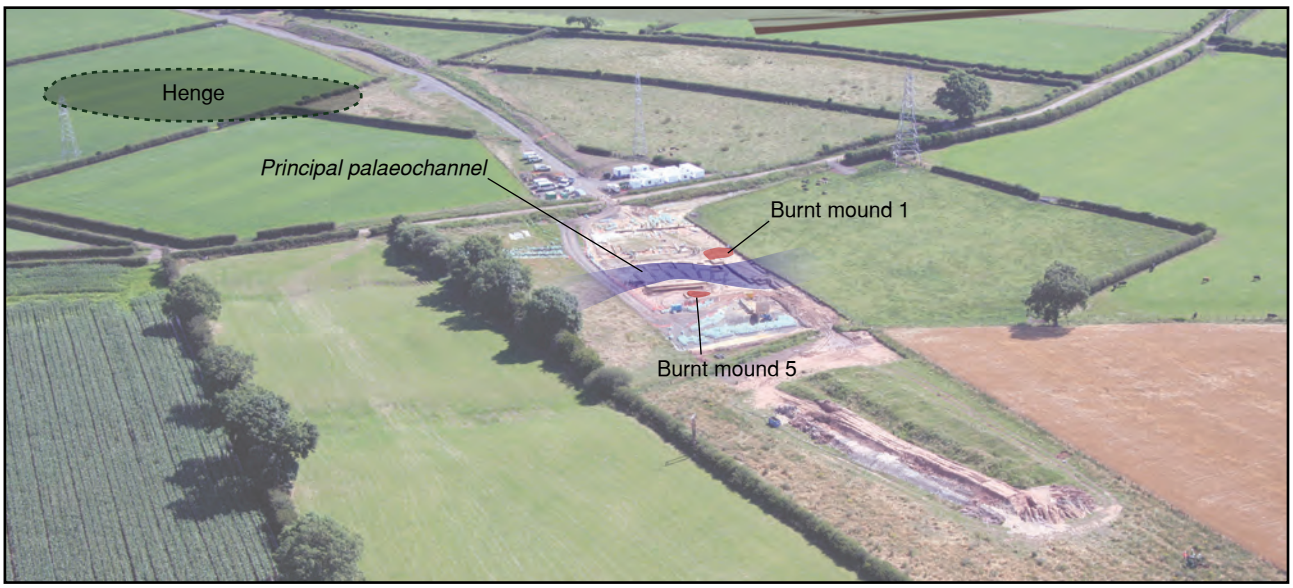


Figure 268: The Principal palaeochannel*, Burnt Mounds 1 and 5 at Stainton West, with the henge monument on the upper river terrace*

Indeed, the sinuous Eden looped around and effectively isolated the terrace on which the henge was sited, which may have engendered perceptions of it as a distinct place and influenced this choice of setting. The later Neolithic monumental complex may also have developed from earlier schemes of land-use, for example, any houses, gardens, shrines, tombs, or other monuments of earlier Neolithic date (*p 359*). Such a large henge monument would have required the labour of many people to construct it and it may be inferred that similarly large numbers attended congregations at it. In this respect, Stainton West, and, more generally, the meander in the Eden, may have been a place of congregation for many millennia: firstly, for mobile hunter-gatherer groups (*p 533*); and latterly for a dispersed farming community. It was, however, the distinctively Neolithic practice of massive monumental architecture that physically defined this space (*Ch 10, pp 326-7*).

Indeed, the distribution of Neolithic monuments throughout Cumbria (Evans 2008; 2011) provides strong indications that these early farmers routinely pursued traditions of movement that bore a great deal in common with those of their hunter-gatherer predecessors (*p 549*). They were often tethered to the same key localities and similarly constrained and channelled by the form and quality of the terrain, yet they also seem to have strived to assemble in congregations of various scales, in sometimes remote places, and maintained social relations with other distant communities. Furthermore, the continued use and exchange of a similar range of lithic raw materials to those used for millennia (*p 539*) suggests that these social networks preserved, or further developed, those that had already existed in the Mesolithic period.

So, the accommodation of domesticated plants and animals into hunter-gatherer economies, along with the practices of agriculture and the other social practices associated with this, may have influenced how the rhythms of life were played out: the who did what and when. The Neolithic resource base may have been more specialised than the more diverse subsistence range enjoyed by Mesolithic hunter-gatherers, but it was potentially under greater human care and control; it was also transportable, storable, and could be accumulated and exchanged in return for power and status. Different regimes of value (Barrett 2011) may have been assigned and inscribed (often literally enshrined by monuments) into the already-encultured landscape (Jordan 2003), but ultimately the introduction of agriculture by migrating Neolithic farmers may have done little to disrupt the wide-scale social patterns of human relationships that had been established by Mesolithic hunter-gatherers. Indeed, the desire to reach out and keep moving may have been one of the reasons, as much as any other, that earlier, potentially more restrictive, agricultural modes, such as the intensively farmed garden plots associated with the first complex timber houses (*Ch 7, p 227*), were relinquished in favour of an emphasis on transhumance in the middle and later part of the Neolithic period (Stevens and Fuller 2012; 2015).

CNDR: A Model for Chalcolithic and Bronze Age Settlement?

The evidence from the CNDR suggests that throughout the late third and early and mid-second millennia BC Stainton West, and its immediate

Plate 216: Burnt Mounds 2-4, on either side of the Principal palaeochannel*, Stainton West*

environs, continued to form a significant geographical locale, which was periodically revisited (Pl 216). Again, as in the later Neolithic period (*p 553*), the significance of this area to Chalcolithic and earlier Bronze Age communities was probably a result of the presence of the henge monument on the upper river terrace, which may have continued to function as a fixed 'ceremonial' point in the landscape. Moreover, it is also possible that, at certain times during these millennia, this section of the River Eden formed a liminal zone, acting as a natural boundary, as opposed to a man-made boundary (*p 556*), that defined different territorial areas. In this sense, it was perhaps well-suited to activities that lay beyond the domestic realm, which were perhaps also essential mechanisms for uniting the wider community at specific times. During the Chalcolithic period and earlier Bronze Age, this may have included steam baths and sweat lodges (associated with Burnt Mounds 2-4), that were perhaps used for ritual purification (*Ch 11, pp 436-7*). Based on the pollen evidence, such activity appears to tally with periods when there was a cessation of clearance (and perhaps settlement) close to the site. This may further strengthen the suggestion that at such times this area was set some distance from domestic settlement.

Beyond this liminal riverside area, traces of domestic settlement were encountered along the CNDR (Fig 269). Given the extensive linear nature of the scheme, it is quite possible that this evidence encapsulates, in microcosm, the wider settlement patterns and associated activity around the inner Solway Firth, throughout the course of the late third and second millennia BC.

The evidence from the CNDR and the wider area suggests that settlement across the lowland coastal plain was of low density during the late third millennium BC. The palaeoenvironmental evidence, however, shows that groups were also settling the surrounding upland areas, although this may have been transient (*Ch 11, p 356*). The period was also characterised by a general deterioration in the climate, though this probably had little impact on the region's communities.

The evidence from Parcel 21 North suggests that lowland settlements of this period probably comprised single, unenclosed, circular or oval timber-built dwellings, situated in small woodland clearings, presumably housing a family group. It is possible that these clearances were occupied for some time, as, at this site, at least two successive buildings of a similar design were constructed on the same spot. Despite both of these also exhibiting signs of refurbishment, the overall duration of occupation may have been relatively short.

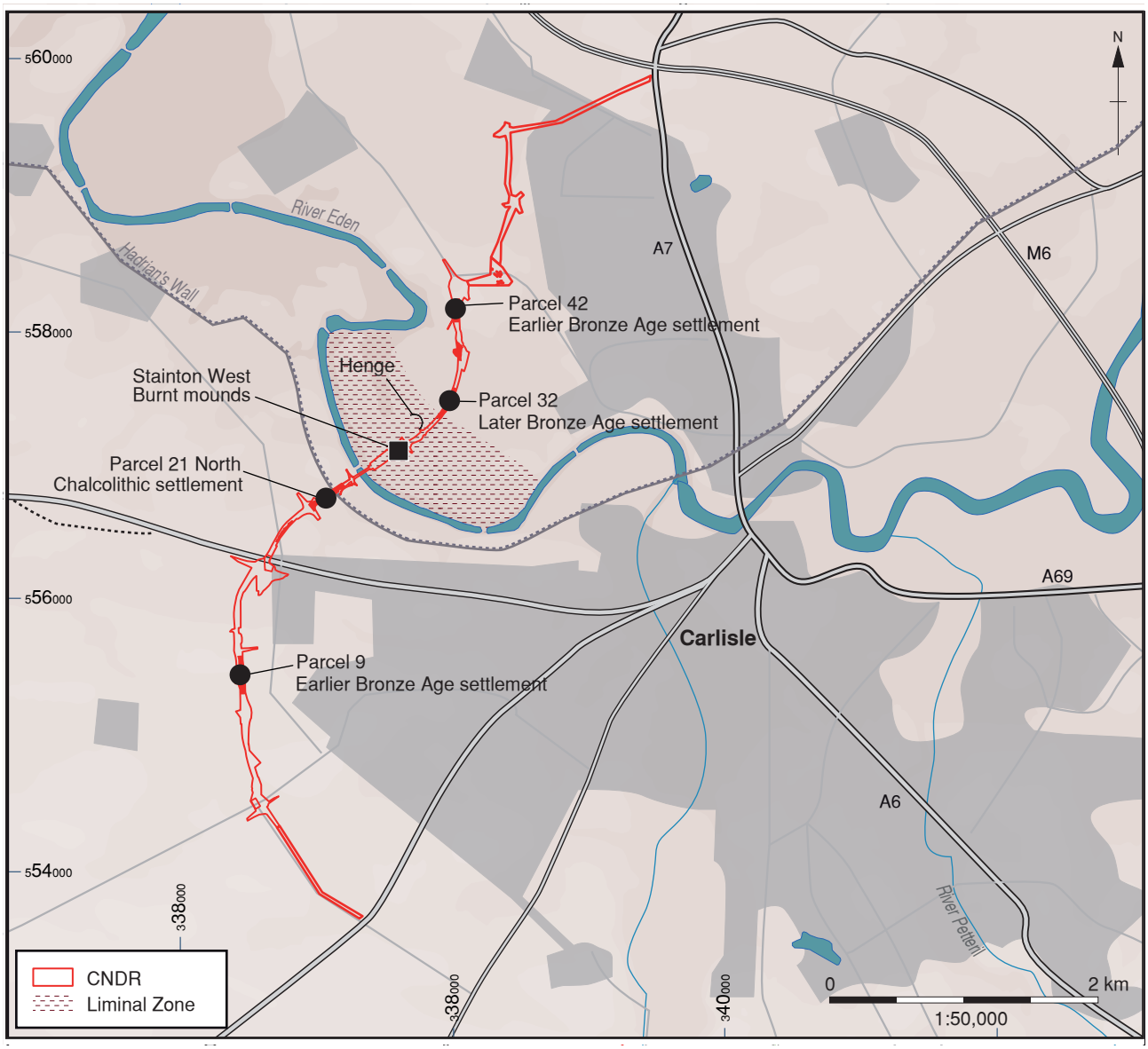


Figure 269: Chalcolithic and Bronze Age settlements along the CNDR (Contains OS OpenData © Crown Copyright [and database right] (2022))

For example, based on the evidence of early Scottish wooden structures in wetland contexts, convincing arguments have been presented for roundhouse life-cycles of only 5-17 years (Crone 2000). Similarly, the analysis of Scottish dryland settlement sites suggests that few Bronze Age timber roundhouses stood in excess of ten years (Halliday 2007). Given this, it is possible that the two successive houses at Parcel 21 North reflect occupation of only 10-35 years.

Another distinct possibility, based on evidence from the other Bronze Age settlements along the CNDR (Fig 269) and a wider analysis of Bronze Age roundhouses in Scotland (*ibid*), is that occupation was not continuous, being punctuated by a period of abandonment. Indeed, settlement patterns at this time may have been fairly dynamic, involving periodic shifts, which is certainly the case across a wider area of northern Britain during the second millennium BC (*ibid*). Even so, certain locales, such as those associated with earlier, abandoned, settlements, appear to have remained fixed, through a shared geographical knowledge, and were subsequently revisited and reoccupied. The reasons for the abandonment and later reoccupation of certain domestic sites are difficult to ascertain. It might, however, have related to the exhaustion of local economic resources, which then required sufficient time to regenerate, or it could have been due to social factors, such as the life-cycles of the inhabitants (*cf* Brück 1999).

In the lowland areas, a similar pattern of dynamic and shifting settlement probably occurred throughout much of the second millennium BC, which significantly involved returning to and reoccupying certain geographical locales. For instance, at Parcel 9,

Plate 217: An idealised reconstruction of a later prehistoric roundhouse comparable to House 1 at Parcel 9 (© Peter Lorimer)

a single unenclosed house (Pl 217), dating to the early second millennium BC, may have been occupied for approximately ten years and then abandoned. However, this site was reoccupied during the mid-second millennium BC, when another house was constructed. This may then have stood for a little longer than its predecessor, as there was some evidence for piecemeal refurbishment, though the difference in the length of occupation may not have been that great. A fenced boundary was also associated with one of these buildings, which again may have been present for a comparatively short period of time, representing a temporary division in a dynamic landscape.

A similar sequence of occupation probably also occurred at Parcel 42, though in this instance the site of an earlier roundhouse was revisited in the mid-second millennium BC, probably following a period of abandonment, when two replacement roundhouses were constructed. Although these later structures exhibited evidence for the small-scale refurbishment of some posts, again they were probably not particularly long-lived, as they had only single-phase hearths. Pollen assemblages from Stainton West provide further evidence for shifting settlement, showing both clearance and alder-carr encroachment close to the site, during the earlier part of the second millennium BC (*Ch 11, p 401*).

In northern Britain, a case can be made for the continuation of such dynamic settlement patterns during the early/mid-second millennium BC (*cf* Halliday 2007). By the end of that time, however, the evidence from CNDR suggests that, within the southern coastal plain of the Solway, this probably occurred within a system of fixed boundaries, indicating formal territorial claims. The creation of such boundaries would require a large input of labour and, as such, large-scale land division may have provided a mechanism for drawing together (and controlling?) dispersed households, which periodically shifted around specific territorial areas. It also suggests that tenure may have been contested and had to be negotiated.

By the end of the second millennium BC, the climatic conditions in the Solway area may well have improved,

being warmer and drier (up until *c* 850 cal BC; *Ch 11, p 418*), and the evidence from the CNDR and the wider locale indicates that the character of Bronze Age settlement and associated activities was undergoing some changes, with the introduction of new types of settlement and a shift away from 'traditional' landscape areas that formerly held some ritual significance. At Stainton West, for example, activity dating to this period was limited to a single hearth, and it is likely that burnt-mound activity (potentially relating to bathing/purification; *p 554*) had ceased. This may suggest that the possible ritual importance of this landscape had dwindled.

The first enclosed settlements also appeared at this time (*Ch 11, p 364*), which, in the lowland areas, were palisaded, an example being found at Parcel 32. It is unclear why settlements became enclosed, though this may have been for enhanced security and/or embodied social status. Despite the existence of permanent land divisions, it is possible that such lowland settlements still formed part of a dynamic and shifting regime, being occupied for comparatively short periods, over a generation or less. For example, a later Bronze Age palisaded settlement, excavated close to Castle Kennedy, Dumfries and Galloway, contained a single refurbished roundhouse that may have been occupied for between 20 and 40 years (Cook 2006). The palaeoenvironmental evidence from the Solway area (*Ch 11, p 365*) also suggests that clearance throughout the later Bronze Age was piecemeal, which could again have been a product of a shifting pattern of settlement, with only small areas being cleared on an *ad hoc* basis.

Pre-Roman and Roman Iron Age Settlement?

It is puzzling that, despite the wider evidence for the existence of numerous Iron Age/early Roman 'native' settlements, and associated systems of land division, on both sides of the Solway (*cf* Higham and Jones 1975; Bewley 1994; RCAHMS 1997; Gregory 2001b), very few physical traces of indigenous settlement during these periods were found on the CNDR. Whilst it is conceivable that this was merely an anomalous consequence of the sample, it could, alternatively, reflect a change in the pattern of rural settlement, from a dynamic system, characterised by open settlements, during the earlier Bronze Age (*pp 554-5*), to a more sedentary system of enclosed settlement that first appeared in the later Bronze Age and then became a dominant feature of the settlement record throughout the late first millennium BC to the early first millennium AD (*cf* RCAHMS 1997; Gregory 2001b).

Five possible examples of this latter settlement type are known in the vicinity of the CNDR, visible as cropmark and earthwork sites (Fig 270). Three of these are rectilinear enclosures forming a discrete group immediately south of the River Eden and Hadrian's Wall, *c* 150 m west of Knockupworth. Two small enclosures are conjoined, both associated with linear boundaries, positioned immediately west of a larger rectilinear enclosure. The other two enclosed settlements are north of the River Eden, comprising the multivallate earthwork enclosure at Grinsdale Camp, Cargo (McCarthy 2002, 45-6, fig 19), close to Parcel 42, and a rectilinear enclosure *c* 60 m west of Parcel 32. None of these sites has been investigated and they remain undated, though a mortarium sherd of the second century AD (*Appendix 11*) was recovered from one of the ditches flanking a track or droveway, seemingly associated with the rectilinear enclosure on the northern side of the Eden, which extended south into the CNDR (*Ch 14, p 506*). However, whilst this provides a hint that this enclosure may have been occupied during the Roman period, the sherd came from an upper fill, so it is conceivable that the ditch (and possibly, therefore, the droveway and the enclosure too) originated far earlier.

Whatever its precise chronology, this enclosure, and also those to the south of the River Eden, appear typical of many similar settlement sites elsewhere in the North. Indeed, sub-rectangular or sub-square ditched enclosures of this kind represent the characteristic site-type of the pre-Roman Iron Age and early Roman period across much of northern England (Haselgrove 2002, 59-60). In the Solway area, many have been recorded from the air, though some have yielded Roman-period pottery (Bewley 1994, 32-4, 40-6, figs 3.12-3.18), and the investigation of another such enclosure at Hayknowes Farm, near Annan, produced evidence of occupation spanning the Late Iron Age to the early Roman period (Gregory 2001c).

Few settlements directly comparable to Grinsdale Camp have been investigated in the area, though survey and small-scale excavation of a large 'hillfort' at Castle O'er, Eskdale, demonstrated a sequence of occupation that might well be paralleled at Grinsdale. It has been argued that Castle O'er began life as a palisaded settlement possibly dating to the Late Bronze Age/Early Iron Age (Mercer 2018, 191), and, tellingly, the presence of a similar, and initial, palisaded enclosure has also been suggested at Grinsdale on the basis of cropmarks on aerial photographs taken by the late Barri Jones (Gregory 1998, 233). At Castle O'er, and perhaps also at Grinsdale Camp, the palisaded enclosure was replaced by a vallated fort, perhaps in the Late Iron Age, with an annexe and system of linear earthworks being added at Castle O'er at some point between the first century BC and first century AD, which had become redundant by the second to fourth centuries AD (Mercer 2018, 192-3). In its

Figure 270: Possible pre-Roman Iron Age sites adjacent to the CNDR (Contains OS OpenData © Crown Copyright [and database right] (2022))

final incarnation, Castle O'er was refurbished as a timber-laced stone-walled fort, probably during the Late Roman period (*op cit*, 72).

Of course, it is also possible that the existence of the sub-rectangular enclosure near the CNDR goes some way to explaining the lack of evidence for occupation within the road corridor itself, since the land traversed by the road may have been farmed from this and Grinsdale Camp, as well as any other, as yet unlocated, settlements away from the route. Indeed, it is conceivable that the comparatively large and elaborately enclosed site at Grinsdale Camp indicates the existence of a well-structured social hierarchy, wherein certain prominent individuals or households controlled large tracts of land and, in a manner similar to a medieval estate, procured labour/allegiances from less dominant settlements/households in the area (*cf* Gregory 2001b; Halliday 2002). This does not, though, explain the absence within the CNDR of evidence for field systems, boundary ditches, ploughmarks, or other features that are characteristic of Iron Age/Roman-period agriculture and land management elsewhere in the frontier zone. It is conceivable, however, that if the land was largely given over to stock rearing, rather than arable agriculture, field or land boundaries might have been comparatively few and far between, or may have taken forms that left little or no trace in the archaeological record, for example hedgerows or fences.

In any event, the palaeoenvironmental evidence from the wider Solway area does seem to indicate that these settlements were situated within a landscape that had been subjected to some large-scale agricultural clearance during the later Iron Age, prior to the arrival of the Romans (*cf* Tipping 1997a; Hodgkinson *et al* 2000; Stallibrass and Huntley 2011, 26-7). That said, the palaeoenvironmental evidence from sites directly associated with the western section of Hadrian's Wall also suggests that stands of ancient woodland were present in certain areas, whilst in others, moorland may have existed.

For instance, at Birdoswald (Wall Mile 49; Fig 271), the spur on which the fort was built appears to have retained its tree cover immediately prior to the construction

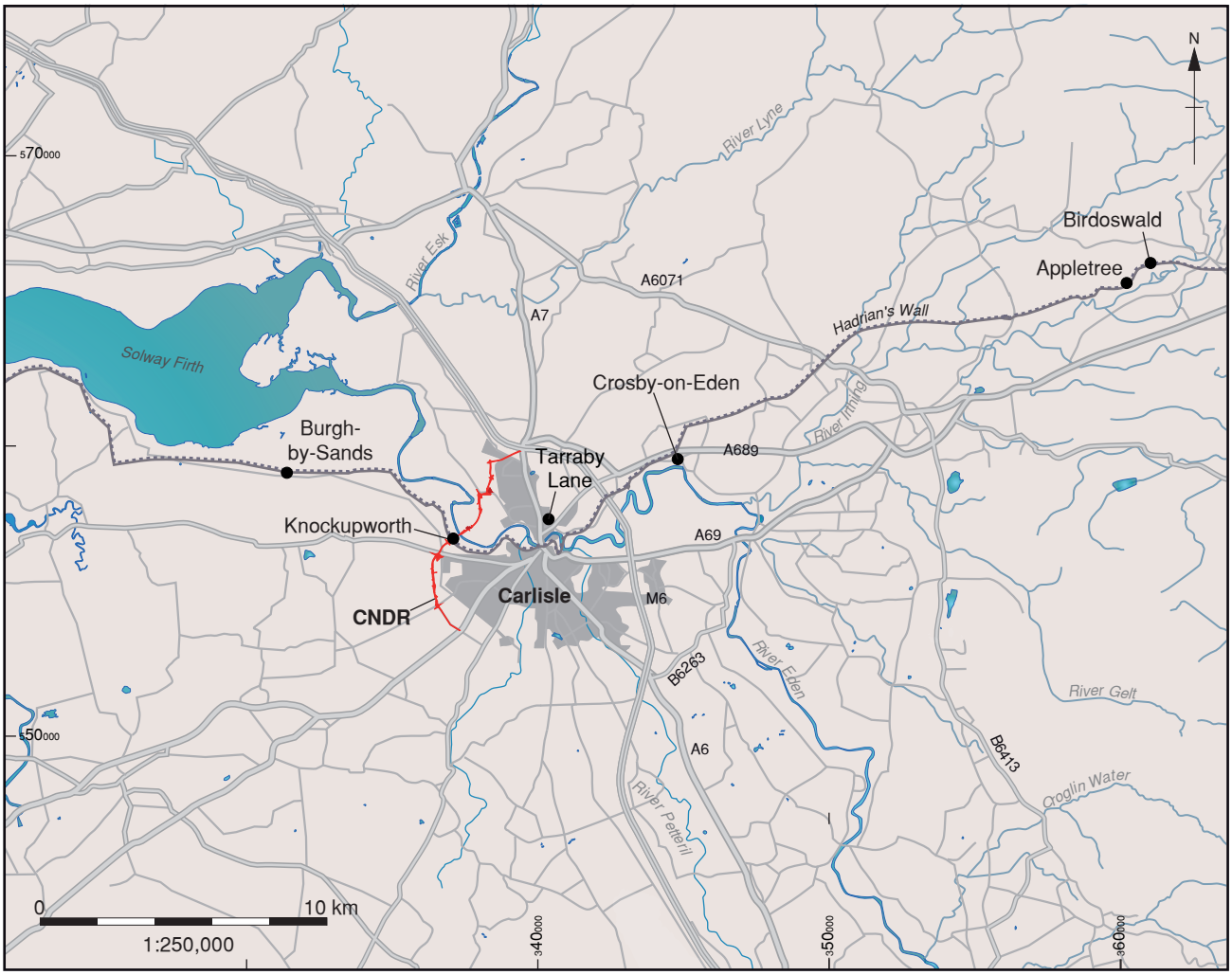


Figure 271: Sites with evidence of the pre-Roman Iron Age and Roman-period landscape in the western section of Hadrian's Wall (Contains OS OpenData © Crown Copyright [and database right] (2022))

of the turf phase of Hadrian's Wall (Wilmott 1999, 145). However, only 1.5 km to the west, at Appletree, the Turf Wall was seemingly built in a landscape of grazed moorland that had been extensively cleared of woodland some considerable time before (Wilmott 2009e, 104; Wells 2009, 114). At Carlisle, substantial oak wall-plates employed in the foundations of a large, late first/early second-century building (possibly a *mansio*) at the northern Lanes (Zant and Howard-Davis 2019) came from trees with ring sequences extending back (in some cases) to the third-, fourth- and (in one instance) fifth century BC (Groves and Tyers 2019), and other sites in Carlisle have also yielded timbers from oaks that began growing in the third- to early second century BC (*ibid*). This suggests that areas of mature oak woodland containing trees as much as 3-500 years old, survived, presumably in the near vicinity of Carlisle and the CNDR, well into the Roman period. In the fort too, good-quality timber from old, slow-grown oaks was used almost exclusively in a reconstruction of the buildings that took place in AD 83-4 (Zant 2009b, 422). However, by the time the fort was rebuilt once again, *c* AD 105, the best stands of timber may have been exhausted, as the new buildings incorporated much comparatively poor-quality timber from younger oak trees (*ibid*).

At Crosby-on-Eden, only 8 km north-east of the CNDR, analysis of a buried soil sealed beneath the turf phase of Hadrian's Wall found no evidence for cultivation pre-dating the frontier works (Bennett 2009, 123); rather, the existence of wet ground, perhaps supporting acid grassland or moorland vegetation, was suggested before the Turf Wall was constructed (*ibid*). At Burgh-by-Sands, *c* 5 km west of the CNDR, again no direct evidence for pre-Roman land-use or environmental conditions was found (Austen 1994, 38), but the character of the Turf Wall at this site suggested that the material used in its construction came from land that had been ploughed, but which had reverted to grassland sometime before the Wall was built (*ibid*).

Importantly, on the CNDR, the presence of an 'open' agricultural landscape, with some evidence for grazing animals, is confirmed by the pollen in the later Iron Age turf block, within the Vallum ditch at Knockupworth (*Ch 13, p 448*). Indeed, it is possible that the development of a largely deforested landscape around Knockupworth during the later Iron Age could have resulted in greater run-off and soil erosion, with a concomitant increase in sedimentation within the River Eden. Such a process may have given rise to the sand-dominated palaeochannels of the Eden that were identified on the fourth river terrace immediately north of Knockupworth (*Ch 2*, *p 45*). The presence of abraded Romano-British pottery sherds in some of the river gravels in this area (*Ch 13*, *p 483*) suggests that the floodplain continued to be an active and dynamic environment during the Roman period, whilst the considerable quantities of charcoal in some channel fills, identified during a borehole survey (Chiverrell 2010), might indicate that the floodplain was being cleared of tree cover or otherwise managed around this time.

The Impact of the Roman Frontier

In the late first century AD, the Roman military arrived in the Solway area and began a process of conquest and construction that would have a major impact on the landscape. It seems that this area was first substantially occupied by the Roman army in the early AD 70s, following the conquest of the Brigantes (*p 561*), with a fort being established at Carlisle in the autumn or winter of AD 72-3, as part of an extensive network of forts and roads designed to hold down the newly conquered territories (Zant 2009b; 2011, 35). At this stage, the concept of a 'frontier' had not emerged and total conquest of the British Isles was still viewed as an achievable goal, particular during the governorship of Julius Agricola (*c* AD 77-84), and his unknown successor (Mattingly 2006, 98).

However, during the early second century, changing imperial attitudes meant that during the reign of the Emperor Hadrian a 'hard' frontier was created, in the early AD 120s, on the Tyne-Solway isthmus (Breeze and Dobson 2000). Elements of this frontier were excavated at Knockupworth, principally the Turf Wall, later rebuilt in stone (Fig 272), and the Vallum (Fig 273; *Ch 13*). This system proved enduring, and the Hadrian's Wall frontier operated for much of the remainder of the Roman period. It was briefly abandoned during an occupation of southern Scotland, in the period *c* AD 140-60, when the Antonine Wall became the frontier. On the CNDR, at Knockupworth, a causeway was created across the Vallum ditch, probably at this time, to allow access through the defunct Hadrianic frontier. When the frontier was regarrisoned, after the withdrawal from Scotland after the death of Antoninus Pius, the Turf Wall was rebuilt in stone, and, at Knockupworth, the Vallum ditch was recut, an extremely unusual feature (*Ch 13*, *p 464*).

Whilst the land traversed by Hadrian's Wall was certainly owned and worked by elements of the indigenous population prior to the arrival of the Roman army (Breeze 2006, 52), the actual social, economic, and environmental impact of the Wall's construction is difficult to assess. However, as the frontier works extended for nearly 120 km across a wide range of landscape types, the impact at a local level was probably extremely variable.

The broader political consequences of the imposition of the Hadrianic frontier in the North West are far from

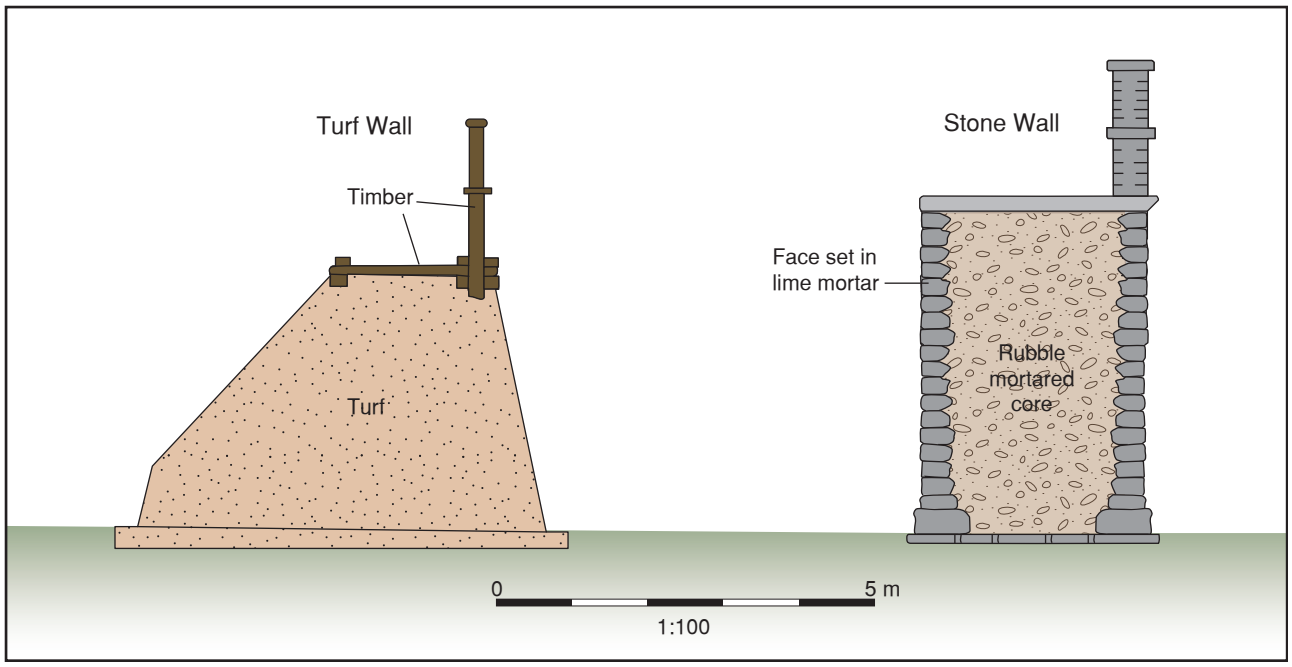


Figure 272: Idealised sections through the Turf and Stone Walls in the western sector of Hadrian's Wall (after drawings originally by Sir Ian Richmond (Richmond 1947, 55))

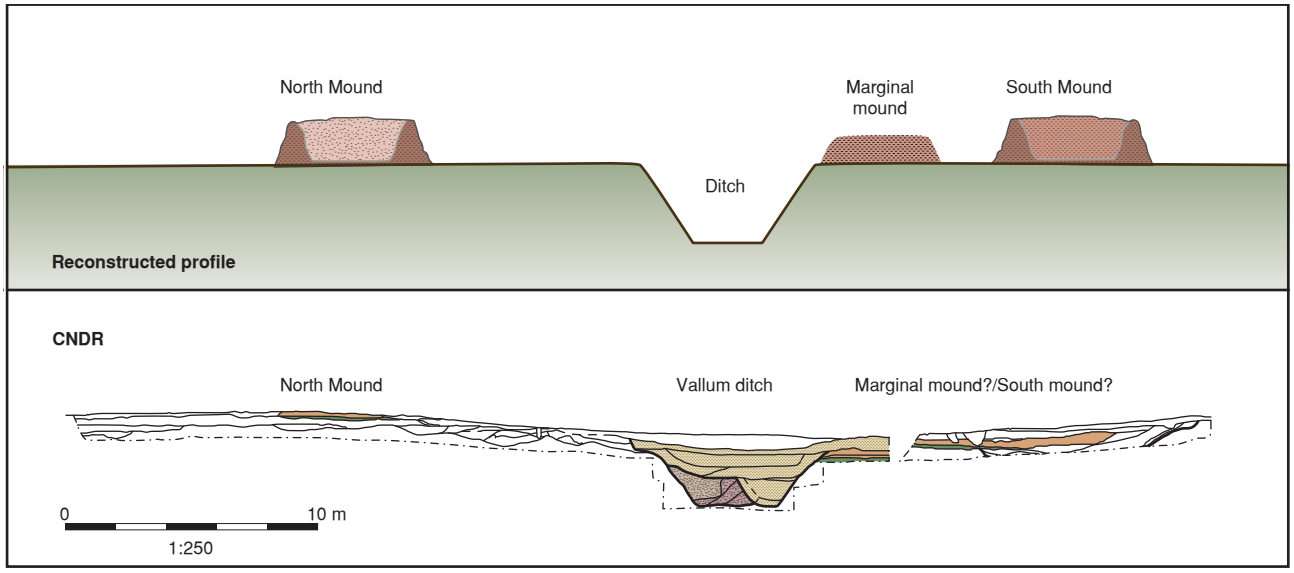


Figure 273: Idealised section across the Vallum, with the section at Knockupworth

clear, primarily because the political situation at that time is almost entirely obscure. Taken at face value, the writings of the late first/early second-century AD Roman historian Tacitus, and of the Greek geographer Claudius Ptolemaeus (Ptolemy), in the mid-second century AD, suggest that much of what is now northern England was occupied by the Brigantes, described as the most populous tribe in the province, whose territory extended from sea to sea (Harding 2004, 23; Breeze 2008, 64-5). If this summation had any basis in fact, it is possible that the Wall lay wholly within Brigantian territory; indeed, it has been suggested (*eg* Shotter 2004, 84) that the new frontier may have been planned with scant regard for existing political boundaries, leading to some Brigantian lands north of the Wall becoming effectively 'detached' and isolated from those to the south. However, evidence in support of this hypothesis is slight, though a statue of the goddess Brigantia is known from the outpost fort at Birrens, north of the Solway in Eastern Dumfriesshire (Daniels 1978, 319). Furthermore, it is possible that the ancient writers took a somewhat generous view of Brigantian influence (perhaps for the sake of literary convenience), and that the tribe's territories were confined largely to lands east of the Pennines (Harding 2004, 23; Allason-Jones 2009).

Elsewhere in the North, several other indigenous groups recorded by Roman writers or attested on

inscriptions have been represented by some scholars as septs within an extended Brigantian confederation (*eg* Shotter 2004, 111-12), though, if Brigantian control was more restricted than the ancient writers suggest, there seems to be no reason why these could not have been independent polities. One such group, the Carvetii, appears to have been located in the northern part of modern Cumbria (Higham and Jones 1985), with, by the early third century, its administrative centre at Carlisle (Edwards and Shotter 2005), though the territory of the *civitas* may have extended much further south into Lonsdale, and possibly also north into Annandale (Breeze 2008, 67-8). It is possible, therefore, that it was Carvetian, rather than Brigantian, lands that were crossed by the Wall in its western sector.

Whilst the wider political ramifications of the Wall's construction are likely to remain largely conjectural, understanding the socio-economic impact of the frontier on local communities, and the environmental impact on the landscapes it traversed, continues to be advanced by modern archaeological research and excavation. In the past, there has been debate (*eg* Dumayne 1994; Dumayne and Barber 1994; Dumayne-Peaty and Barber 1997; McCarthy 1997) regarding the extent to which the landscape of the frontier zone had already been altered by the indigenous inhabitants during the pre-Roman Iron Age, but, on balance, it does seem likely that the landscape in the Tyne-Solway corridor as a whole on the eve of the construction of Hadrian's Wall comprised a highly variable patchwork of arable and pastoral fields, woodland, moorland, and other natural vegetation (*pp 559-60*, Wilmott 2009g, 130).

In all probability, therefore, the construction of the frontier required the requisitioning of large tracts of productive agricultural land across considerable areas of the Wall zone, and this was presumably also the case in the vicinity of the CNDR. For example, close to Knockupworth, at Tarraby Lane, Stanwix (Fig 271), the Wall and its associated works were built across an extensive system of arable fields, represented in the archaeological record by ditched boundaries, buried soils, and plough- or ard-marks scoring the natural clay, which covered an area of at least 17 ha (and probably considerably more) to the north of the Wall fort (Smith 1978; Zant and Town 2013). Although it is probable that these fields were still in use at the time the Wall was built (Smith 1978, 35-7; Zant and Town 2013, 62-4), the Roman army seemingly had little regard for existing patterns of land management, since the frontier works were driven diagonally across the fields, presumably forcing the abandonment of the entire system. Somewhat earlier, at Carlisle, *c* 1 km south of the Wall, arable cultivation may have ceased only a short time before the construction of the primary fort in AD 72-3 (Zant 2009b, 445-6; Guttmann-Bond 2009, 1527). Although the procedures and protocols adopted by the Roman army in requisitioning these fields remains unknown, in Germany, farmers affected by the construction of frontier works under the emperor Domitian (AD 81-96) were compensated for the loss of their crops (Breeze 2006, 52-3).

Whilst the character of the landscape through which the Wall was built is gradually becoming clearer, the broader, long-term impact of the construction of the Hadrianic frontier on indigenous settlement and society has been comparatively little studied. In some parts of the North, particularly east of the Pennines, and closer to the CNDR, beyond the Wall in eastern Dumfriesshire, where the evidence for Iron Age and Roman-period 'native' settlement is generally more plentiful than in north-west England, it is clear that settlement expansion, accompanied by agricultural intensification and innovation, began in the pre-Roman Iron Age, possibly in response to population increase (RCAHMS 1997; Gregory 2001a; Zant and Howard-Davis 2013, 142-3).

However, in the North West, it has been suggested that the archaeological evidence from some areas points to an expansion in settlement sites in the aftermath of the Roman conquest (Nevell and Roberts 2005, 115), rather than earlier (though this has been disputed elsewhere in the region (Bewley 1994, 74-7)), and it is also claimed that environmental evidence from some areas hints at an expansion of cereal cultivation to higher levels (up to *c* 250 m OD) than was the case in the immediate pre-Roman Iron Age (Nevell and Roberts 2005, 115). If this is correct, it is possible that these developments were a direct result of the arrival of the Roman army, which, it is argued, would probably have required a considerable increase in agricultural production (*ibid*).

On the Wall, it is self-evident that the garrison, which may have numbered (at least on paper) somewhere in the region of 9-10,000 men during the second/early third century (not including the units in the outpost forts or those on the Cumbrian coast), would have required vast quantities of food and other provisions. Given the cost of transportation during the Roman period, especially overland (Higham and Jones 1985, 107-8), it is likely that as much as possible would have been acquired locally, particularly in the case of basic commodities such as grain and meat. Precisely how this worked in practice is unclear; in Britain as a whole (and, indeed, elsewhere in the Empire), each individual fort would have been surrounded by a *territorium*, comprising land, presumably appropriated in one way or another from the local inhabitants, which was administered by the military authorities in order to provide the garrison with at least some of its food and other basic resource requirements (*op cit*, 109). This may

have been requisitioned directly from the locals, as a form of taxation in kind, or farmers might have been required to convert a proportion of their agricultural surplus into cash, to facilitate the payment of taxes. Presumably, some such system operated around each of the Wall forts, though evidence is lacking.

It also seems likely that retired soldiers were settled on farms established within their fort's sphere of influence (Shotter 2004, 139), or were given plots within the extramural settlement outside the fort, from which the land immediately adjacent may have been farmed. However, each *territorium* would doubtless also have encompassed a number of pre-existing farmsteads or settlements. How this affected existing patterns of land tenure is not known, nor is it clear to what extent the 'native' inhabitants interacted socially and/or economically with the military or with the discharged veterans (Philpott and Brennand 2007, 65). The extent of the military holdings around any particular fort is also unclear, but they presumably varied in size depending on the composition and size of the garrison, and the nature of the surrounding landscape. Certainly, there is archaeological evidence for the existence of extensive agricultural landscapes in the immediate vicinity of some forts, for example at Brougham, near Penrith, where ditched field boundaries, watering holes, and other agricultural features, all dating to the Roman period, were recorded for a considerable distance south and east of the fort (Zant in prep).

Whatever the exact mechanisms may have been for the local production and supply of provisions to the army of the Wall, it is clear that the quantities involved must have been huge. It has been estimated, for example, that the men of a single 500-strong auxiliary infantry regiment (*cohors peditata*) would have needed at least 163,800 kg (163.8 tonnes) of grain (or the equivalent in other foodstuffs) *per annum* (Higham and Jones 1985, 107). The Wall garrison would, therefore, have required in the region of 3-3300 tonnes of food each year. However, to this must be added the fodder/grazing needed for the horses of the *alae* and *cohortes equitatae* (probably at least 3000 animals, not including remounts), the pack/draught animals and officers' mounts, and the rations of servants, slaves, grooms, or others, who, whilst not formally 'on the strength', must have been attached to each unit (James 2001, 80). Whilst this is impossible to quantify, it must at least double the amount of food that was required for the soldiers alone. Additionally, other commodities, including leather (or untreated animal hides), wool, and timber, for which the Roman army always had an inexhaustible demand (Nevell and Roberts 2005, 111), are likely to have been obtained locally, wherever possible. It must also be remembered that land would be required to sustain the inhabitants of the extramural settlements that sprang up outside the walls of virtually every fort in the region, many of which were clearly of considerable size (Hodgson 2009, 35), with populations quite possibly comparable to those of the garrisons themselves. Whilst it is probably the case that many of the inhabitants produced much of their own food and other essentials, each community must have included a significant proportion of 'non-producers', who made a living by providing other goods and services to the garrison, and their neighbours.

Even if only a proportion of the food and other provisions required by the Wall garrison and their dependants came from the frontier zone, the production and supply of such enormous quantities of *materiel* may have placed considerable strain on the rural economy. On the evidence from sites such as Stanwix, where the Wall and its associated installations were built over recently cultivated fields (*p 562*), this can only have been exacerbated by the loss of prime agricultural land to the new frontier system. What impact this had locally (if, indeed, it had any significant effect across the frontier zone as a whole) is, however, unknown, nor is it clear how (or even if) the imposition of the Wall changed patterns of settlement and agriculture within the Solway area. It is also not clear whether it allowed for the development of a more 'Romanised' provincial society further to the south (*cf* Hodgson 2009, 49), following the emergence of a probable market centre at Carlisle, certainly a significant administrative and (presumably) commercial centre by the early third century (Edwards and Shotter 2005). Whilst it is currently impossible to demonstrate conclusively whether or not the construction of Hadrian's Wall, and the consolidation of the Tyne-Solway frontier line from the mid-second century onwards, played a part in these developments, the conclusion that the imposition of the frontier was a significant factor seems inescapable (*op cit*, 49; Wilmott 2009g, 130).

Despite the challenges that the construction of the Wall must have presented, both socially and economically, to the indigenous peoples of the frontier zone, it seems probable that the presence, throughout the Roman period, of large numbers of military personnel, together with the more-or-less Romanised populations of the extramural settlements, would also have provided opportunities for those living in the rural hinterland (Shotter 2004, 139). Whilst the demographic make-up of the settlements outside the forts is far from clear, logic dictates that a significant element of the population would have comprised native Britons, mostly, presumably, of local stock, who were attracted by the economic and social opportunities provided by the military garrisons. Indeed, personal names of certain or probable 'Celtic' type are well-attested on inscriptions from the military settlements

of the frontier zone (Birley 1979, 107-14), though it is impossible to know if these individuals were local or if their origins lay elsewhere in Britain, or the north-western provinces of the Empire.

For those locals who continued to live in the countryside, the evidence from some rural settlements suggests that elements within the indigenous population not only aspired to the ownership of 'Roman' cultural trappings, such as imported pottery, food, drink, and metalwork (Shotter 2004, 147), but were also able to afford them, presumably through the generation of an agricultural surplus over and above that needed for subsistence and the payment of taxes. By and large, however, the majority of excavated rural sites in the region typically yield only very small quantities of diagnostic Romanised material (*eg* Philpott 2000, 186), and it also seems that, in general terms, the quantities of Roman artefacts decreased the further away the rural settlement was from an urban centre (*cf* White 2014; Millett 2014).

A question remains, therefore, over the extent to which the bulk of the rural population was willing or able to 'buy in' to the Roman cultural package. On the one hand, it is possible to argue that the scarcity of such material at rural settlements is indicative of relative economic poverty, but it is also possible that the evidence points not to poverty, but to a degree of cultural conservatism, which resulted in a slow 'take-up' of Roman material culture (Hingley 1989, 34-5, 146). Indeed, this could be supported by the evidence from Barker House Farm, only some 6 km to the south of the fort and civil settlement at Lancaster, where an Iron Age 'lifestyle', associated with two 'traditional' Iron Age-style roundhouses, occurred in the second/third centuries cal AD (Zant and Bagwell 2007).

Early and Later Medieval Settlement and Landscape in Stainton Township

Further significant discoveries made during the archaeological investigations along the route of the CNDR comprised the remains of two settlements, one perhaps the successor to the other. Both of these were within the township of Stainton (Fig 274), which perhaps operated as a defined territorial unit during the medieval period (*Ch 14, p 496*).

The earliest of these was in Parcel 42, and dates to around cal AD 710-950, which, perhaps coincidently, equates with the period when climatic conditions improved, following their deterioration at the end of the Roman era (*Ch 14, p 485*). As far as can be ascertained, this settlement represents a small hamlet, perhaps typical of those scattered across the other townships in the Solway area. It contained four contemporary rectangular timber buildings and one other, which may have stood either in isolation or was a short-lived predecessor. Although their precise functions are difficult to discern, the hamlet may have comprised two domestic structures, contained in their own fenced compounds, and two ancillary/agricultural buildings within a single larger compound, one of which was completely rebuilt at some stage (*Ch 14, p 501*). The status of these inhabitants remains uncertain, particularly as there were no artefactual remains, which might have shed some light on this.

A model of a typical northern English rural hamlet, not dissimilar to that at Parcel 42, dating to 'some centuries before the Norman conquest' would probably have contained a high-status farmstead, enclosed within its own separate toft or garth, which might house 'a senior farmer, some of his kin, and some household slaves' (Roberts 2008, 129). In the case of Parcel 42, one of the large putative domestic buildings (Building 4 or 5) might therefore represent one such dwelling of a 'senior farmer'. It is also suggested (*ibid*) that such a 'model' hamlet would contain other tenants (free and unfree) housed in additional dwellings, situated within an enclosed toft, and, again, either of the suspected domestic buildings at the Parcel 42 settlement might conceivably have fulfilled this role, as well as the smaller 'ancillary' buildings (1-3) immediately to the west. In any event, the most important feature of the Parcel 42 settlement is that it seems have been nucleated, which, in turn, suggests that such nucleation was underway in this part of the Solway area by the eighth/ninth century. Hence, this process seems to represent the first steps in the formation of a village, including evidence of 'planning', these being prominent features of the later medieval rural landscape (*cf* Aston 1985, 82).

The agricultural land that supported the Parcel 42 settlement would have lain beyond it. It is clear from the palaeobotanical remains that arable farming was practised, including the cultivation of wheat, barley, and oats, and this most probably occurred within a mixed-farming system, whereby stock rearing was also significant. Although direct evidence for animal husbandry, in the form of animal bone, was absent, due to the lack of survival of this material in the acidic soils, it is worth noting that the Parcel 42 hamlet appears to have been enclosed by a light fence, which may have been designed to stop stray livestock entering the settlement, and the charred remains of holly and heather were recovered, which are plants that could have been used as winter fodder (Spray 1981).

Based on this evidence, it is probable that the immediate landscape contained meadows/pastures and arable plots, which, according to palaeoenvironmental

information from across the Solway area (*Ch 14, p 487*), was dotted with stands of woodland (the size and location fluctuating throughout the early medieval period) and extensive areas of mossland. Evidence from Glasson Moss to the west, on the southern shore of the Solway, suggests that some of these wetland areas were used for hemp retting during the period when the Parcel 42 hamlet was occupied, indicating

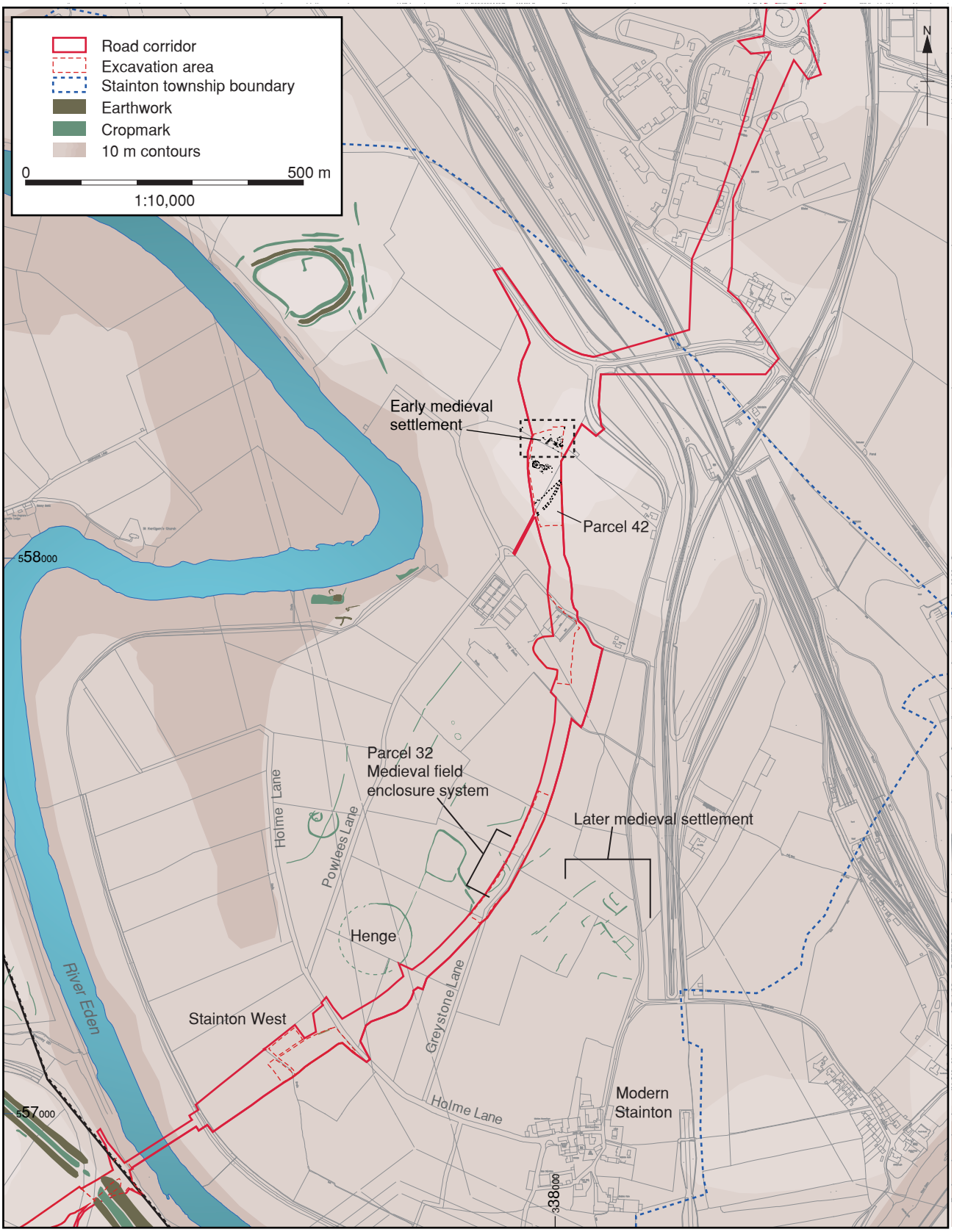


Figure 274: Medieval settlement in Stainton township (Contains OS OpenData © Crown Copyright [and database right] (2022))

that such cultivation was also a feature of the early medieval agricultural landscape (Cox *et al* 2001). In addition, such areas, as in the later medieval period, would have provided sources of fuel and areas suitable for rough grazing (*Ch 14, p 496*).

Precisely how this lowland rural landscape was held, organised, and worked is not, however, clear, although one possibility, based on later medieval agricultural practices in the Cumbrian lowlands (*Ch 14, p 496*; Winchester 1987, 74-5) was that an infield-outfield system was in operation, with a block of permanently cultivated (and manured) infield land, used for arable cultivation, close to the settlement, with an outfield area that was used as pasture, with pieces that were periodically cultivated for a few years before being returned to pasture (*cf* Oosthuizen 2010, 380). Indeed, a further possibility is that access from the Parcel 42 settlement to one such outfield area was via a trackway, the course of which crossed the CNDR, and was redefined in the post-medieval period through the addition of ditches (*Ch 14, p 526*). The route of this track might also suggest that these putative outfield areas lay close to the River Eden.

It is unclear whether this was the only early medieval settlement in Stainton township, though another candidate might be the potential medieval cropmark site to its south-east (*Ch 14, p 506*), which could conceivably have originated in the early medieval period. The Parcel 42 settlement had clearly been abandoned by the mid-tenth century, and it is possible that settlement in the township then became focused on, or shifted to, this latter site, which itself probably represents the precursor to the present-day village of Stainton. The cropmarks relating to this settlement appear to indicate several rectangular building plots, arranged in an irregular cluster. Although these buildings may not all have been of contemporary date, they do seem to suggest that, perhaps, in its final incarnation, this was a nucleated settlement.

The primary evidence for the date of this cropmark was derived from several ditched boundaries, excavated within Parcel 32, *c* 140 m west of the settlement core. Material from the base of one of these boundaries suggests it was created at some point between the late tenth and mid-twelfth century, whilst pottery of twelfth- to fourteenth-century date suggests that it was filling during this time (*Ch 14, pp 508-9*). The place-name 'Stainton', although not unusual in Cumbria, contains elements deriving from Old Norse (*stein*), and Old English (*tun*), translating as stone enclosure/farm/village (Armstrong *et al* 1950, 95), and this possibly references the cropmark settlement and its boundaries, which may have existed (or may even have been founded?) during the period when this part of the Solway area came under Viking influence.

Dating aside, the excavated boundaries in Parcel 32 hold further significance for understanding the form of the late medieval landscape in Stainton township, as they appear to relate to a large rectangular enclosure on the western side of the cropmark settlement, with perhaps another similarly shaped enclosure immediately to the north-west. Based on the known layout and organisation of Anglo-Saxon fields in England (*cf* Oosthuizen 2010, 124), one suggestion is that these large enclosures, perhaps created prior to the Norman Conquest, contained an 'open'-field system, an arrangement which would then go on to form the backbone of field organisation in the Cumbrian lowlands throughout the later medieval period (Winchester 1987, 72).

If this was the case, the enclosures at Parcel 32 might have been divided into furlongs, containing narrow strips, which were organised communally by the inhabitants of the settlement, with movement between the strips being unimpeded by any physical barriers (*cf* Thirsk 1964). Throughout England, the use of furlongs, although generally a feature of the post-Conquest rural landscape, seems to have occurred from at least the tenth century onwards (*cf* Oosthuizen 2010, 126), which would therefore fit well with the dating evidence from the Parcel 32 enclosures. Indeed, further confirmation of the use of these enclosures for arable farming was provided by the palaeoenvironmental evidence, the ditches producing evidence for the cultivation of oats, barley, and bread-type wheat (*Ch 14, p 509*).

The boundary ditches may also have acted as land drains, probably needed to cultivate this terrain effectively. Drainage ditches may thus have been a characteristic feature of medieval rural settlement in the area, seen also close to the village of Rickerby, immediately to the north-east of Carlisle, where a series of medieval ditches appeared to have had this function, though in this instance they were used to define small crofts and gardens to the rear of later medieval houses in the settlement (Masser 2006).

Another area of medieval cultivation may also have existed in the vicinity of the Neolithic henge monument, which might have been associated with this settlement. It is evident that the area was ploughed when the adjacent enclosures were in existence, as ploughsoil began to enter the henge's ditch during the later medieval period, and this contained palaeoenvironmental evidence for cereal cultivation (*Ch 14, p 509*). It seems likely therefore that the significance of this, by then, ancient monument had dwindled, and that it was perhaps no more than an agricultural 'inconvenience', within a parcel of land that was viewed as being more important for growing arable crops.

The Creation of the Modern Rural Landscape

On either side of the CNDR, the modern rural landscape comprises a familiar swathe of enclosed fields and a scattering of rural villages and hamlets, the majority of which date to the post-medieval period. Many elements associated with the post-medieval rural landscape, particularly boundary ditches, were evident within the road corridor, which related to the enclosure by Parliamentary Act, of areas of moorland (commons and waste), during the eighteenth and earlier part of the nineteenth century (*Ch 14, pp518-22*). Indeed, at that time the formal enclosure of moorland was widespread across Cumbria, following either the passing of Parliamentary acts or private agreements (Kain *et al* 2004, 59; Whyte 2006), and it was to have a profound and enduring effect on the landscape of the area south of the Solway, producing the field pattern still extant today.

The CNDR and the Development of the Cultural Landscape

Each successive generation has inherited an encultured landscape, which has informed their own understandings and actions. The experiences of the Late Mesolithic hunter-gatherers will have been shaped by the choices of their forebears: which valleys they chose to range; where they cleared the woodlands; and where they established their camps. This is seen in the persistent use of the island between the two channels of the River Eden, at the edge of the floodplain at Stainton West. Social networks may also have developed, between far-flung communities, early in the Mesolithic period, possibly even before the deciduous woodlands had recolonised. These persistent lines of communication, demonstrated by the regional lithic distributions, stretched northwards up into Scotland and eastwards from the Irish Sea (or beyond), along the Eden Valley, and over the Pennines to, at least, the Yorkshire coast.

These Mesolithic geographies may have owed much to the natural formations of the landscape, but they were inherited by transhumant Neolithic farmers, who travelled similar pathways with their herds, cleared small tracts of woodland to create agricultural plots, and remained tethered to many of the same key places. This can be seen in the superimposition of lithic assemblages dating to both periods, and the monuments that were often constructed at these same places. At Stainton West, such landscape continuity, at the dawn of the Neolithic period, resulted in tree felling, structural elaboration of the palaeochannel, and the performance of depositional rites at what had once been the site of an earlier hunter-gatherer encampment. Later on in the Neolithic period, the same site was selected for the creation of burnt mounds, seemingly associated with the nearby henge monument.

Once established, these Neolithic ceremonial landscapes often appear (as was the case at the CNDR) to have been key foci for subsequent generations of metal-using farmers, in the earlier Bronze Age. These communities were the first to espouse a truly settled way of life, in permanent (or semi-permanent) 'unenclosed' settlements associated with agricultural fields. The houses were found at multiple sites along the road scheme, pointing to an extensively settled lowland landscape, with clearances evident within the pollen record. The continued use, at Stainton West, of burnt mounds suggests that the monumental complexes also retained their importance.

Although the evidence from the Solway area is scant, there seems to have been a marked shift in ideology in the later Bronze Age, which witnessed the appearance of 'enclosed' palisaded settlement sites, together with the use of bronze artefacts with seemingly militaristic overtones. These may well reflect a greater requirement for both defence and display, and may hint at wider changes in society, leading to it becoming increasingly hierarchical. It is also quite possible that during this time monuments and ritual landscapes dwindled in significance. Presumably, however, the landscape of the Solway was farmed, cleared, and divided, very much as it had been in the earlier part of the Bronze Age.

The processes set in motion in the later Bronze Age, in the Solway area, accelerated in the pre-Roman Iron Age. Population levels may have increased, with a concomitant increase in woodland clearance and farming (both arable and pastoral), and also the construction of settlements of varying sizes that were enclosed by ditched boundaries. The landscape also appears to have been more extensively divided during this period, and it is possible that the Iron Age landscape around the Solway contained a series of 'estates', whereby particular household/settlements rose to prominence, controlling substantial areas of landscape and perhaps procuring labour and agricultural resources from lesser households.

In the late first century AD, the indigenous population of the Solway area was radically affected by the presence of the Roman army. Initially, this may have been by hearsay, but, by at least the early AD 70s, direct contact was established. The effect of the arrival of the Roman military at one level was profound: the influx

of a mass of exotic peoples; the establishment of novel military installations and institutions; the subsequent creation of a 'hard' frontier across the landscape; and also the first urban areas; and the resettlement of Roman veterans. These events, particularly the construction of the frontier and forts, required the requisition of indigenous land and, perhaps, the relocation of communities. Other stresses were probably also placed on the populace, which centred on issues of military logistics, particularly the imposition of taxes. It is quite possible, though, that the basic fabric of indigenous society remained largely unaltered, and that beyond Carlisle and the frontier, rural life continued much as it had done before the arrival of the Romans.

In one sense, the early medieval period witnessed many changes, as the over-riding political veneer shifted on several occasions, the morphology of rural settlement and domestic architecture changed, and agricultural productivity may have increased, through the use of new crops and systems of farming. It is possible, though, that during this time the structuring of rural society may have echoed that of the Iron Age, with small estates in operation, the landscape containing a smattering of dispersed rural settlements and holdings nestling between tracts of cleared agricultural land, woodland stands, and mosslands. The character, however, of the modern rural landscape around the inner Solway Firth owes much to the later medieval and post-medieval periods. It was during this time that the first nucleated rural settlements appeared, many of which are present to this day, and the process of enclosure began, which produced the now familiar pattern of fields and routeways.

The fields, boundaries, tracks, and towns of the modern landscape in Carlisle's hinterland have been established as part of an historical process that is still unfolding. Indeed, as part of this, the most recent addition to the rural landscape is the CNDR (Pl 218). This route, whilst vastly improving communications across the area and reducing congestion within the city, has also had many other benefits; it has enabled the nuances and subtleties associated with the development of the region to be explored over an extended temporal period, within an area of Cumbria that has hitherto seen little archaeological investigation. Importantly, this exploration has only been possible through a combination of advanced planning and cooperation between Cumbria County Council, road-construction companies, engineers, and archaeologists, and the work presented in this volume provides clear testament to all those involved in this ambitious, but ultimately fulfilling, archaeological project, of a scale that has rarely been seen in the North West, or indeed nationally.

Plate 218: The CNDR under construction, looking south

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INDEX

Abbeytown Ridge 213, 377, 439, *see also* New Cowper Quarry
Act of Parliament (Enclosure acts) 518, 521, *see also* Enclosure
Adze *see* Lithics, adze
Aglionby 377-8, 495
Agriculture 12, 31, 33-4, 57, 59, 182, 185, 207, 226-7, 300, 317-20, 373, 401-2, 487, 553, 559, *see also* Crops; Cultivated ground; Cultivation; Farming; Husbandry
  intensification of 487, 562
  practices 57, 553
Ainstable 377-8
Aird Quarry, Stranraer 378, 420
Aldingham 432, 436
Aldoth 377-8
Ancestors/Ancestral 154, 170, 181, 221, 223, 230, 279, 308-11, 314-18, 320, 327, 358-9, 361, 373, 375, 434, 445, 543, 549-50, 552, *see also* Kinship
  house 230
  grove *see* Grove, ancestral; Grove, sacred; Khanty
  power 309, 311, 315-16, 327, 359, 361
  rites 327, 361, 552
Anglesey 344
Anglo-Norman kingdom 32, 493
Anglo-Saxon
  building type/style 511
  fields 566
  kingdoms *see* Kingdoms, Anglo-Saxon
  placenames 513
  settlements 513
Animal 55, 57, 103, 173, 176, 186, 534, *see also* Aurochs; Bear; Beaver; Butchery; Cattle; Deer; Dolphin; Eel; Fish; Hunting; Lynx; Pig; Salmon; Shellfish; Wild boar
  as a commodity 320, 327, 553
  bone 221, 223, 360, 423, 443, 527, 564, *see also* Antler
    bird 176
    pig 176
    salmon 176, *see also* Salmon
  butchery of 153, 223, *see also* Butchery
  domesticated 207, 223, 228, 287, 291, 300-1, 315, 320, 401, 548, 553, *see also* Husbandry
  grazing 33, 59, 87-8, 193, 226-7, 286-7, 291, 300, 311, 315, 327, 334, 401, 405, 448, 496, 509, 548, 560, 563, 566, *see also* Grazing
Annandale 209, 214, 373-5, 433, 487, 490, 494, 562, *see also* Robert de Brus
Antler 27, 55, 59, 62, 108, 113, 121, 123, 128, 130, 141, 153, 156, 162, 169, 536, *see also* Animal, bone
Antonine Wall 451, 453, 457, 462, 466, 476-7, 479-80, 560
  platform at Tollpark 462
Anvil *see* Lithics, anvil
Appletree *see* Hadrian's Wall, Appletree
Army
  Jacobite 517
  modern 474
  Roman *see* Roman, army
  Welsh and Mercian 490
Arrowhead *see* Lithics, arrowhead
Arthuret 490
Aspatria 420, 445, 492
Aurochs 101, 169, 176, 181, 320, 533, 536
Awl/borer *see* Lithics, awl/borer
Axe *see* Bronze, axe; Copper, axe; Lithics, axe
Axe-working Area *see* Stainton West, Areas, Axe-working

Backwater Channel see Stainton West, *Backwater Channel*
Bark 85, 88-90, 108, 195-6, 249, 255, 270, 285, 337, 367, 435, 547, *see also* Trees; Wood
  removal 88, *see also* Girdling
Barley *see* Cereals, barley
Barn 511, 513, 516, *see also* Kiln, barns
Barrow 218, 315, 375, 377, 418, *see also* Cairns
Barrow in Furness 217, 356, 432
Bart's Shelter 60, 62, *see also* Caves
Basal sands and gravels see Stainton West, stratigraphical units, *Basal sands and gravels*
Bathing/purification *see* Ceremonial, complex/monuments, bathing/purification; Sauna; Sweat lodge
Battle
  of Armterid 490
  of Carham 493
  of Chester 490
  of Culloden 517
Beads 34
  glass 483, 506
  medieval (glass) 506
  prehistoric (stone) 25, 112, 133, 540
  post-medieval 522
  Roman/Romano-British 31, 483
Bear 53, 82-3, 113, 124, 176, 318, 534, *see also* Animal; Lynx; Wood, clawmarks
  brown 82, 534
Beaumont *see* Hadrian's Wall, Beaumont
Beaver 32, 70, 72-3, 75-6, 82, 84-5, 87-8, 94, 100-1, 103, 192, 249, 367, 534-5
  activity 46, 49, 72, 82, 87
  built *see* Beaver, dam; Beaver, lodge
  coppicing 88
  dam 46, 72-6, 78-80, 82-3, 85, 88, 90, 93, 100-1, 337, 535
  damming 57, 82
  lodge 12, 46, 72-6, 79, 80, 82, 88-90, 92-4, 98, 101, 435-6, 535

bank 75-6
wood, gnawed pieces 245-6, 249, 256, *see also* Wood, gnawed
Beck Burn, Solway Moss 59, 418, 486-7
Beckton Farm, Lockerbie 230, 356, 378, 428, 434, 439, 445, *see also* Lockerbie
Beetle *see* Insects, beetle
Belmont Hoard 265, *see also* Cumbrian Clubs; Langdale; Lithics, axe/axehead
Bernicia *see* Kingdom, Anglo-Saxon; Kingdom, Northumbrian
Bewcastle Fells 39
Bexhill, East Sussex 175, 179, 428, 435
Bioturbation 27, 52, 97, 124, 129, 323, 329, 528
Birdoswald 472, 474, 477, 487, 489, 514, 559, *see also* Hadrian's Wall, fort, Birdoswald
Birkrigg 217
Birrens 561
Black Carts *see* Hadrian's Wall, Black Carts
Black Fell Moss 180
Blackpool 209
Blackthorn *see* Charcoal, blackthorn-type; Plants, blackthorn
Blade *see* Lithics, blade
Bladelets *see* Lithics, bladelets
Blairhall Burn 230, 378, 380, 428, 433, 439, 442, 444
Boat building 154, 158, 172
Bog
body, Scaleby Moss 377
burst 486
surface wetness 365, 418
Bolton Fell Moss 225, 365, 378, 485-7
Bone 27, 55, 59, 62, 82, 108, 113, 121, 123, 128, 130, 156, 176, 217, 359-60, 536, *see also* Animal, bone; Human, bone
working 108, 113, 121, 123, 128, 130, 141, 153, 262, 536, 546
Bonfire Scar Cave 62, *see also* Caves
Boomby Gill 159, 453
Borehole survey 19, 45, 560
Boreland Cottage Lower 353, 427, 434, 437
Botcherby Nurseries 378, 380, 437, 439, 495
Boundary
Bronze Age 12, 33, 364, 377, 397, 405, 408, 423, 444-5, 457, 554, 556, 567
curvilinear 447
ditch 12, 34, 445, 457, 521-2, 559, 566-7
fenced 445, 556
field 31, 325, 520, 522, 526-7, 563
Iron Age 447, 559
rectilinear 447-8, 557
medieval 12, 34, 325, 485, 491, 494, 496, 505-7, 509, 556
forest 494
post-medieval 12, 31, 520-2, 526-7, 567-8
Roman 447, 450, 557, 559, 562-3
Bounded area 54, 150, 163, 174, 186, 228-9, 265, 315, 326-7, 476, 519, *see also* Models, Ingold; Territories
Bowness Common 226, 406
Bowness-on-Solway *see* Hadrian's Wall, fort, Bowness-on-Solway
Boyne Valley 230
Braided water system 15, 40, 48, 149, 434, 532, *see also* Rivers
Bracken *see* Plants, bracken
Brambles *see* Plants, brambles
Brampton kilns 456, 483, *see also* Kiln; Pottery, Roman
Brighouse Bay 433
Brigantes 560-2
Broadlea Henge 378, 380
Bronze 375, 382
axe (flat) 380
dirk 32, 382
halberd 32, 382
Bronze Age 24, 32-4, 41, 321, 427
boundary *see* Boundary, Bronze Age
Bronze Age alluvium see Stainton West, stratigraphical units, *Bronze Age alluvium*
Bronze Age/Iron Age alluvium see Stainton West, stratigraphical units, *Bronze Age/Iron Age alluvium*
burnt mound tradition 344, 352, 360, 552, *see also* Burnt Mound; Chalcolithic/Bronze Age, Burnt Mound
ceremonial activities *see* Ceremonial, complex/monuments, Chalcolithic/Bronze Age
climate 365, 373, 434
communities 373, 375, 377-80, 382, 401-2, 405, 409-10, 418-22, 432, 434, 437, 444-5, 553-5, 557, 567
ditch 12, 31, 33, 364, 375, 377, 380, 403, 407-11, 418, 423, 426, 437-8, 443-5, 456, 567
enclosure 380, 408, 420-1, 424, 445, *see also* Enclosure, palisaded; High Crosby
fence/fenceline *see* Fence/fenceline, Bronze Age
flooding/flood events *see* Flooding events
hearth 5, 31, 34, 367, 387-8, 395-400, 403, 405, 413, 415-18, 420, 422, 426, 429, 431, 433, 439, 443-4, 556-7, *see also* Garlands Hospital; New Cowper Quarry
monument 9, 216, 320, 326, 380, 436-7, *see also* Ceremonial, complex/monument; Chalcolithic/Bronze Age, Burnt Mound; Henge monument
metalwork/metalworking 32, 363, 377
palstave 32, 382
pottery *see* Pottery, Bronze Age
reactivation channel *see* Stainton West, reactivation channel
roundhouse 12, 24, 31, 33, 380, 382, 402, 405, 411-14, 417, 420, 431, 440-4, 447, 555-7
Parcel 9
House 1 402-5, 426, 431, 438, 440, 443, 556
House 2 402-5, 426, 431, 438, 440-1, 443-4

Parcel 21
House 3 403, 407, 409, 444, 506
A 407, 410, 426, 438
B 407, 410
post-built 407, 437, 439
Parcel 42
House 4 403, 411, 413-15, 417, 438, 440-1, 443
House 5 411-13, 417, 440, 443
House 6 403, 411, 415-17, 438, 440, 443
porch 405, 413-15, 417, 441, 444
post-built 380, 402, 412, 420, 440, 443-4, *see also* Townhead Road
ring-groove 380, 420
settlement 12, 24, 377-8, 382, 402, 405, 410-11, 417, 421, 423, 437, 440, 444-5, 496, 553, 557, *see also* Chalcolithic/Bronze Age, platform settlement
palisaded 420, 445, 448, 557
trackway 445
Brougham 563
Brunstock *see* Hadrian's Wall, Brunstock
Bryant's Gill 516
Bucklers Park, Berkshire 428, 435
Building *see also* Dwelling; Medieval, building; Roundhouse; Structure
circular 33, 60, 68, 136, 177, 380, 395, 431, 434, 436, 554
sub-circular 118, 136, 177, 499, 514
stone 489
timber 12, 30, 209, 230, 315, 335, 439, 489, 510-11, 513-16, 564
Buiston Crannog 486, 513
Burgh-by-Sands 39, 451, 474-8, 481, 492, 495, 560
Fauld Farm (Milecastle 72) 476, *see also* Hadrian's Wall
Burgh Marsh 474-5, 479
Burial 32, 162, 207, 216-17, 221, 315, 323, 360, 363, 365, 375-7, 379, 382, 418-19, 436-7, 492, *see also* Cemeteries; Cist; Cremation; Excarnation; Human, remains; Inhumation
cremation 375, 377, 382
inhumation 375
Viking see Viking, burial
Burin *see* Lithics, burin
Burnfoothill Moss 59, 225-6, 485-7
Burning
in situ 64, 69, 118, 278, 281
selective 59
vegetation 57, 59, 64, 87-8, 90, 100-1, 162, 203, 308, 371, 533, *see also* Clearance
wood/charcoal 89-90, 101, 350, *see also* Charcoal; Wood, burnt
Burnmoor 231, *see also* Stone, circle
Burnt Mound 12, 19, 22, 25, 31, 47, 344-5, *see also* Chalcolithic/Bronze Age, Burnt Mound; Neolithic, Burnt Mound
Bronze Age 31, 33, 44, 47, 52, 94, 344, 347
Chalcolithic 31, 33, 44, 94, 344
Medieval 344, 433, *see also* Holyrood; Nether Wasdale
Neolithic 31, 33, 44, 94, 207, 344, 352
Burr-wood blanks 92-3, *see also* Wood
Butchery 104, 108, 113, 119, 121, 123, 128-31, 141, 145, 147, 153, 158, 260-2, 279, 317, 538, *see also* Animal
Butchery Area *see* Stainton West, Areas, Butchery

Cairnfield 365
Cairns 63, 216-18, 315, 375, 377, 436-7, 549
Camp *see* Grinsdale Camp; Hadrian's Camp; Hunter-gatherer, camp; Roman, camp
Canal *see* Carlisle, canal
Cargo 493, 495-6, 557, *see also* Grinsdale Camp
Carlisle 1-3, 12, 14, 34-5, 37, 39, 40, 59, 60, 377-8, 474-8, 485, 489-96, 513-14, 516-22, 529, 560, 562-3
Airport 377-8
Archaeology Unit (CAU) 2, 3, 7
Blackfriars Street 489
Caldewgate 496, 520, 522
Canal 12, 14, 34, 449, 463, 470, 478, 485, 517, 520-1, 529
Cathedral 489, 491-3
deanery 491
friaries 495
garrison town 493, 516-17
hinterland 485, 568
northern Lanes 560
Orton Road 2, 522
St Alban's chapel 492
St Cuthbert's church 491, 493
St Mary's Priory (and church) *see* Carlisle, cathedral
Scotby Road 230, 356, 377-8, 420, 447
Scotch Street 489, 492
and Silloth Railway 12, 14, 34, 485, 529
Carr 47, 50, 54-5, 59, 85, 87, 124, 192, 196, 223, 303, 314, 317-18, 323, 333-4, 401, *see also* Tree
alder 50, 330, 334, 401, 548, 551
birch 59
Carrawburgh *see* Hadrian's Wall, Carrawburgh
Carvetii 490, 562
Carzield, Dumfries 216, 224, 227
Cass ny Hawin II, Isle of Man 55, *see also* Mesolithic, pit house
Castle O'er 557, 559
Castlerigg 326, *see also* Stone, circle
Castlesteads *see* Hadrian's Wall, Castlesteads
Cattle 101, 186, 207, 287, 291, 318, 448, 496, *see also* Animal, domesticated; Livestock
Causeway 34, 408, 477, 479-80, 560
Caves 62, 162, 221, *see also* Bart's Shelter; Bonfire Scar Cave; Kent's Bank Cavern
Cawfields *see* Hadrian's Wall, Cawfields
Cumbria County Council's Historic Environment Service (CCCHES) 1, 13, 19
Ceann nan Clachan 428, 436, *see also* Burnt Mound
Cemeteries 375, 377, 418, 436, 492, *see also* Burials
enclosed 377

Cereal
barley 137, 212, 216, 227, 401, 403, 405, 407, 409, 415, 418, 443-5, 498, 501, 505-6, 509
charred 403, 424, 498, 503, 505-6
grains 137, 445, 505, 509
naked 216, 227, 409
cultivated 88, 213, 226-7, 300, 325, 401, 418, 487, 509, 562, 566
grain 226-7, 403, 409, 425, 445, 498, 501, 506, 509, 516, 562-3
domesticated 216, 221, 227-8, 320, 548, 553
wheat 209-12, 221, 227, 405, 409, 418, 424-5, 443, 445, 498, 502, 505-6, 509, 513, 564, 566
emmer 209-10, 212, 221, 227, 409, 424, 443
Ceremonial
complex/monuments *see also* Henge monument; Monument
bathing/purification 33, 353-4, 360-1, 435-7, 552, 557, *see also* Sauna; Sweat lodge
Chalcolithic/Bronze Age 380, 427, 552, 554, *see also* Botcherby Nurseries; Broadlea; Pict's Knowe
Neolithic 216, 228, 230, 326, 357, 361, 379-80, 382, 427, 567, *see also* Castlerigg; Dunragit; Long Meg
landscape 361, 379, 554, 567
midden (after feasting) *see* Midden, ceremonial
Chalcolithic 12, 31-4, 44, 46-7, 50, 230-1, 344, 347, 362-71, 373-5, 380, 382-7, 400-3, 426-7, 430-40, 553-5
Burnt mound *see* Chalcolithic/Bronze Age, burnt mound
activity 12, 31, 33, 44, 323, 344, 353, 364, 367-8, 382-7, 390, 394, 400-1, 427, 431, 433-4
Chalcolithic alluvium see Stainton West, stratigraphic units, *Chalcolithic alluvium*
communities 373-4, 380, 402, 427, 436-7, 439, 553-4
flooding/flood events *see* Flooding events
pottery *see* Pottery, Chalcolithic
reactivation channel *see* Stainton West, reactivation channel
structures/houses 12, 33, 118-19, 373, 382, 409, 439-40, 444, 553, *see also* Manchester Airport; New Cowper Quarry; Tatton Park
Chalcolithic/Bronze Age
Burnt Mound *see also* Burnt Mound; Bronze Age, Burnt mound tradition; Neolithic, Burnt Mound
1 96, 329, 336, 341, 343, 345-50, 352, 354-5, 357-8, 400, 551-2
2 94, 367-8, 373, 382-3, 386-90, 399, 401, 426-7, 429-32, 436, 554
3 367, 373, 382-3, 386, 390, 392-5, 398-9, 401, 426-7, 430-1, 554
abandoned 401
4 367, 373, 382-6, 390-5, 397-9, 401, 426-7, 429-32, 436-7, 554
abandoned 401
5 329, 336, 341, 343, 350-2, 355, 357, 431, 551-2
6 367-8, 382-3, 386-7, 393-4, 398-9, 401, 426-7, 430-3
network (social/exchange) 375
palaeoenvironmental evidence 363, 368, 445, 532, 554, 557
platform settlement 378, 380, 437, *see also* Bronze Age, settlement
Chalk Beck, near Carlisle 494
Charcoal 142-3, 216-19, 342-3, 345-7, 349-50, 384-5, 387-92, 395-9, 403, 409-15, 417, 422-5, 432-4, 501, 503-6, 525
blackthorn-type 63, 100, 125, 325, 389, 398, 413, 423-4, 533, see also Plants, blackthorn
hazel 68-9, 96, 122, 137, 212, 217-18, 230, 279, 283, 325, 342, 368, 391-2, 420, 424-5, 503-5
intrusive 506, 525
oak 137, 334, 350, 398, 405, 413, 423-4, 499, 501
Charred plant remains 27, 30, 34, 216, 227, 402, 415, 424, 443, 445, 467, 496, 501, 509, 513, 522
Chert *see* Lithics, raw material, chert
Chest of Dee 178
Chronological model 28, 30-1, 35, 68, 76, 81, 103, 108, 135, 142, 149, 201, 203, 209, 233, 246
Church *see also* Carlisle, St Alban's chapel
at Dacre 515
Northumbrian 492
possible near Carlisle 490, 492
St Cuthbert's *see* Carlisle, St Cuthbert's church
St Mary's Priory *see* Carlisle, cathedral
Cist 375, *see also* Burial
Clay 5, 82, 86, 96, 228, 230, 289-90, 335, 382, 391, 431, 451-2, 467-8, 470, 474-6, 478-9
objects
ball 230
tobacco pipe 25, 526, 463
Clearance 57, 59, 87, 100-1, 162-3, 193, 225-7, 300-1, 314-18, 365, 373, 401, 418, 448, 487, 548-50, *see also* Burning, vegetation; Woodland, clearance
Cleuchbrae, Annandale 428, 433
Climate change 56, 59, 373
Cnoc Coig, Oronsay 150
Coarse stone *see* Lithics, coarse stone
Cobble *see* Lithics, cobble
Cocklakes 214, 377-8, 428, 432, 436
Colt Park, Barrow in Furness 378, 428, 432, *see also* Burnt Mound
Communities *see* Bronze Age, communities; Hunter-gatherer, bands; Hunter-gatherer, clans; Medieval, communities; Mesolithic, communities; Neolithic, communities; Post-medieval, communities; Roman, communities
Connect CNDR 1, 11, 13-14
Cooking pit 32, 69, 116, 118-20, 127, 137, 152, 177

Copper
artefacts 32, 373-4
axe (flat) 374
production 435
source for 374
Coppice/coppicing *see* Woodland, coppice/coppicing
Core *see* Lithic, core
Coulderton 61
Cowdery's Down, Hampshire 511
Cramond 54
Crawford, Gallow Hill 428
Cremation 171, 375, 377, 382, 418, 437, *see also* Burial, cremation; Human, bone; Inhumation
Cropmarks 3, 9, 16, 30-1, 219, 322-3, 325-6, 375, 377, 420, 445, 447, 482, 506-7, 557, 566
Crops 34, 162, 211, 227, 290, 315, 321, 335, 354, 409, 424, 443, 509, 513, 562, 566, *see also* Agriculture; Cropmarks; Cultivated ground; Cultivation
Crosby Garrett 61, 217, 315
Crosby-on-Eden 59, 474-7, 479-80, 493, 560
Cultivated ground 85, 333, 448, 482, *see also* Agriculture; Cereal, cultivation; Crops; Cropmarks; Cultivation
Cultivation 34, 87-8, 226-7, 315-16, 333-4, 401, 418, 443, 481-2, 487, 495-6, 501, 509, 521, 562-4, 566, *see also* Agriculture; Cereal, cultivation; Crops; Cultivated ground
Culvert 16, *see also* Hadrian's Wall, culvert
Cumberland 491, 493-5, 517
Duke of 517
Infirmary 378
Cumbria 27, 39, 58-61, 104-5, 107, 177-9, 208-9, 223, 225-31, 318, 377, 431-2, 490-1, 510-11, 549-50, 566-8
County Council's Historic Environment Service 1, 11
northern 37, 216, 492-3, 514
Cumbrian Clubs 265, *see also* Belmont Hoard; Langdale; Lithics, axe/axehead
Cummersdale 493, 496, 520, 522
Cummersdale Moor 496, 518, 522
Cumwhitton 492-3, *see* Viking
Cursus *see* Neolithic, cursus
Cutacre 439, 445

Dacre 474, 514-15
Dagger *see* Bronze, dagger
Davidson's Banks *see* Hadrian's Wall, Davidson's Banks
Death 28, 90, 145, 195, 255, 298-9, 310, 315, 436, 451, 490, 492-5, 542, 560, *see also* Burial; Cemeteries; Cist; Cremation; Human, remains; Inhumation
Deepcar 54
Deer 101, 159, 162, 169-70, 173, 176, 180-1, 183, 287, 315, 318, 320, 533, 536
Deforestation 57, 204, 226, 315, 373, 542, 560, *see also* Forestation
Deglaciation 39, 40, 532, *see also* Glaciation
Deira *see* Kingdom, Anglo-Saxon; Kingdom, Northumbrian
Dendrochronology 82, 145, 194, 197, 200, 204, 239, 250, 252, 255-6, 282, 358, 543
samples 21, 195
wiggle matching 27-8, 30, 76-7, 79, 80, 246, 256, 291, 298, 329-30, 358
Deposition (ritual/deliberate) 223, 275, 279, 304-5, 316, 320, 323, 547-9, *see also* Votive
foci 335, 337, 547
oblative 222, 275, 279, 307, 317
Diatoms *see* Microfauna/flora, diatoms
Dinoflagellate cysts *see* Microfauna/flora, dinoflagellate cysts
Dirk *see* Bronze, dirk
Disease 59, 164, 185, 291, 301
Dissolution of the Monasteries 32, 516
Ditch *see* Bronze Age, ditch; Hadrian's Wall, Vallum, ditch; Iron Age, ditch; Medieval, ditch; Mesolithic, ditch; Neolithic, ditch, Post-medieval, ditch; Roman, ditch
double 9
drainage 522, 527, 566
enclosure 34, 217-18, 321, 447, 482, 557
intercutting 5
ring 375, 377, 380, 437
Dolfin, lord of Carlisle 493
Dolphins 160, 537
Drain *see* Medieval/post-medieval landscape, drain; Hadrian's Wall, drain
Drawdykes *see* Hadrian's Wall, Drawdykes
Drigg 62, 175, 178, 428, 432, *see also* Wood, platform, at Drigg
Droughduil Bridge 434
Droveway *see* Medieval/post-medieval landscape, drain
Drumburgh
Hadrian's Wall fort *see* Hadrian's Wall, fort
Moss 418
Dumfries 39, 55, 59, 107, 209, 214, 216, 218, 225-7, 315, 326, 344, 380, 431-3, 490, 561-2
Dung 33, 87-8, 193, 286-7, 315, 334, 367, 467, 481, 548
Dunragit 60, 175, 177-8, 216, 218, 224, 344, 353, 427-8, 434, 490
Durrington Walls 356

Eamont Bridge 216-17, 325, *see also* River, Eamont
Earthwork 5, 34, 230, 408-9, 431, 433, 437, 445, 447, 450-1, 455-7, 466, 474-5, 477-9, 509, 557
East Challoch 216, 224, *see also* Mid-Challoch; West Challoch
Easthwaite Farm, Nether Wasdale 428, 433, 436
Economy 27, 158, 160, 164, 169, 172, 185, 207, 213, 487, 492, 517, 536, 550, 552, 563
Edinburgh 34, 521, 529
Eel 54, 176-7, 180, 183, 246, 254, 314, 544, *see also* Animal
Ehenside Tarn 175, 178, 221-2, 226, 262, 265, 318, 551, *see also* Wood, platform, at Ehenside Tarn
Elder *see* Trees, elder

Ellerside Moss 227
Elm *see* Trees, elm
Elm Decline *see* Trees, elm, Elm Decline
  Demise (EDD) *see* Trees, elm, Elm Decline, Demise
Emperor (Roman)
  Antoninus Pius 451, 560, *see also* Antonine Wall
  Domitian 562
  Hadrian 451, 560, *see also* Hadrian's Wall
  Septimius Severus 451
Encampment *see* Mesolithic, encampment
Enclosure *see* Bronze Age, enclosure; Iron Age, enclosure; Medieval, enclosure; Neolithic, enclosure; Post-medieval, enclosure
  Acts of Parliament *see* Acts of Parliament
  award 518, 522
  circular 16, 216, 232, 323, 326, 379-80
  curvilinear 214, 218-19, 420
  maps 30, 518, 528
  palisaded 214, 420-1, 445, 447, 557
    funnel entrance 421, 424, 445
    multiple 420
  rectilinear 447, 557
English Heritage/Historic England 1, 14, 16, 24, 27, 30-1, 35, 216, 323, 380, 552, *see also* Historic England
Epochs
  Boreal age 56
  European Preboreal 56
  medieval warm 486
  Holocene 17, 30-1, 39-41, 44-6, 48, 53, 60, 64, 178, 365-6, 532-3
    mid- 40-1, 45, 48
    sea-level rise 40
  Loch Lomond Stadial 39, 58
  Pleistocene 19, 41, 46, 48, 323, 358, 533
  Triassic 37
  Windermere Interstadial 39
  Younger Dryas 31
Eskdale 491, 493, 557
Eskmeals 57, 62, 175-6, 178, 180, 182, 225-6
Ethnographic study 54-5, 157, 160, 164, 177, 308-9, 536, *see also* Khanty
  Jordan's 163, 309-10
Etterby 493, 495-6
  Hill 496
Ewanrigg 377-8
Excarnation 171, 315, 445, *see also* Burial
Excavation
  hand 13, 19, 22, 268
  open-area 3, 8-10, 12-13, 19, 453, 459, 485, 521

Fabricator *see* Lithics, fabricator
Facially pecked *see* Lithics, facially pecked
Farm 493, 495, 563, 566
Farmers 185, 207, 320, 551, 553, 567
  earliest 9, 301, 308, 553
Farming 9, 24, 33, 53-4, 57, 59, 184-6, 204-5, 207, 226-9, 236, 318, 487, 548-53, 564, 566-8
  practices 24, 186, 549
Felling *see* Tree, felling
Fence/fenceline
  Bronze Age 405-6, 420-1, 423
  medieval 504-5, 513, 516, 564
  Mesolithic 69, 178, 241, 244-6, 302, 545
  Neolithic 303-7, 312, 544, 547-8
  post-medieval 527
Field
  Anglo-Saxon 566
  Iron Age/pre-Roman 562-3
  medieval *see* Medieval/post-medieval landscape, field/field system
  Neolithic 275, 315, 317, 320, 562
  post-medieval *see* Medieval/post-medieval landscape, field/field system
Fire-setting 57, 87-8, 181, 282, 311-12, 316
Firepits 433, 436
Fish 153, 159-60, 162, 174, 178, 180, 183, 233, 236, 320, 533, 536, *see also* Eel; Salmon
  trap 236-7, 242, 247, 254, 291, 303, 543
  weirs 163, 275, 303
Fishing 9, 88, 94, 108, 128, 132, 140-1, 153, 159-60, 165, 172-3, 176-80, 221, 254, 279, 320, 536, *see also* Hunter-gatherer
  camp 541
  shellfish *see* Shellfish
  weight 108, 141, 159
Fitz Park 221, 227
Flamborough Head 61, 107, 166, 180, 539, *see also* Lithics, raw materials
Fleswick, St Bees 61
Flint *see* Lithics, raw material, flint
Flooding events 33, 47, 51-2, 90, 125, 145, 187-9, 192, 195, 198, 203-4, 226, 239, 367-8, 371, 391, 418, 542-4
Floodplain 5, 40-1, 45-7, 50-2, 100, 103-4, 149, 159-60, 203-4, 233, 334, 358-9, 401, 483, 531-6, 542
Foddering 181, 227, *see also* Grazing
Food 57, 82, 103, 160, 164, 173, 227, 405, 435-7, 443, 562-4
Foraging 54, 82, 87-8, 94, 160, 163, 165, 207, 310, 321, 534, 538, 542-3, 550, *see also* Hunter-gatherer
Forest *see also* Woodland
  of Inglewood 494-5
  submerged 39
Forestation 56, 162, *see also* Deforestation
Formby 160
Forth-Clyde isthmus 34, 451, 479
Fremington, near Penrith 105, 514, 516
Funerary
  rites 55, 171, 315, 361, 536
  site
    Bronze Age 32, 327, 375, 377, 437
    Neolithic 327, 361
  vessels 360, 375, 377

Fungal spores 27, 33, 57, 87-8, 194, 287, 291, 301, 334, 358, 401, 448, 481, 548
Kretzschmaria deusta 87, 194, 286-7, 334-5
Furness Peninsula 62-3, 211, 226-7, 320

Galloway 40, 55, 107, 180, 209, 214, 216, 218, 227, 315, 344, 353, 363, 433, 490, 513
Gamelands 61
Garden 315-16, 485, 518-19, 528-9, 550, 553, 566
formal 9, 34, 485, 518-19, 528
plots 211, 227, 315, 358, 553
Garlands Hospital 377-8, 428, 433, 436, *see also* Burnt Mound
Garrison *see* Carlisle, garrison town; Hadrian's Wall, garrison
Gelt Valley 377
Geology 17, 29, 36-8, 61, 105, 108, 181, 217, 251, 279, 350, 546
bedrock 36-7
glacial 37, 108
natural 29, 350
superficial 38, 181
Gildas 490
Girdling 92, 301, 312, 535, 550, *see also* Bark; Ring-barking; Tree
Girvan 216, 221, 427, 435
Glaciation 9, 37, 39, 486, *see also* Deglaciation
Glades 57, 87, 221, 302, 316, 535, 544
Glasgow 1, 34, 521, 529
Glass 25, 34, 527
beads 483, 506
Glasson Moss 378, 406, 486-7, 565
Gleaston Mill 62
Gospatric (lord) 493
Grain *see* Cereal, grain
Grassland 58, 87, 193, 287, 334, 405, 466, 482, 509, 560
Grave cover 492, *see also* Burial
Grazing 33, 59, 87-8, 193, 226-7, 286-7, 291, 311, 327, 334, 401, 405, 448, 496, 509, 548, *see also* Animal, grazing
Great Langdale 59, 154, 171, 220-1, 223, 226-7, 313, 318, 321, 359, 540, *see also* Langdale
Great Orton 39
Gretna 39, 60, 216, 378, 437
Greymoorhill North bridge 1
Grid-square area see Stainton West, *Grid-square area*
Grinder *see* Lithics, grinder
Grinding 108, 133, 262, 265-6, 359, 546
slabs 262
Grinsdale 493, 495-6, 557
Camp 496, 516-17, 557, 559, *see also* Cargo
Common 496, 520, 522
Ground stone *see* Lithics, ground stone
Graves (stone lined) 437
Grove 311, 317, *see also* Tree; Woodland
ancestral 55, 221, 315-18, 549-50
sacred 309-10, *see also* Khanty
Grubbing 308, 311-12, 316, *see also* Tree; Tree-throw; Woodland

Gully 3, 177, 413, 415, 498, 501
drip 413-14
ring 367, 394-7, 426-7, 431, 434
Gutterby 326

Habitation Area *see* Stainton West, Areas, Habitation
Hadrian's Camp 474-7, 481
Hadrian's Wall 1-3, 5, 7, 9, 11-12, 14, 24-5, 30-1, 34-5, 408, 450-3, 456-60, 472-7, 479-83, 529-32, 559-63, *see also* Roman, army; Roman, fort
abandoned 452, 466, 479, 560
Appletree 472, 474, 478, 480-1, 560
Beaumont 474
berm 7, 452, 467, 470, 481
Black Carts 464, 480
Brunstock 478-9
Cawfields 470, 479
culvert 460, 462, 476-7
Cumberland Infirmary 378
Curtain Wall 450-1, 453
Davidson's Banks 477
Drawdykes 474, 476
drain 408, 455, 457-8, 460, 461-2, *see also* Hadrian's Wall, Vallum, ditch
stone-lined 457, 460
fort
Birdoswald 472, 474, 477, 487, 489, 514, 559
Bowness-on-Solway 451, 474-6
Carrawburgh 477
Castlesteads 472, 474
Drumburgh 475-6
Stanwix 451, 474, 476, 481, 489, 493, 514, 562-3
garrison 451, 489, 560, 562-3
Hare Hill 475, 479
High House 478-9
Intermediate Wall 475-7
laminated turf 448, 466, 474, 478
metalled surface 7, 452, 462, 468, 481
Milecastle 450-3, 474-7, 479, 481
Military Way 450, 452-3, 467-8, 478, 481
mortar 452, 476
Narrow Wall 452, 475
Raven Bank (Milecastle 77) 476
rubble core 7, 452, 458, 460, 475-6
stone facing 460-2, 475-7
Stone Wall 12, 14-15, 34, 451, 453, 455-63, 472, 474-7, 481, 561
Broad Wall 452
flag/flagstone 451, 460, 475-7
foundation 475-6
footing 460
Tarraby Lane 476, 481, 562
Turf Wall 7, 12, 15, 380, 408, 448-51, 453, 455-8, 460, 463, 466, 470, 472, 474-9, 481, 560-1
construction 34
levelled 455, 459, 475

ramparts 451, 466, 474
Turret 450-1, 453, 472, 474, 476
Vallum 3, 5, 7, 12, 14-15, 31, 34, 448, 450, 452-3, 456-7, 462-72, 474, 477-82, 529, 560-1
cheeks 470, 479-80
ditch 5, 7, 12, 14-15, 34, 448, 452, 463, 465-8, 470, 479-82, 485, 509, 560
primary 448, 464, 466, 478
drainage run/trench 14, 462-5, 468, 470
East Bog 480
Irthington 478
mounds 12, 456, 463, 466, 474, 479-80
marginal 15, 452-3, 463, 467, 470, 472, 478, 480
north 5, 7, 15, 448, 450, 457, 463, 467-71, 477, 479-81
south 7, 452, 463-4, 470, 472, 479-80
secondary crossing 452-3, 466-7, 477, 479
trackway 452, 467-8, 481
Wall core 461, 476
Wall Mile 448, 453, 474, 480, 559
Wallsend 452
Watch Hill 474-5
Willow Holme 475-6, 520
World Heritage Site 1, 9, 34, 448
Halberd *see* Bronze, halberd
Hall
medieval *see* Medieval, hall
Neolithic *see* Neolithic, hall; Lockerbie
timber 216, 315, 511, 489, 491, 514, 516
timber-framed 209-11, 216, 489, 516
Hammerstone *see* Lithics, coarse stone, tools, Hammerstone
Hare Hill *see* Hadrian's Wall, Hare Hill
Harraby 495
Harrison Combe 59, *see also* Langdale
Harrison Stickle 221, 265, *see also* Langdale
Harvest 160, 180, 316-17, 536, 549, *see also* Agriculture; Cereal; Crops; Farming
Hawick 521
Hawthorn *see* Tree, hawthorn
Hayknowes Farm 377-8, 447, 557
Hazel *see* Tree, hazel
Hazelnut *see* Tree, hazelnut
Hearth *see* Bronze Age, hearth; Mesolithic, hearth; Neolithic, hearth
Hebrides 56, 150
Hemp 415, 487, 565
Henge monument 12, 33-5, 63-4, 216-17, 230, 323-6, 353-4, 357-8, 360-1, 380, 427, 436, 506, 509-10, 552-4, 566-7, *see also* King Arthur's Round Table; Little Round Table; Mayburgh; Stonehenge
Hengiform 326, *see also* Henge monument
Herding 221, 310, 315, 320, 327, 550, *see also* Cattle; Husbandry; Livestock
Herds 181, 186, 211, 287, 316, 548, 567, *see also* Cattle; Husbandry; Livestock
Hesket House 474
Hesket-in-the-Forest 492
Hide 108, 112-13, 119, 121, 125, 128, 133, 141, 145, 147, 153-4, 156, 159, 162, 169, 536
Hide-working 104, 108, 113, 119, 124-6, 128-9, 133, 141, 145, 147, 154, 158, 163, 536, 538
Area *see* Stainton West, Areas, Hide-working
High Crosby 378, 420
Hillfort 420, 557
Hinterland *see* Carlisle, hinterland; Roman, hinterland (rural)
Historic England 1, 16, 24, 27, 31, 35
Hoddom 487, 511, 514-16
Holbeck Park 111, 211-14, 216-17, 223, 227-8, 320-1
Holm Farm, Dumfries 218
Holme St Cuthbert 60
Holyrood 344, *see also* Burnt mound; Medieval, burnt mounds
Holywood
North 218
South 216
Houghton 492, 495-6, 520
House *see* Bronze Age, roundhouse; Building; Medieval, house; Mesolithic, Structure; Neolithic, house; Structure
earth house/holy site *see* Khanty
timber 209-11, 224, 227, 230, 308, 314-21, 485, 549, 553, *see also* Lockerbie
Howburn Farm, South Lanarkshire 60
Howes Plantation 61
Howgill Castle 227
Howick 55, 175, 177, *see also* Mesolithic, pit house
Human
bone 55, 171, 217, 223, 380, 443, *see also* Burial; Cremation; Human, remains
remains 55, 60, 217, 223, 315, 317, 327, 377, 380, *see also* Burial; Cremation
Hunter-gatherer 32, 54-5, 90, 94, 100-1, 103, 154, 159, 164, 169, 172-4, 177-8, 180-6, 203-5, 207, 227, 229, 327, 548-51, 553
aggregation 108, 149, 154, 156-8, 160-1, 163-4, 166, 171-2, 174, 176, 178-83, 204, 536-7, 542
band 37, 51, 54, 154, 156, 158, 161, 166, 169, 171, 173-5, 180, 183, 220, 265, 536-7, 539, *see also* Hunter-gatherer, clan
camp 68, 98, 149, 152, 154, 156-60, 163-4, 166, 174, 176-9, 182-3, 533-4, 536-8, 541, *see also* Bexhill; Dunragit; Eskmeals; Milltimber; Netherhall Road; Standingstones
base 149, 154, 156-7, 160, 163, 178, 536-7, 541
residential 154, 162, 166, 176-7, 179-81, 183, 536
seasonal
autumn/spring 177
autumn/winter 55, 160, 179, 183
spring/summer 108, 158-9, 171, 176, 179-81, 310, 541
summer/autumn 176, 179, 181, 536-7, 541
temporary 98, 157
clan 154, 156, 158, 169, 171-2, 180, 316, 536-7, 539
community 164, 172-3, 176, 186, 327, 541, *see also* Mesolithic, community

diet 159-60, 536-7
fishing *see* Fishing
foraging *see* Foraging
mobility 32, 150, 160-4, 166, 168, 171, 173, 176, 179, 534, 539, 541
models 28-32, 54, 103, 108, 144-5, 161-3, 173, 176-7, 179, 186, 192, 203, 291, 298, 541, 564
Bonsall's 176
Myers' 161, 163, 173
Reynier's 162-3, 173
Simmons' 176-7, 179
seasonal 150, 156, 163, 173, 179, 541
rites of passage 169, 171, 536, 550
territories 54, 162-3, 169, 326, 490, 560-2, *see also* Bounded areas; Hunter-gatherer
Ingold's model 54-6, 163-4
stable long-term 162-3
overwintering strategies 162, 180, 183
Hunting 56-7, 88, 94, 104, 153, 160, 162-3, 165, 172-3, 176, 178, 180-1, 183, 310-11, 320, 536
game 57, 59, 101, 160, 162-3, 165, 178, 180-1, 320, 533-4, 536, 541, *see also* Animals
platform 94
seasons 310
whale *see* Whale hunting
Hurdle (wooden) 245, 303, 382, 386, 430-1, 544, *see also* Wood
construction 245
panels 382, 431
Husbandry 24, 57, 87-8, 100, 147, 172, 186, 287, 334, 564, *see also* Animal, domesticated; Cattle; Herding; Herds; Livestock

Ice Age 9, 39, 40, 53, 486-7, 532
Ice flow 37, 39
Idols 310-11
Inhumation 375, *see also* Burial; Cremation
Insects 27, 30, 33-4, 39, 57, 71, 85, 87, 189, 192, 195, 285-7, 291, 334, 386, 401
beetle 85, 192-3, 196, 286, 334, 358, 548
dung 33, 87-8, 193, 286-7, 315, 334, 548
ground 85, 192, 195
weevil 85, 192, 196, 286, 334
Institute for Name Studies 492-3
Ireland 54, 56, 175, 182-3, 303, 314, 318, 374, 418, 435-7, 439, 518, 549
Co Cork 436
Co Kilkenny 436
Irish Sea 37, 39, 56, 61, 177, 182-3, 204, 227, 318, 375, 491, 540, 542, 567
Basin 39
Iron Age
activity 9, 12, 24, 31-2, 34, 340, 367-8, 380, 385, 401, 418, 420, 446-8, 482-3, 557-60, 562, 567-8
alluvium *see* Stainton West, stratigraphical units, *Bronze Age/Iron Age alluvium*
boundary *see* Boundary, Iron Age
ditch 447-8, 557, 559-60, *see also* Hayknowes Farm
enclosure 447, 508, 557-9
palaeoenvironmental evidence 559
pollen 12
pre-Roman 9, 24, 448, 482, 557-9, 562, 567
trackway 34, 447, 557
Irthington 478, *see also* Hadrian's Wall, Vallum
Isle
of Arran 107, 161, 170
of Man 39, 55-6, 175, 378, 439, 486, 491, 514
of Rùm 179, *see also* Kinloch

Jacobite 516-17, *see also* Army, Jacobite

Kent's Bank Cavern 60, *see also* Caves
Kerricks Farm, Dumfries 375, 378
Khanty, Siberia 309-10, *see also* Ethnographic study
Killerby, North Yorkshire 152, 175
Kiln 456, 483, 516, *see also* Brampton; Hoddom
barns 516, *see also* Hoddom
King Arthur's Round Table 216, 325, *see also* Henge monument
Kingdom
Anglo-Norman 32, 493
Anglo-Saxon 490
Northumbrian 490-1, 516
Rheged 490
Scoto-Northumbrian 494
Strathclyde 492-3, 497
Kingmoor 2, 3, 496, 518
House 3, 9, 34, 517-19, 527-8
Kings/Queens
Aethelfrith 490
Athelstan 492
Canmore, Malcolm 493
David I 494-5
Ecgfrith 491
Edward III 496
Eric Bloodaxe 492
Henry I 493-4
Henry II 494
Malcolm II 493
Matilda 494
Oswy 490
Owen the Bald 493
Robert the Bruce 495
Stephen of Blois 494
Urien 490
William II 32, 493
Kingstown Road 1
Kinloch, Isle of Rùm 179
Kinship 154, 158, 317, *see also* Ancestors/ancestral
Kirkbampton 39
Kirkbride 37
Kirkburn, Annandale 214, 216, 373-5, 378, 437, 439

Kirkby Stephen 105, 180
Kirkconnel 511, 514, 516
Kirkhill, Dumfries 344, 353-4, 428, 433
Kirkland 475, 479
Knapping *see* Lithics, knapping
Knife *see* Lithics, knife
Knockupworth 3, 5, 7, 12, 14-15, 25, 27, 34, 449-50, 452-7, 466-8, 470, 474-81, 483, 509, 529-30, 560-2

Lake District 37, 39, 93, 97, 107-8, 154, 161, 166, 174, 176, 180-1, 216-17, 231, 260, 360, 539-40, *see also* Lithics, tuff, Lake District
Lakeland Fells 61, 181, 221
Landscape
  encultured 55, 163, 172-3, 309, 317, 541, 550, 553, 567
  erosion 5, 7, 34, 48-51, 64, 70-2, 83, 87, 103-4, 188-9, 193-4, 235, 240, 251-2, 255-6, 458
  levée 44-5, 48, 367, 371, 382, 385, 390, 392
    scrollbar 367
  meander 5, 15, 40-1, 50, 103, 358, 367, 483, 553
  medieval/post-medieval *see* Medieval/post-medieval landscape
  melt-water channel 39, *see also* Channel; Palaeochannel
  mires 40, 58, 221, 225, 316, 344, 365, 448, 482
  monumental 228-9, 359, 551, *see* Ceremonial, complex/monuments; Henge monument; Neolithic, monuments
  moorland 496, 518-20, 522, 559, 562, 567
  sacred use of/places in 164, 171-2, 182, 308, 310-11, 427, 434, 436-7, *see also* Ancestral; Ceremonial, complex/monument; Khanty; Shrine
Langdale 59, 60, 107, 110-11, 154, 171, 182, 209, 220-1, 223-7, 313, 318, 321, 359-60, 539-40, 549, 552, *see* also Cumbrian Clubs; *Great Langdale; Harrison Combe; Harrison Stickle;* Lithics, axe/axehead; Lithics, raw material, tuff, Langdale; Loft Crag; Pike o'Stickle
  Belmont Hoard *see* Belmont Hoard
  decline of 360
  Pikes 171, 182
Lazonby 377
Leisters 314, 536, *see also* Wood, trident
Levée *see* Landscape, levée
Levens Park 63
LiDAR 15, 19, 30, 40-2, 45
Lime *see* Tree, lime
Lindisfarne 492
Lintshie Gutter 378, 380
Lithic-free Activity Area *see* Stainton West, Areas, Lithic-free
Lithics
  adze 110-11, 113, 133, 153-4, 158, 170, 182-3, 213-14, 314, 320, 539-40, *see also* Lithics, axe/axehead
  anvil 96, 108, 119, 129, 133, 139-41, 196, 262, 264, 273, 278, 306, 317, 395, 540, 546
  arrowhead 124, 213, 223-5, 229, 264, 270-1, 274-9, 283-4, 305-6, 308, 318, 320, 342, 400, 544, 547-8
    leaf-shaped 213, 223-5, 270-1, 283-4, 320, 342, 544, 547-8
    petit tranchet-derivative 229
    retouched 283
  assemblages 17, 24-6, 53-4, 56, 60-3, 68, 97, 104, 108, 111, 117-18, 125, 131, 136, 150, 537-8
    Honey Hill 54
    Horsham 54, 56, 162
  awl/borer 118-19, 123, 126-8, 130, 132, 137, 140, 154, 196, 284
  axe/axehead 28, 32, 110, 133, 154, 197-8, 221-2, 244-5, 264-6, 272, 274-8, 294, 308, 311, 317-18, 336-7, 339, 341, 360, 382, 547, 550, *see also* Belmont Hoard; Bronze, axe, flat; Copper, axe, flat; Cumbrian Clubs; Langdale; Lithics, adze
    blanks 261
    finishing 262, 307, 359, 550
    Group VI *see* Lithics, tuff, Group VI
      axe 107, 110
      tuff 61, 112, 124, 127, 133, 274, 548
    Group XI *see* Lithics, tuff, Group XI
      flanged 382
    maintenance 158, 538, 540
    polished stone 33, 60, 110-11, 113, 121, 129, 133, 135, 182, 213-14, 216, 223, 230, 256, 264-5, 305, 359, 540, 546, 548-9
      fragment 110-12, 124, 127, 284
    polishing 317, 339
    stone 76, 88, 110-11, 121, 129, 133, 135, 140, 182, 214, 224, 230, 248, 252, 264, 271, 539-40
  blade 31-3, 56, 59-63, 68, 96-8, 108, 110, 118-19, 121-2, 129-32, 198, 223-4, 264-8, 270-1, 274, 391-2
    broad 56, 118, 130, 196, 264, 267-71, 283-4, 306, 320, 547
    flint 60, 129, 230, 392, 395
    production 61, 68, 96-7, 108
    retouched 131, 267
    Welsh Group VIII 62
    utilised 267, 270-1
  bladelets 56, 60-2, 68, 96-8, 104, 118-19, 123, 125, 127-30, 132-3, 136, 139-41, 154, 163, 196, 223-5
    backed 56, 60, 68, 96-8, 104, 118-19, 123, 125, 127-30, 132-3, 136, 139-41, 154, 163, 196, 284
  burin 119, 126, 130
  burnt 98, 137, 281
  chunk 96, 98, 116, 131, 264, 267, 271
  coarse stone 126, 154, 196, 258, 260-2, 264, 266, 270, 272-3, 275, 277-8, 338-9, 342, 540, 547
    tools 25, 34, 93, 96, 107, 109, 117, 119, 121, 129-30, 133, 216, 262-3, 265, 271-2, 306-7

hammerstone 108, 121, 124, 130, 133, 196, 230, 261, 278, 306, 317, 540
unworked 256, 258-9, 266, 274, 278, 337-8, 547-8, 552
cobble 62, 107-8, 121, 124, 126, 133, 258, 260-2, 266, 272, 275, 277-8, 306-7, 313, 468, 481
tool 93, 108, 119, 126, 260-2, 265, 278
unworn 108, 126, 133, 342
blanks 108
composite tools 122-3, 139, 152-3, 165-6
core 61-3, 68, 93-8, 110, 130, 136, 139-40, 196, 198, 260-5, 267-8, 277-9, 283-4, 452, 460, 476, 546
dressing 68, 104, 106, 129, 132, 198
Levallois-type 283
preparation 97, 166
tools 96, 108, 121, 196-7, 260-2, 264-6, 277-9, 546
trimming flake 93, 96
debitage 60-3, 93, 95-8, 104-5, 113, 118-19, 121-2, 127, 129-34, 136, 139-40, 196, 198, 223-5, 261-2, 283-4
edge-retouched pieces 119, 123, 126, 128, 130, 132, 140-1, 196, 224
Entities 25-6, 65-6, 68-9, 94-5, 97-8, 108, 111, 117-21, 123-9, 132-3, 136-7, 139, 141, 150, 283
fabricator 229
facially pecked 108, 121, 261, 264, 266, 272-3
fine point 98, 196, 268, 342
flake 56, 68, 93-4, 96, 98, 110-11, 121, 126, 128-31, 133, 135-6, 139, 165-6, 260-2, 264, 271-2
regular 130, 265, 267
retouched 98, 267
tools 262, 264-5, 547
flaked 95-6, 117-18, 123-6, 129-30, 136-7, 154, 156, 167, 198, 258, 266, 270-1, 274-5, 277, 279-80, 342
grinder 154, 156, 261-2, 278, 306, 317
ground stone 108-9, 119, 133, 154, 262, 264
tools 133, 344
hafted 56, 152, 221
knapping 25, 52, 60, 68, 95, 98, 107-8, 113, 116-18, 120-33, 136-7, 139-40, 198-9, 261, 268-9, 275-7
group 52, 68, 95, 98, 107, 117-18, 121, 123, 125-7, 129-30, 133, 136, 139, 198-9, 268, 275-7
in situ 113, 133
knife 56, 98, 119, 121, 126, 132, 137, 154, 156, 224, 229, 261, 265, 284, 306, 317
Skaill 261, 306
microlith 56, 60-3, 68, 94, 96-8, 108, 118-19, 121-33, 136-7, 139-41, 152-3, 165-6, 170, 178, 209, 266-8, 320
fragments 94, 96-8, 116, 119, 121-3, 125, 127-8, 133, 136-7, 139-41, 198, 284
rod 211-12
tear-drop-shaped 98
microwear 113, 119, 122-3, 128, 133
analysis 34, 104, 112, 121, 125, 129, 132, 140, 147, 158
use-microwear study 53, 108, 536
narrow-blade 31-3, 54, 56, 60, 63, 96-7, 100, 104, 118, 130, 136, 162, 165, 176-8, 196, 267-8
microlithic 32
nodule 25, 60-1, 105, 113, 127, 129, 132, 139, 152, 165-6, 169, 254, 268, 275, 277, 547
pedological analysis 367-8, 373, 398
points, obliquely blunted 121, 196
polissoir 221-2, 262, 277, 307, 336, 340-1, 359-60, 552
pounder 261, 265
procurement 164, 166, 539, *see also* Hunter-gatherer, mobility; Mesolithic, network; Neolithic, network
quern 221, 444-5
raw material/types 26, 33, 60-3, 68, 93, 96-8, 101, 104, 106-8, 113, 116, 121-3, 126, 129, 133, 136, 147, 153, 161-6, 180, 233, 266-7, 270, 278, 280, 539, 553
chert 60-3, 96-8, 104-5, 118-19, 121-3, 125-7, 129-30, 133, 136-7, 139, 161, 166, 168, 181, 223, 269-70
brown 198, 267-8, 344, 547
flake 98, 391, 395, 413, 432, 443
good-quality brown 198, 267, 344
Scottish 62, 68, 94, 97, 107, 121, 125, 127, 129, 133, 136, 139-40, 166-7, 169-71, 180-1, 196
Southern Uplands 60-1, 161, 267, 269, 271, 539
flint
beach-pebble 62, 93, 161, 170, 180, 223, 537, 539, 547
brown 98, 155, 270
grey 68, 96, 98, 107, 116, 121, 123, 125-6, 129, 132-3, 140, 153, 196, 269-71, 284, 306
tools 126, 214, 544
Yorkshire 60, 62-3, 68, 105, 118-19, 165-71, 180-1, 183, 196, 320, 539, 547
grey 306, *see also* Flamborough Head
ochre 25, 62, 98, 107-8, 112, 116-17, 119, 121, 124-6, 128-30, 133, 153, 409, 540
pebble-flint 60-3, 68, 96-9, 104-5, 113, 116, 118-19, 121, 123-7, 129-30, 132-3, 136-7, 139-40, 165-6, 269-71, 342
pitchstone 60-2, 68, 107-8, 119, 121, 123, 125, 129, 133, 136, 165-6, 170, 180-1, 216, 223-5, 269-70
Arran 166, 181, 216, 354, 537, 539, 547
quartz 60-1, 107, 112, 218, 223, 547
pieces 271, 339
rhyolite 61-2, 109, 124, 260
tuff 60-3, 68, 96, 98, 107, 111-13, 119, 121, 123-4, 127, 129, 132-4, 136, 140, 153-4, 156, 168, 170, 181, 183, 196, 211, 213, 218, 220, 223-4, 254, 258, 260, 265-7, 269-72, 274-5, 277-8, 283-4, 306-7, 313, 339, 342, 344, 360, 391-2, 538, 540, 546-8
andesite 109, 111-12, 133-4, 260, 274
cobbles 272, 277, 307
unworked 272, 275, 278, 306
Cumbrian 182, 216, 225
dacite 108, 110-12, 133, 140-1, 260
flaked 119, 124, 127, 129, 133, 218, 391

Group VI 60-2, 107, 110, 112, 121, 124, 127, 133, 154, 171, 182, 214, 223, 230, 265-6, 539-40, *see also* Lithics, axe/axehead
Group XI 111-12, 134
Lake District 93, 97, 166, 181, 216, 265, 307, 360, 539-40
Langdale 107, 154, 220, 223, 360, 539-40
porphyritic 140
reduction 113, 127, 133
reduction 56, 59, 61, 87, 93, 96-7, 108, 113, 117, 122-7, 129, 132-3, 136-7, 139-40, 153-5, 165-6
retouched 63, 94, 96, 98, 104-5, 110, 119, 121-3, 125-33, 137, 139-41, 153, 196, 267, 270-1, 283-4
scalene 54, 56, 60, 94, 97-8, 104, 119, 121-3, 125, 127-9, 132-3, 136, 139, 141, 165, 342
triangle 56, 60, 94, 97-8, 104, 119, 121-3, 125, 127-9, 132-3, 136, 139, 141, 342, 536
narrow 54
scatter 12, 17, 19, 24, 26, 177-9
scraper 94, 119, 123, 126-30, 132-3, 137, 154, 156, 158, 196, 198, 223, 225, 229, 270, 283
side 94, 196, 270
side-and-end-form 284
struck 17, 19, 25, 44, 62, 96-7, 100-1, 113, 116, 125, 196, 216, 279, 283
tools 17, 31, 100, 107, 153, *see also* Lithics, aze/axehead; Lithics, coarse stone, tools; Lithics, flake, tools; Lithics, flint, tools; Lithics, ground stone, tools
manufacture 33, 93, 97, 108, 113, 119, 122-3, 136, 139, 153-4, 156, 165, 168, 170-1, 223, 260, 262, 266, 270, 275, 278, 307-8, 313, 359, 536, 539-40
toolkit 162-3
transverse 266, 270, 274, 284
use-wear 25, 122, 141, 261, 536
volcaniclastic 62, 96, 107-8, 161, 170, 196-7, 247, 258, 260, 263, 266, 304, 306-7, 312-13, 359, *see also* Lithics, tuff
wear traces 119, 130, 536
Little Ice Age 486-7
Little Orton 37
Little Round Table 216, 326, *see also* Henge monument
Livestock 33-4, 287, 327, 334, 421, 467, 480-1, 509, 516, 548, 564, *see also* Animal; Cattle; Husbandry
Lochar Moss 377-8
Lockerbie 209-11, 216, 224, 227, 230, 315, 321, 356, 375, 378, 434, 437, 445, 514, 516, 549
Neolithic hall 209-11, 216, 516, *see also* Neolithic, hall
Loft Crag, Langdale 360, *see also* Langdale
London 314
Long Meg 175, 180-1, 216-18, 223, 227-9, 321, 326, *see also* Ceremonial, complex/monument; Henge monuments; Stone, circle
Lonsdale 562
Loomweights 514
Loweswater 227
Luce Bay 60, 225
Lunt Meadows 55, 175, 177, *see also* Mesolithic, site
Lynx 82-3, 534, *see also* Animal; Bear; Wood, clawmarks

Madder *see* Plants, madder
Main Post-Glacial Transgression 39, 40
Manchester Airport 439-40, *see also* Chalcolithic, structures/houses
Manor Bridge, Peebleshire 59
Marine transgression 40, 59, 204
Maryport 60, 107, 154, 377
Maybole 216
Mayburgh 216, 325, 328, *see also* Henge monument
Meadowsweet *see* Plants, meadowsweet
Medieval
activity 1, 12, 24, 27, 30-2, 34, 325, 407, 432, 484-98, 503-6, 508-10, 513-17, 532, 564-6, 568
boundary *see* Medieval/post-medieval landscape, boundary, medieval
communities 487, 490, 495-6
ditch 12, 34, 325, 377, 483-5, 505-10, 566
Early medieval 505, 510-13, 515
building 12, 34, 487, 489, 505, 510-16, *see also* Dacre; Fremington; Hoddom; Kirkconnel; Parker's Croft
Parcel 42
Building 1 497, 499, 502, 505, 510-11, 513-16
Building 2 498-502, 505, 510-11, 513-16
Building 3 501-3, 505, 510-11, 513-16
Building 4 498, 502, 504-5, 510-11, 513-16, 564
Building 5 498, 502-3, 505, 510-11, 513-16
post-built 514
burnt mounds 344, 433, *see also* Holyrood; Nether Wasdale
hall 489, 491, 514-16, *see also* Birdoswald; Carlisle; Kirkconnel
house 485, 506, 513, 516, 566
settlement 9, 12, 30-1, 34-5, 418, 485, 495-8, 502, 505, 510, 516, 527, 564-6
sites 488-9, 503, 513-14
enclosure 496, 506, 509, 532, 566-8
rectilinear 507-8
estates 491, 559
fence/fenceline *see* Fence/fenceline, medieval
palaeoenvironmental evidence 485-6, 564-6
pottery *see* Pottery, medieval
road (possible) 481
settlement 506-7, 510, 516, 527, 564-6
tenants 491, 564
Medieval/post-medieval landscape
boundary
medieval 12, 34, 325, 485, 491, 494, 496, 505-7, 509, 556
forest 494
post-medieval 12, 31, 520-2, 526-7, 567-8
drain 12, 31, 34, 96, 125, 417
field/field system 24, 485, 496, 506, 509, 517, 559, 566

land
division 24-5, 32, 445, 447-8, 485, 557, *see also* Field
management 24, 34, 320, 521, 559, 562
trackway
medieval 505-6, 566, 568
post-medieval 31, 522, 526-7, 566
Meschin, Ranulf 493
Mesolithic
activity 52-4, 57, 60, 62, 68-9, 94, 111, 114, 132-3, 177-8, 219
communities 53, 55, 100, 154, 160-2, 164, 166, 169, 171-4, 176, 180, 182-6, 211, 321, 536, 538-9, 541, 567
ditch 12, 533
encampment 32-3, 52-3, 103, 145-54, 156-60, 170-2, 177-8, 180, 183, 187-8, 191, 198, 200, 203-4, 207, 233, 283, 291, 304, 308-9, 316, 358, 388, 531-9, 541-2, 548, 567, *see also* Stainton West
I 29-30, 104, 108, 112-15, 119-20, 122, 124-5, 127-32, 135, 139-41, 143-8, 153, 187, 203, 233
II 29, 104, 108, 111, 113, 135, 137-8, 140-1, 143-8, 153, 187, 203-4, 536-9
abandonment 145, 149, 187, 291, 538, 542
III 130-6, 108-9, 112, 141, 144-5, 147-8, 187-8, 198, 200, 203, 291, 531-3
hearth 12, 29, 32, 60, 62, 64-9, 95, 98, 104, 113-20, 122-9, 132, 136-7, 139, 143-4, 146, 150, 152, 158, 177-8, 203, 209, 281, 399-400, 522, 525, 533, *see also* West Challoch; Chest of Dee; Killerby; Redkirk Point; Williamson's Moss; Windy Harbour
hunter-gatherer *see* Hunter-gatherer
Mesolithic alluvium *see* Stainton West, stratigraphical units, *Mesolithic alluvium*
Mesolithic organic deposit *see* Stainton West, stratigraphical units, *Mesolithic organic deposit*
Mesolithic/Neolithic alluvium *see* Stainton West, stratigraphical units, *Mesolithic/Neolithic alluvium*
Mesolithic overbank alluvium *see* Stainton West, stratigraphical units, *Mesolithic overbank alluvium*
midden 302, 304-7, 312, 319, 533, 535, 544, 551, *see also* Stainton West, Areas, Midden
shell 57, 150, 179
network (social/exchange) 33, 54, 163-4, 166, 169, 171, 173-6, 182, 186, 204, 319-21, 539, 541-2, 567
occupation 133, 283, 308
palaeoenvironmental evidence 46, 53, 55, 57-8, 83, 87, 93, 100-1, 163, 181, 191, 196, 203-4, 308, 532
Phase *see* Stainton West, Phase, Mesolithic
pithouse *see* Cassny Hawin II; Howick; Mount Sandel
settlement 12, 61, 161-2
sites *see* Chest of Dee; Dunragit; Cnoc Craig; Cramond; Howick; Kinloch; Lunt Meadors; Killerby; Mount Sandel; Nab Head; Redkirk Point; Star Carr; Williamson's Moss; West Challoch; Windy Harbour
societies 54, 162, 315, 541, 551
structure 115, 119, 135-6, 146, 153, 157-8
Parcel 27 (Stainton West)
1 64-5, 67-8, 70, 114-16, 131, 136, 150, 152, 157-8, 533-4, 545
2 68-70, 100, 113, 115, 120, 150, 533-4
abandoned 70
3 113, 115, 117-20, 145, 150
4 113, 115, 117-19, 137, 145-6, 150, 152
5 113, 115, 117-19, 137, 145-6, 150
6 68, 111, 113, 135-7, 139, 145-6, 150, 152-3, 158
technology 18, 59, 161, 196, 283, 534
Metalwork 25, 32, 34, 363, 377, 382, 418, 522, 564
Microcharcoal 57, 59, 87, 89, 101, 163, 189, 193-4, 287, 291, 334, *see also* Charcoal
Microfauna/flora
diatoms 34, 83-4, 191, 193, 285, 287, 332, 371
dinoflagellate cysts 83, 192
non-pollen palynomorphs 27, 34, 83, 86
ostracod 27, 34, 83, 192-3, 285, 287, 332
Microwear *see* Lithics, microwear
Mid-Challoch 434, *see also* East Challoch; West Challoch
Midden *see* Mesolithic, midden
Area *see* Stainton West, Areas, Midden
ceremonial (after feasting) 310
Midgeholme Moss 486-7
Migrants 186, 318, 375
Migration 39, 57, 71, 108, 146, 154, 159-60, 162, 164, 166, 177, 186, 207, 367, 537, 541
Milecastle *see* Hadrian's Wall, Milecastle
Military Road 517
Military Way *see* Hadrian's Wall, Military Way
Milltimber, near Aberdeen 175, 178-9
Mitchell Staithes Farm, Ossett, West Yorkshire 356
Monk Moors 62
Monolith *see* Palaeoenvironmmental, monolith
Monument *see* Bronze Age, monument; Ceremonial, complex/monument; Henge monument; Neolithic, monuments; Stone, circle
Moorland *see* Landscape, moorland
Morecambe Bay 63, 221
Mortar *see* Hadrian's Wall, mortar
Mortuary 219, 315, 550, *see also* Burial; Funerary
Mount Sandel 159, 176, 179, *see also* Mesolithic, pithouse

Nab Head 54
Narrow-blade *see* Lithics, narrow blade
National Heritage List for England 1, 3, 5, 448, *see also* Scheduled Monument

Native North American 435-6
Coastal Tlingit 158
Mistassini Cree 158
Neolithic
Burnt Mound 352-3, 360
1 96, 329, 336, 341, 345-50, 352-3, 354-8, 360, 382, 388, 400, 551-3
5 329, 336, 341, 350-3, 355-8, 360, 382, 390, 393, 431, 551-3
ceremonial activity *see* Ceremonial, complex/monuments, Monuments; Neolithic; Neolithic, monuments
colonising groups (possible) 186, 227, 318, 548
communities 24, 185-6, 207-8, 211, 223, 227-30, 239, 279, 308, 310-11, 315-21, 327, 354, 358, 361, 543, 549-51, 553, 567
culture 208, 211, 230, 318, 320
cursus 216, 218, 227, 315, 321, 437
monument 216, 437
timber 218
deposits 269-70, 286, 290-1, 333, 335, 368, 548
diet 236
ditch 16, 64, 214, 217-18, 321, 323-5, 420, 485, *see also* Henge; Long Meg; New Cowper Quarry; Plasketlands
Earlier Neolithic alluvium *see* Stainton West, stratigraphical units, *Earlier Neolithic alluvium*
Earlier Neolithic organic deposit *see* Stainton West, stratigraphical units, *Earlier Neolithic organic deposit*
enclosure 16, 216-19, 229, 275, 321, 323, 325-6, 380, 566, *see also* Henge monument; Long Meg; New Cowper Quarry; Plasketlands
farmers 185, 207, 320, 551, 553, 567, *see also* Farmers; Farming
hall *see* Lockerbie, Neolithic hall
hearth 213, 221, 284, 304, 345, 347, 352, *see also* Ehenside Tarn; Roose Quarry
Later Neolithic organic deposit *see* Stainton West, stratigraphical units, *Later Neolithic organic deposit*
monuments 216, 219, 325, 361, 553, *see also* Ceremonial, complex/monuments; Henge monument; Neolithic, cursus
network (social/exchange) 33, 327, 360-1, 541, 551, 553
palaeoenvironmental evidence 47, 207, 225, 233, 249, 282, 284, 300, 303, 320, 332, 334, 532, 548, 550
people 33, 221, 227
Phase *see* Stainton West, Phase, Neolithic
sites 223, 228, 313
structures 209, 230, 236, 246, 299, 301, 336, *see also* Lockerbie
transition to 33, 60, 185-6, 198, 204-5, 230, 318, 320, 543, 549
Neolithisation 185, 208, 227, 321, 549
Nether Wasdale 344, 433, 514-15, *see also* Burnt mound; Medieval, Early medieval, burnt mounds
Netherhall Road, Maryport 60-1, 154
Nethertown 61-2
New Cowper Quarry 213, 223, 230, 373, 378, 420, 439-40, 445, *see also* Abbeytown Ridge
Newby 1, 373-4, 378, 493, 495-6
Hill 373-4, 378
West 1
Newcastle 452, 517
Nithsdale 214, 216
Non-pollen palynomorphs *see* Microflora/fauna, non-pollen palynomorphs
Norham upon Tweed 492
Norse 492-3, 495, 566
North British Railway 521
North Park Farm, Bletchingley, Surrey 175, 179
Northern Ireland 175, 439
Northern Isles 435, 437
Northumberland 55, 105, 177, 420, 490, 494-5, 503
Northumbria 490-3, 511, 516, *see also* Kingdom, Northumbria
Nosterfield, North Yorkshire 356

Oak *see* Trees, oak
Ochre *see* Lithics, raw material, ochre
Ordnance Survey 13, 496, 524
Orkney 230, 261-2, 306, 360
Orton (Great and Little) 493
Over Rig 59, 226, 486
Overby Quarry 377-8

Paddle *see* Wood, paddle
Page Bank Farm, Barrow in Furness 378, 428, 432
Palaeochannel *see* Stainton West, *Principal palaeochannel*
Palaeoenvironmental evidence *see also* Chalcolithic/Bronze Age, palaeoenvironmental evidence; Iron Age, palaeoenvironmental evidence; Medieval, palaeoenvironmental evidence; Mesolithic, palaeoenvironmental evidence; Neolithic, palaeoenvironmental evidence; Pollen
event *see* Tree, elm, Elm Decline
methodology and analyses 11, 21-2, 24-7, 30-5, 45-7, 53
monolith 22, 27, 30, 76, 78-80, 86, 142, 200-1, 235-6, 287-93, 296-8, 300, 329-30, 335, 369-71, 509
samples 22, 89, 191, 201, 287, 289-90, 298, 325, 329, 335
Palstave *see* Bronze Age, palstave

Parcel (excavated along CNDR) *see* Scheme archaeological sites/Parcel
Parker's Croft, Shap 514, *see also* Medieval, Early medieval, buildings, post-built
Pasture 2, 17, 315, 334, 358, 418, 496, 564, 566, *see also* Grazing; Herding
Peat 39, 41, 59, 61, 70, 72, 125, 135, 225, 235, 258, 284, 329, 334-5, 432, 486
Pebble-flint *see* Lithics, raw material, pebble-flint
Pennines 37, 60-1, 105, 161, 166, 168, 171, 174, 180-2, 209, 225, 490, 541, 561-2, 567
Penrith 37, 61, 178-80, 216, 228, 318, 325, 328, 563
Pentrefelin, Gwynedd 427-8
Pict's Knowe 216, 225, 326, 378, 380
Pig 160, 177, 536, *see also* Animals, domesticated
Pike o'Stickle, Langdale 221, 265, *see also* Langdale
Pine *see* Tree, pine
Pitchstone *see* Lithics, raw material, pitchstone
Plank *see* Wood, plank; Wood, trough, plank-lined
Plants
  blackthorn 63, 84, 100, 116-17, 125, 142, 193, 201, 254, 285, 325, 334, 350, 388-9, 413, 423-4, *see also* Charcoal, blackthorn-type
  bracken 86-7, 89, 289-90, 335
  brambles 286, 334
  ivy 86, 192-3, 196, 334
  madder 289-90, 335
  meadowsweet 85-7, 286, 289-90, 334-5, 548
  ribwort plantain 86, 288-90, 300-1, 335, 401, 481, 548
  rushes 85, 192, 286, 333-4, 401, 448
  sedges 39, 59, 83, 85-6, 88, 192, 286, 289-90, 334-5, 401, 418, 445, 448, 501
Plasketlands 218-19
Platform *see* Chalcolithic/Bronze Age, platform settlement; Wood, platform
Plough 2, 17, 34, 52, 323, 325, 463, 470, 480, 496, 509, 527, 559-60, 562, 566
  furrows 527
Ploughing 2, 17, 34, 325, 463, 470, 480, 496, 509
Polissoir *see* Lithics, polissoir
Pollen 27, 30, 34, 57, 86-7, 101, 163, 193, 225-6, 287, 289-90, 325, 335, 401, 481, 509, *see also* Palaeoenvironmental; Tree, pollen
  cereal 226, 365, 509
  cereal-type 33, 226-7, 288, 291, 300-1, 401, 418, 445, 481
  evidence 59, 204, 222, 227, 401, 436, 448, 535, 554
  signature 293, 325
  sites 378, 485-6
  superzone 27, 78, 86-7, 193, 200, 287, 292, 294, 296-7, 330, 334, 401
Port Carlisle 474, 520, *see also* Hadrian's Wall
Post-medieval 12, 34, 485, 517, 521, 523-7, 567
  boundary *see* Medieval/post-medieval landscape, boundary, post-medieval
  communities 516
  ditch 69, 120, 347, 521-2, 526-7, 567
  enclosure 9, 12, 34, 485, 495-6, 518-22, 526, 528, 532, 567-8, *see also* Aglionby; Botcherby; Harraby; Rickerby; Tarraby; Upperby
Post
  holes 9, 136-7, 216-19, 395-8, 402-3, 405, 407, 412-14, 417, 420-1, 423-6, 445, 497-9, 501-6, 510-11, 513-15
  pipe 218, 407, 413, 417, 424
  pits 219, 380, 501
  ring 380, 402, 405, 412-13, 417, 440-1, 444
  setting 238, 303, 544
Pottery
  Bronze Age 5, 230, 363, 375, 377, 380, 402, 409, 417, 421, 423-4, 429, 436, 443-5
    bucket-shaped vessel 396-7
    Deverel-Rimbury 375, 397
    Food Vessel 375, 377, 437
    Urn
      bucket 375
      collared 375, 377
      cordoned 375, 377
  Chalcolithic
    Beaker 32, 230, 363, 373, 375, 377, 380, 437, 439-40
      AOC 373
  Medieval 9, 34, 478, 508-9, 566
    glazed 9, 478
  Neolithic 25, 31, 185, 207, 209, 213, 216, 221, 223, 225, 227-8, 230, 264, 274-5, 277-9, 283, 304, 306, 308, 317-18, 320, 339, 344, 354-61, 548, 550
    Carinated Bowl 33, 209, 211-14, 216, 218, 221, 271, 274, 277, 307-8, 320, 360, 547-8
    Grooved Ware 230, 261-2, 330, 344, 354-61, 373, 434, 440, 551-2
      Clacton style 356
    Impressed Ware 230
    Peterborough Ware 221, 230
  post-medieval 25, 31, 463, 521-2, 526, 529
  Roman 12, 31, 34, 45, 409, 456, 482-3, 508, 557, 560, 564
    amphora 467
    Black-burnished ware 458, 483
    mortarium 482, 557
    samian 467
  vessels 216, 271, 330, 355-8, 360, 373, 375, 377, 395-6, 425, 456, 467, 483, 520, 552
Poulton-le-Fylde 177, *see also* Windy Harbour
Pounder *see* Lithics, pounder
Principal palaeochannel *see* Stainton West, *Principal palaeochannel*

Quarry 162, 212-13, 215, 221, 223-4, 227, 230, 360, 373, 377-8, 420, 439-40, 445, *see also* Aird Quarry; New Cowper Quarry; Overby Quarry; Roose Quarry; Stainton, quarry
Quarrying 169, 182, 221, 359-60, 527, 549
Quartz *see* Lithics, raw material, quartz
Quern *see* Lithics, quern

Racks Moss, Dumfries 377-8
Radiocarbon
age 78-81, 142-3, 200, 292-7, 330-1, 343, 369-70, 384-5, 396, 403, 422, 498, 506
date/dating evidence 59, 64, 69, 98, 100, 108, 122, 171, 217-18, 221, 230, 278, 298, 355-6, 371, 395, 4042, 447, 466-7
evidence 98, 149, 219, 304, 363, 443, 445
Railway 1, 12, 14, 34, 449, 463, 470, 478, 485, 517, 520-1, 529
network 520
Raiset Pike 217, 315
Raven Bank (Milecastle 77) *see* Hadrian's Wall, Raven Bank
Ravenglass 62
Reactivation channel *see* Stainton West, reactivation channel
Rheged *see* Kingdom, Rheged
Rhyolite *see* Lithics, raw material, rhyolite
Ribwort plantain *see* Plants, ribwort plaintain
Rickerby 495, 566
Rieinmellt (of Rheged) 490
Ring barking 92, 181, *see also* Bark; Girdling; Tree
River
Annan 60, 166, 218, 227, 353, 373-4, 377, 382, 447, 537, 557
Bann 176, 179
Cald Beck 105
Caldew 105, 181
Cambeck 476
Eamont 58, 61, 168, 175-6, 178-81, 216-17, 318, 325, 541
confluence with River Eden 168, 175-6, 178, 180
Eden 1-3, 5, 14-15, 32-4, 40-3, 100-1, 103, 159-60, 178-81, 453, 482-3, 493-6, 520-7, 529-33, 552-4, 557
confluence with River Eamont 168, 175-6, 178, 180
floodplain 5, 32, 40, 100, 128, 203, 401, 483, 542, 552, *see also* Floodplain
Valley 32, 37, 40, 60-1, 63, 87, 101, 105, 163-4, 166, 168-74, 178-9, 377, 536-7, 539, 541
Esk 58, 60, 62, 166, 176, 486, 537
estuary 62
Humber 490
Irthing 450-1, 468, 472, 475-6, 478, 481
Kent 63
Lowther 179-80, 541
confluence with Eamont 179-80
Mersey 490
migration 87
Nith 60, 166, 218, 227, 326, 537
Swale 180
Tees 490
Terrace (around Stainton West) *see also* Stainton West
1 32, 34, 40-2, 63-4, 103, 207, 216, 320, 322-3, 358, 361, 533, 552
2 32, 40-3, 46-7, 50, 52, 533
3 32, 40-5, 48, 50, 64, 82, 94, 100, 103, 365-7, 382, 420, 533
4 32, 34, 40-2, 44-5, 47, 366-7, 479, 483
5 32, 40-2, 45
upper 16, 34, 553-4
Tyne 490
Wyre 209
Robert de Brus, 1st Lord of Annandale 494
Rock art 229, 447
Roman
army 34, 477-8, 480, 532, 560, 562-3, 567
auxiliaries 490
building 489, 513
camp 447
civil/extramural settlement 489, 563-4
communities 562-3, 567
ditch 456-8, 460-1, 474, 478, 481-2, 557, 559-60, 562-3, *see also* Brougham; Irthington; Stanwix
Vallum *see* Hadrian's Wall, Vallum, ditch
emperor *see* Emperor (Roman)
fort 32, 448, 451-2, 472, 474, 477-9, 487, 489-90, 513, 532, 557, 559-64, 568, *see also* Hadrian's Wall, forts
ramparts 478
frontier 1, 24, 448-9, 485
system 449-51, 479, 563
hinterland (rural) 563
mansio 560
military 24, 32, 490, 560, 567, *see also* Roman, army
period 9, 221, 367, 408, 445, 447-8, 451, 457, 463, 480-3, 485-6, 489, 532, 557, 559-60, 562-3
early 448, 482-3, 557
road 489
Roose Quarry 211, 213, 223
Ross Bay, Kirkcudbright 378, 380, 428
Rotten Bottom, Dumfriesshire 226, 485-6
Rottington, St Bees 61-2
Roundhouse 12, 31, 33, 380, 402, 405, 411-14, 417, 420, 431, 440-1, 443-4, 447-8, 555-7, 564
Bronze Age *see* Bronze Age, roundhouse
double-ring 440
Iron Age 448, 564
post-built 440, 443
Rushes *see* Plants, rushes

St Alban's chapel *see* Carlisle, St Alban's chapel
St Bees 61-2
St Cuthbert 490-2
church *see* Carlisle, St Cuthbert's church
St Mary's Priory (and church) *see* Carlisle, cathedral
Salmon 108, 154, 159-60, 164, 166, 169, 171-2, 176-81, 183, 536, *see also* Animal, bone, salmon
migration 154, 159, 164, 166
Sauna 31, 33, 353, 360, 431, 435-6, *see also* Ceremonial, complex/monument, bathing/purification; Sweat lodge
Scafell, Lake District 62, 266
Scaleby Moss 377-8
Scalene *see* Lithics, scalene
Scheduled Monuments 1, 3, 5, *see also* Hadrian's Wall; National Heritage List for England

Scheme archaeological sites/Parcels 3, 5, 7-9, 12, 15-16, 18, 30, 33-5, 364, 402-4, 406, 409-11, 417, 421, 423, 425-6, 431, 437-41, 443-5, 479, 482-5, 496-8, 502, 505-7, 509-11, 513-16, 521-8, 554-7, 564-6
Scotby 495
Scotland 39, 56-60, 177-8, 182, 208-9, 224-7, 363-5, 375, 377-8, 435, 437, 479-80, 486-7, 490, 492-5, 510-11
Scottish Southern Uplands 37, 60-1, 539, *see also* Lithics, raw material, chert, Scottish, Southern Uplands
Scraper *see* Lithics, scraper
Sea level 39-40, 48, 53, 59, 192, 365, 418, 542
  highstand 39, 40, 62, 192
Seal Howe 61
Sedges *see* Plants, sedges
Shap 61, 105, 514, 516
Shellfish 162, 183, 537, *see also* Animal; Fishing
Shrine 310, 315-16, 318-20, 359, 549, 553, *see also* Ceremonial, complex/monument; Landscape, sacred use of/places in
Silloth 12, 14, 34, 478, 485, 521, 529
Siward, Earl of Northumbria 493
Sizergh 217, 321, 428, 433, 436, *see also* Burnt Mound
Skelda Hill 62
Skelmore Heads 217
Smittons, Kirkcudbrightshire 60
Solway Firth 33, 39-40, 60, 100-1, 103-4, 160-1, 163-4, 166, 168, 171, 173-6, 178-80, 182-3, 204, 214, 218-19, 228, 230-1, 373-5, 377-8, 418, 439, 447-8, 485-7, 493-4, 556-7, 567
  area of 32, 37, 39, 56, 161, 229-30, 373, 379-80, 432-3, 445, 447-8, 492-3, 516, 556-7, 559-60, 563-7
  Moss 59, 225-7, 418, 486-7
  Plain 37, 60, 63, 363, 380, 401, 418, 420, 486
Sparrowmire Farm 428, 432-3, 436, *see also* Burnt Mound
Spear 56, 159, 221, 279, 314, 316
  head 32, 382, 418
Springfield Lyons, Essex 511
Stabilised land surface *see* Stainton West, stratigraphical units, *Stabilised land surface*
Stainmore 492
Stainton 1-2, 5, 9
  Holme Lane 15, 482-3, 522
  township 518, 564-6
  Quarry 212-13, 215, 223, 227
Stainton West
  Areas
    Axe-working 113, 131, 134, 153, 158, 538
    Butchery 113, 121, 128-9, 131, 147, 153, 538
    Habitation 113-15, 119-22, 128, 135-7, 145, 147, 150, 152-3, 157-8, 538
    Hide-working 113, 124, 126, 128-9, 147, 538
    Lithic-free Activity 113, 130
    Midden 70, 113, 115, 120, 125, 130, 137, 150, 152-3, 538
    Peripheral 113, 131-5, 538
    Tool-production 113, 121-2, 136-40, 145, 147, 152-3, 178, 538
  Backwater Channel 16, 31, 43-9, 51-2, 81, 96-9, 103, 112-13, 128-9, 133, 153-4, 191, 198, 282-4, 341-2, 533-5, *see also* Channel; Stainton West, *Principal Palaeochannel*; Stainton West, third channel
  beck (nearby) 15, 19, 44
  excavation of 16, 44, 320, 485, 541
  encampment *see* Mesolithic, encampment
  Grid-square area 19-21, 26-8, 44-7, 50-2, 68-70, 81, 94-6, 103, 114-15, 141-3, 149-51, 203, 279, 282-5, 297-301, 341
  grid-squares 65, 68, 96, 98, 100, 116-19, 123-7, 129-30, 132-3, 136-7, 139-40, 198, 203, 283-4, 342, 344
  island 49, 57, 82, 94, 103, 147, 149-50, 153-4, 156, 158, 171-3, 177, 179, 233, 308-10, 533-8
  Phase
    Mesolithic 64, 69, 70, 78-82, 90, 94, 103, 108, 141-3
      I 64, 69, 103, 141
      II 70, 78-82, 90, 94, 103, 141
      III 103-4, 108, 141-3, 145
      Hiatus 187-8, 196, 198-200, 202-5, 233, 284, 291, 542
    Neolithic
      Early Neolithic I 233, 235, 238-9, 258-9, 263-6, 268-9, 271, 274-5, 284, 291, 293, 298-301, 303, 316, 319-21
      Early Neolithic II 233, 236, 271-2, 274-5, 284, 287, 298-301, 304
  pond/ponded area 16, 19, 44, 73, 82, 85, 101, 191, 233, 235, 246, 264-6, 277-8, 303, 329, 344
  Principal palaeochannel 21-4, 43-52, 70-1, 78-80, 85-8, 90-5, 150-3, 188-91, 233-6, 259-64, 282-98, 302-7, 328-31, 355-7, 367-71, 548-54, *see also* Channel; Stainton West, *Backwater Channel*; Stainton West, third channel
    baulks 19, 21-3, 248, 250, 253, 337, 511
    bays 18, 21-3, 70, 72-4, 78-80, 86, 89, 94, 142, 187-9, 191, 193-5, 197, 200-1, 234-8, 240-2, 246-56, 259, 263-4, 266, 268, 270-2, 274, 277, 279, 282, 286-300, 329-32, 335-9, 341, 345, 351, 355-7, 367-73, 383-4, 387-8, 390, 393, 395, 401, 542
    Depositional Zone 275-7
    sequence 41, 50-1, 85, 191, 204, 259, 266, 287-8, 298, 543, 546, 550
  stratigraphical units
    Basal sands and gravels 46, 48, 50, 52, 70, 76, 92, 96, 98, 259, 340, 342

Bronze Age alluvium 31, 46-7, 52, 367-8, 370-3, 382, 384-5, 390, 392, 398, 401
Bronze Age/Iron Age alluvium 46-7, 52, 340, 367, 373, 383, 385, 395, 401, 418, 420
Chalcolithic alluvium 21, 31, 46-7, 50, 85, 258, 267, 269, 333, 335, 347, 349, 367-71, 373, 382, 384-7, 390, 392, 401
Colluvium 12, 43, 46-7, 52, 112, 133, 240, 497
Earlier Neolithic alluvium 31, 46-7, 50, 233-6, 258, 267, 269-71, 273-5, 277, 284, 286-9, 291, 298, 300, 304, 328-9, 333, 338
Earlier Neolithic organic deposit 19, 21, 31, 46-7, 49-50, 191, 194, 233-40, 244, 246-7, 249-50, 255-6, 258, 265, 267-71, 274-5, 277, 284-91, 295, 298, 300, 303-4, 308, 311, 329, 333, 337-40, 355, 357-8, 543, 546-7
Later Neolithic organic deposit 19, 21, 46-7, 50, 85, 235, 258, 266-7, 269, 271-2, 274-5, 328-9, 332-40, 358-60, 368-9, 551-2
Mesolithic alluvium 31, 46-7, 49, 85-7, 94-6, 144, 188-9, 191-6, 198, 201, 203-4, 235, 258, 286, 365, 542
Mesolithic/Neolithic alluvium 31, 46-7, 50, 85, 87, 103-4, 142-5, 188, 191, 193-6, 198, 200-4, 235, 237, 239-40, 252, 255, 258, 267-9, 284-6, 291, 300, 303, 311, 542
I 103-4, 142, 145, 201
II 81, 143, 145, 196, 198, 200-3, 284, 291
Mesolithic organic deposit 76, 82
I 76-9, 82, 90, 101
II 76-7, 82, 90, 92, 101
Mesolithic overbank alluvium 17, 31, 43, 46-8, 51-2, 99, 104, 122, 124-5, 129, 133, 144-5, 150, 191, 198-200, 203
Stabilised land surface 19, 31, 46-7, 49-52, 68-9, 97, 99, 104, 108, 112, 122-3, 125, 133, 143-4, 203, 283
reactivation channel 189, 233, 367-71, 373, 382, 401
retention pond 16, 19, 373, 395
third channel 44-5, 48-9, 67, 99, 367
wooden platform *see* Wood, platform, at Stainton West
Stake *see* Wood, stake
Stakehole 12, 60, 62, 64, 67-9, 104, 113-15, 117-18, 136-7, 139, 150, 177, 284, 347, 391-2, 434-5
Stalling 380, *see also* Animal, domesticated; Cattle; Livestock
Standing stones 55, 177, *see also* Henge monument; Stone, circle
Stanwix *see* Hadrian's Wall, fort, Stanwix
Star Carr 54-5, 124, 223, 303, 314, 317-18, 541
platforms 55, 541
Statue 528, 561, *see also* Birrens; Kingmoor House
Stone
beads *see* Beads, prehistoric
burnt 68, 118-19, 127, 137-9, 214, 350, 390-2, 395, 397-9, 429, 433-4, 444
circle 216-17, 229-30, 325-6, 360, 375, 436-7, *see also* Burnmoor; Castlerigg; Long Meg
cross
arm 492
head 492-3
ring-headed 493
fire-cracked 9, 27, 64, 69, 116, 118, 127, 214, 216, 346, 386, 390-1, 410-11, 427, 431-3, 444
hot 347, 435-6
inscribed 447
spread 113, 136-7, 139-40, 143, 153, 345-50, 352, 522, 525-6
tools 25, 32-4, 56, 93, 96, 107-9, 117, 129-30, 133, 207, 216, 262-3, 265, 271-2, 278-9, 305-6, *see also* Lithics, tools
Stone-working 69, 95-6, 113, 117, 119-20, 126, 136, 223, 266, 268, 306-7, 344, 359, 457, 476, 546
activity 96, 117, 120, 136
Stonehenge 55, 326, *see also* Henge monument; Stone, circle
Stranraer 177, 218, 420, 490, *see also* Aird Quarry
Strathclyde 492-3, 497, *see also* Kingdom, Strathclyde
Structure *see also* Bronze Age, roundhouse; Chalcolithic, structures/houses; Medieval, Early medieval, building; Medieval, Early medieval, hall; Medieval, Early medieval, house; Mesolithic, structure; Neolithic, hall; Neolithic, structures
four-post 29, 31, 409-10, 425, 437, 439, 444-5
rectangular posthole 31
timber 177, 233, 278, 311, 378, 514
circular 60, 395, 431, 434, 436
ephemeral 216, 392, 436
Stuart, Charles Edward 516
Summerhill 326
Sweat lodge 435-6, 554, *see also* Ceremonial, complex/monument, bathing/purification; Sauna
Sweden 73, 307
Sweet Track 309, 314, 549

Taliesin 490
Tarn Moor 61
Tarnflat, St Bees 61-2
Tarraby Lane *see* Hadrian's Wall, Tarraby Lane
Tatton Park 439-40
Temescal (Mayan) 436, *see also* Sauna; Sweat lodge

Tenure 162-3, 169, 172, 181, 207, 310, 319, 327, 556, 563
Thirlings 486, 503
Thirlmere 227
Thunacar Knott 265
Timber *see also* Wood
  circle 357, 380, 437
  raking 503, 505, 511
Tombs 207, 216, 221, 228, 230, 275, 314-15, 361, 375, 380, 549, 553, *see also* Burial; Cist
  chambered 380
Tool-production Area *see* Stainton West, Areas, Tool-production
Toolmarks 92, 198, 253, *see also* Wood
Tools *see also* Lithics, tools
  maintenance 94, 96, 119, 123, 147, 538
  manufacture 93, 156, 223, 260, 275, 307
  production 68, 93-4, 145, 153, 158, 538, *see also* Stainton West, Areas, Tool-production
  retouched 63, 104-5, 110, 119, 121-3, 125-9, 132-3, 137, 139-40
  struck-lithic 17
  worked-stone 207
Townhead Road, Dalston 378, 420
Track/trackway *see* Bronze Age, trackway; Hadrian's Wall, Vallum, trackway; Iron Age, pre-Roman, trackway; Medieval/post-medieval landscape, trackway
Tree 28, 31, 81-2, 84-8, 92, 191-3, 195-7, 280-2, 286-7, 298-300, 308-11, 313-17, 333-5, 342-3, 548-50, 559-60
  alder 32-3, 84-6, 143, 192-3, 240-1, 254, 285-92, 294-7, 332-5, 384-5, 401, 403, 413-14, 422-4, 501, 503-5, *see also* Carr, alder
  ancient 233, 302, 304-8, 312, 314, 544
  bole 90, 92, 280-1, 342, 387, *see also* Tree-throw
  elder 286-7, 310, 334
  elm 32-3, 58-9, 72, 79, 80, 84-6, 89, 142, 192-4, 204, 226, 236, 285-6, 288-95, 300-1, 334-5, 548
    Elm Decline 30, 47, 59, 226-7, 287-94, 296-7, 300-1
    Demise (EDD) 287-91, 293, 296-7, 300
  felling 33, 88, 90, 127, 195, 233, 240, 249-50, 252, 278-9, 281-3, 305, 311-16, 336-8, 544, 548-50
  grubbing *see* Grubbing
  hawthorn 72, 84, 89, 193, 195, 246, 252, 285-7, 293, 325, 334, 385, 388-9, 391, 395, 398
  hazel 68-9, 78, 84-8, 142-3, 160, 192-6, 203, 211-12, 216-18, 254-7, 285-97, 333-8, 368-9, 384-6, 422-5, 503-6
    thicket 87-8
    woodlands 32, 100
  hazelnut 68-9, 78, 84-5, 142, 160, 178-9, 195-6, 201, 203, 212, 216-18, 230, 292-4, 296, 329-30, 368-9
    charred 69, 160, 176, 203, 211, 218, 221, 227, 384, 386, 405
    shell 68, 212, 214, 217-18, 224, 230, 329, 443
  lime 58, 193, 286
  oak 58-9, 72, 79, 80, 84-6, 192-4, 226, 250-2, 276, 285, 287-91, 294-7, 330-1, 334-5, 350-2, 413-14, 503-5
    acorns 160, 183, 537
    trunk 47, 72, 75-6, 83, 88, 90, 92, 191, 239-40, 250, 255-6, 266, 275, 277, 534, 544
  pine 55, 58, 85-7, 193, 334
  pollen 59, 288, 487, *see also* Pollen
  pollarding 301
  ring 28, 79, 80, 84, 89, 92, 204, 295-6, *see also* Dendrochronology
  root bole 90, 92, 280-1, 342
  willow 39, 85-6, 152, 192-3, 196, 256, 285-6, 290, 334-5, 395, 403, 409, 443, 475-6, 501, 525
Tree-throw 31, 77, 81-2, 96-101, 124-5, 127, 129, 141-4, 209, 211-13, 215-17, 279-83, 297-8, 311-12, 340-4, 391, *see also* Grubbing
Trident *see* Wood, Trident
Trough 343, 345-6, 350, 352, 382, 384-9, 391-2, 398-9, 427, 429-37
  clay-lined 430
  hurdle-lined 430
  plank-lined 382, 390-1, 430-3, 437
Tsunami 53
Tuff *see* Lithics, tuff
Tyne Gap 39

Ullswater 181
Upper Forth Crossing 439, 444
Upperby 495
Use-wear *see* Lithics, use-wear

Vale of Eden 37, 39
Vallum *see* Hadrian's Wall, Vallum
Venerable Bede 491
Viking 492-3, 497, 506, 566, *see also* Cumwhitton; Norse
  burial 492
Votive (offering) 233, 238, 260, 275, 307, 317, 483, *see also* Deposition

Wales 54, 175, 344, 437, 439, 513, 549
Wallsend *see* Hadrian's Wall, Wallsend
Walney Island 62, 105, 228, 356
Walton Moss 486-7
Warden's Dyke 216, 378, 437, 439
Warren Field 55, 178
Wastwater 58, 62
Watch Hill *see* Hadrian's Wall, Watch Hill
Watching brief 3, 9, 12-13, 16, 482, 485, 509, 529
Waterlogged plant remains 34, 84-5, 87, 103, 192, 195, 285, 287, 333-4, 386, 401, 448, 482, *see also* Plants
Wattling 386-7, 430, *see also* Wood
Weevil *see* Insects, weevil
Weir 246, 275, 279, 303, *see also* Fence; Fishing
Well, timber-lined 489

Wessex 230, 492
West Challoch 55, 60, 175, 177-8, *see also* East Challoch; Mid-Challoch
West Newton 60
Wetland 50, 58-9, 63, 88, 100, 103, 128, 152-3, 160, 171, 176, 192-3, 209, 235, 286-7, 314
Whale hunting 57, *see also* Hunting
Wheat *see* Cereal, wheat
Whinfell 514, 516
Whitecrook Bridge 353, 434
Wiggle matching *see* Dendrochronology, wiggle matching
Wild boar 177, *see also* Animal
Williamson's Moss 59, 62, 175-6, 178, 222, 225, 314
Willow *see* Tree, willow
Willow Holme *see* Hadrian's Wall, Willow Holme
Windy Harbour, Poulton-le-Fylde 55, 175, 185, 209
Wood 21-2, 31-2, 49, 50, 72-3, 75-6, 84, 87-91, 113, 191-2, 194-6, 239-41, 244-51, 253-6, 277, 287, 335-8, *see also* Timber; Tree; Wattling
  altered 25, 196, 275, 277-8
  artefacts 33, 47, 50, 221, 239-40, 247, 249-51, 276-7, 282, 304, 359, *see also* Wood, paddle; Wood, Trident
  blanks *see* Burr-wood blanks
  boughs 47, 72, 158, 191, 233, 237, 239-40, 303, 311, 542, 544
  burnt 87, 91, 101, 271, 277, 409, 547
  charred 88-90, 100-1, 129, 163, 221, 250, 255-7, 312, 329, 337, 342, 535
  chips 163, 246, 249-50, 254-6, 262-3, 265, 278, 282, 295, 305, 311-12, 317
  chopmarks 254
  claw marks on 83, 534, *see also* Bear; Lynx
  debris 249, 262, 278-9, 359, 552
  fragments 84, 192, 195, 329, 332
  gnawed 72, 82, 245-6, 249, 254, 256, 534, *see also* Beaver
  heartwood 79, 80, 195, 295-6, 330-1, 447
  hurdle *see* Hurdle
  non-structural 249-50
  paddle 240, 247, 250-1, 258, 263, 265, 275-9, 293, 304-6, 311, 313-14, 316, 544, 547
  platform 33, 47, 222, 238, 240, 246, 249, 251-2, 254-5, 265-6, 271, 275-9, 303, 306, 309, 314
  plank
    lined trough 382, 390-1, 430-3, 437, *see also* Garland's Hospital; Sizergh Castle; Sparrowmire Farm
    oak 252-4, 256-7, 271, 277, 279, 282, 298, 359, 544, 547
    split for use 240, 311, 314, 320, 346, 544, *see also* Wood, paddle; Wood, trident
    splitting technology 279, 305, 311, 314, 544, 548
  platform
    at Drigg 432
    at Ehenside Tarn 221-2, 549
    at Stainton West 33, 47, 76, 94, 238-41, 246, 249-56, 262, 265-6, 271, 275-9, 303-6, 308-9, 312, 314-17, 335, 359, 445, 543-9
    at Star Carr 55, 541
  procurement 279, 311
  roundwood 78, 84, 88, 90, 92, 116, 240-1, 244-5, 248-57, 285, 292, 294-5, 317, 337, 369, 544
  sapwood 80, 195, 217, 254, 271, 294, 297-9, 330-2, 344, 357
  split 88, 249-50
  stake 67-9, 113-15, 117-18, 136-7, 240-1, 243-6, 248-51, 253-4, 256, 277, 294-5, 303, 335-9, 357-60, 432-7, 544-5
    driven 33, 74, 198, 222, 240, 246, 248, 330, 335, 344, 355, 357-8, 360
  structure 25, 31, 62, 237-8, 240-7, 250, 254, 256, 258, 263-4, 266, 275-7, 279, 288, 291, 294-5, 298-9, 301, 303-4, 337
    in-situ 30, 239, 303
  timbers 79, 80, 196-8, 200, 249-52, 256, 275-6, 278-9, 295-6, 303-4, 311-12, 314-17, 329-31, 358, 511, 513-15, 549-50
  tool-faceting 90
  trident 222, 238, 240, 247, 253-4, 263-4, 271-9, 287-8, 297-301, 304-6, 311, 314, 317-18, 320, 544-5, 547-8
    1 222, 238, 247, 253-4, 256, 264, 268, 271, 275-8, 287, 294, 298-301, 304-6, 314, 320, 547-8
    2 222, 247, 253, 271-4, 276-8, 287-8, 290, 297, 299-301, 305-6, 314, 320, 545, 548
  trough *see* Trough; Wood, plank, lined trough
  trunks 72-3, 76, 84, 89, 90, 92, 233, 240, 247, 250-1, 253, 256, 258, 263, 265, 276, 311
  twig 28, 78-9, 142, 192, 292-3, 296-8, 370, 405
  unworked 236, 239, 251, 254-6, 271
  worked 31-2, 49, 50, 89-91, 198, 221, 239, 247, 249-51, 253-6, 271, 275, 277, 335-7
Wood-cutting 88, 90
Woodland 32-3, 57-9, 84-5, 87-8, 100-1, 162-3, 172-3, 192-6, 226, 235, 285-7, 304-8, 314-16, 333-4, 486-7, 535, *see also* Grubbing
  canopy 59, 548
  clearance 33, 180, 193, 291, 300, 315, 401, 448, 487, 548, 567, *see also* Clearance; Tree, felling
  coppice/coppicing 72, 75, 82, 84, 87-8, 92, 101, 147, 163, 172, 226, 233, 239-41, 244-5, 248-50, 252-5, 301-8, 311-12, 316, 337, 535, 544, 550
  hazel *see* Tree, hazel, woodlands
  mixed 78, 162
  regeneration 226, 486-7
  species 192, 287, 434
Woodworking 24, 33, 46, 57, 108, 128, 153, 249, 262, 265, 278-9, 282, 305, 314, 337, 548
World Heritage Site 1, 2, 9, 34, 448, 531, *see also* Hadrian's Wall
Wormanby 476

Yeavering 511
York 492, 495
  Treaty of York 495

From an Ancient Eden to a New Frontier:

An Archaeological Journey along the Carlisle Northern Development Route

The Carlisle Northern Development Route (CNDR) is a major road around the western side of Carlisle, which opened to traffic in February 2012. This volume describes the results of an extensive programme of archaeological investigation carried out by Oxford Archaeology between May 2008 and April 2011.

This revealed highly significant remains at Stainton West, on the floodplain north of the River Eden. These related to a Mesolithic seasonal aggregation encampment, dating to *c* 6000-4300 cal BC, on an island between two palaeochannels. It contained domestic features and an *in-situ* flaked-lithic assemblage of over 300,000 pieces, dominated by a narrow-blade technology. Waterlogged deposits included the remains of a beaver lodge and dam in the palaeochannel defining the western side of the island, which also contained a wealth of palaeoenvironmental evidence. Neolithic activity began in *c* 3800-3700 cal BC, comprising tree felling and the construction of a wooden platform in the palaeochannel, associated with the intentional deposition of tree-felling debris, coarse-stone tools, flaked lithics, pottery, and wooden artefacts, including a paddle and two 'tridents'. Palaeoenvironmental remains provided evidence for an elm decline, herding, and small-scale arable farming. Two Later Neolithic burnt mounds were established during the first half of the third millennium cal BC.

Evidence for Chalcolithic and Bronze Age activity included more burnt mounds at Stainton West in use until *c* 1600 cal BC. Evidence for settlement and agriculture was found elsewhere, dating to the twenty-third- to ninth century cal BC, including structures, roundhouses, boundary ditches, and ceramics.

The Hadrian's Wall frontier was also examined by a transect at Knockupworth in Wall Mile 67, including the Turf Wall and Vallum, their subsequent slighting, and the Stone Wall, constructed around AD 158-60, when the Hadrianic frontier was reconstituted. Early medieval activity comprised five apparently near-contemporary rectangular posthole buildings near the Cargo road. These were dated to the early eighth- to mid-tenth centuries cal AD, and was probably a small agricultural settlement. Other remains related to the agricultural landscape from the later medieval and post-medieval periods.

This volume is the result of a multi-disciplinary approach to the archaeological and palaeoenvironmental data, undertaken by numerous authors at Oxford Archaeology as well as external specialists. The results provide a glimpse into the rich history of the Carlisle area, shedding important light on prehistoric hunter-gatherers and farmers, the Roman frontier, and early historic communities in the wider Solway area.

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