REPORT ON THE DISCOVERY OF PREHISTORIC FAUNAL REMAINS (INCLUDING AN AUROCHS SKULL) AT HAUGHTON STROTHER, SIMONBURN, NORTHUMBERLAND

NOVEMBER 2009

PCA

PRE-CONSTRUCT ARCHAEOLOGY

Report on the Discovery of Prehistoric Faunal Remains (including an Aurochs Skull) at Haughton Strother, Simonburn, Northumberland

Central National Grid Reference: NZ 8977 7399

Site Code: HST 09

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1. NON-TECHNICAL SUMMARY

1.1 An assemblage of prehistoric faunal remains was recovered in June 2009 during sand and gravel quarrying at Haughton Strother, Simonburn, Northumberland. The central National Grid Reference for the site is NT 8977 7399. The quarrying, which is being undertaken by Thompsons of Prudhoe, is subject to a planning condition requiring a programme of archaeological monitoring and recording.

1.2 The site is located on a series of former river terraces of the River North Tyne and the two terraces that cover the majority of the site are notable for the presence of palaeochannels which infilled during prehistory. The site was subject to a programme of geoarchaeological, palaeoenvironmental and archaeological assessment and evaluation in 2004-2005, all this work being undertaken ahead of determination of the planning application for the extraction scheme – a phased programme of quarrying that was scheduled to take place over a period of some 15 years.

1.3 An archaeological trial trenching evaluation at the site by Pre-Construct Archaeology in 2005 produced somewhat inconclusive results since ground conditions meant that the excavation of all trenches had to be curtailed due to water ingress before a masking layer of alluvium could be penetrated. Thus the presence or absence of buried soils or archaeological deposits remained to be demonstrated. A planning condition for the scheme - implemented on the advice of the Northumberland County Council Conservation Team - required a programme of archaeological monitoring and recording during extraction to record and sample any archaeological deposits that might be encountered.

1.4 The programme of archaeological work was effectively suspended in 2006 when it became apparent that meaningful archaeological monitoring was largely impossible within the 'wet working' excavation method. An arrangement was put in place whereby Thompsons agreed to inform the County Conservation Team in the event of any deposits or remains of possible archaeological interest being uncovered, thereby allowing Pre-Construct Archaeology to undertaken further site visits.

1.5 In June 2009 the County Conservation Team was informed that faunal remains, including a largely complete skull with horns, had been recovered towards the southern end of the site. The English Heritage North East Regional Science Advisor provisionally identified the skull from a photograph as that of an aurochs, an extinct species of wild cattle. The remains – the skull and two large fragments of antler, all in an excellent state of preservation - were given to Pre-Construct Archaeology in July 2009. A programme of analysis was agreed with the County Conservation Team and English Heritage.

1.6 The aurochs skull has been identified as being from an elderly male aurochs. Sand and gravel adhering to it and the fact that the nose was water worn suggest that the horns had anchored the skull in the gravel bed of a palaeochannel. Both antlers have been identified as being from red deer stags carrying large adult sets of antlers, one was a shed antler while the other was from an animal that had died before shedding. One of the antlers had sand and gravel adhering to it and, again, was water worn.

1.7 Thus it appears that all the faunal remains date from the period when the palaeochannel was still active and flowing, rather than from the peat deposits that infilled the channel when it had ceased to flow. Gnaw marks observed on both antlers indicate that both the shed antler and the dead stag lay for a time on drier land adjacent to the river, where other animals had access to them, before being washed into the river.

1.8 Samples of bone from the aurochs skull and one of the red deer antlers were submitted for AMS radiocarbon dating. The calibrated age range was 5670-5520 cal BC for the aurochs skull and 5620-5480 cal BC for the antler, placing the faunal remains within the mid 6th millennium BC, the Late Mesolithic period. These dates correspond with data from an earlier geoarchaeological evaluation, which indicated that the palaeochannel from which the aurochs skull and red deer antlers were likely recovered was active before the late 6th to early 5th millennium BC.

1.9 The aurochs skull and red deer antlers are of great significance in regional terms since faunal remains from the Late Mesolithic period, particularly from inland areas, are particularly scarce and where bone is found, it is generally very poorly preserved.

2. INTRODUCTION

2.1 General Background

2.1.1 This report describes the circumstances of the recovery in the summer of 2009 and subsequent analysis of an assemblage of prehistoric faunal remains at Haughton Strother, Simonburn, Northumberland. Sand and gravel is being extracted from the site by W. & M. Thompson (Earthworks) Limited (Thompsons of Prudhoe or Thompsons) in a phased programme of work of approximately 15 years duration.

2.1.2 The central National Grid Reference of the quarry site at Haughton Strother is NT 8977 7399 (Figure 1). It covers 19.5 hectares of former haugh land, at a height of *c*. 74m OD, and is defined by a meander of the River North Tyne on its northern, eastern and western sides, with the steeply rising valley side to the south (Figure 2).

2.1.3 Prior to the determination of the planning application for the extraction scheme, a phased programme of archaeological work was undertaken, including an archaeological desk based-assessment, as part of an Environmental Impact Assessment in 2004,[1] a geoarchaeological field evaluation in 2004[2] and an archaeological trial trenching field evaluation in 2005.[3]

2.1.4 The 2004 geoarchaeological evaluation established that the proposed extraction site occupies five river terraces (Terraces 1-5) to the south of the river, with Terrace 5 representing the current river terrace (Figure 2). Palaeochannels running across Terraces 2 and 3, which cover much of the site, filled up in the Mesolithic period, while palaeochannels running across Terrace 4, next to the current river terrace, filled up in the Bronze Age. It was concluded that while there was some possibility of evidence of prehistoric human activity across these terraces, any such remains would certainly be masked by later alluvium.

2.1.5 The archaeological field evaluation undertaken by Pre-Construct Archaeology Limited (PCA) in 2005 investigated 32 trenches across the site. The results were generally inconclusive as ground water ingress prevented any of the trenches being excavated to a depth at which buried soils or archaeological features or deposits might be present. What the work did demonstrate, however, was that, even at the height of summer, ground conditions would make any additional work of a similar nature impossible.

2.1.6 Accordingly, Northumberland County Council Conservation Team (NCCCT) recommended that a planning condition be imposed requiring a programme of successive archaeological monitoring and recording work ('watching briefs') be maintained on the site to record and sample any archaeological deposits that might be encountered during the phased extraction. A Brief[4] for the work was issued which stipulated that 'intensive watching brief' should be undertaken in the area of the palaeochannels, while 'general watching brief' was required on the surfaces of the terraces. In response, a Project Design[5] for the programme of watching briefs was prepared by PCA and approved by NCCCT.

[1] Wardell Armstrong 2004.
[2] Passmore and Yorke 2004.
[3] PCA 2005.
[4] NCCCT 2005.
[5] PCA 2006.

2.1.7 The first phase of archaeological watching brief was effectively suspended in 2006 when it became apparent that meaningful archaeological monitoring was largely impossible within the 'wet working' extraction method. However, an arrangement was agreed whereby Thompsons would inform NCCCT in the event of any deposits or remains of possible archaeological interest being uncovered, thereby allowing Pre-Construct Archaeology to undertaken further site visits.

2.1.8 In June 2009 NCCCT was informed that faunal remains, including a largely horned skull, had been recovered at some depth during 'wet working' in the southern part of the site. These remains were evidently recovered from the southern part of a palaeochannel on the western side of Terrace 2. The English Heritage North East Regional Science Advisor provisionally identified the skull as that of an aurochs, an extinct species of wild cattle. The faunal remains assemblage, comprising the skull and two large fragments of antler, all in an excellent state of preservation, were given to PCA in July 2009. A programme of analysis was agreed with NCCCT and English Heritage.

2.1.9 At the time of writing, the Site Archive is housed at the Northern Office of PCA, at Unit N19a, Tursdale Business Park, Durham. The completed Site Archive, comprising the faunal remains and all written, drawn and photographic records, will be ultimately deposited with the Great North Museum, Newcastle-upon-Tyne, under the site code HST 09. The Online Access to the Index of Archaeological Investigations (OASIS) reference number is: preconst1-67933.

2.2 Site Location and Description

2.2.1 The Haughton Strother quarry site is located near Simonburn, Northumberland at central National Grid Reference NT 8977 7399 (Figure 1). Prior to the extraction scheme it comprised three fields of low-lying pasture land covering 19.5 hectares.

2.2.2 The site is defined by a meander of the River North Tyne on its northern, eastern and western sides, with the steeply rising valley side to the south (Figure 2). Haughton Strother farm overlooks the site from the valley side to the south-west.

2.2.3 Formerly haugh land given over to pasture, at the time of the site visit to recover the faunal remains in July 2009, the site comprised an operational sand and gravel quarry.

2.3 Geology, Geoarchaeology and Topography

2.3.1 The site lies at a height of *c.* 74m OD, bounded by the River North Tyne on its northern, eastern and western sides with the steeply rising valley side to the south.

2.3.2 The geoarchaeological field evaluation undertaken at the site in 2004 established that Holocene alluvial valley floor development occurred at this location in a relatively narrow corridor that is flanked, and underlain, by Late Glacial till and glaciofluvial sands and gravels.

Figure 1. Site location
Scale 1:50,000

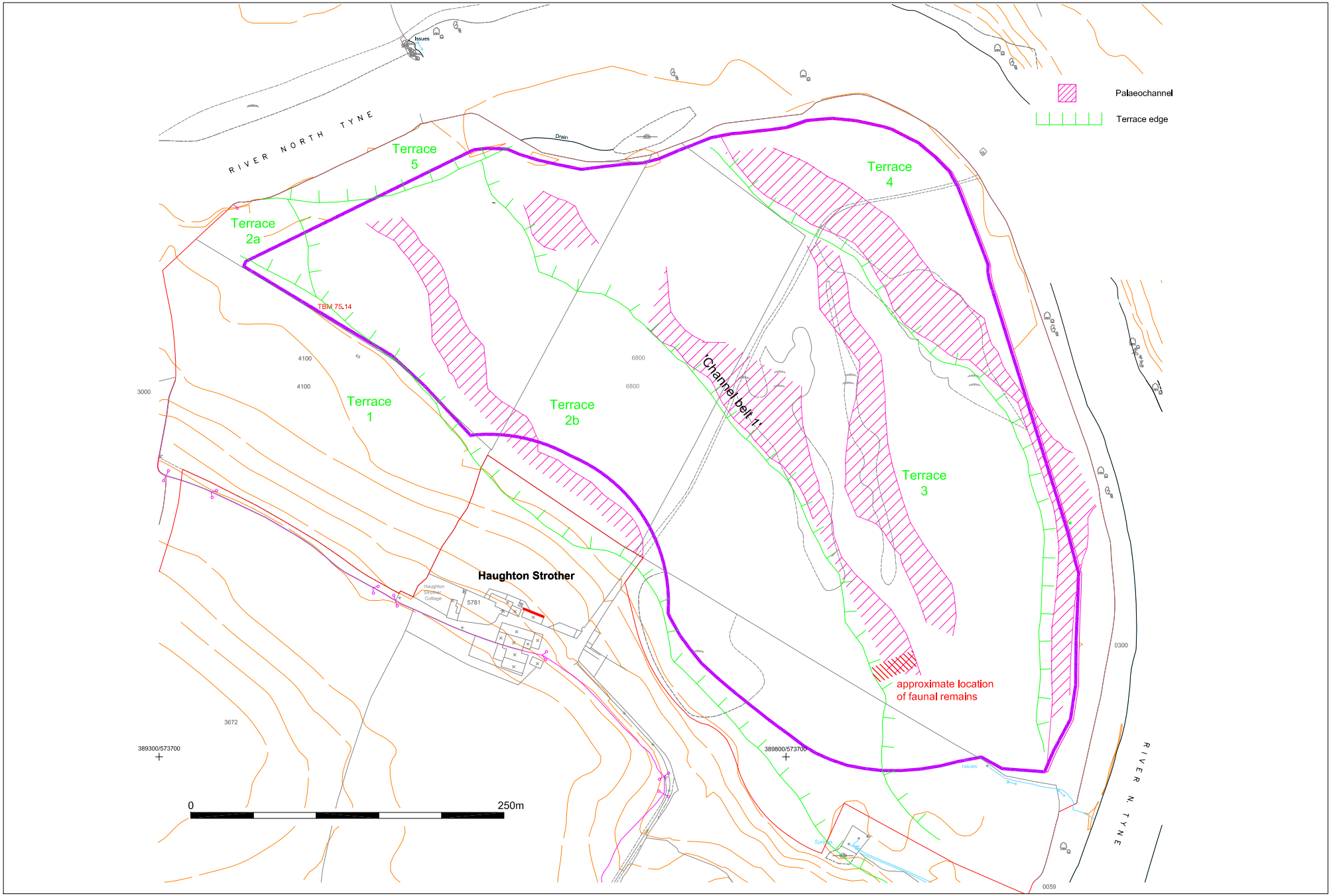

Figure 2. Location of faunal remains
Scale 1:400

2.3.3 At least five fluvial terraces (Terraces 1-5) were identified at the site (Terrace 5 being the current river terrace), with younger alluvial fills being associated with episodic northerly migration of the North Tyne. The fluvial terraces – which are detailed further below - lie *c.* 10m below a high-elevation terrace assumed to be of Late Glacial age, and on which the Haughton Strother Farm is located. Borehole data indicates that terrace surfaces (excepting palaeochannel depressions) are underlain by a variable thickness of largely inorganic floodplain sands, silts and clays. Floodplain alluviation at the site appears to have been relatively rapid, with no evidence to suggest the presence of distinct buried soils or stable landsurfaces.

2.3.4 Terraces T2-T4 were found to exhibit well-preserved palaeochannels with variable thicknesses of organic-rich and peaty sediments. Basal ^{14}C dates from palaeochannels on T2 and T3 indicate that these terraces formed the active channel and floodplain environments of the periods before the late 8th-early 7th millennium BC and the late 6th-early 5th millennium BC, respectively. Peaty and organic-rich sediments in the respective channel fills therefore had the possibility of providing palaeoecological data (via analysis of pollen, plant macrofossils, *etc*) for the period contemporary with later Mesolithic times. Subsequent development of the T4 channel and floodplain environment took place following a period of valley floor incision and reworking of deposits in the north-western part of the site; a basal ^{14}C date dates abandonment of the T4 palaeochannel to the period shortly before cal BC 1390-1130, and brackets the development of T4 to the period spanning the Late Mesolithic to Middle Bronze Age. Here, palaeochannel sediments had the potential to yield palaeoecological data that could provide information of archaeological relevance to the Mid-Late Bronze Age (assuming the infill spans a period of less than 500 years), particularly with regard to local land use activities. It was also thought possible that these deposits may have also preserved features and (or) materials associated with riverbank and wetland activities (*e.g.* fish traps, votive offerings, *etc*.).

2.3.5 Subsequently, a further period of valley floor incision, focused in the area flanking the modern river channel, preceded development of the inset T5 terrace. Although this clearly post-dates the Middle Bronze Age, the investigations did not identify any direct chronological control for Terrace T5. On the basis of comparable alluvial sequences described elsewhere in the North Tyne basin, this unit was provisionally interpreted as a post-medieval alluvial unit.

Details of the five fluvial terraces

2.3.6 Terrace 1 lies *c.* 6.0m to 7.0m above the present level of the North Tyne channel, adjacent to the steep Late Glacial terrace bluff immediately north of Haughton Strother Farm. Borehole data indicates that this terrace has a thin (*c*. 1.0m) inorganic sandy fine member overlying sand and gravel.

2.3.7 Terrace 2a comprises a poorly-defined terrace surface situated towards the north-western limit of the overall quarry site, lying *c.* 0.50m above the more extensive Terrace 2b. No palaeochannels or floodbasin features were identified on the surface of Terrace 2a. Borehole data identified a thin (*c*. 1.40m) inorganic clayey fine member overlying sand and gravel.

2.3.8 Terrace 2b lies adjacent to Terrace 1 and is *c.* 4.0m to 5.0m above the present level of the North Tyne channel. This terrace features a meandering channel adjacent to the Terrace 1 terrace bluff. Borehole data revealed fine-grained channel deposits up to 2.70m thick overlying sandy gravel channel bed sediments. Organic-rich sediments with plant macrofossils were identified in both cores. Boreholes elsewhere on this terrace identified sandy gravels, representing former channel bed and bar sediments, overlain by between 1.0m to 3.0m of fine-grained and largely inorganic floodplain sediments.

2.3.9 Terrace 3 lies adjacent to the terrace bluff of Terrace 2b. It lies at *c.* 4.0m above the present level of the North Tyne channel and has at least two well-preserved palaeochannel belts. 'Channel belt 1' forms a meandering, locally anabranched (multiple channel) channel that is well-defined at the terrace bluff with Terrace 2b (see Figure 2). Sediment cores revealed channel fill deposits up to 3.50m thick overlying sandy gravel channel bed sediments. Organic-rich sediments were evident in most cores. 'Channel belt 2' forms a gently meandering channel located to the north-east of, and parallel to Channel belt 1. One borehole core in the geoarchaeological investigation was terminated at 1.0m due to core collapse/ recovery problems; overlying sediments were inorganic clays and clayey silts. A second core revealed 1.40m of fine-grained sediments overlying channel-bed gravels, with sediments between 0.50m to 1.30m being peaty and organic-rich clayey silts with good ^{14}C and palaeoecological potential. Several other boreholes provided additional data on the terrace stratigraphy; these indicated underlying sandy gravels (representing former channel bed and bar sediments) to be overlain by between 0.80m to 3.80m of fine-grained and largely inorganic floodplain sediments.

2.3.10 Terrace 4 lies inset below Terrace 3 and is *c.* 3.0m to 3.50m above the present level of the North Tyne channel and features a meandering and possibly locally divided palaeochannel. Sediment cores revealed fine-grained channel fill sediments up to 2.47m thick overlying channel bed gravels. Organic-rich peaty and clayey silts and fine sands with good ^{14}C and palaeoecological potential were evident in a few cores. Boreholes elsewhere also provided additional data on this terrace stratigraphy; these indicated underlying sandy gravels (representing former channel bed and bar sediments) to be overlain by between 2.50m to 4.10m of fine-grained, inorganic floodplain sediments.

2.3.11 Terrace 5 forms a narrow alluvial bench that is inset below Terrace 4 and is *c.* 2.0m to 2.50m above the present level of the North Tyne channel. It lies largely outside of the proposed extraction area, and has been locally disturbed by drainage works and a plantation.

2.4 Planning Background

2.4.1 At the time the planning condition relating to archaeology was attached to planning permission for quarrying at Haughton Strother, the site lay with Tynedale District. On 1 April 2009, a new unitary authority, Northumberland County Council, became the planning authority for the whole of Northumberland replacing the previous system of distinct local authorities. NCCCT retains responsibility for archaeological development control throughout the county.

2.4.2 The planning system is being widely overhauled as a result of the *Planning and Compulsory Purchase Act 2004*. At the time the planning condition relating to archaeology was attached to planning permission for the extraction scheme at Haughton Strother, national planning policy guidance relating to archaeology was set out in *Planning Policy Guidance Note 16: 'Archaeology and Planning'* (PPG 16).[6] PPG16 is currently under review as part of a consultation paper (July-October 2009) on a new planning policy statement on the historic environment.

2.4.3 At the time the planning condition relating to archaeology was attached to planning permission for the extraction scheme at Haughton Strother, relevant local planning policy was set out in the *Tynedale District Local Plan*, adopted in April 2000. Section 5 of the Local Plan set out policies relating to archaeology and other cultural heritage assets. Northumberland County Council is in the process of establishing – within the context of *The North East of England Plan, Regional Spatial Strategy to 2021* (RSS)[7] - a Local Development Framework, through which Development Plan Documents will gradually replace existing Local Plans from the previous system of distinct local authorities.

2.4.4 Following the submission of a planning application[8] for the extraction at Haughton Strother, NCCCT recommended that a phased scheme of archaeological and geoarchaeological work should be undertaken.

2.4.5 The primary phase of work consisted of the aforementioned archaeological desk-based assessment in 2004. The assessment, including a site visit undertaken in 2003, was required in order to compile the cultural heritage chapter of an Environmental Impact Assessment. This work identified that the proposed quarry would affect aspects of archaeology and cultural heritage through 'physical impact on potential buried remains'. While no features of archaeological interest were identified during the course of the assessment or through the site inspection, it was concluded that there remained the potential for archaeological remains to be present within the proposed site.

2.4.6 The aforementioned geoarchaeological field evaluation undertaken in 2004 established the geoarchaeological potential of the site and its alluvial history. The results of this work are detailed in Section 2.3

2.4.7 NCCCT then required the aforementioned archaeological trial trenching field evaluation prior to determination of the planning application. However, as previously described, the results of this were inconclusive, necessitating NCCCT to recommend a planning condition relating to archaeology be attached to planning permission. The condition stipulated that a programme of archaeological watching briefs be undertaken at the site during the phased extraction scheme to record and sample any archaeological deposits that might be encountered. A Brief for this work was issued by NCCCT and a Project Design was prepared by PCA, this to form the approved 'written scheme of investigation' as required by the planning condition.

[6] Department of the Environment 1990.
[7] Government Office for the North East 2008.
[8] Ref: 04/00062/CCMEIA.

2.5 Archaeological and Historical Background

2.5.1 There is no evidence for any prehistoric activity within, or in the immediate vicinity of, the Haughton Strother extraction site. There are two prehistoric sites recorded within a 1km radius of the site. The site of a former stone circle was present in 1774 although not recorded by 1824. An early Bronze Age cist burial was excavated in 1975 at Hollybush Field, Gunnerton and contained a crouch burial of a male dating to *c.* 1500 BC.

2.5.2 Despite the close proximity of Hadrian's Wall, which is located *c.* 3km to the south of the site, there is no recorded Roman activity in the area.

2.5.3 The earliest mention of Haughton Strother dates from 1177 when it was recorded as being within the personal estate of Waltheof, the Earl of Northumberland. By 1273, Haughton Strother had become part of the personal estate of Alexander III of Scotland who granted Haughton Strother to William Swinburn. The land stayed in the possession of the Swinburn family until the post-medieval period when it came into the possession of the Widdrington family. In 1642 the land was passed to the Smith family.

2.5.4 The settlement of Haughton is recorded on Speed's 1620 Map of Northumberland, however, Haughton Strother is not recorded. The earliest depiction of Haughton Strother occurs on the Armstrong map of 1769, which records the settlement as 'Struthers' with a similar settlement recorded on the northern side of the river. Two structures are recorded on the southern side of the river, which equate to the present Haughton Strother farm buildings; however, as the map is stylised this may not be an accurate representation of the buildings at this time.

2.5.5 Haughton Strother is recorded as 'Strother' on Fryer's map of 1820. A possible structure is recorded at the site, but there is insufficient detail to identify individual buildings. The mill at Nunwick was recorded for the first time on this map. Greenwood's map of 1828 records the place name of Haughton Strother for the first time and shows three individual buildings in a courtyard formation with a north-south aligned track connecting these buildings to Nunwick Mill.

2.5.6 The 1st edition Ordnance Survey map of 1866 depicts the site comprising five fields with a woodland belt on the river edge. A track was recorded aligned north-south extending from the Haughton Strother farmstead to a crossing point at the river, which is in the same position as the current farm track. No change is recorded on the subsequent Ordnance Survey maps.

2.6 Aims and Objectives

2.6.1 As originally envisaged, the programme of watching briefs at the quarry site was required in association with the removal of deposits in the vicinity of the palaeochannels and bulk stripping of alluvium on terrace surfaces. The broad aim of the work was to ensure that important archaeological remains were not destroyed without first being adequately recorded. Within the NCCCT Brief, more specific objectives were set out for 'intensive watching brief' to be undertaken in the area of the palaeochannels, and 'general watching brief' required on the surfaces of the terraces. In response, PCA prepared the aforementioned Project Design for the programme of watching briefs, which was approved by NCCCT.

2.6.2 Although the first phase of archaeological watching brief was effectively suspended in 2006, after it became apparent that meaningful archaeological monitoring was largely impossible due to the 'wet working' extraction method, an arrangement was put in place whereby Thompsons agreed to inform NCCCT in the event of any deposits or remains of possible archaeological interest being uncovered, thereby allowing PCA to undertaken further site visits. Therefore, the broad aims of the programme of archaeological watching briefs remained valid.

3. ARCHAEOLOGICAL METHODOLOGY

3.1 Fieldwork

3.1.1 All fieldwork undertaken by PCA follows the guidelines set out in the relevant Institute for Archaeologists' document, in this case *Standard and guidance for archaeological watching brief.*[9] PCA is an IfA-Registered Organisation (RO 23). The aforementioned NCCCT Brief and Project Design prepared by PCA for the phased programme of watching briefs at Haughton Strother were also followed.

3.1.2 The programme of sand and gravel quarrying by Thompsons at Haughton Strother is scheduled to take up to 15 years. Within this scheme, the site is divided into four 'phases' with each phase area divided into up to four areas for each year of working. In 2006, the first year of working, it became apparent that the overall aims of the watching brief were largely unachievable as the extraction was 'wet working', that is undertaken at depth, below water, using a long reach machine. For the 'intensive watching brief' it was therefore not possible to record profiles of any palaeochannels nor to recover column samples from these features. It was also not possible to record and sample any archaeological features that may have been present on the banks of the channels or within their fills. The aims of the 'general watching brief' on the terrace surfaces were similarly unachievable as these interfaces lay below the water table.

3.1.3 An arrangement was put in place whereby Thompsons agreed to inform the NCCCT in the event of any deposits or remains of possible archaeological interest being uncovered, thereby allowing PCA to undertaken further site visits.

3.1.4 Accordingly, the discovery in June 2009 of a large horned skull by the machine operator was immediately reported to NCCCT. The skull was provisionally identified, from a photograph, by Jacqui Huntley, the English Heritage North East Regional Science Advisor, as being that of an aurochs. The skull was delivered to the Northern Office of PCA shortly after its discovery. An on-site meeting took place on 10 July 2009 attended by representatives of Thompsons, NCCCT and PCA, as well as Jacqui Huntley from English Heritage. Further faunal remains, comprising two deer antlers, recovered by the machine operator, were collected by PCA during the site visit. At the meeting, following observation of the 'wet working' methodology, it was agreed by all parties that archaeological monitoring would be unproductive and that extraction should continue with the machine operator remaining vigilant for any further archaeological or biological material recovered at depth.

3.2 Post-excavation

3.2.1 An initial assessment of the condition of the faunal remains was made by Karen Barker, an independent archaeological conservator. As the material was in good condition, it was recommended that the faunal remains be slowly air dried in unheated premises and inspected daily for signs of decay. Jacqui Huntley was consulted regarding this methodology, which proved effective as the skull and antlers slowly dried without evident damage or decay.

[9] IFA 2001.

3.2.2 The aurochs skull was examined by Louisa Gidney of the University of Durham at the Northern Office of PCA and the red deer antlers were examined in a University laboratory. A faunal remains assessment report was prepared and this has been included in full as Section 4 of this report. A sample of bone was removed from the aurochs skull by PCA and given to the University to be submitted for radiocarbon dating. The stump of the trez tine of one of the red deer antlers was removed by the University for radiocarbon dating. Both of these samples were submitted to the Scottish Universities Environmental Research Centre, East Kilbride, Scotland for AMS dating. The results of this analysis form Appendix A to this report.

3.2.3 The complete Site Archive will be packaged for long-term curation. The Site Archive comprises paper and photographic records (including material generated electronically during post-excavation) and the faunal remains. In preparing the complete Site Archive for deposition, all relevant standards and guidelines documents referenced in the Archaeological Archives Forum guidelines document[10] will be adhered to, in particular a well-established United Kingdom Institute for Conservation (UKIC) document[11] and a forthcoming IfA publication.[12]

[10] Brown 2007.
[11] Walker 1990.
[12] IfA forthcoming.

4. THE FAUNAL REMAINS

By: ***Louisa Gidney (ASDU)***

4.1 The Aurochs Skull

4.1.1 Although peat deposits are present on the site, infilling palaeochannels, the sediment adhering to the aurochs skull is sand and gravel. Preservation of the posterior of the skull, with the horn cores, is excellent. The nasals and premaxillae appear to have been lost in antiquity. The anterior of the maxillae are rounded and water worn, suggesting that the weight and anchoring effect of the horn cores had settled the skull in the sediment with the nose sticking up. This suggests that the skull was already disarticulated and had been moved by water when it came to rest in this position. An articulated body is unlikely to have the head in such a position.

4.1.2 The excellent preservation of the horncores, with damage to only one tip, possibly caused during recovery, suggests that the horn sheaths were *in situ* when the skull was deposited, rotting away once the skull was embedded in the gravel. The time taken to wear away and smooth the edges of the maxillae may not have been long, depending on the volume of water. Possibly winter spate water and flooding could have moved, abraded and buried the skull in only one season.

4.1.3 The presumed burial position of the skull and the lack of any further finds of elements of aurochs suggest that the animal died in a riverine location upstream and the skull was washed down river. The weight of the surviving part of the skull suggests this may not have moved far but other, lighter, parts of the body may have been washed further downstream.

4.1.4 Only stumps of two teeth, the left molars 2 and 3, remain *in situ*. No estimate of wear stage is possible. The sockets show that the full adult dentition had been present at death, but the water abrasion to the maxillae indicates that the remaining teeth had been washed away. Figure 3 shows the possible position of the aurochs skull in the river gravels. The water worn parts are above the line and the pristine parts below the line. This demonstrates how the horn cores could have acted to anchor the skull in the gravel, irrespective of the strength of the current.

Figure 3. Possible position of the aurochs skull in the river gravels

4.1.5 The skull is extremely robust and exhibits a range of masculine and advanced age characteristics. A selection of measurements was taken for comparison with the data for Danish aurochsen[13] with some further measurements defined by von den Driesch.[14]

Measurements (* = within range of Danish aurochs bulls)

Horncores
Approximate basal diameters only, arms of callipers too short
Ora-aboral diameter 89.6mm
Dorso-basal diameter 125.4 mm
Circumference of base of horn core: left 37.8cm, right 37cm *
NB "in the large horn cores of bulls, in which the base is highly granulated, this measurement is more or less inaccurate" (Degerbol and Fredskild 1970, 77)
Length of outer curvature: left, 76cm; right 73cm (tip chipped) *
Breadth between tips of horncores 75cm
Least breadth between bases of horncores 21cm

Frontal
Minimum breadth frontal 24cm *
Greatest breadth across orbits 31cm *

Occipital
Width across occipital condyles 125.7mm *
Greatest breadth foramen magnum 42.6mm

4.1.6 This specimen falls within the middle to upper size range for Danish aurochs bulls, suggesting an earlier rather than later prehistoric date. This is substantiated by the Mesolithic radiocarbon date for this specimen of the mid 6th millennium BC.

4.1.7 Several morphological features indicate that this was an elderly animal at death. The frontal suture has completely fused and there is extensive bridging of the frontal sinus. The horncores are smooth with deep grooves. Massive perlen, age-related granulation, around the bases of the horn cores has spread from both sides to the intercornual eminence. The frontals, orbits and mastoid processes all have the rough surface identified by Grigson[15] as an attribute of advanced age in the aurochs.

4.1.8 This new find of an aurochs skull is a useful addition to the debate on the preferred habitat of the species, as deduced from the find spots of aurochs bones. Hall noted that translocation and preservational bias might skew such distribution patterns but still considered that the evidence supports the hypothesis that the aurochs favoured low-lying, relatively fertile flat ground. [16] This plausible scenario is, however, open to other interpretations. Finds of aurochs are dominated by skulls of mature bulls, often only the horn cores with part of the frontals survive,[17] suggesting the resting position proposed above for the Haughton Strother skull may have been a default for water deposited skulls.

[13] Degerbol and Fredskild 1970.
[14] von den Driesch 1976.
[15] Grigson 1978, 143-4.
[16] Hall 2008, 187.
[17] Degerbol and Fredskild 1970, Plates I-VII.

4.1.9 Senior ungulate males deposed from the rut usually adopt a solitary lifestyle apart from the herd. In the Oostvaardersplassen nature reserve, such individuals of the resident Heck cattle population frequently die amidst areas of impenetrable reed.[18] If a corpse in this situation were bloated, it could be washed a long way downstream by floodwater, even as far as the estuarine areas noted by Noddle as favoured findspots.[19] Bodies that had decomposed to bare bones would soon be spread by floodwater, the distribution depending on the weight of the individual bones. Heavy rainfall in July 2009 has demonstrated recently the rapid and destructive rise in local river levels, more than capable of spreading decomposed bodies or moving bloated carcases bodily. Riverine finds of isolated aurochs bull remains may therefore merely indicate the environment downstream of the secluded wetland area chosen by old bulls to die in. This may not necessarily have been the preferred habitat of the cows with calves or the breeding and younger bulls. The location of Haughton Strother in the valley of the North Tyne, with the valley sides rapidly rising to over 220m OD to the north, suggests that the upland grazing could have been utilised by the local live aurochs population.

4.2 The Red Deer Antlers

4.2.1 Two incomplete antlers of red deer were recovered. One is a left side shed antler which has broken during recovery, with the loss of the terminal tines and crown. The brow and trez tines are present, the bez tine appears to have broken off in antiquity. The shaft of the antler has cracked and broken posterior to the bez tine at a point of weakness caused by an area of gnaw marks on the medial aspect (Figure 4). The gnawing does not appear to have penetrated to the cancellous interior of the antler beam but this is now exposed by the modern damage. Modern red deer shed their antlers in February-March.[20]

Figure 4. Gnaw marks at the point of breakage of the left antler

[18] Wijngaarden-Bakker 1997, 195.
[19] Noddle 1989.
[20] Schmid 1972, 90.

4.2.2 The other antler is a right side, still attached to the pedicle and frontal, indicating that it derives from an animal that had died. Analogy with modern deer indicates that this animal died between September and February when the stag carries a full head of antlers. The frontal has broken off from the skull along the suture lines and posterior to the orbit. The brow and bez tines are present. The trez tine and remainder of the beam have broken off in antiquity. The broken edges of the beam and the frontal are clearly water worn. The stump of the trez tine has been removed for radiocarbon dating. There is sandy silt, rather than peat, adhering to the cancellous tissue within the beam. The lateral aspect of the beam, posterior to the bez tine, has an area of gnaw marks (Figure 5). Staines notes that cast antlers today are frequently chewed by deer and other mammals in Scotland, though the habit is not so common elsewhere, probably for the phosphorous and calcium content.[21]

Figure 5. Gnaw marks on the right antler

4.2.3 While both stags were carrying large adult sets of antlers, more spectacular prehistoric trophy heads are known. One example is the specimen now in the Department of Archaeology at Durham University, found at Street House Farm, Hackforth, North Yorkshire in 1971, containing peat ascribed to pollen zone VIIIb. This is considerably younger than the mid 6th millennium BC example from Haughton Strother and suggests a difference in the calendar age of the individual stags rather than any epoch-related change in size.

[21] Staines 1991, 495.

4.2.4 The gnaw marks on both antlers indicate that both the shed antler and dead stag originally dropped on drier land adjacent to the river, where other animals had access to them, before being washed into the river, presumably by flood water, and deposited in the gravels. There is no evidence to suggest that either the auroch or the red deer were associated with the peat deposits identified on this site. Rather, both species appear to have lived upstream, with the remains subsequently being washed down stream. The brow and trez tines of the shed antler and the brow and bez tines on the other antler would appear to have acted in a similar way to the aurochs horns, to anchor the specimens into the gravel bed, hence the greater evidence for water abrasion on the frontal and beam of the second antler.

4.3 Radiocarbon Dates

4.3.1 Sub-samples of one of the red deer antlers and the aurochs skull were sent for AMS radiocarbon dating.

4.3.2 The 2 sigma calibrated age range was 5620-5480 cal BC for the red deer antler and 5670-5520 cal BC for the aurochs skull. Full details form Appendix A to this report.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 The aurochs skull and one of the red deer antlers recovered from the quarry site at Haughton Strother have been radiocarbon dated to the mid 6th millennium BC and are therefore of Late Mesolithic date. With this in mind, a brief summary of the geomorphological, palaeoenvironmental and archaeological background to this period will be useful. Following the end of the last glaciation, the landscape of the region was free of ice by around 15,000 BP. In many areas substantial deposits of till were dumped in the lower valley regions and sand and gravel outwash terraces were formed.[22] In higher areas, the high-energy flows from the meltwaters cut deep into valley floors leaving relict river terraces and these rivers have often shifted course across the valley floors and terrace surfaces, leaving palaeochannels, such as those seen at Haughton Strother. The upper part of the North Tyne between Kielder Water and Bellingham flows through comparatively broad valleys with gently meandering channels.[23] From Bellingham to its confluence with the South Tyne at Warden, the North Tyne valley becomes narrower and steeper with few well-developed alluvial basins. An alluvial basin *c.* 0.75km wide has been investigated on a meander of the North Tyne 6km west of Bellingham where six river terrace levels have been identified to date, similar to the sequence recorded at Haughton Strother.[24]

5.1.2 Pollen evidence from the region indicates that with the improvement of the climate after the end of the last Devensian glaciation, tundra scrub developed across the region with the landscape gradually becoming wooded.[25] Pollen samples from Stainmore, Cumbria show that mixed woodlands including birch, oak elm and lime were established by the 6th millennium BC[26] and a similar environment is likely to have existed across much of Northumberland. Although there is little palynological evidence for human impact on the vegetation cover in the region in the early prehistoric period, there is some indication of woodland clearance, although on a very small scale. At Bloody Moss, Otterburn, not far from Haughton Strother, there is some evidence for anthropogenic forest clearance in the Mesolithic period.

5.1.3 Scatters of Mesolithic worked flint are found across the region and activity of the period seems to have been widespread across the Tyne Valley, though the intensity of activity varies between locations. Lithic scatters have been found on both sides of the River Tyne and further back on the valley sides. Little Mesolithic lithic material has been found in the vicinity of the North and South Tyne, but this is thought to be due more to a lack of research that reflecting true patterns of exploitation of the landscape.[27] An exception is the small collection of Late Mesolithic material recovered during excavation of a later prehistoric and Roman site from a site along the upper North Tyne at Kennel Hall Knowe, Kielder.

[22] Petts and Gerrard 2006, 14
[23] Passmore and Macklin 1997.
[24] *ibid*.
[25] Weyman 1984.
[26] Petts and Gerrard 2006, 14
[27] Weyman 1984.

5.1.4 Mesolithic sites are known in the area of the confluence of the two rivers at Shorden Brae and Red House, Corbridge and Low Shilford, Riding Mill. Several working sites are known away from the immediate vicinity of the river in the Corbridge-Stocksfield area. Analysis of the lithic scatters has shown that the assemblages can be divided into those created during extractive activities, such as hunting and raw material acquisition, and maintenance or processing activities.[28] Bluffs overlooking the main valleys seem to have been particularly favoured locations for the latter activities and although evidence for hunting seems to have been ubiquitous, the deeply incised side valleys appear to have been the most favourable locations for providing access to raw materials**.**

5.1.5 Although the distribution of finds of aurochs remains has led to the suggestion that the preferred habitat of this species was low-lying, relatively fertile, flat ground, it is possible that this might not actually reflect true herding patterns. Analysis of the aurochs skull has demonstrated that it was from an elderly male and skulls of mature bulls certainly dominate the faunal remains of this species. Observation of modern ungulates has shown that mature deposed males usually adopt a solitary lifestyle apart from herd and such individuals often die in areas of impenetrable reeds. It is thus feasible that the riverine location in which the aurochs was found may reflect the area downstream of the secluded wetland area chosen by the bull to die in, with the preferred habitat of the herd being areas of upland grazing. It is generally thought that the aurochs was extinct in Britain by the Bronze Age, possibly due to overhunting.[29]

5.1.6 In sum, therefore, it is considered likely that the landscape in which the Haughton Strother aurochs and red deer were living would have been one in which a small Late Mesolithic population could exploit the varied habitats that such a landscape would have offered at this time.

5.2 Recommendations

5.2.1 The faunal remains from Haughton Strother are of great significance at a regional level and therefore it is recommended that a publication report detailing the assemblage be prepared for inclusion in a local archaeological journal such as *Archaeologia Aeliana* or in a natural history journal such as the *Transactions of the Natural History Society of Northumbria.*

5.2.2 Justification for this recommendation can be found in the *North-East Regional Research Framework for the Historic Environment.*[30] The following research priority is listed in the Palaeolithic and Mesolithic Research Agenda and Strategy section of that volume*:*

> **Mx. Faunal evidence**
>
> *Given the lack of faunal evidence from the region, it is important to exploit what little material does survive.*
>
> *Despite occasional spot finds of animal bones, preservation of faunal material is very poor in the North East, though it is clear from discoveries at sites such as Howick that, in certain contexts, bone survival might be quite good. Any faunal material recovered must be dated using high-precision radiocarbon techniques.*

[28] Petts and Gerrard 2006, 19.
[29] Davis 1987.
[30] Petts and Gerrard 2006.

It is important that all spot finds of animal bones are adequately recorded on local HERs. Where such finds are recovered in non-PPG16 situations, funds should be available to carry out analysis and radiocarbon dating.

Any major assemblages of Mesolithic faunal material must be fully analysed and published.

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7. ACKNOWLEDGEMENTS AND CREDITS

Acknowledgements

Pre-Construct Archaeology Limited would like to thank Thompsons of Prudhoe for commissioning and funding the work herein described. The liaison role of Ryan Molloy is acknowledged.

The curatorial roles of Nick Best and Karen Derham of the Northumberland County Council Conservation Team are acknowledged. The input of Jacqui Huntley, English Heritage North East Regional Science Advisor, is also acknowledged.

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Report: Jenny Proctor and Robin Taylor-Wilson

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CAD: Adrian Bailey

Other Credits

Faunal Remains Assessment: Louisa Gidney, ASDU

Radiocarbon Dating: Scottish Universities Environmental Research Centre

APPENDIX A
RADIOCARBON DATING

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RADIOCARBON DATING CERTIFICATE

14 October 2009

Laboratory Code	SUERC-25722 (GU-19566)
Submitter	Helen Ranner Archaeological Services Durham University On behalf of Pre-Construct Archaeology Limited.
Site Reference	Haughton Strother, Hexham
Sample Reference	HST09 (RDA)
Material	Antler : Red deer - cervus elaphus
$\delta^{13}C$ relative to VPDB	-21.6 ‰
Radiocarbon Age BP	6595 ± 40

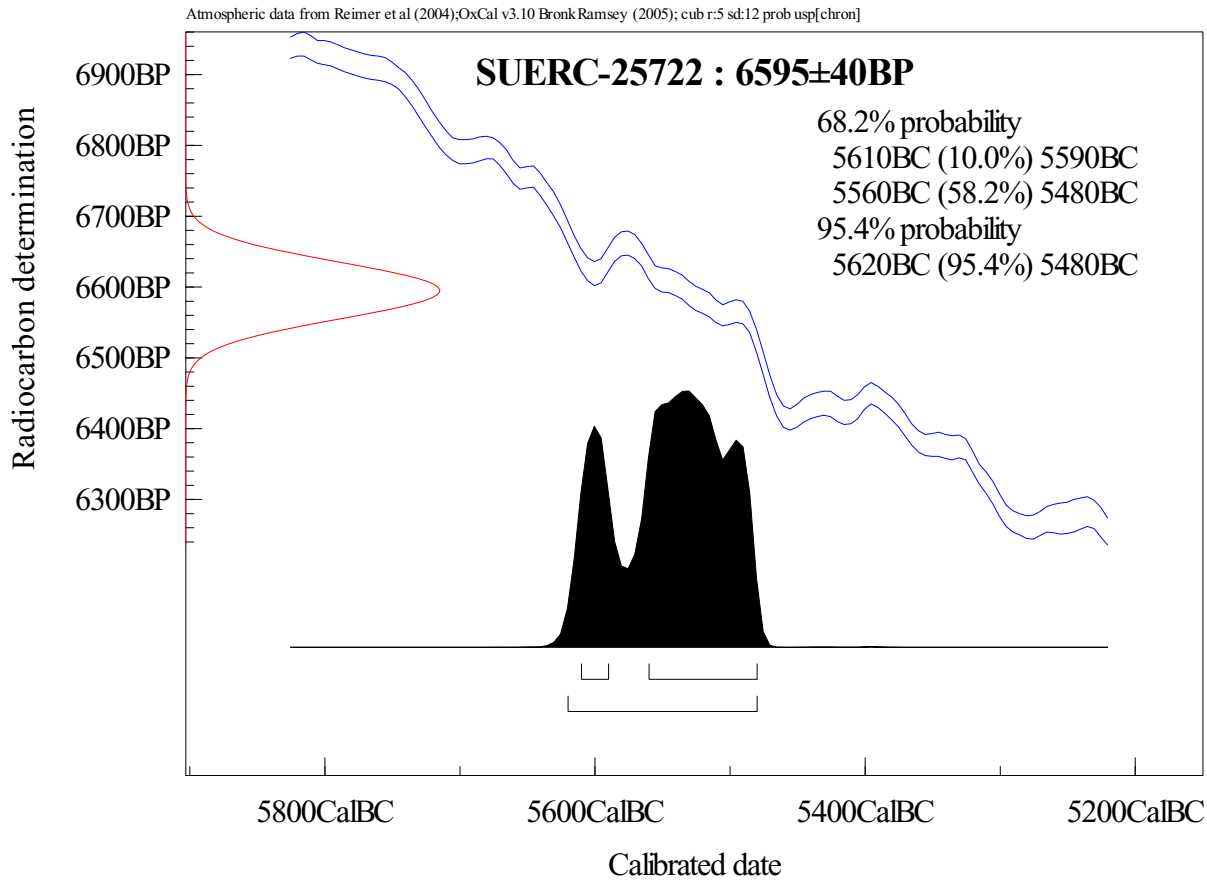
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot



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14 October 2009

Laboratory Code	SUERC-25723 (GU-19567)
Submitter	Helen Ranner Archaeological Services Durham University On behalf of Pre-Construct Archaeology Limited.
Site Reference	Haughton Strother, Hexham
Sample Reference	HST09 (AS)
Material	Skull : Auroch - bos primigenius
$\delta^{13}C$ relative to VPDB	-22.0 ‰
Radiocarbon Age BP	6685 ± 40

N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

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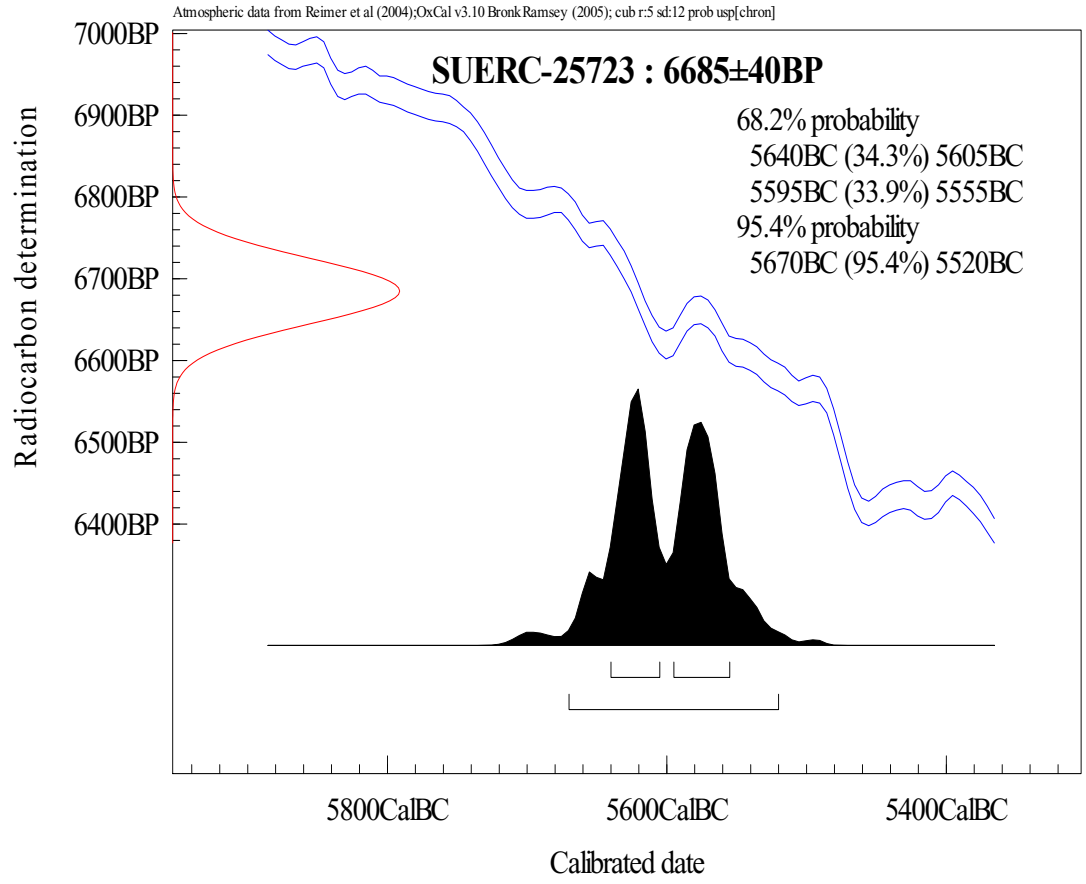
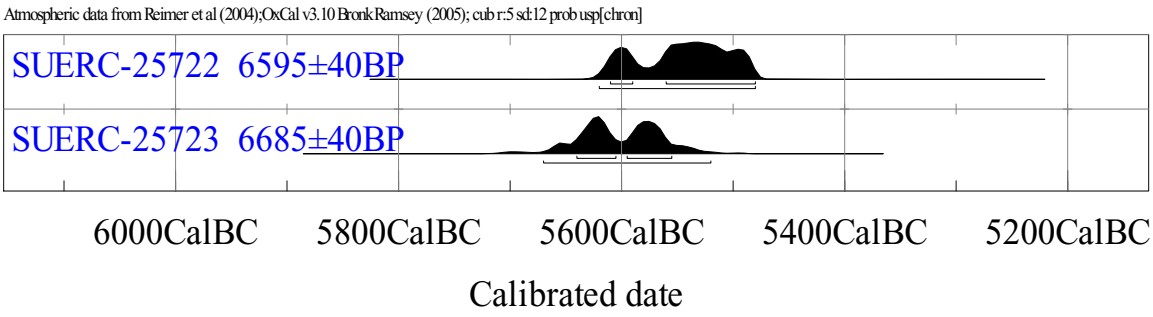
Conventional age and calibration age ranges calculated by :- Date :-

Checked and signed off by :- Date :-

Calibration Plot





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