Heritage at Risk S17 Project at Cow Cave, Chudleigh Rocks, Teignbridge, Devon (Scheduled Monument 1010726)

Interim Report, March 2016

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Introduction

The background to the project is given in the Project Proposal (attached). Briefly, two risks to the cave and its sediments have been identified.

(1) Open access to the cave by the public. Damage has included digging of sediment faces and setting of fires in the cave. Of particular concern has been fire setting against sediment faces which has resulted in baking and significant damage to the sediment. This damage is ongoing: fires have been set in the cave since the end of the field excavation on 19/2/2016. In addition fake “cave art” were painted on the wall and an adjacent sediment remnant in 2005.

(2) Natural erosion of the sediment faces, particularly prevalent on Section C at the rear of the cave, which preserves the most complete sediment sequence present anywhere in the cave.

The management recommendations laid out in the proposal were to conduct a limited rescue excavation of Section C at the rear of the cave (Figure 1, 2), in order to record and stabilise parts of the section at risk of collapse. To prevent future damage, installation of a grille was proposed approximately 10m from the cave entrance, to prevent unauthorised access to the vulnerable inner area of the cave. In preparation for grille installation a small trench was to be dug across the floor at this point and the exposed sediments recorded (Figure 1).

The field recording and excavation part of the project was carried out between 5/2/2016 to 19/2/2016. This followed the proposal but had to be modified in places. While the project broadly confirmed the stratigraphy proposed by Simons (2010) it was found to be significantly more complex than that recorded by him and Lundberg & McFarlane, (2008). Extensive, previously unrecorded sediment remnants were found against the north and south walls and the roof of the inner chamber of the cave. These remnants are thin and potentially vulnerable to erosion so obtaining a record of them was considered important. They include the previously unrecorded uppermost part of the Reindeer Stratum which is present as a high level remnant on the south wall of the inner chamber, and potentially at risk of erosion or collapse. It was considered important that this be sampled in detail, in order to obtain a record of the sediment in case of possible loss of the remnant in future. In addition Section C needed to be recorded in greater detail than originally anticipated. The sediments were found to be significantly affected by later piping; and the Broken Stalagmite Floor was found to be a breccia with complex internal stratigraphy. The greater complexity recognised suggests this unit may be more significant than formerly proposed. During recording and excavation it became apparent that many parts of Section C are still actively eroding, increasing the importance of obtaining a detailed record of the face in its current state.

Rescue Excavation Methodology

Recording and excavation methodology were laid out in advance of the excavation in the Project Brief and Method Statement (attached). For recording and excavation of Section C this methodology was adhered to with the following modifications. Originally a planar cut section, Section C now has a complex 3 dimensional shape due to excavation by Simons in1962-3, and collapse over the years since then. This necessitated a modification of normal section drawing methods, with a laser line level used to facilitate plotting the section at a scale of 1:10 onto a plane parallel with the original plane of the 1962 section (still visible in sediment baulks at either end). The shape of the section necessitated the preparation of two section drawings, one in the original plane of the Simons cut section, and a second of the irregular modern face some 1-2 metres behind (Figures 3, 4). A series of points were EDM surveyed across the section to provide 3-dimensional control, with survey point locations being recorded on the drawn sections. While it had been originally envisaged that drawings of the other sections would also be prepared at lesser scale, the large number of previously unidentified sediment remnants located made this impossible in the time available. Instead all sediment faces in the cave (including Sections A, B and C, and other sediment remnants on the cave walls) were photographed, and their 3-dimensional locations determined by surveying a series of EDM surveyed points on each section/remnant, with the survey point locations being recorded on the photographs.

Sample columns were excavated in the Reindeer Stratum on the south side of Section C to cut back and record the overhanging sediments in that part of the section as per the Project Brief and Method statement. Additional sampling of Section C and adjacent sediments was carried out, as agreed with Vanessa Straker (HE scientific advisor). A further column was excavated from the high level remnant of the top of the Reindeer Stratum on the south wall of the inner chamber. The stratigraphic complexity identified in Broken Stalagmite Floor posed problems that necessitated sampling of this part of the sequence for U-series dating and pollen analysis. The Stream Deposit section in the Alcove was recorded and exposed bone recovered, as per the Project Brief and Method statement. Excavation of the trench in preparation for placing of the grille revealed a further exposure of the Stream Deposit (Figure 5), but produced almost no palaeontological material (a single small bone fragment). Bulk samples were taken of the two main sedimentary units identified in the trench. Additional bulk and pollen spot samples were taken elsewhere in areas identified by specialists (Chris Hunt, Chris Gleed-Owen) as being of particular interest (Tables 1, 3).

The sampling undertaken was significantly more than originally envisaged. inclusion of an additional sample column in particular placed a considerable extra workload on the excavators and all workers were needed in the cave in order to complete sampling within the time allotted, significantly putting back post excavation analysis.

Results

A plan of the cave showing locations of sections and sampling areas is given in Fig. 1. Section C is shown in detail in Figures 2-4, with sampling locations marked.

Sample columns were excavated in the Reindeer Stratum at two locations determined by the areas considered to be at greatest risk of sediment collapse. These achieved the aim of removing the actively collapsing overhanging deposits. All sample columns were excavated in 5cm spits. These were (see Table 1 for list of individual samples):

Column A: the uppermost part of the Reindeer Stratum in the high level sediment remnant on the south wall of the inner chamber. 13 spits.

Column B: the overhanging, uppermost remaining part of the Reindeer Stratum on the north side of Section C. This column was immediately adjacent to Column C and the (unsampled) stalagmite boss at the top of the column was designated Spit 1, to maintain as near as possible stratigraphic equivalence with Column C. 6 spits.

Column C: overhanging to vertical Reindeer Stratum on the south side of Section C, immediately adjacent to Column B. The top spit of this column was a dark earth flooring a pipe, probably stratigraphically equivalent to the stalagmite boss at the top of Column B. 14 spits.

Pipe fill D: a column of 4 spits excavating a loose pipe fill of Reindeer Stratum, immediately below Column B. This area had been a major source of collapse over recent years and is rich in bone, but its stratigraphic relationship to the intact Reindeer Stratum around it is unclear, hence it was sampled separately.

Other bulk samples: bulk samples were taken of loose dark earth from a pipe in the middle of Section C, and from a microfauna rich patch of the high level remnant on the south wall of the inner chamber.

All the above samples were taken for flotation/sieving, clast lithological analysis and recovery of fauna and archaeological material. Larger bones, charcoal and stalagmite samples were recovered individually and surveyed in during excavation. They are listed in Table 2. Pollen samples were taken from Columns A and C, at 2.5cm resolution (tied in with the spit samples), and additional pollen samples taken at locations specified by the specialist (Chris Hunt). See table 3 for list of samples.

Specialist studies to be carried out over the second year include the following:

Clast lithological analysis (Chris Proctor).

Mammal & bird bone (John Stewart).

Herpetofauna (Chris Gleed-Owen).

Molluscs (Chris Hunt).

Pollen analysis (Chris Hunt).

14C dating of bone (Oxford radiocarbon dating lab).

U-series dating of stalagmite (to be decided).

Conclusions

A final analysis will depend on the results of laboratory work over the coming year, but the following tentative conclusions can be reached on the basis of field observation and mapping of the sedimentary sequence.

(1) The lithostratigraphic sequence proposed by Simons was found to be broadly correct, though more complex than recorded by him.

(2) The Stream Deposit was confirmed to be alluvial in origin: as such it resembles, and may be correlative with the Siliceous Group of Pixies Hole (Collcutt, 1984).

(3) The broken stalagmite floor in Section C was found to consist of 3 components. These are from base up: broken massive stalagmite; breccia with fragments of a thin stalagmite floor included in it; and light cementation of the upper part of the Breccia in places. The thin stalagmite floor is the unit dated by Lundberg & McFarlane (2008) at 148±1 and 167±2 ka. The complexity of this unit shows that is cannot be simply equivalent to a short phase of stalagmite growth but probably represents a long interval of time. Particularly significant is that following the growth of the dated floor, it was broken up and incorporated into a breccia, and this was recemented before the Reindeer Stratum started to form. This implies that the Reindeer Stratum may be much younger than the dated stalagmite.

(4) The Reindeer Stratum is a typical colluvial cave earth, and the slope of the surviving remnants of the top of the deposit show that it entered from the SE corner of the back of the cave, probably through gull fissures visible in the cliff outside. Determination of its age will await biostratigraphic studies and 14C dating, but the data presently available implies a Devensian age is likely.

(5) Extensive piping of the entire sequence has occurred. This has affected the Reindeer Stratum particularly severely, eroding away much of the upper part of this unit in Section C.

Table 1. List of bulk samples (including sample columns). Samples were sieved through a standard sieve stack, for clast lithological analysis and recovery of vertebrate microfauna, molluscs, artefacts and other archaeologically significant material. 1 further sample block was taken for SEM analysis.

Name	Description	EDM nos	Date
Column A spit 1	Lithological/faunal sample	217, 218	18/02/16
Column A spit 2	Lithological/faunal sample	217, 218, 219, 220	18/02/16
Column A spit 3	Lithological/faunal sample	219, 220, 221, 222	18/02/16
Column A spit 4	Lithological/faunal sample	221, 222, 223, 224	18/02/16
Column A spit 5	Lithological/faunal sample	223, 224, 225, 226	18/02/16
Column A spit 6	Lithological/faunal sample	225, 226, 227, 228	18/02/16
Column A spit 7	Lithological/faunal sample	227, 228, 229, 231	18/02/16
Column A spit 8	Lithological/faunal sample	229, 230, 231, 232	18/02/16
Column A spit 9	Lithological/faunal sample	230, 232, 233	18/02/16
Column A spit 10	Lithological/faunal sample	233, 234, 235	18/02/16
Column A spit 11	Lithological/faunal sample	234, 235, 238	18/02/16
Column A spit 12	Lithological/faunal sample	236, 238, 239	18/02/16
Column A spit 13	Lithological/faunal sample	236, 237, 239	18/02/16
Column B spit 1 north	Stalagmite, charcoal sampled	345-352	16/02/16
Column B spit 2 north	Lithological/faunal sample	240, 241	15/02/16
Colum B spit 1	Stalagmite, not sampled	241, 246	15/02/16
Column B spit 2	Lithological/faunal sample	241, 242, 246, 247	15/02/16
Column B spit 3	Lithological/faunal sample	242, 243, 247, 248	15/02/16
Column B spit 4	Lithological/faunal sample	243, 244, 248, 249	15/02/16
Column B spit 5	Lithological/faunal sample	244, 245, 249, 250	15/02/16
Column B spit 6	Lithological/faunal sample	245, 250	15/02/16
Column C spit 1	Lithological/faunal sample	246, 259	15/02/16
Column C spit 2	Lithological/faunal sample	246, 247, 259, 260	15/02/16
Column C spit 3	Lithological/faunal sample	247, 248, 260, 261	15/02/16
Column C spit 4	Lithological/faunal sample	248, 249, 261, 262	15/02/16
Column C spit 5	Lithological/faunal sample	249, 250, 262, 263	15/02/16
Column C spit 6	Lithological/faunal sample	250, 251, 263, 264	16/02/16
Column C spit 7	Lithological/faunal sample	251, 252, 264, 265	16/02/16
Column C spit 8	Lithological/faunal sample	252, 253, 265	16/02/16
Column C spit 9	Lithological/faunal sample	253, 254, 266	16/02/16
Column C spit 10	Lithological/faunal sample	254, 255, 266	16/02/16
Column C spit 11	Lithological/faunal sample	255, 256	16/02/16
Column C spit 12	Lithological/faunal sample	256, 257, 268	16/02/16
Column C spit 13	Lithological/faunal sample	257, 258, 267, 268	16/02/16
Column C spit 14	Lithological/faunal sample	258, 267	16/02/16
Pipe D spit 1	Lithological/faunal sample	269, 272, 275	17/02/16
Pipe D spit 2	Lithological/faunal sample	269, 270, 272, 273, 275, 276	17/02/16
Pipe D spit 3	Lithological/faunal sample	270, 271, 273, 274, 276, 277	17/02/16

Pipe D spit 4	Lithological/faunal sample	271, 274, 277	17/02/16
Section C, SEM block	SEM block	Plotted on section drawing	19/02/16
Section C, dark burrow fill	Lithological/faunal sample	Plotted on section drawing	19/02/16
Inner chamber S. side, microfaunal bone cluster	Lithological/faunal sample	Plotted on section photo	19/02/16

(Table 1 continued).

Table 2. List of individually recorded finds, including bone, charcoal and stalagmite fragments.

Number	Description	Location	EDM no.	Date
0001	Small piece of charcoal	Column B spit 5	278	15/02/16
0002	Small fragment of bone	Column B spit 4	279	15/02/16
0003	Large charcoal fragment, cemented into base of stal boss, touching 0004	Column B spit 2N	345-348	16/02/16
0004	Large charcoal fragment, cemented into base of stal boss, touching 0003	Column B spit 2N	349-352	16/02/16
0005	Bone, possibly tooth enamel fragment	Column B spit 2N	369	15/02/16
0006	Bone fragment	Column C spit 4	438	15/02/16
0007	Bone fragment, 5cm long	Column C spit 4	439, 440	15/02/16
0008	Bone fragment	Column C top of spit 5	441	15/02/16
0009	Bone fragment	Column C spit 4	466	15/02/16
0010	Bone fragment	Column C spit 5	487, 488	15/02/16
0011	Bone fragment	Column C spit 5	489	15/02/16
0012	Bone fragment cemented into breccia, Stream deposit/Stal breccia jct	Section C Str.Dep top	491-2, 494-5	16/02/16
0013	Small bone, microfauna, Stream Deposit	Alcove	497	16/02/16
0014	Bone epiphysis	Column C spit 6	498	16/02/16
0015	Bone fragment	Column C spit 6	499	16/02/16
0016	Large bone fragment, end of long bone	Column C spit 6	500, 501	16/02/16
0017	Bone fragment	Column C spit 7	502	16/02/16
0018	Bone fragment	Column C spit 7	503	16/02/16
0019	Bone fragment	Column C spit 13	505	16/02/16
0020	Bone fragment	Burrow D spit 1	624	17/02/16
0021	Bone fragment	Burrow D spit 1	625	17/02/16
0022	Bone fragment	Burrow D spit 1	649	17/02/16
0023	Rib bone	Burrow D spit 2 (-3)	650, 651	17/02/16
0024	Bone fragment	Burrow D spit 3	669	17/02/16
0025	Bone fragment	Burrow D spit 3	670. 671	17/02/16
0026	Bone fragment	Burrow D spit 3	672, 673	17/02/16
0027	Large shattered bone fragment	Burrow D spit 3	674, 675	17/02/16
0028	Bone fragment	Burrow D spit 3	706, 707	17/02/16
0029	Bone	Burrow D spit 3	708, 709	17/02/16
0030	Rib-like bone	Burrow D, spit 3	710, 733	17/02/16
0031	Rib bone	Column A spit 11	near 235	17/02/16
0032	Charcoal, 2-3mm fragment	Column A spit 9	none	18/02/16
0033	Charcoal, 4-5mm fragment	Column A spit 10	none	18/02/16

0034	Bone fragment	Column A spit 10	none	18/02/16
0035	Tiny bone fragment, Stream Deposit gravel	Trench	none	19/02/16
0036	Long bone, Stream Deposit	Alcove	723, 724	19/02/16
0037a	Massive Stalagmite sample, basal part of of Stalagmite breccia	Section C	557-663	19/02/16
0037b	Subsample of above	Section C	557-663	19/02/16
0037c	Subsample of above	Section C	557-663	19/02/16
0038a	Fragment of clean stalagmite floor, upper part of Stalagmite breccia	Section C	550, 551	19/02/16
0038b	Subsample of above	Section C	550, 551	19/02/16
0038c	Subsample of above	Section C	550, 551	19/02/16
0039	Stalagmite from top of stalagmite breccia	Section C	544, 545	19/02/16
0040a	Cemented sediment, upper gravel	Trench	none	19/02/16
0040b	Cemented sediment, upper gravel	Trench	none	19/02/16

(Table 2 continued).

Table 3. Pollen samples.

Number	Description	Location	Date
0100	Column sample (= modern pollen sample)	Column A black skim from top	19/02/16
0101	Column sample	Column A spit 1 upper	19/02/16
0102	Column sample	Column A spit 1 lower	19/02/16
0103	Column sample	Column A spit 2 upper	19/02/16
0104	Column sample	Column A spit 2 lower	19/02/16
0105	Column sample	Column A spit 3 upper	19/02/16
0106	Column sample	Column A spit 3 lower	19/02/16
0107	Column sample	Column A spit 4 upper	19/02/16
0108	Column sample	Column A spit 4 lower	19/02/16
0109	Column sample	Column A spit 5 upper	19/02/16
0110	Column sample	Column A spit 5 lower	19/02/16
0111	Column sample	Column A spit 6 upper	19/02/16
0112	Column sample	Column A spit 6 lower	19/02/16
0113	Column sample	Column A spit 7 upper	19/02/16
0114	Column sample	Column A spit 7 lower	19/02/16
0115	Column sample	Column A spit 8 upper	19/02/16
0116	Column sample	Column A spit 8 lower	19/02/16
0117	Column sample	Column A spit 9 upper	19/02/16
0118	Column sample	Column A spit 9 lower	19/02/16
0119	Column sample	Column A spit 10 upper	19/02/16
0120	Column sample	Column A spit 10 lower	19/02/16
0121	Column sample	Column A spit 11 upper	19/02/16
0122	Column sample	Column A spit 11 lower	19/02/16
0123	Column sample	Column A spit 12 upper	19/02/16
0124	Column sample	Column A spit 12 lower	19/02/16
0125	Column sample	Column A spit 13 upper	19/02/16
0126	Column sample	Column C spit 1 upper	19/02/16
0127	Column sample	Column C spit 1 lower	19/02/16
0128	Column sample	Column C spit 2 upper	19/02/16
0129	Column sample	Column C spit 2 lower	19/02/16
0130	Column sample	Column C spit 3 upper	19/02/16
0131	Column sample	Column C spit 3 lower	19/02/16
0132	Column sample	Column C spit 4 upper	19/02/16
0133	Column sample	Column C spit 4 lower	19/02/16
0134	Column sample	Column C spit 5 upper	19/02/16
0135	Column sample	Column C spit 5 lower	19/02/16
0136	Column sample	Column C spit 6 upper	19/02/16
0137	Column sample	Column C spit 6 lower	19/02/16
0138	Column sample	Column C spit 7 upper	19/02/16
0139	Column sample	Column C spit 7 lower	19/02/16
0140	Column sample	Column C spit 8 upper	19/02/16

0141	Column sample	Column C spit 8 lower	19/02/16
0142	Column sample	Column C spit 9 upper	19/02/16
0143	Column sample	Column C spit 9 lower	19/02/16
0144	Column sample	Column C spit 10 upper & lower	19/02/16
0145	Column sample	Column C spit 11 upper & lower	19/02/16
0146	Column sample	Column C spit 12 upper & lower	19/02/16
0147	Column sample	Column C spit 13 upper & lower	19/02/16
0148	Column sample	Column C spit 14 upper & lower	19/02/16
0149	Sample around bone	Column C around bone 0007	15/02/16
0150	Sample around bone	Column C around bone 0008	15/02/16
0151	Sample around bone	Column C around bone 0016	16/02/16
0152	Sample around bone	Burrow D around bone 0023	17/02/16
0153	Sample around bone	Burrow D around bone 0027	17/02/16
0154	Sample around bone	Burrow D around 0028/29/30	17/02/16
0155	Spot sample, dark earth Frog Stratum	Roof remnant	19/02/16
0156	Spot sample, brown earth Reindeer Stratum	Roof remnant	19/02/16
0157	Spot sample, dark earth	S. end of central pipe/burrow, Section C	19/02/16
0158	Spot sample, red sediment, Reindeer Stratum	Section C, by SEM block	19/02/16
0159	Spot sample, yellow sediment, Reindeer Stratum	Section C, by SEM block	19/02/16
0160	Spot sample, Stalagmite breccia	Stalagmite Breccia, Section C	19/02/16
0161	Sample around bone, Stream Deposit	Alcove around bone 0036	19/02/16
0162	Spot sample	Subsample of upper gravel, Trench	19/02/16
0163	Modern pollen sample, surface sediment	SE corner of trench in cave	19/02/16
0164	Modern pollen sample, surface sediment	Dump outside cave, by EDM station peg	19/02/16
0165	Modern pollen sample	Halfway between 0164 & 0166, not taken yet	19/02/16
0166	Modern pollen sample, soil sample	GPS station in field	19/02/16

(Table 3 continued).

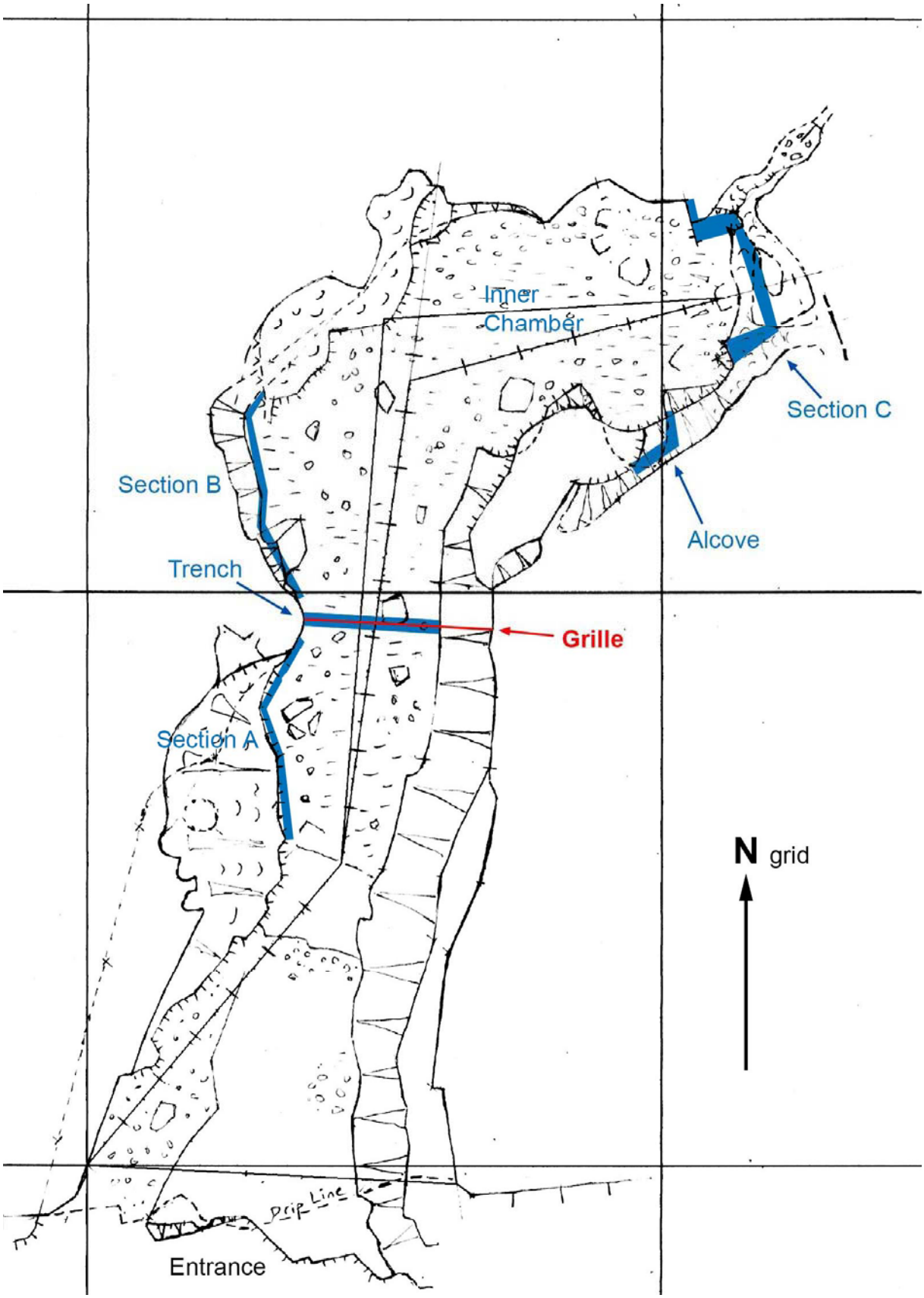

Figure 1

Plan of the cave showing locations of sections, the trench and other named features.

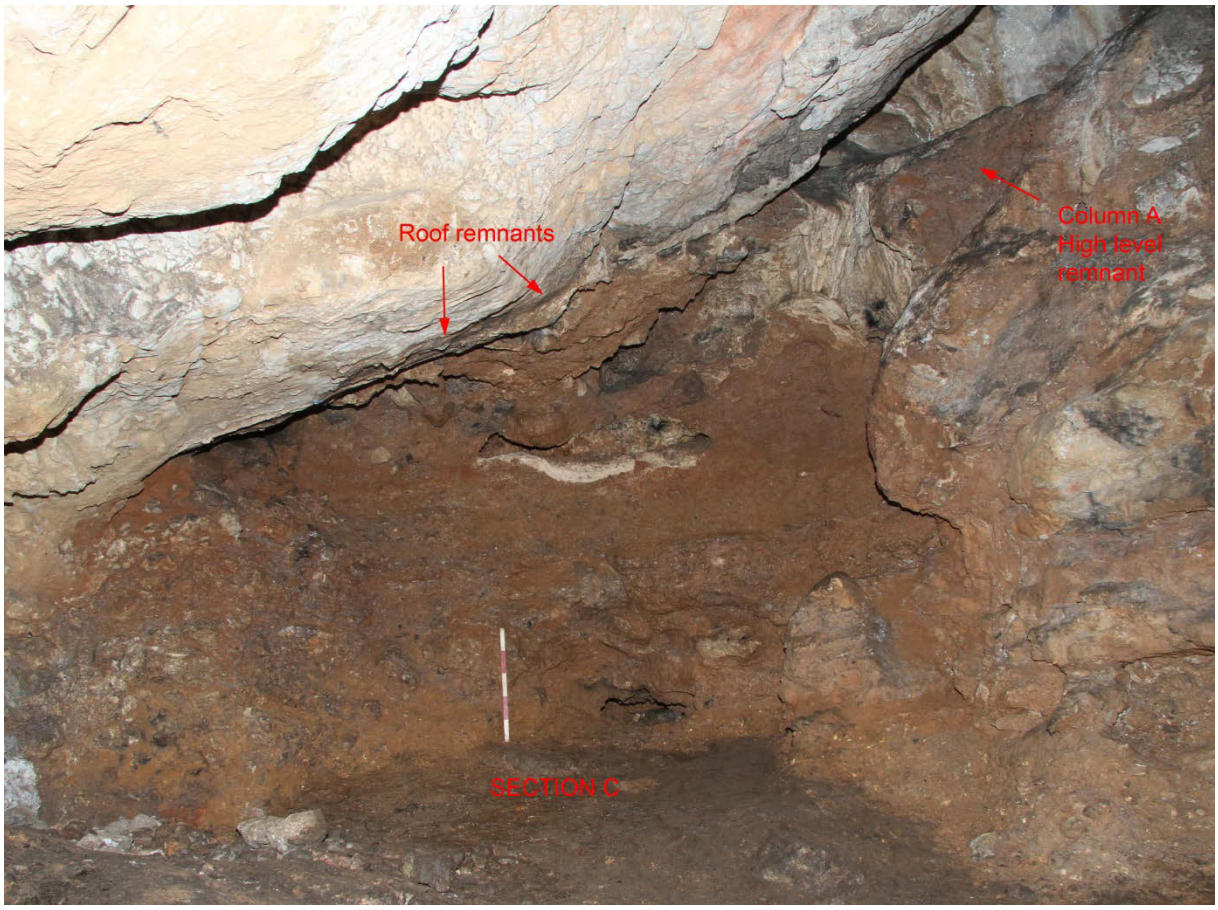

Figure 2

Annotated photograph of Section C and adjacent sediment remnants at the back of the cave. 0.5 metre scale bar.

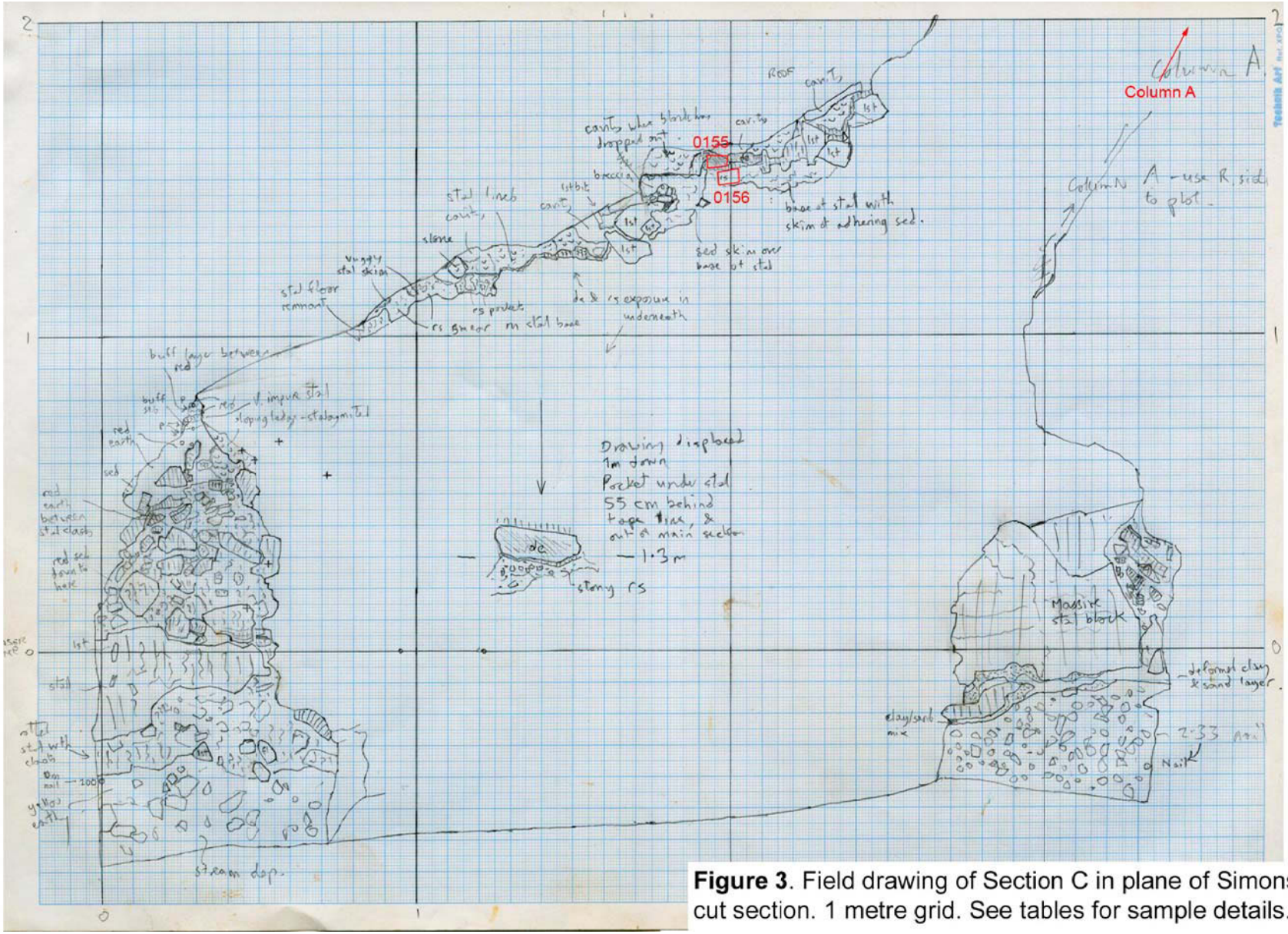

Figure 3. Field drawing of Section C in plane of Simons cut section. 1 metre grid. See tables for sample details.

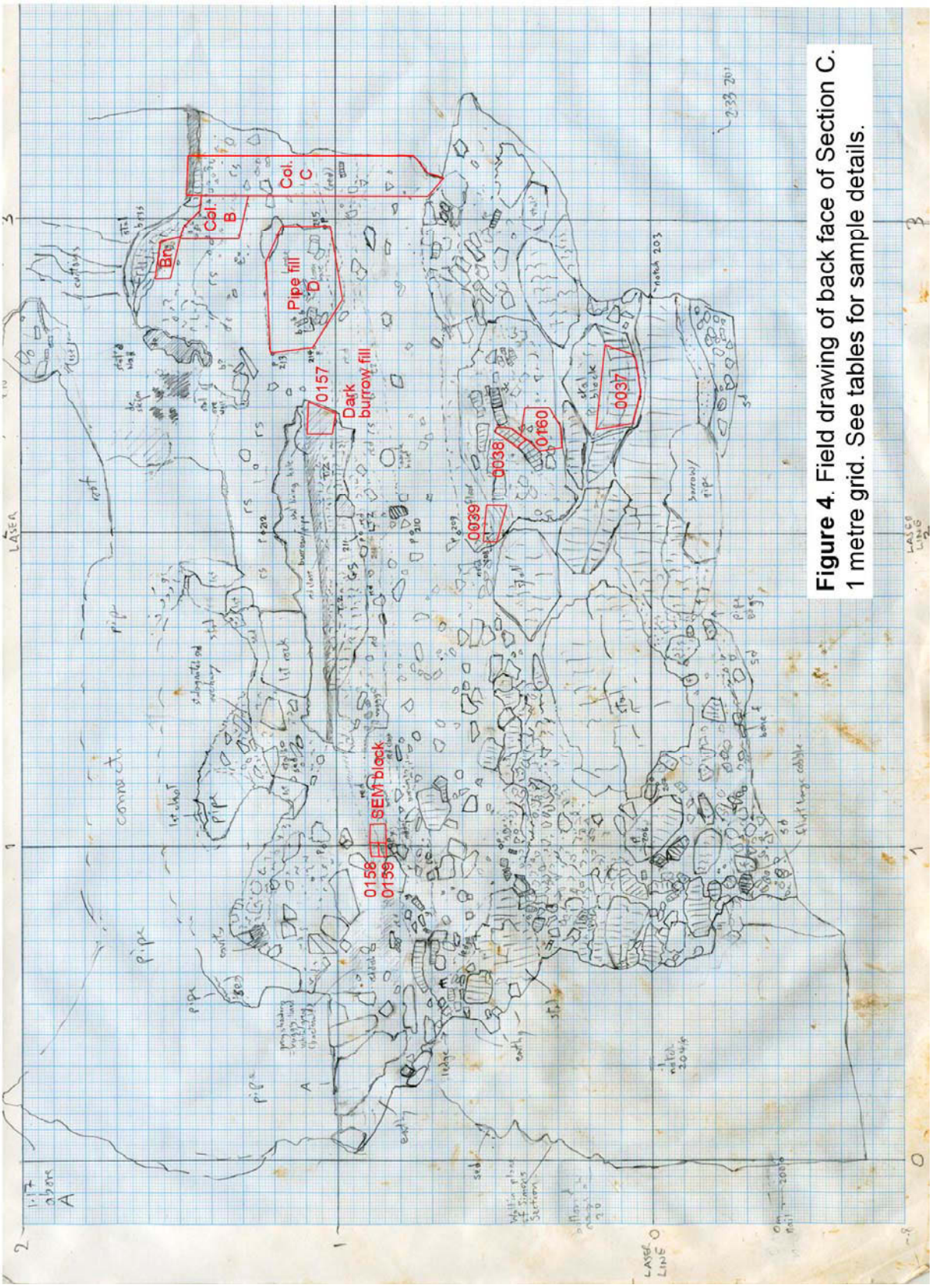

Figure 4. Field drawing of back face of Section C. 1 metre grid. See tables for sample details.

Figure 5.

Bedded Stream Deposit gravels exposed in the Trench. Inch and centimetre scales.

Acknowledgements

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References

Collcutt, S.N. 1984. The analysis of Quaternary cave sediments and its bearing upon Palaeolithic archaeology, with special reference to selected sites from Western Britain. Unpublished PhD thesis, University of Oxford.

Lundberg, J, Simons, J. & McFarlane, D.A. 2008. A Pleistocene chronology for the fauna and artefacts of Cow Cave, Devon, UK. *Cave and Karst Science (Transactions of the British Cave Research Association)* **34,** 101-4.

Simons, J. W. 2010 A Re-appraisal of the Stratigraphy, Palaeontology and Dating of Cow Cave, Chudleigh, Devon, England. *International Journal of Speleology,* 39 (2), 113-135.