GeoArch

Report 2008/36

Excavations at Cindermill, Shropshire (FID08): Data Structure Report

Dr Tim Young

FID08: Site Narrative

Non-Technical Summary

Previous field survey (Young 2007) had identified the Fiddle site as being a water-powered site, but the non-invasive approaches could not determine whether the use of water power was associated with the bloomery, or whether there was a separate phase of use of the site as a mill.

The site was tested with a single trench spanning the predicted course of the leat at a point where it is abutted by both the north and south slag dumps. The dense slag deposit to the south of the leat was not excavated, so the leat margin was not defined. The leat was not completely sectioned, but was to be approximately 5m wide. The nearest face of the slag south of the excavation lay 2-3m from the trench. It was excavated as far as the water table at approximately 80.15m OD (1.85m below modern surface; the same level as that of the water in the stream immediately to the west). The overall depth of the leat remains unknown.

Most of the fill of the leat was provided by bloomery slags which appear to have been tipped into the leat from the south. Detailed stratigraphy of the slag deposit was not resolvable, partly because of the lack of internal stratification preserved by the coarse slag fragments and partly because of masking by post-depositional changes, including alteration of the slag, loss of matrix and the coating of clasts in pink clay, all associated with the passage of groundwater through the deposits.

The deposits on the northern side of the leat comprised a well-bedded succession of fine-grained sediments with occasional large slag clasts. The sediments are related to those seen on the bank north of the leat, although precise correlation has not yet been determined. The layers within the leat show some small-scale folding and the dip of the strata appears too steep for the angle of repose of the sandy layers. These factors suggest that the block of fine deposits on the north side of the leat may possibly not be *in-situ,* but may have slumped from the north.

The upper fills of the leat (also extending up the slope to the north) comprised dark soils containing substantial quantities of pottery, clay pipe, some bone and locally accumulations of large stones. These deposits are interpreted as rubbish accumulating in possible garden soils, below the post-medieval cottage. The lower part of this build-up includes a significant proportion of weathered yellow claystone clasts, possibly derived from the natural on the bank above. This lower deposit is locally separated from the topsoil by a dark, slag-rich deposit, which may possibly have been a path across the hollow of the former leat.

Methods

The initial project design was intended to provide evidence to date the three bloomery sites (Ned's Garden West, Ned's Garden East and Fiddle) surveyed in 2007. The intention was to test selected areas of possible structures using 1m-square test-pits and to extract charcoal (and pottery if possible) from the slag dumps using 2m-square test-pits.

The test-pitting of the two sites at Ned's Garden was undertaken in May 2008, but that at the Fiddle bloomery was delayed until October 2008. Following the successful variation of the design at Ned's Garden, with the merging of individual planned test-pits into a single trench to maximise the potential for understanding of stratigraphic relationships, a similar approach was adopted at Fiddle. The test pits for the two slag dumps and the leat were merged into a single N-S trench cutting all three components. The initial trench was 9m long (N-S) by 1m wide (E-W). The chosen location had the added advantage of being in a hollow below the probable site of the post-medieval cottage and therefore a likely area for accumulation of occupation rubbish, which would allow dating of that activity (therefore providing some of the key information that might have otherwise been obtained by a test pit on the site of the cottage). The initial trench was dug to a maximum depth of 0.70m over the centre of the leat. At that depth the early leat fills (associated with use or deliberate backfill) were not yet encountered and the trench was still in late sag fills. The decision was then made to widen the central section of the trench to allow stepping down of a central "sondage". This was done by expanding the area from 2 to 5m from the south end of the trench, to take in an extra 2m width to the west of the trench. Thus the E section of the sondage was in continuity with the W section of the main trench. This sondage was dug, in part, to the water table (1.85m below surface). At the end of the excavations the sondage was expanded to a point 1.2m from the south of the trench in a successful attempt to locate the southern margin of the leat.

The trench was dug by hand, with spoil stored on sheeting to minimise impact on the vegetation. Contexts were numbered with 4-digit codes, commencing with 1001. The site code is FID08.

Geographical location is given in this report using the site coordinate system [X,Y,Z] employed for the 2007 survey (Young, 2007). The 2007 report states:

"The topographic survey was initiated with an arbitrary coordinate value assigned to survey station STN1 of [100,200] and z = 100m, where the Y direction was approximately north. Subsequent GPS data collection showed STN1 lay at E = 370503.31, N = 282803.72, although data quality was slightly poor, because of the tree cover. The grid peg at [120,100] was also measured by GPS, and, being in the open, gave a higher quality measurement of E = 370521.44, N = 282794.80, height = 83.99m OD. These measurements indicate that the site grid is aligned with the Y direction lying 26.2° east of grid north and the site origin lying at National Grid reference E = 370325.47, N = 282668.34. The site datum lies 15.80m below OD".

Trench 1 was oriented so as to be perpendicular to the expected course of the leat. The field description of the trench took this direction to be N-S, whereas the trench is oriented towards 15.5° E of the Site Y direction (i.e. 41.7°E of grid north).

The topographic description below uses unconverted site X and Y ([X,Y]), but uses corrected heights OD. The extensive tree cover for some considerable distance around the site precluded direct control of the survey by RTK-GPS as would normally be done for a GeoArch survey.

Site Narrative

1. Area North of the leat

The natural was formed by dense, compact, yellow clay with local clasts of weathered siltstone and sandstone. The natural surface dipped southwards from 82.0m OD at the N end of the trench to 81.4m OD at the lip of the leat 3.35m to the south (a dip of 10.3°).

The natural clay was overlain by a charcoal-rich deposit (c1016) for 2.45m upslope from the leat edge. This layer reached up to 130mm thick. It contained some thin layers of ferruginous sand-grade material locally. The layer contained abundant small-diameter (up to 50mm) roundwood charcoal. The context pinched out (locally against a small rise in the natural) approximately 1.3m from the north end of the trench.

The northern 0.20m of the charcoal deposit was overlain by a thin, but hard and compacted stone floor (c1023), formed of small stones (up to 60mm) pressed into the natural clay, forming a layer typically just a single stone in thickness. Where the floor overlay c1016 the underlying deposit was compacted into a thin black lamina just a few mm in thickness. The southern margin of the stone floor was parallel to the leat margin.

The stone floor was overlain by a second floor (c1021), again very compacted, but formed of slabs of bloomery tap slag. The surface of this floor rose, and its thickness increased, towards the NW corner of the trench. The floor extended approximately 1m from the N margin of the trench (thus not completely covering the earlier floor), but it too was bounded by a line parallel to the leat (this is not evident from the sections, because of probable root damage close to the W section).

The charcoal deposit c1016 is interrupted by a partly-excavated feature, of which a semicircular area appears within the trench. This is interpreted at present as having a cut c1018, although if a cut it is very low-angle and other interpretations are possible. The earliest deposit within the cut is a patchy white clay deposit c1019 up to 20mm thick, but discontinuous, and it is unclear if this formed a deliberate lining, although appears to do so around the southern margin of the feature. The white clay is closely overlain by a thin (<20mm) brown ferruginous sandy layer c1022, which appears to be continuous with the earliest “floor” overlying (1016) elsewhere in the trench. The central fill of the feature is a brown soft clay c1018, bearing large clasts of stone and slag, some of which were oriented vertically. This deposit appears to run up over c1022 and its correlatives to the north, but to the south there appears to be a steep boundary with darker deposits assigned to c1012, although root damage cannot be ruled out. C1018 is thus intercalated within c1013.

Most of the trench shows deposits overlying c1016, c1023 and c1021 that form a succession of dark brown and red sandy layers, possibly spreads of ore fines and possibly in some cases floors,

alternating with soft, dark charcoal-rich layers. This complex includes the correlatives of “floor” c1022. All of these deposits are placed into context (1016). The degree of root disturbance currently makes detailed description of the succession within this context impossible. The context is overlain by c1007, a greyish clayey deposit, which includes the zones of disturbance, but which may represent, at least in part, a depositional event (abandonment?) as well as subsequent disturbance. Close to the leat c1007 overlies a rather similar, but darker, soft deposit (c1012). Both c1007 and c1012 were initially traced into the leat fill. In the case of c1007 this correlation was tentative and the deposits assigned to c1007 in the leat have now all been placed in c1012; c1007 is now restricted to the disturbed zone above c1013 on the slope. C1012 will be discussed further as a part of the leat fill.

C1007 is overlain by c1004, a greyish deposit containing abundant lumps of decomposing claystone and limestone. C1004 is distributed evenly down the slope. It is overlain directly by c1001, which extends up to the modern surface.

2. The leat

The leat is defined by cut c1003, which has been well-exposed on the northern side of the leat and in a small area on the south. The water table prevented excavation to the base of the leat in between.

The lowest deposits seen within the leat were solely of slag, referred to context c1009 and a slag-rich clay, c1014. The movement of water through the leat fill had resulted in the loss of any original matrix from c1009, but has also lead to the deposition of a pinkish clay coating over the weathered slag. These two features together make the recognition of original depositional features extremely difficult. It is not clear whether c1009 extended across the whole width below the fine-grained sediments associated with the N bank, or whether c1014 underlay the fine sediments. These fine sediments (c1012, c1010 and c1015) appear to terminate downwards against the top of c1009 in the section, but during excavation flat stones were found (not visible in the section) above c1014, which may suggest that c1010 at least may have flattened out before grading into c1014 on the base of the leat (see also below).

C1015 rests directly on the natural at the north side of the leat and continues down to the water level. This context yielded a large sherd from a jug in Midlands Purple. The base of the overlying c1010 rested on a thin, slightly impersistent, layer of white clay. This is taken as the top of c1015, which is a yellow-orange clayey deposit bearing abundant large clasts of stone, slag and charcoal. The impression given when digging was that c1010 had similar components to the overlying c1012 but was more coherently layered. In section the layering appears somewhat convoluted and the boundary between the two parts of c1010 showed an apparent slip scar when cleaned. These features suggest that c1010 has to some degree slumped into its present position.

C1010 was a layered deposit, rather similar to c1013 higher up the slope. The upper part of c1010 was a charcoal-rich horizon, the lower part a ferruginous sandy material, similar to the ?ore-fines floors of c1013. The boundary between the two parts was marked by a scatter of large stones, aligned with the slope and just possibly with some flat slabs at water level which covered a large chafing dish sherd (in c1014).

C1010 was overlain by the more homogeneous deposits of c1012. Within the leat the lower part of c1012 was much darker than the upper part. The context was characterised by a patchy distribution of deposit types, suggestive of some disturbance.

The slag fill c1009 is overlain by c1008, a rather similar deposit, perhaps containing rather smaller clasts of slag and lacking the strong overprinting by the effects of groundwater flow. At approximately the interface between c1008 and c1009 lay the linear deposit c1011. This thin deposit was of a dark charcoal-rich clay with abundant ferruginous concretions. This is most likely to be an in-situ deposit, but has been sampled to aid interpretation.

C1008 is overlain towards the south of the leat by c1005 a dense slag deposit with a dark matrix and bearing fresh slag clasts. Both c1008 and c1005 show a strong downslope alignment of clasts. On the south side of the leat c1005 extends almost to the modern surface. Within the centre of the leat c1008 is overlain by c1006, a deposit containing not only slag, but also much domestic refuse (pottery, bone etc) and also large stones, particularly as a sub-circular pile in the SW part of the extension. The overlying deposit (c1002) is a slag-rich material, probably directly reworked from the slag dumps. It contained some artefactual material, but much of the pottery from this context may have been derived from its base – the interface with c1006, and also from the SW corner of the extension where this context may have passed laterally into fine soils. The patchy distribution of this context, within the centre of the excavated area, mat suggest that it might have formed a distinct partial infill to the surviving hollow over the leat, possibly as a path for instance. C1001, the modern topsoil, extended across the whole trench, but was very this over c1005 and c1002, but much thicker on the slope above the leat, where it overlay c1004.

Dating

The post-ex programme will involve the production of a formal report on the pottery, but will also include an investigation of the abundant charcoal recovered with a view to commissioning 14C dating of deposits from the bloomery phase.

Spot dating of material recovered from the excavation gives a 15th century age to the two significant pottery sherds from the leat. Pottery and clay pipes from the deposits above the leat backfill appear to cover the period from early 17th century to late 18th.

Discussion

Although the trial trench has achieved much in unravelling the sequence of events in the core of the Fiddle site, there remain tantalising problems and difficulties of correlation.

As a synthesis one can consider the area in terms of:

1. In the North of the area, a hard metalled surface, initially of stone, later of slag, extended to within about 2.25m of the leat. A 1.5m width of surface was observed, but it is unclear whether this was an internal working surface (probably most likely), or an external yard or track.

2. Between the surface and the leat there was a circular feature of uncertain nature, possibly a post or water barrel perhaps, which was cut through an early deposit of charcoal fines, or locally prevented its accumulation. Although accumulation of charcoal rich material continued in this area, it was interrupted by 3-4 sheets of probable ore fines, which appear to be associated with material accumulating on the metalled working surfaces upslope. Where actually in the area of the metalled surfaces these sheets are themselves very compacted and possibly trodden.

3. One of the sheets should most likely be correlated with the similar material found within the northern side of the leat. The most likely correlation would allow the deposit in the leat (the lower part of c1010) to be correlated with the uppermost red "floor" surface in c1013; a correlation that might allow c1015 in the leat to be comparable to the lithologically similar c1018 in the fill of the circular feature. An alternative correlation would be for the lower part of c1010 to correlate with c1022 in the circular feature and for the white clay in the upper part of c1015 to correlate with the white clay c1019 in the circular feature.

4. Despite the apparent correlations between the deposits in the north side of the leat and those on its north bank, there are some considerable problems. Although c1013 was disturbed by root action throughout the northern part of the trench, the disruption between the circular feature and the leat was more marked. Both the charcoal deposit c1016 and two overlying red "floors" within c1013 show surfaces which are strongly flexed over the leat margin, but which stop abruptly near the flexure, as if forming the top of a slip scar.

The surface of the lower part of c1010 as excavated in the leat also showed features which resembled small slips or slumps. The section of c1010 also shows a complex morphology which might be interpretable as a series of convolutions produced by slumping.

A further problem with c1010 is that it is currently at too steep an angle for the granular "floor" deposits to have had a suitable angle of repose, even allow for compaction, and the same is probably true of the overlying charcoal rich deposits too. The low-angle of the "floors" of c1013 is also possibly problematic as they seem to be accumulating too horizontally for simple slope-wash, unless somehow supported or constrained at their down-slope ends.

These factors together suggest that the block of dominantly fine-grained sediments on the north side of the leat is not in-situ. Although simple slope failure might explain the features observed, such failure might be due to decay or removal of a barrier at the base of the slope. Given the close proximity of the trench to likely position of the waterwheel, it is quite possible that the leat was originally held with a masonry or timber structure, either within the excavated area or perhaps immediately to its west. The sloping leat sides and its substantial width are not compatible with the shape of a wheel pit, although quite appropriate for the tail-race.

5. Much of the fill of the leat is in the form of a coarse slag deposit, probably a reworked slag dump, emplaced from the south side. The degree to which the leat could have been infilled during its use, without impairing its function, is not yet known – but it is unlikely that significant slag deposits would have been allowed to accumulate within the leat during its use. Various possibilities exist for the nature of the infill and the original form of the leat:-

a. the leat contained a timber “liner” and the slag slumped, or was pushed, into the leat after the decay/removal of the liner as suggested for the slumping on the N side.

b. the leat ran in a culvert from the wheel pit (to the west of the excavation trench) to the tail race (where the leat runs clear of the slag dump to the east). The slag was dumped above the culvert and collapsed into the leat on its decay.

c. The leat was open and slag was simply dumped into it, to plug it, on the abandonment of the iron works. Plugging of the leat would be necessary to stop the river subsequently exploiting the line of the leat.

Reference

YOUNG, T.P. 2007. Topographic and geophysical survey of two bloomery sites near Highley, Shropshire. *GeoArch Report 2007/03.* 7pp.

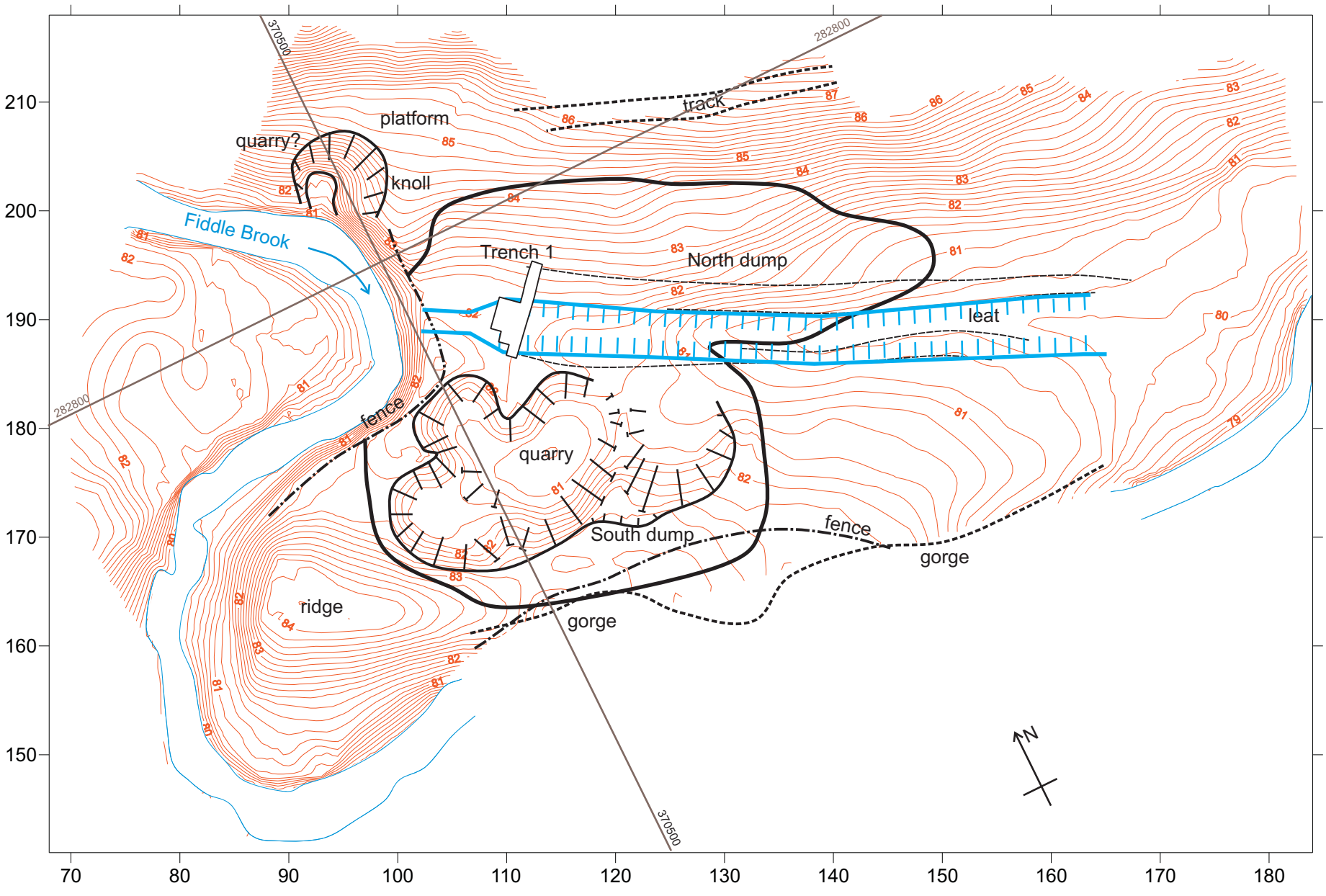
Figures and Tables

Figure 1. Site Plan

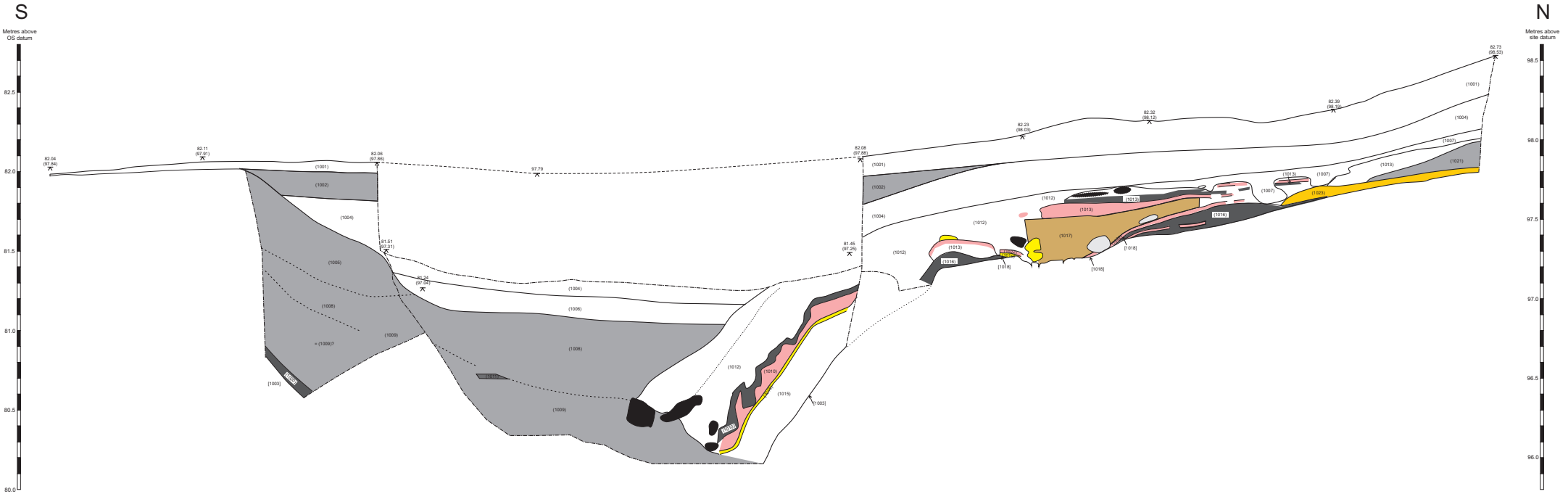
Figure 2. Sections

Figure 3. Stratigraphic matrix

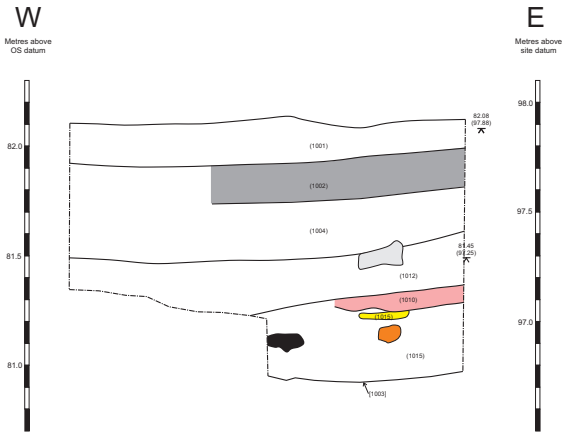
Table 1: Context Register


370500
282800
platform
track
quarry?
knoll
Fiddle Brook
Trench 1
North dump
leat
fence
quarry
South dump
fence
gorge
ridge
gorge
370500
N
210
200
190
180
170
160
150
70
80
90
100
110
120
130
140
150
160
170
180

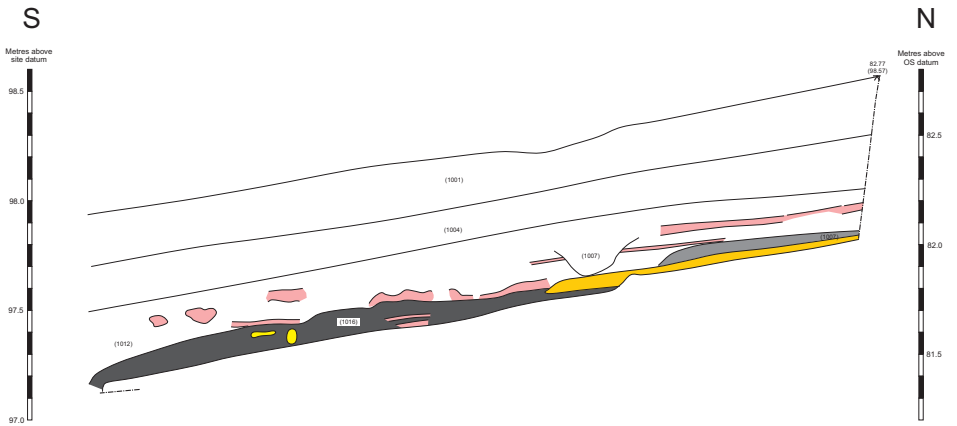
Section 1: Trench 1 west side

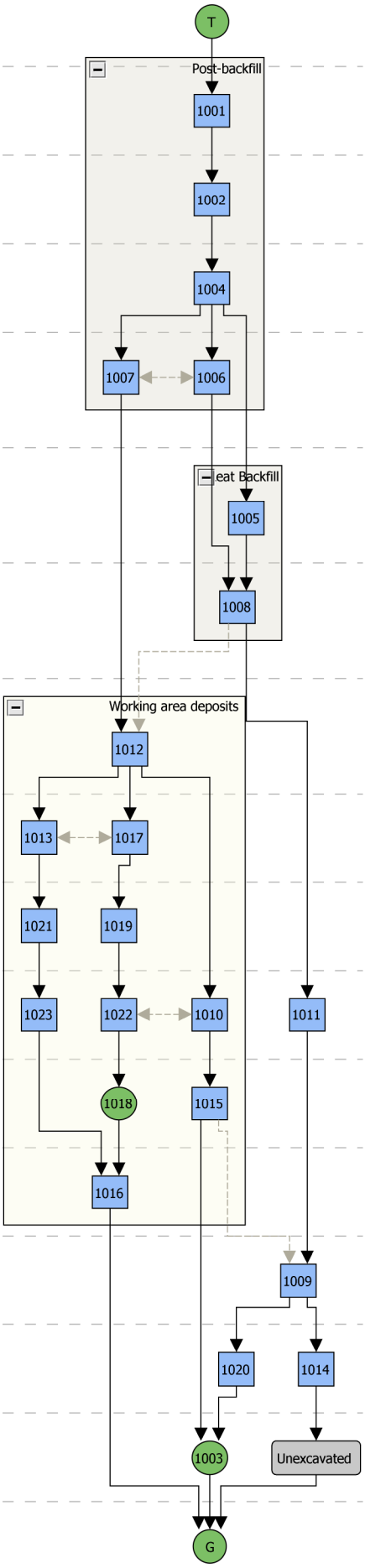


Section 2: Trench 1 extension north side



Section 3: Trench 1 east side (reversed for comparison with west section)




T
Post-backfill
1001
1002
1004
1007
1006
eat Backfill
1005
1008
Working area deposits
1012
1013
1017
1021
1019
1023
1022
1010
1011
1018
1015
1016
1009
1020
1014
1003
Unexcavated
G

context	description	pottery no	pottery weight	glass no	pipe no	Cu-alloy	iron	lead	bone weight	charcoal weight	charcoal notes	charcoal number	bf slag
Trench 1													
1001	topsoil: dark grey-brown loam	137	698	2w 2b	19	buckle, inlay	3 nails, knife		40				
1002	upper fill of leat [1003]. Slag rich dark grey deposit	61	508	4w 4b	30 (2 spurred bowls)		6 nails	strip and disc	64				1 small
1002	[in extension]	166	786										
1003	cut of leat												
1004	brownish grey soil with frequent yellow limestone clasts	112	852	3w	31 (2 stamped bowls)		3 nails	strip	456				1 large 1 small
1004	[in extension]	62	794										
1005	black silty slag dump	5	20						90	24		7	
1006	brownish grey soil with slag and large stones	8	194				1?nail		84				
1007	dark-grey charcoal rich deposit, in part within root damage cut into (1013)	3	68	1w									
1008	black slag layer with pink ashy inclusions									76	74 (top b1005) + 2	63	
1009	pink/grey slag layer									24		25	
1010	red/black mottled and layered ashy depost	1	2							198		54	
1011	dark grey/black charcoal-rich layer mottled with rusty orange and grey												
1012	dark grey/brown soft/loose, slag- and charcoal rich deposit, locally with large stones	1	4							34		5	
1012	[in extension]								12	56		23	
1013	red compact floor layer at N end of trench									30		20	
1014	pale yellowish cream clay with slag	1	148							2		1	
1015	orange sandy gravels with stone and slag	1	52							30	28 + 2	5	
1016	charcoal-rich clayey deposit on natural									58		18	
1017	brown stoney clay with large slag clasts, fill of feature formed by cut [1018]												
1018	cut of circular feature												
1019	pale clay lining to [1018]												
1020	dusty black charcoal layer												
1021	compacted slag surface at N end of trench									44		12	
1022	red sandy "floor" material within [1018]												
1023	compacted yellowish stone surface at N end of trench												
u/s	on site	8	52										
u/s	off site	7	56										
		573	4234										
										576		233	