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Investigations at Middleton Scriven Mill, Shropshire, [SO 685873], 2009.

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Abstract

Topographic survey, geophysical survey and targeted small-scale excavation has investigated the probable site of a water mill. The topographic survey revealed the water management system for the mill, including a substantial dam, which probably diverted much, if not all, of the stream flow into the leat supplying the mill. At the opposite end of the leat a broadening of the leat appeared to be a pond. There was no topographic expression of a dam blocking the pond.

Geophysical evidence for a building on the expected site of the mill below the slope across the termination of the pond was inconclusive despite the presence of strong magnetic anomalies.

Excavation provided a radical reinterpretation of the site. The strong geophysical anomalies proved to be related to mid-20th century levelling of the area southeast of the pond. Prior to this the topography had been very irregular; not just a simple fall in front of the pond as expected. The steep slope seen in the topography passed down into a 2m deep gully, closed to the NE, and to the SE of which the bedrock rose to only 1m below its level in the pond area. Extrapolation of the observed structures into other areas on the basis of the geophysical results indicates a hummocky topography over the area of the lower lawn. The most likely explanation for a hummocky region bounded upslope by an abrupt arcuate steeper bounding slope is that this area is a small land-slip, with the steeper slope being its scar. Thus the present surviving pond is not the entirety of the original pond, but is truncated by the land-slip.

A trench (Trench 2) was also dug much closer to the stream and a watercourse was located here approximately on the line of the modern boundary between the garden and the road. Although it could be argued that this might merely be a roadside drain, particularly if there was originally a ford just upstream of the present bridge (as might be suggested by the outline of the road boundaries), the preferred explanation is that it was the tail race from the mill. There is a total difference in height of 5m between the base of the tail race and the floor of the pond. This is clearly sufficient to run a substantial wheel, but this would have needed to be situated much closer to the road than initially envisaged.

The location of the pond dam is still unknown. The surface of the natural in the SE end of Trench 1 was truncated by the 20th century levelling, so the location of the dam here cannot be ruled out. The geophysical survey suggests there is another fall in the level of the natural just 1.5m SE of the end of Trench 1, which might indicate a dam location in this area. If so, a gap of 6m between this feature and the edge of the road (the extrapolated line of the tail race) would allow room for a mill.

The 20th century levelling of the land-slipped area include the truncation of the natural at the SE end of Trench 1, and the dumping of red clay, dark artefact-rich soil and some road-stone into the hollows. The source of these materials is not known, but might possibly be local, perhaps deposits associated with the mill and dam. The levelling was followed by the creation of a new, more direct, track from the road into the field (replacing an earlier track which skirted the most hummocky ground). Artefactual evidence suggests the levelling was no earlier than the 1930s. Cartographic evidence suggests that the track was altered between 1954 and 1973, but an aerial photograph appears to show the realigned track as early as 1948.

Further investigations to locate the mill might include extending the line of Trench 1 to clarify the nature of the geophysical feature immediately to its SE. Approximately 4m of the 8m gap between Trench 1 and the road is easily accessible and should allow location of the back wall of a roadside mill if it was this far upslope. The mill itself is likely to have been disturbed by the land-slip.

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Background

The project was designed to follow-up investigations by Andy Johnson, which suggested that the area now enclosed as a part of the garden of Brook Cottage, but lying SW of the stream, and formerly part of a field labelled on the Tithe Map of c. 1840 as Mill Meadow, had been the site of a mill. Pieces of a millstone had been recovered from the stream bed in the area and what appeared to be a large leat traverses the lower part of Mill Meadow.

The remit of the project was to use topographical and geophysical survey to clarify the nature of the leat, its probable dam, and the area suggested as the mill site. The initial survey was to be followed by small-scale targeted excavation to locate, and if possible to date, the mill itself.

Topographic survey showed the leat to be substantial, with the dam constructed in alignment with the leat bank, forming an elegant engineering structure capable of diverting the flow of the stream. No topographic evidence for a dam closing the proposed millpond could be located, but geophysical survey of the “lower lawn” (an area bounded to north and west by an almost amphitheatre-like steeper slope) produced strong anomalies. Indeed, although the anomalies formed a crudely rectilinear pattern suggestive of a building, the intensity of the anomalies appeared excessive for what might be expected of a mill.

Excavation targeted areas thought likely to help resolve these problems. Trench 1 extended from within the pond, over the proposed dam location (incorporating an earlier trial trench of Andy Johnson’s), down onto the lower lawn and intersecting the margin of the strong magnetic anomaly. Trench 3 investigated the centre of the pond and Trench 4 the trackway (the stones of which were exposed on the surface). Trench 2 was positioned to investigate an area of possible outfall towards the stream.

Survey work was conducted during late April/early May 2009, with excavation following in late May. Weather conditions for all phases of the work were good, with some rain during the excavation.

Topographic Survey

Methods

A Nikon DTM330 EDM and the Trimble 5700/4700 RTK system (Trimble 4700 base-station, with 5700 rover) were used to obtain a high quality topographic survey.

The principal topographic survey tool employed in this survey was the Nikon EDM, with the Trimble 5700/ 4700 RTK GPS system used to provide locations for a few control points not under tree cover. The EDM was controlled by a TDS *Recon* computer running *Survey Pro Max* and the GPS survey by a Trimble *TSCe* running *Survey Controller v10.4*, with calibration to OSTN02.

Survey data were assembled and post-processed in *Trimble Geomatic Office* software and exported to *Surfer* for production of 3D images.

Selected survey markers remain in place to facilitate any further interventions.

Results

The leat was traceable for approximately 150m. At its northern end the dam was apparently represented by a mound on either side of the stream, in each case probably cored by natural deposits. The dam was positioned across a bend in the river, so the dam lay in continuity with the downslope leat bank. The surviving dam remnants reached 121.5m OD N of the stream and 121.4m S of the stream. The leat bank maintained a similar height to the south, being at 122.0m just to the south of the area where the leat has been cut through by the recent track leading down to the ford. The surviving bank changes in height slightly over the 100m to the south with varying degrees of preservation, but is at 122.0m OD just outside the present garden. Within the garden, adjacent to the supposed pond there is initially a break in the bank, with the ground lying at a similar level to the interior of the pond (120.2m; this is a possible location for a take-off of water back to the stream). The termination of the bank is on the knoll with a height of 120.8m, somewhat lower than the main length of bank.

The leat itself is variably infilled. The maximum infilling is in the mid part of its length; both to the north and the south the leat is less infilled, and at its northern termination, possibly scoured. At the north, the modern stream level (as measured at the time of survey) is 117.9m. The take-off into the leat rises through a slight gully with a base from around 120.0m into a more level-bottomed section with ground level at 120.6m. South of the badly damaged section of leat, the infill thickens rapidly, to a point just south of the emergence of the leat into the field from the wood, where the infill reaches over 121.5m (in places less than 0.3m below the adjacent bank top). At the southern edge of the field the leat infill only reaches 120.8m, giving the bank a surviving topography of 1.5m. Within the pond area the surface of the fill falls to about 120.4m. Excavation showed the base of the pond to lie at approximately 119.54m in Trench 3 (0.86m below surface), close to its centre, and at 119.9m in Trench 1, nearer to its margin.

Where the leat is relatively unfilled the 121m contour defines a channel 4-5m wide. If the leat were to be filled to 120m, it would have given a water depth of 1m in the pond, have required a 3-4m high dam across the stream, and would have provided a total head of about 6m compared with level of the stonework in the channel seen in Trench 2 (see below). There is little evidence, therefore, for a strong gradient to the leat, and taken together with the relatively wide channel, it would seem likely that the whole leat was designed to supplement the apparently small pond for storage.

Geophysical Survey

Methods

The magnetic gradiometer survey was undertaken using a Bartington Grad601-2 dual magnetic gradiometer. Data were downloaded from instrument, assembled and cleaned in *Archeosurveyor*. The survey was conducted on 20m grids with a 2m walked traverse interval (1m traverse interval on the combined dataset), walked in parallel and with a 0.25m sample interval (i.e. raw data grid has 1.0 x 0.25m node spacing). Data processing comprised assembly of the composites for each instrument, clipping of the data at an appropriate level and application of the destripe function.

The ground resistivity survey was undertaken with a Geoscan RM15 resistivity meter, operating two pairs of mobile electrodes on a PA5 frame, via an MPX15 multiplexer. The mobile electrode pairs had 0.5m spacing (giving the main component of the response from 0.5-0.7m depth) and 1.5m spacing (giving a response dominated by depths of 1.5-2.1m). Data were collected on 20m grids, walked in zig-zag pattern, on 1m traverses with 0.5m sample interval (i.e. raw data grid has 1.0 x 0.5m node spacing). Data processing in *Geoplot* was limited to edge matching grids and removal of any minor data spikes (due to poor electrode contact). Data were exported from *Geoplot* and imported to Golden Software's *Surfer*.

The survey was laid out using tapes to locate grid positions off the baseline. The grid locations were subsequently recorded using the Trimble5700/4700 GPS system. The survey exceeded English Heritage (1995) and the Institute of Field Archaeologists (Gaffney & Gater, 1991) guidelines of location of the whole survey to within 1m of the National Grid, and location of points within the survey to within 0.1m with respect to the local grid. All grid peg locations are recorded to an estimated horizontal accuracy of 0.04m.

Results

The ground resistivity survey using 1.5m-spaced mobile probes shows a strong discrimination of the area of lower ground in the SE of the field. The NW side of this area shows an almost straight margin from 5-6m west of Trench 1 to a point just to the N of the large oak tree on the bank. The sharpness of this line is probably due to it being a steep contact between natural and overlying deposits (a lower angle contact would probably appear more gradual). This interpretation is borne-out by observation of the contact in Trench 1, where the margin of the natural is steep and is well-marked at 1.5m below surface.

To the north of this line there are three areas of lower resistivity, which contrast with the very high resistivity of the west bank of the leat and of the bank constructed to carry the fence across the leat. The most prominent of these is adjacent to the grass-cutting pile – and is probably due to the high conductivity of the leachate, rather than reflecting a real underlying feature. A rather smaller resistivity low lies on the course of the track as it rises up into the leat area. This is probably reflects the structure of the track and that the track may act to funnel groundwater flow. A third area of low resistivity lies against the west side of the leat and may indicate original leat sediments lying close to the bank.

The ground resistivity survey undertaken with 0.5m-spaced mobile probes shows some subdivision of the area of generally low resistivity. A zone of reduced resistivity 3m wide runs from the eastern side of the excavation trench towards the gate. To the east of this the resistivity rises again, so that the resistivity of the 2-3m along the edge of the field is markedly, though variably, higher. This high is probably associated with the trackway. To the SW of the area of relatively low resistivity, the resistivity is rather variable, with a series of highs. One of these broadly corresponds with the northern edge of the upstanding area of bedrock in the E of Trench 1, the second corresponds with an enhanced magnetic signature probably forming the southern edge of this bedrock.

The NW margin of the lower lawn is not marked by such sharp resistivity contrast as it was in the 1.5m-spaced survey; this indicates that the margin of the natural is not marked (or not intersected) by a depth of 0.5m – this was confirmed by excavation in Trench 1 where the top of the natural was found to lie more than 0.5m below surface. The remainder of the survey shows similar features to the deeper survey.

The magnetic gradiometry shows strong featuring over the lower lawn area, but is almost completely quiet over the raised parts of the field. This provided possible evidence for a structure in the lower areas, although details are hard to determine. The anomaly is surprisingly strongly marked and was difficult to interpret. Excavation in Trench 1 suggests that the strongly magnetic area probably corresponds to the occurrence near to the surface of the lower, anthropogenic debris- and dhustone- rich fills of the hollow. This observation can thus be extended to suggest that other areas of raised magnetism may also be the margins of similar hollows.

The zone of the resistivity low close to the track has a speckled magnetic texture quite different to the area to

the west. This may reflect the presence of magnetic material (brick, magnetic stone?) in the track.

Map and aerial photo regression

Early maps of Middleton Scriven are very limited. The Ordnance Survey 2": 1 mile preliminary drawing of c.1817 shows little detail, but arguably the road west of the bridge may show a slight northwards widening. The Tithe Map of c. 1840 shows no useful detail. The oldest map with significant detail in the area of the mill site is the OS First Edition 1:2500 of 1883/4. This shows an area with trees with a boundary corresponding closely with the arcuate steeper slope, now interpreted (see below) as a land-slip scar. The boundary of the road is shown trending downhill, roughly on the modern line, but continuing towards an area very close to Trench 2, where it turned sharply southward back to the line of the modern road boundary. A trackway is shown running from the roadway itself northwards across the E end of the triangular extension to the road boundary, passing through the boundary immediately west of the corner, then turning to run NW towards the pond area.

This arrangement is the same on the 1903 1:2500 First Revision. The next version that has been available for study is the 1954 1:10560 (National Grid, 1st Imperial Edition), in which the detail is a little sketchy, but appears to show the same arrangement as in 1884 and 1903.

The 1973 National Grid 1:2500 National Survey shows a different situation, with a new length of track near the road, leading to the site of the present gate, parallel to and alongside a new boundary to the woodland to the east. The 1973 map also shows a realignment of the road, a widening of the cutting on its south side and the truncation of a track leading towards the bridge from the south, together with the disappearance of a track by the eastern side of the river. By the 1979 1st Metric Edition 1:10000, the straight boundary to the woodland alongside the leat is shown, but there are no tracks illustrated.

Aerial photographs taken between 1948 and 1971 (1948, 1961, 1962, 1971) show a length of hedge at right angles to the road, approximately in the area of the current bunker, but which is apparently absent in photographs from 1976 onwards. The growth of bushes along this line presumably marks the steep scarp to the west of the land-slip. None of the aerial photographs shows any indication of substantial trees within the land-slip area, as suggested by the 1884 and 1903 maps. Discrimination between the different courses of the track is difficult on the aerial photographs, but the track appears to be in its current location in the 1948 photograph (though this is not certain, and would contradict the 1954 OS mapping).

Thus realignment of the road (and widening of the cutting) would appear to date from between 1954 and 1973 on the basis of the published OS mapping. However, the aerial photographs appear to show the widened cutting at least as far back as 1961, and possibly also in 1948. Thus the photographic evidence appears to place the realignment as pre-1961 and possibly pre-1948.

Excavation

Trench 1

Description

This trench incorporated an exploratory trench that had been dug previously by Andy Johnson, with an extension to the NW into the area of the probable pond and an "L" shaped extension to the SE, which was intended to increase the chances of locating structures in front of the putative dam location.

The NW end of the trench show a very simple stratigraphy with topsoil [101] passing downwards into a lower unit, possibly also hill-wash [102], which rested on a horizontal surface [103], interpreted as the cut at the base of the pond/leat. The underlying natural was highly weathered, with pieces of decomposed sandstone and siltstone lying in a yellow-brown clay-rich matrix. There were no clear water-lain sediments that could be positively identified as having been deposited in a pond. The northern part of the trench yielded only a single stratified artefact, a silver disc 25mm in diameter, interpreted as part of a post-medieval button, from [102].

The surface [103] appeared to continue smoothly as far as the abrupt drop in the bedrock, corresponding to the visible topographic feature. The top of the drop was approximately coincident with the northern end of the pre-existing trench, and the details of the relationship between the deposit in the pond [102] and the subsoil covering the weathered bedrock on the steep slope [112] were unclear. Both deposits were rather clean deposits, with few stones and occasional charcoal flecks. It is possible the two are equivalent and both represent the pre-mid 20th century soil.

Subsoil [112] was traceable down into the large hollow in the central part of the trench, and in the base of the hollow contained some large charcoal fragments – possibly suggestive of clearance prior to the subsequent dumping episode. The subsoil was also traceable as a thin veneer rising up onto the bedrock "high" to the SE. The subsoil [112] was not recognised in the part of the trench running to the NE, where the steep tilt to the NW of the highly thinned deposits combined with a very dry, compacted, soil below the overlying surfaces, made recognition of this layer difficult.

Within the "hollow" in the main section of the trench, a succession of rather complex deposits overlay the buried subsoil. The initial deposit was restricted to just the SE side of the hollow, and was a brown clayey deposit containing abundant fragments of dhustone (dolerite from the Clee Hills) commonly employed as road-stone since the 1860s.

Overlying the deposits with dhustone was a unit of dark clay soils, with abundant pottery, tile, brick and metalwork [116]. The pottery appeared to be mainly 19th to early 20th century. There were a few clay pipe fragments. The assemblage would be typical of, for instance, a post-medieval garden deposit.

Higher fills in the hollow were dominated by stiff red clay, commonly bearing large blocks of unworked stone. The clays were divided into two contexts. The lower [113] rested on the dark deposits of [116] and passed up from dense, homogeneous red clay into a level where the clay was in large blocks (probably individual spade-fulls) mixed with veneers of dark soil. The upper clay-rich layer [111] shows a similar cycle with dense clays, overlain by red clays in blocks with

dark material penetrating down cracks between the blocks and forming an irregular thin layer within the top of the context. In this instance the dark materials were dominated by coal dust.

Where the red clayey materials lapped onto the raised bedrock area at the SE of the trench, there was difficulty in distinguishing the feather-edges of the various fills of the hollow. The dominantly clay rich materials in the lower part of the section were placed into [113], although they probably included material equivalent to [112] and [117] as well as to [113]. The upper part of the section in this area was markedly more sand- than clay- rich, forming a discrete context [114] which is traceable into the hollow as a deposit underlying the SE part of [111]. The stratigraphy suggests that the upper part of the bedrock rise in the SE of Trench 1 was truncated during the levelling work and it is possible that [114] represents part of the debris from the removal of bedrock.

The clay deposits were overlain by a brown deposit [110] with abundant finds of pottery and other materials. The context again shows a texture suggestive of deposition as blocks of dug material.

The final deposit in the fill of the hollow was a lens of brown-red clayey silt [109], representing a final stage in the development of the dump.

At the east end of the trench the trackway seen in Trench 4 was encountered. The basal layer of this comprised large local stones in a brown silt [108], overlain by a more coherent surface of large stones [106], which were in turn overlain by a gravel of dhustone and coal, which also extended laterally about 2.5m SW of the large stones of [106] and which may have been laterally equivalent to the layer of coal and dhustone incorporated into [111].

Interpretation
Trench 1 did not show any of the features that were expected. The pond was terminated abruptly at the bedrock face with no indication of a dam, and to the SE of the face the bedrock did not fall away sufficiently to allow for a mill to be situated here. Instead the apparently gentle slope of the modern garden was underlain by bedrock with a hummocky topography, which had been truncated and levelled at some relatively modern date.

The levelling deposits showed a dominance of dark, artefact rich soil at the base, overlain by deposits rich in red clay, with a coal rich layer at the top possibly being associated with steam vehicle activity over the flattened topography (see also below under Trench 4). The material probably derived from a single site, with inversion of the stratigraphy as the excavation cut into the original location. The homogeneity of the source is reflected by the fragments apparently from a single vessel, probably a teapot, with an internal brown glaze and an external dark green glaze, which were recovered from contexts [110], [113], [114] and [116]. Most of the artefacts from the fills were probably 19th-20th century, but possibly earlier material from the 17th-18th centuries includes trailed slip ware ([108], [110] & [116]), a possible Midlands Purple pot rim [116] and thin black glazed red ware ([105] [110] & [116]). The youngest identifiable material was aluminium foil, probably a wrapper from confectionery (recorded from [111] but possibly from the underlying dark soils of [113]). Less closely dateable materials from the fill of the hollow include mortar, brick, firebrick, roofing tile, floor tile, ceramic drain pipe, clay pipe, iron nails, staples, rod and strapping, a copper alloy ring, clinker, small fragments of bottle glass and occasional pieces of window glass.

The backfills of the hollow were overlain by deposits associated with the trackway running from the road up the slope to the area of the pond (better seen in trench 4). The track materials were associated with fragments of glazed ceramic drain pipes of very recent appearance.

Trench 2

Description
Trench 2 contained part of a watercourse, stone-lined or embanked on one side, with water-lain fills, overlain by a succession of later dump and collapse deposits, interdigitating with darker soil to the east. The succession in the upper part of the stratigraphy to the east of the trench was confused by modern disturbance extending to a considerable depth.

The watercourse was cleared to its base only over a very small area for safety reasons. The base was probably mainly cut into the natural (although a cut could not be proved in the small area examined). To the northern side of the channel, a layer of stones appeared to have been laid on, or pressed into, the natural. The base lay at approximately 114.75m OD (just 0.3m above the modern water level in the adjacent stream).

The channel was bounded to the north by a low structure of stone [212]. The wall was unmortared, but was heavily weathered and infiltrated by clay, making it difficult to determine whether a binding clay had been present originally. The well preserved section of the wall was overlain by further highly weathered stone [213] which was probably also part of the structure. The lower fill [210] within the watercourse was mainly clay-dominated, although there were frequent laminae and lenses of coarser sediment, of up to gravel grade. Some of the coarser materials shows manganese-rich cements. These materials were dominantly a pale yellow-brown to cream colour.

The lower water lain sediments are overlain by deposits of a more variable colour [207], including a prominent lens of red clay. This context contained numerous fragments of lime mortar. This context was overlain by a more dominantly red clay with mortar fragments [206].

The area of the watercourse and wall was almost entirely overlain at a high level by a deposit of slabby, green sandstone blocks [205]. The blocks had sunk into the underlying deposits ([206], [207] and [210]) in many places. This disturbed layer under the stones of [205] yielded a well-reserved clay pipe bowl, dated to 1780-1820.

The stones of [205] were overlain by a rather variable, but dominantly fine grained context [203]. This context was mainly brown clay, bearing clasts of dhustone and various burnt materials. The lower part of the context had an intercalated lens of yellow-brown clay [204].

The overlying context was much darker and bore a larger proportion of dhustone. Towards the west the context was dominated by a dense mass of dhustone gravel [202a], which towards the east became progressively more muddy, with a lower proportion of gravel clasts [202b].

The boundary of the road has been adjusted within the last few decades, and the area of dense dhustone

gravel has apparently been within the boundary of the road prior to this.

The topsoil [201] was thin to absent over the main area of gravel, becoming thicker towards the east of the trench. In the southeast of the trench (not shown in Figure 7), the topsoil overlaid a dump of black, ashy material [208] of recent origin. In this part of the trench there was a layer of clay [209], under [208] but sealing the gravel [203]. This clay may derive from landscaping or building within the garden – perhaps being spoil from the building of the adjacent "summerhouse" or the pit containing the septic tank which is very close to the trench.

Interpretation
Trench 2 contains 5 context groups:

1. [212] & [213]: contexts associated with the construction of the watercourse. Stone structure [212] and its weathered upper levels [213] appears to represent a structure containing the watercourse on its northern side. The original surrounding topography is uncertain, but this was probably the slightly down-slope side of the channel.

2. [210], [207] & [206]: contexts associated with sedimentation within the watercourse. Fill [210] contained no finds. Fills [207] and [206] contained abundant fragments of mortar and some charcoal. The disturbed layer below the subsequent dump of stone [205] contained a clay pipe (dated to 1780-1820), but it was unclear in which of the disturbed underlying contexts it was originally, although it must have come from close to the top of this succession

3. [205]: Dump or collapse of stone over the abandoned watercourse. The stone of [205] shows some similarity with the slabby green sandstone employed in [212]/[213]; there is therefore a possibility that this context represents further collapse or demolition of the watercourse structure. Alternatively it may be debris from another phase of activity, perhaps associated with alterations to the road. The deposition of this deposit is constrained by the 1780-1820 pipe immediately below it, and the abundant dhustone (unlikely to older than 1850) within the sediments above.

4. [203] & [202]: Contexts influenced by the road. These contexts show abundant dhustone gravel, which in the lower levels may represent material washed off the adjacent road surface, but the dense gravel deposit of [202a] must represent either the road margin itself or a dump of road chippings.

5. [209], [208] & [201]: These deposits are all associated with the modern garden and/or very recent landscaping.

Trench 3

Description
Trench 3 was placed in the approximate centre of the pond area to determine the stratigraphic succession there, since the NW end of Trench 1 was marginal to the apparent topographic expression of the pond.

The rockhead was highly weathered, as in Trench 1, but was possibly better differentiated from the overlying subsoil (?) [304], which was a brown clayey silt approximately 70mm thick. It was comparable with deposits [103] and [112] of Trench 1. The overlying deposit [303] was a more yellow clayey silt with sporadic Mn-mottles. This context contained a single sherd of Midlands Purple pottery close to its top. The overlying context [302] was slightly more brown than [303], contained sporadic flecks of charcoal and fewer Mn-mottles, but was otherwise rather similar. The topsoil [301] was brown, soft, silty and gradational into [302].

Interpretation
The succession in Trench 3 was broadly similar to that in the NW of Trench 1, although rather thicker. In neither case was the succession what was expected from the pond, presumably because sediment accumulated in the pond largely as hill-wash.

Trench 4

Description
Trench 4 was not a single trench, but 3 aligned sub-trenches with 2m gaps between the trenches, to provide coverage down the slope from just NE of Trench 1 to the gate onto the road. Trench 4a, the furthest NW, was 3m long by 1m wide, trenches 4b and 4c were each 1m by1m.

Trench 4a had a stratigraphic succession with strong similarities to the E end of Trench 1. The natural was a mainly brown (although there were some redder patches), rather weathered, rockhead [408]. This was overlain by a clean brown silty soil [409] in the SE half of the trench. This deposit was similar to [115] in the eastern part of Trench 1, itself probably equivalent to the pre-dump soil [112] in the main section of Trench 1.

This clean deposit was overlain by a brown silty soil with abundant charcoal, dhustone fragments and fragments of tiles [405], which extended over the whole trench. This context was overlain by a track surface which comprised two contexts, a number of very large stone slabs, mainly of local sandstone, [403] with an interstitial gravel material of mainly limestone chippings, which locally covered some of the large stones [402]. The track surface was mainly covered by modern topsoil, but the large stones locally rose above the surface.

In Trench 4b, the natural appeared to be a red or purplish hard clay. This was overlain by similar material, but which was clearly disturbed [406], but highly compacted. This disturbed natural was capped by a layer (included within the same context) of stones, apparently forming a surface, but which might have been simply a compacted (mechanically rolled?) stone-rich reworked natural. This stone layer formed a very marked top to the reworked natural, with the subsequent layer of brown silty soil [405], lying upon it with marked discontinuity. [405] showed similar features to those in Trench 4a 2m to the west. The track surface ([403] & [402]) was also broadly similar, although [402] contained lenses of intercalated coal dust, not seen in Trench 4a. [401] completely covered the track surface.

In Trench 4c there was a very similar succession, but the reworked natural [406] was much thicker and showed multiple layers, with distinct tip lines in the upper layer, containing alternating zones of maroon and yellow-brown deposits. Again the top of the reworked natural was sharp, but lacked the stone layer seen in Trench 4b. The brown silt [405] was only present locally in this trench, with the track surface material lying directly on the reworked natural in most areas. The heavy stones of [403] only showed in the SW section. The interstitial material and a general

spread to the NE of the large stones was dominated by dhustone fragments, although still containing limestone chippings. This material was given the context number [404] to distinguish it from the limestone-only material [402] in 4a and 4b, although it may well have just been a lateral variant.

Interpretation
Although various interpretations are possible, Trench 4 appears to show two distinct phases of activity. In the first, a dump of reworked natural red clay was emplaced, apparently starting at the SE, and received extreme compaction, suggesting that a mechanical roller had been employed, or at very least that heavy machinery had driven over the material. The use of such machinery may also be suggested by the common layers of coal dust, not only in Trench 4, but also in the upper deposits in Trench 1. Steam powered road rollers were developed in the 1860s and employed until the 1960s. This phase of dumping and possible rolling would have opened up the site, and may have been done to permit access for the dumping of the deposits filling the hollow in Trench 1. The development of the brown silty soil [405] over much of this area suggests that the area was not a track at this time, but that the track surface ([402]/[403]) followed at some later time.

Discussion

The Mill

The interpretation of the site remains problematic. Elements of the water management system are now better understood. The upstream dam and leat are now well characterised. The excavations in the probable pond produced mixed results; silts in the area of the pond produced late medieval to early post-medieval pottery, but there was no indication of the location of the dam itself. The stone-walled watercourse in Trench 2 would appear very likely to be the tail race for the mill.

The potential location for the mill is thus apparently tightly constrained. The probable tail race is aligned with the modern northern boundary of the road to the west of the excavation, suggesting that the boundary may perpetuate the old tail race.

The identification of the truncation of the pond as being the result of land-slipping provides an explanation for the absence of the dam in the expected location in Trench 1. The actual location of the dam remains uncertain. In the SE end of Trench 1 the natural bedrock had been truncated by the levelling operations, so it was unclear if it had been overlain by the dam. The dam may have lain further SE, and a straight edge to a geophysical anomaly immediately SE of Trench 1 might indicate its location, although this might equally be another fracture within the slipped mass.

Various possible locations for the mill could be suggested to explain the observations described above, but it now seems most likely that the topography of the mill site has suffered extensive modification through land-slipping since the period of operation of the mill.

The land-slipping is suggested by the amphitheatre-like form of the present garden. The slope forming the SE termination of the pond is continued in an arc to the southwest, towards the road. Although possibly modified by recent landscaping, this feature resembles a land-slip scar. The buried hummocky topography in Trench 1 can be viewed as the result of disrupted blocks within the land-slip. It may be relevant that the natural recorded in Trench 1 was very highly weathered.

However one views the interpretation of the observations, it is now clear that there is insufficient fall for a waterwheel close to the expected dam location. Either the dam location is elsewhere (the favoured interpretation) or water must have been supplied to the wheel by a launder.

If the hummocky topography seen in Trench 1 was original and outside the dam, it seems unlikely that such a setting would not accumulate rubbish during the lifetime of the mill – yet none was found. Equally, if the topography was original and within the pond it would have acted as a sediment trap and deep pond sediments would have been expected within the hollow.

The interpretation of the features seen in Trench 1 as being the result of land-slipping means that the mill site is likely to be extremely complex. The dam and mill probably lay at a location between the land-slip scar and the road. To have a fall to power the wheel in such a location may suggest that the mill lay in a rather confined hollow, possibly generated by an earlier phase of land-slipping.

The 2009 investigations revealed little direct evidence for the date of the mill. The sediments of the pond area yielded two artefacts – a sherd of Midlands Purple pottery (a fabric ranging from the 15th – 18th centuries and a silver alloy disc 25mm in diameter, interpreted as part of button. A similarly-sized disc, but in copper alloy, was recovered from a superficial deposits [204] in Trench 2, so both discs are interpreted as being of later post-medieval age.

The only other significant piece of dating evidence from Trench 2 was a clay pipe – probably of local origin and datable to the period 1780-1820. This pipe came from immediately below the stone spread [205], and was probably in context [206] (although there was considerable disturbance immediately below the stones, so an origin in [207] or the top of [210] cannot be excluded). This date is significant, for the context of the pipe is associated with deposits bearing lime mortar ([206] and [207]) interpreted as material derived from the degradation of the mill building, and immediately below the stone spread [205], which resembles the stones in the race structure ([212] and [213]) and is therefore interpreted as probably representing a collapse of part of that structure.

The levelling/dumping

The substantial levelling on the site involved both removal of upstanding topography (SE end of Trench 1, possibly also in Trenches 4b and 4c), as well as dumping of reworked natural clays (Trench 1, Trenches 4b and 4c) and artefact-rich dark soils (Trench 1).

The reworked deposits were associated in many instances with the occurrence of road-stone from the dhustone quarries of the Clee. The dumps near the road (Trenches 4b, 4c) of reworked natural were highly compacted, indicating the use of rolling equipment or, at very least, the passage of very heavy equipment over the spoil. Ddustone was exploited for use on roads from the 1850s onwards; the use of traction engines starts in approximately the same period, with

steam rollers appearing from the late 1860s (although probably not in widespread rural use until much later). There was evidence for aluminium foil in the dark deposit [113] in the hollow in Trench 1. Aluminium foil progressively replaced tin foil as a food wrapper from 1910 onwards, becoming common in the mid-twentieth century. It may also be significant that the maps of 1884 and 1903 show a land parcel bearing large trees at the mill site, but these are gone by the aerial photograph of 1948.

The date of the dumping/levelling operation is likely to have been in the second or third quarter of the 20th century, with the trackway constructed as a separate, later event.

Although the origin of the dumped material is unknown, since the alteration of the site at the time of dumping involved both cut and fill levelling operations, it is quite possible that the dumped spoil originated within the general area of the site. The ceramic building materials from the assemblage could be early 19th century (though probably not much earlier), the pottery shows elements ranging back to the 17th, perhaps even the 16th, century and it may be significant that some of the earlier pieces are amongst the larger fragments of pottery; the later ceramics are dominantly highly comminuted debris. Such material could have come from construction of a new road, alterations to the road cutting or changes to bridge, as well as simply tidying up the area of the former mill.

The trackway

The trackway encountered in Trenches 1 and 4 appears to have a sub-structure of large stone blocks and a surface of smaller dhustone and limestone fragments. The large blocks are associated with a fine, silty, deposit lying above the levelling deposits, suggesting that there may have been a significant time-interval between the levelling and the construction of the track. The track probably dates to a somewhere between the 1940s and early 1970s; unfortunately tree cover prevents clear identification of the course of the track on aerial photographs from this period.

Summary

The topographic survey demonstrates the elegant engineering of the dam and leat. The dam probably utilised a constriction in the incised valley to reduce the construction required, but is none- the-less an impressive structure. The water level in the leat probably lay at about 3.5 m above modern stream level. This would have created ponding in the valley above the dam extending upstream for some distance (although the fall of the stream is quite rapid here, so this may only have been for around 100m of less).

The leat appears to be fairly level between the dam and pond, so it too would have functioned as part of the pond. Since it is likely that much, or even all, of the stream flow would have been directed along the leat, a take-off would have been required above the mill, and the most likely location for this is just inside the modern garden boundary.

As discussed above, the most likely interpretation of the dam location is that it was disturbed, probably by land-slipping, and that it must have lain much closer to the road. The bedrock at the southeast end of Trench 1 is only 1m below the floor of the pond, and is interpreted as a land-slipped continuation of the pond floor (although truncated by levelling, so the overlying of this natural by the dam cannot be excluded). In contrast, a fall of 5-6m is present overall between the pond and the probable tail race. This would allow for a large wheel, if the overall fall is focused in one location. One possible line is suggested by a marked straight edge in the magnetometer data, which suggests the elevated natural in the southeast end of Trench 1 ends approximately 1.5m further SE than the end of the trench. The potential utilisable fall in this area is not known. The available space for the mill building is very small and it is likely to have fronted onto the road.

The watercourse in Trench 2, interpreted as the tail race, apparently lies along the modern road boundary. Whilst it is possible that this watercourse is merely a roadside drain, its substantial construction and early abandonment would suggest against this.

The age of the mill is unclear. The substantial engineering of the dam and leat hints at a post-medieval structure, although a late medieval origin cannot be excluded. The existence of a mill in Middleton Scriven in the post-medieval period is implied by two pieces of documentary evidence: a will records that John Dudlick was a miller in Middleton Scriven in 1588 and a lease of 1751 mentions “6 pieces of land called the Moores lying near the Mill”. Abandonment of the mill was possibly around 1800, from the evidence of the clay pipe in the abandonment levels of the probable tail race. The mill is not shown on the 1817 Ordnance Survey preliminary drawing, the Tithe map of the 1840s, nor on any later mapping.

The mill site was levelled by dumping. The dumped material had a basal layer [117] rich in dhustone blocks. This material has been quarried as road-stone from the Clee Hills since the 1860s, and so gives a *terminus post quem* for the levelling of about 1864. The dumping phase is however, likely to have been much more recent, possibly in the mid 20th century on the basis of small fragments of aluminium foil (confectionery wrapper?) from the lower part of the dump [113]. In general, the lower sections of the dump contained a high proportion of dark, organic, soil rich in small pottery fragments (which showed a very range of ages from possibly 17th-20th centuries); higher parts of the dump contained a higher proportion of stiff red clay and large stones. This may suggest the inversion of an original stratigraphy present in the source of the dumped material. That source may have been elsewhere within the area, but it is also possible it was nearby, possibly clearance of the mill site itself.

References

Gaffney, C. & Gater, J. (with Ovenden S.) 1991. *The use of geophysical techniques in archaeological evaluations*. IFA Technical Papers No 9.

English Heritage 1995. *Geophysical Survey in archaeological field evaluation*. Research & Professional Services guideline No 1, 39pp.

Figure 1. Topographic survey of site.

Figure 2. 3d images of topography

Figure 3. Detail of mill site area, showing cartographic features pre-levelling

Figure 4. Geophysical surveys

Figure 5. Trench 1 NE-facing section

Figure 6. Trench 1 NW-facing section

Figure 7. Trench 2 S-facing section

Figure 8. Trench 4 SW-facing section

Figure 9. 3D image of topography of mill site area, with interpretation of land-slip

Figure 10. Detail of topographic survey showing interpreted pre-levelling topography indicated by hachures.

Context	Overlies	Underlies	Description
101	102	surface	Topsoil – north of trench, pale brownish
102	103	101	Red brown silt with rotten stone
103	104	102	Cut below 102 – base of pond/leat
104	n/a	103, 112,	Weathered bedrock – natural
105	106/107/114/ 111/110/109/ 112?	surface	Topsoil – south of bedrock step – dark
106	108	105	Coarse road-stone surface (restricted to E part of trench; laterally equivalent to 107 further west)
107	114/108	105	Small road-stone chips and coal (laterally equivalent to 106 in the east)
108	113	106/107	Large local stones in brown silt (laterally equivalent to 114 to the west?)
109	110	105	Lens of red clayey-silt
110	111	109	Dark, charcoal-rich deposit
111		110	Red silt with sandstone
112			Brown subsoil with charcoal flecks
113			Red clay with abundant green sandstone
114			Sandy rubbly deposit with charcoal flecks, clinker and coal
115			Brown friable silt
116			Dark brown humic soil with frequent charcoal pottery and other artefacts
117			Yellowish/light brown sand with frequent road-stone
118			Reddish clay with decayed yellow sandstone
119	115/117	113	Brown silty deposit with frequent road-stone, possibly equivalent of 114? N side of E extension

Table 1: context summary for Trench 1

Context	Overlies	Underlies	Description
201	202/208	surface	Topsoil – absent in parts of western end of trench, where 202 extends to surface
202	203	201	Roadstone chippings, comes richer in fine matrix to E (202b)
203	204	202	Brown topsoil with large roadstone pieces
204	203	203	Yellow-brown clay (within 203)
205	206/207/210/ 211	203	Compact deposit of green sandstone in platy slabs
206	207	205	Mottled red clay with mortar
207	210	206	Yellowish brown sandy silt with charcoal flecks
208	209	201	Black ash deposit
209	203	1208	Red clay
210	Natural/212	205/207	Pale yellow-brown sandy silt
211	213	205	Red silt with sandstone
212	?	213	In-situ green sandstone walling
213	212	210/211	Decayed green sandstone

Table 2: context summary for Trench 2

Context	*Overlies*	*Underlies*	*Description*
301	*302*	*surface*	*Topsoil*
302	*303*	*301*	*Yellow brown silt with rare charcoal flecks*
303	*304*	*302*	*Soft yellow silt with Mn-mottling*
304	*103*	*303*	*Brown clayey silts, decomposed stone and a little Mn-mottling*
103	*natural*	*304*	*Cut for base of leat/pond*

Table 3: context summary for Trench 3

Context	*Overlies*	*Underlies*	*Description*
401	*402/403/404*	*surface*	*Topsoil*
402	*405*	*401/403?*	*Roadstone chippings with coal lenses*
403	*402?/405*	*401*	*Large stones forming track*
404	*406*	*401*	*Mixed dhustone and limestone fragments)*
405	*406*	*402/403*	*Brown silt*
406	*207*	*404/405*	*Redeposited natural with haematite-rich clay*
408	*n/a*	*405/409*	*Brown weathered bedrock*
409	*408*	*405*	*Red-brown deposit in SE half Trench 4a (=[115])*

Table 4: context summary for Trench 4

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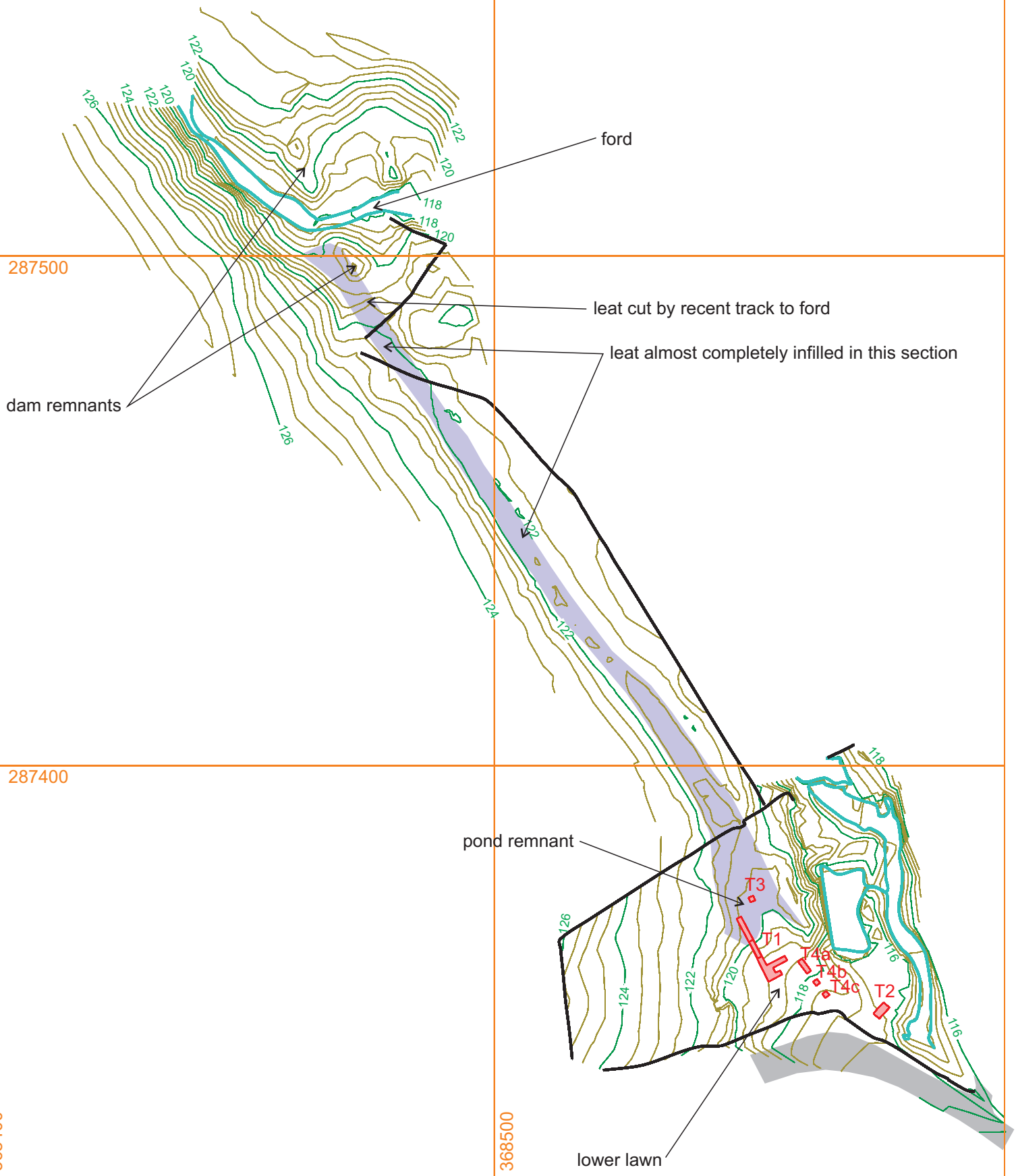
Report 2009/52. Figure 1

topographic survey

black lines - modern boundaries
green lines - contours at 0.5m intervals, dark green 2m intervals
blue lines - edges of water at time of survey
grey tone - modern road
blue tone - leat
red - excavation trenches

Produced: 26/11/09 | Scale: 1:1000 @ A4



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Report 2009/52. Figure 2

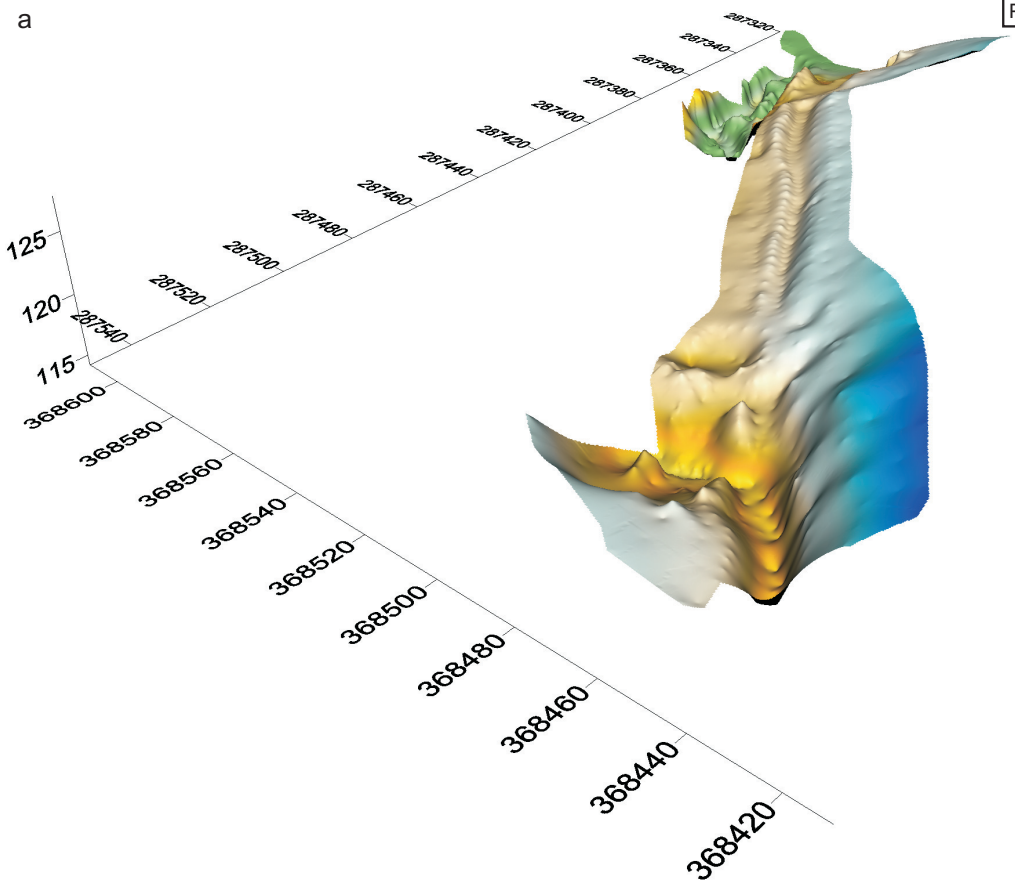
topographic survey as 3d image

x3 vertical exaggeration

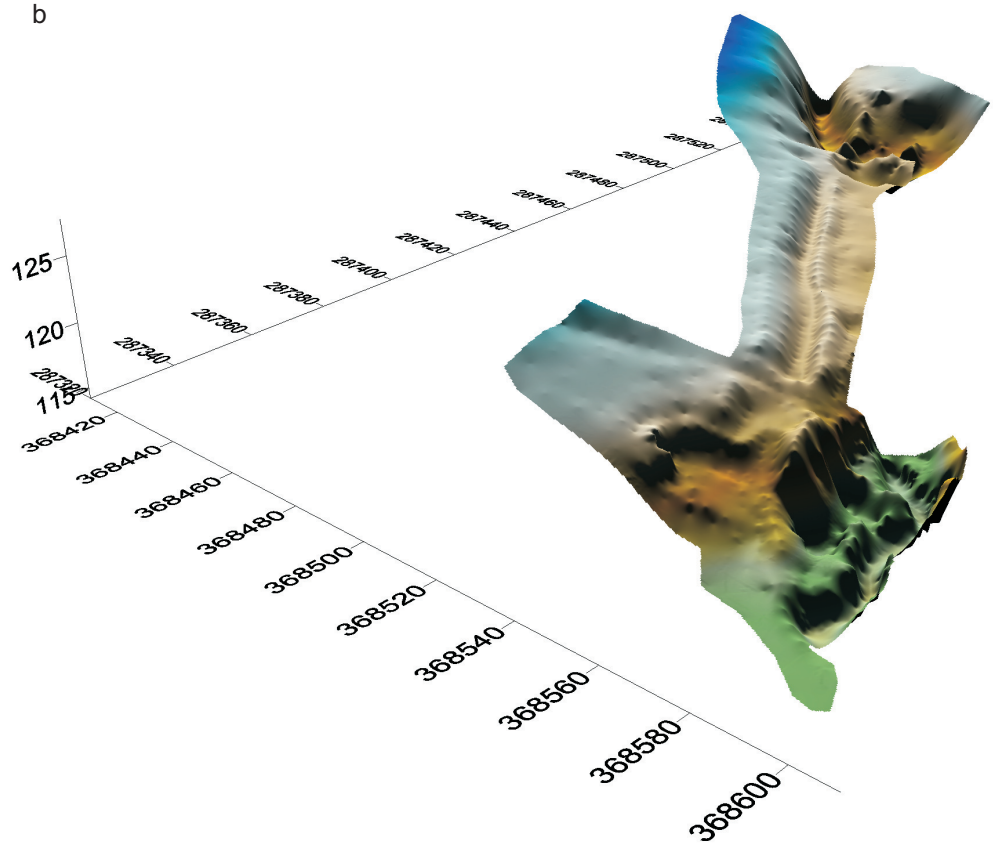
a. viewed from NW, remains of dam in foreground.
b. viewed from SE, probable mill site in foreground

Produced: 26/11/09

a



b



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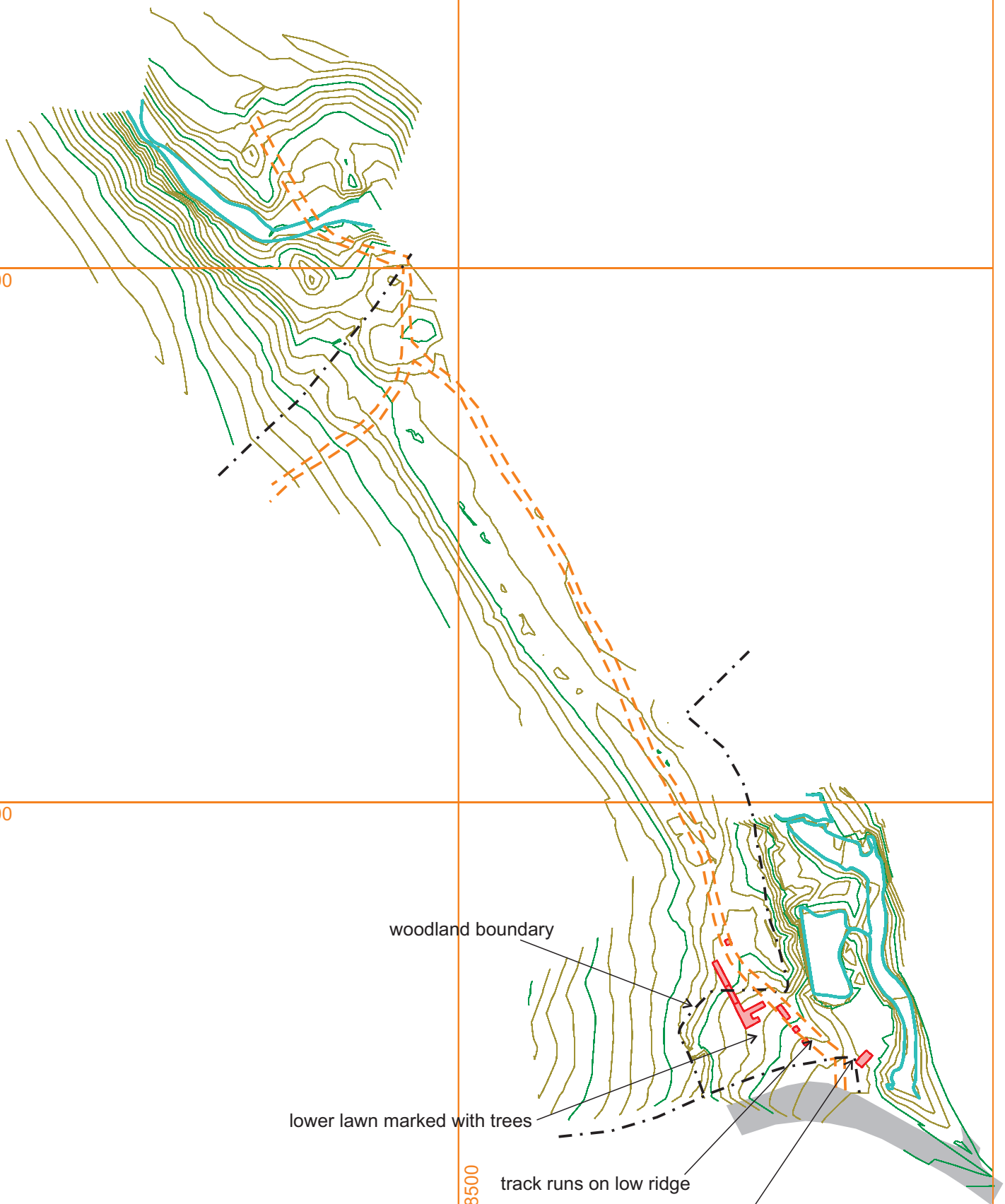
Report 2009/52. Figure 3

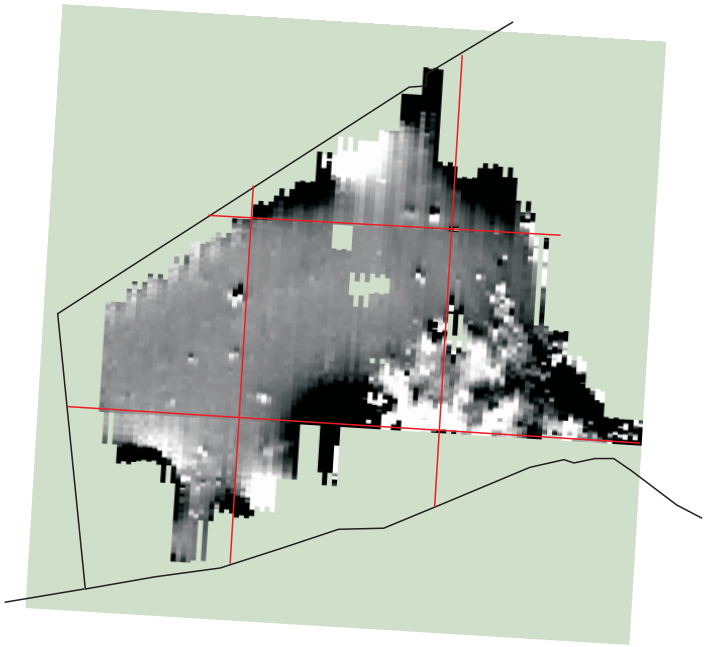
topographic survey with selected 1884 features

black lines - selected boundaries from 1884 OS 1:2500
green lines - modern contours as in Figure 1
blue lines - edges of water at time of survey
grey tone - road
red - excavation trenches

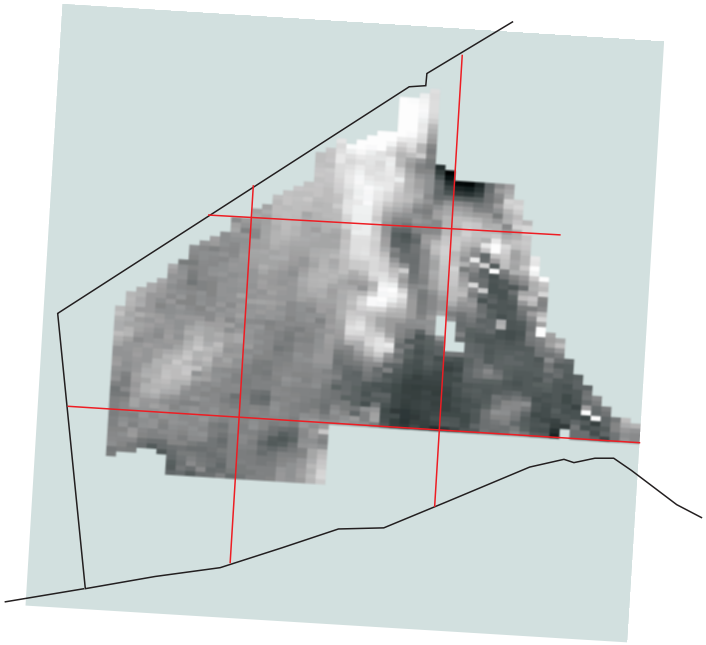
Produced: 26/11/09 | Scale: 1:1000 @ A4



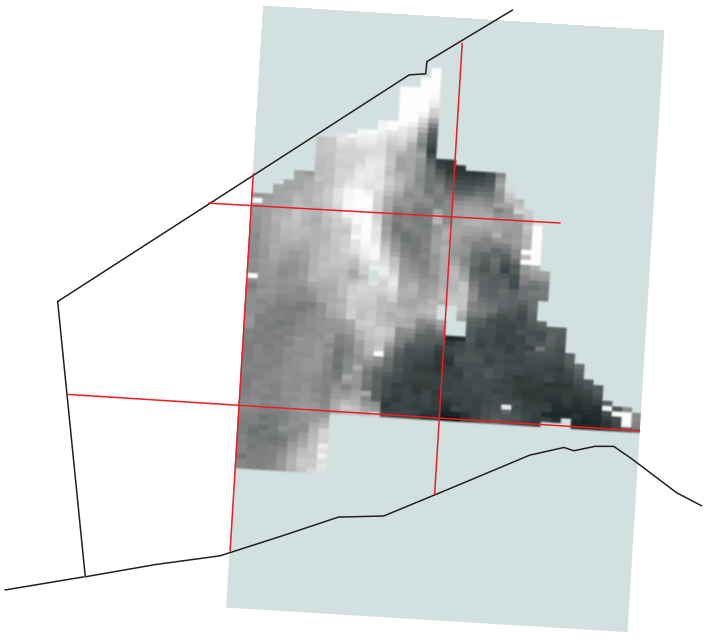
a



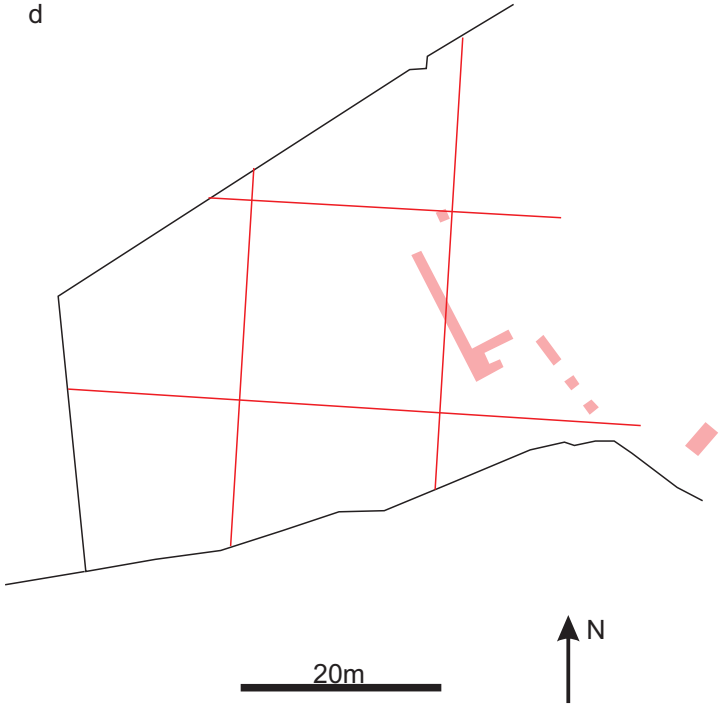
b



c



d



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Report 2009/52. Figure 4

geophysical surveys

a: magnetic gradiometer survey,
greyscale black -13nT to white +13nT
b. ground resistivity survey, 0.5m probe spacing,
greyscale black = low to white = high
c. ground resistivity survey, 1.5m probe spacing,
greyscale black = low to white = high
d. grid layout with 20m survey grids, boundaries and trenches

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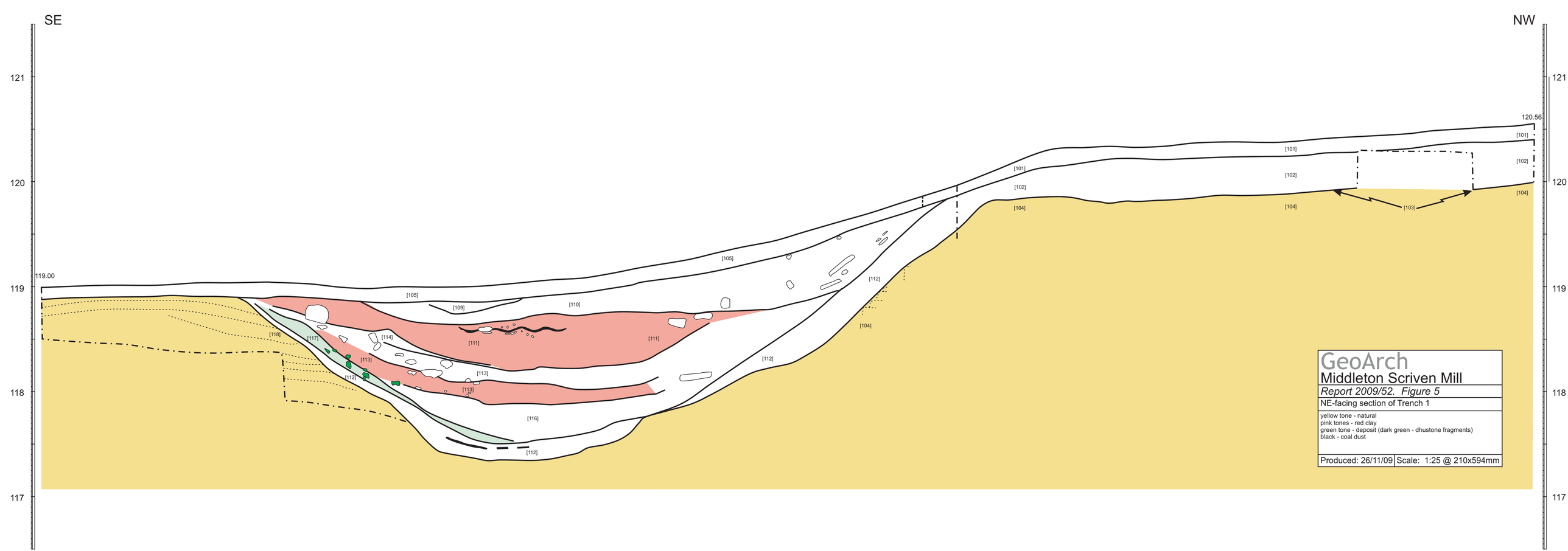
SE
NW
121
120
119
118
117
119.00
120.56
[101]
[102]
[103]
[104]
[105]
[109]
[110]
[111]
[112]
[113]
[114]
[116]
[117]
[118]
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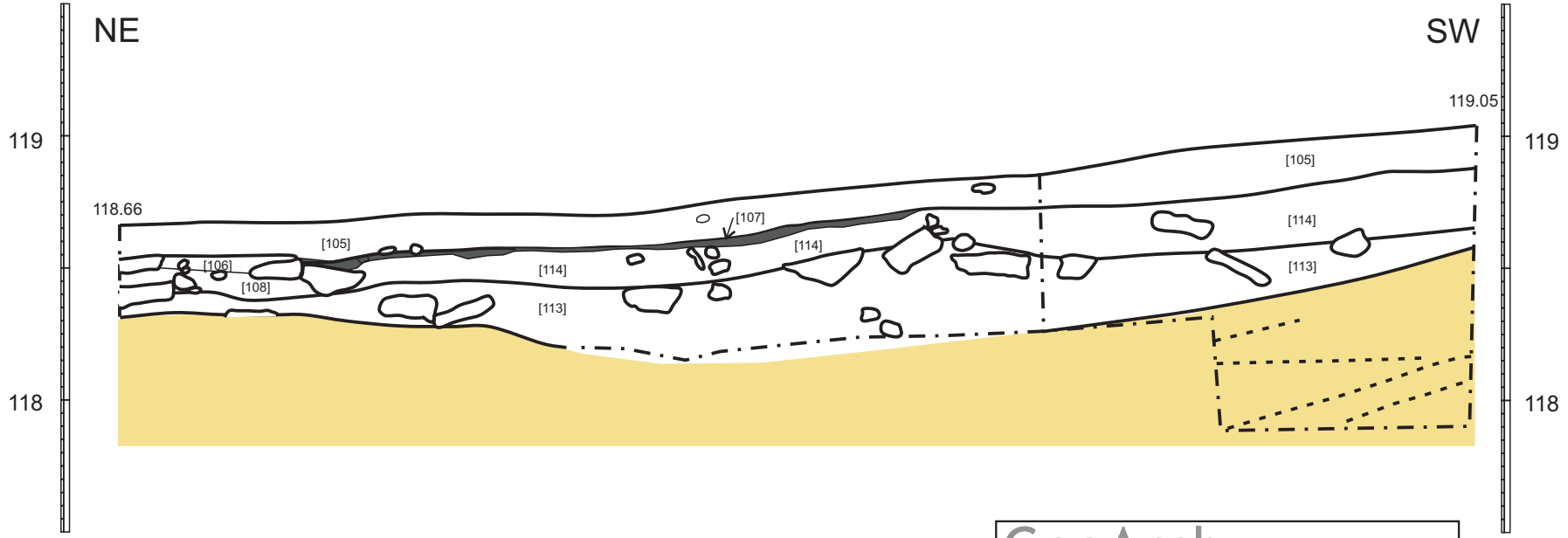
Report 2009/52. Figure 5
NE-facing section of Trench 1
yellow tone - natural
pink tones - red clay
green tone - deposit (dark green - dhustone fragments)
black - coal dust
Produced: 26/11/09
Scale: 1:25 @ 210x594mm



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Report 2009/52. Figure 6

NW-facing section of Trench 1

yellow tone - natural
black - coal dust and dhustone gravel

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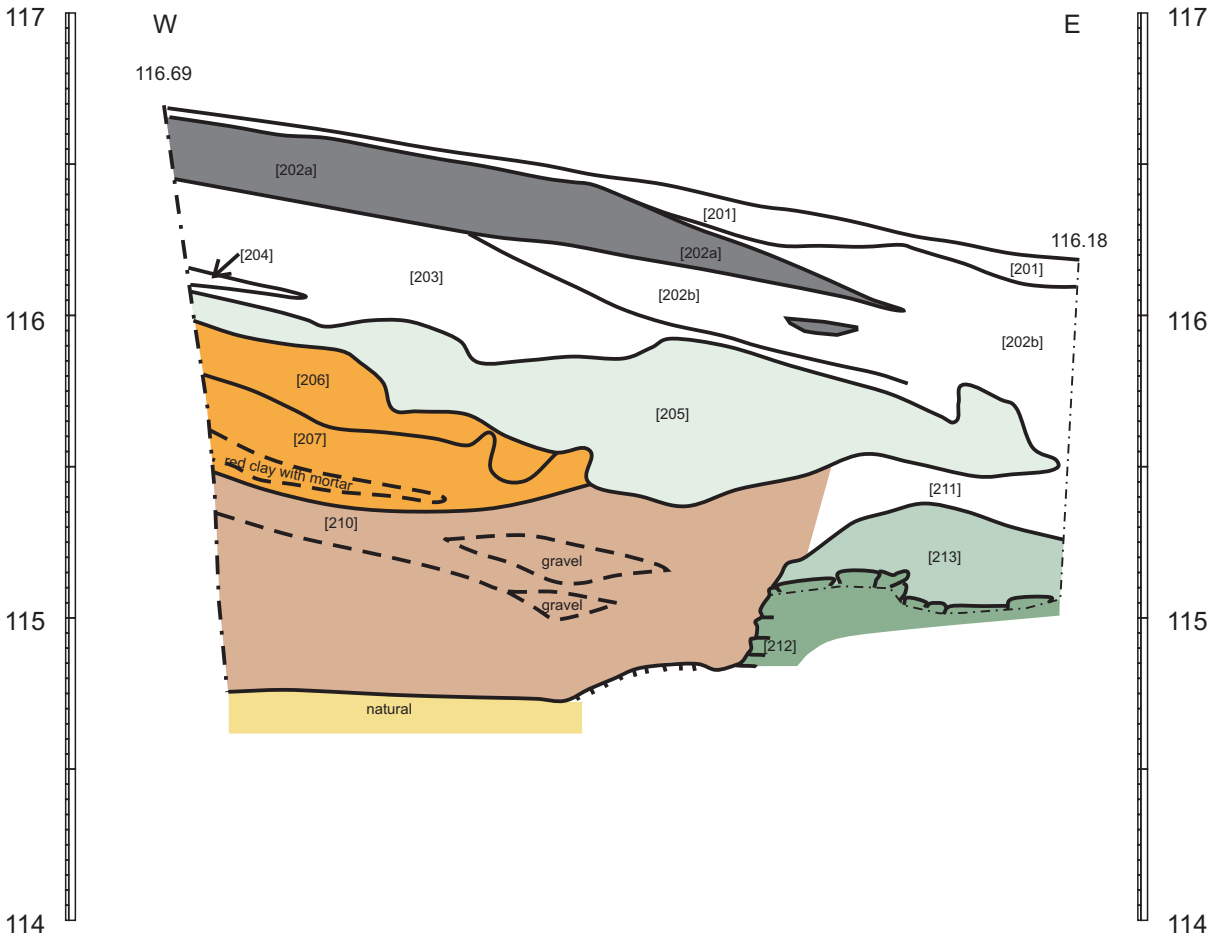

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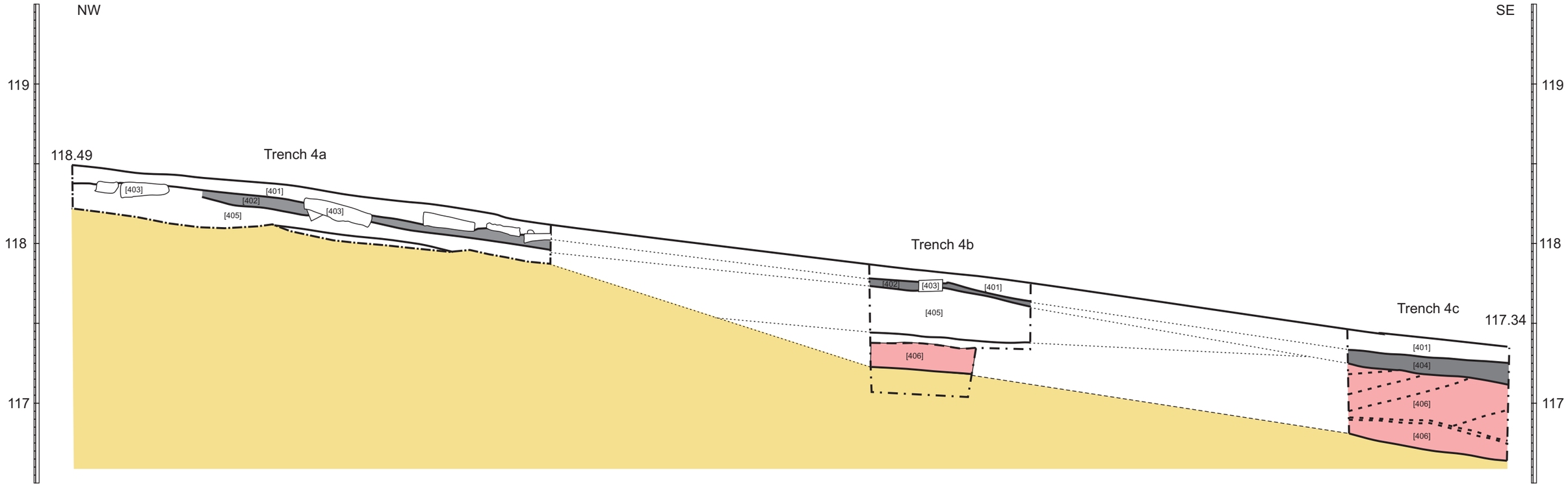
S-facing section of Trench 2

yellow tone - natural
grey tone - road-stone gravel
dark green tone - *in-situ* stonework (mid-green where weathered)
pale green tone - loose stone
orange tone - fine-grained sediments rich in mortar
brown tone - water lain silts and gravels

Produced: 26/11/09	Scale: 1:25 @ A4



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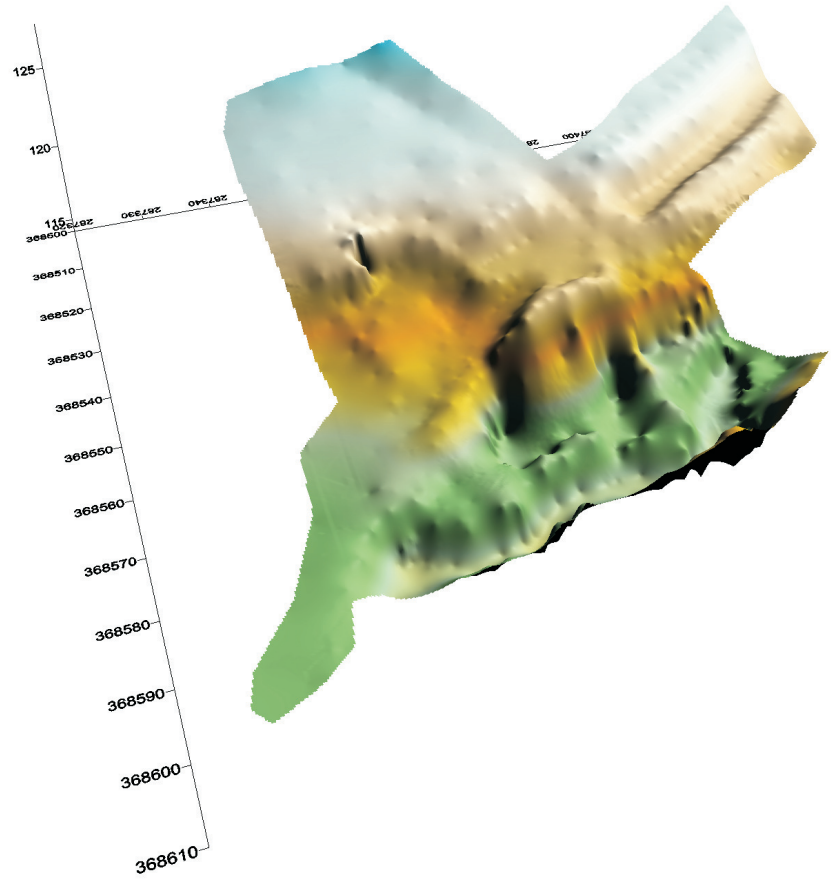
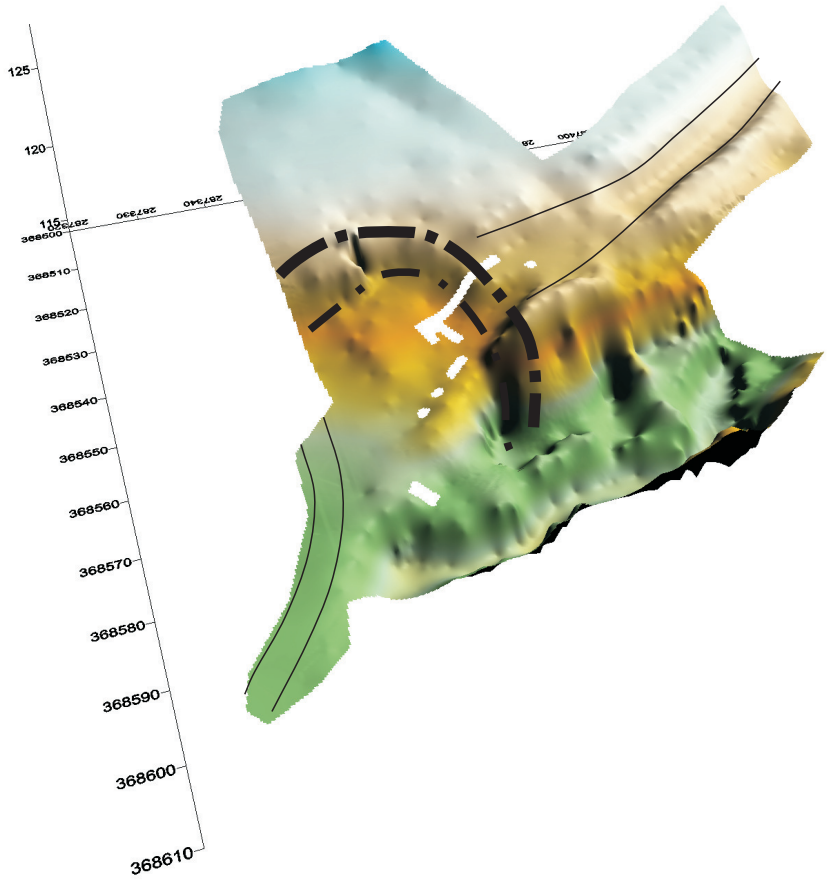
SW-facing section of Trench 4a, 4b & 4c

yellow tone - natural
grey tone - road-stone gravel
pink tone - redeposited natural

Produced: 26/11/09 | Scale: 1:25 @ A3





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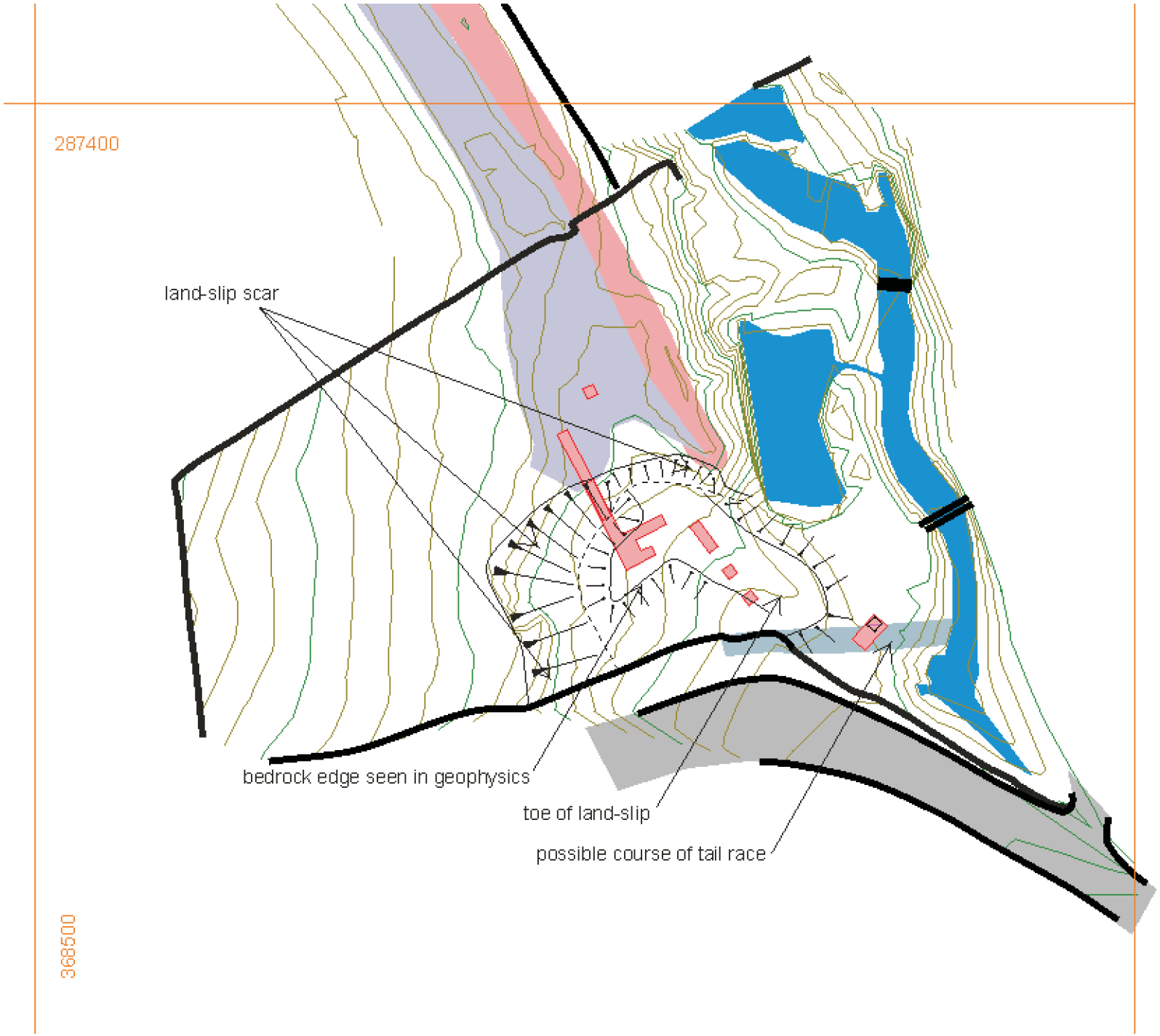
Report 2009/52. Figure 9

3d topographic survey of probable mill site

Above: 3d image of topographic survey of probable mill site (x2.5 vertical exaggeration)
Below: as above but showing location of trenches (white), margins of leat and suggested landslip scar. Bold pecked line shows the top of the scar, thin pecked line the base of the scar.

Produced: 26/11/09	



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Report 2009/52. Figure 10

survey with proposed pre-levelling topography

hachuring - pre-levelling topography from excavation and inferred from geophysical survey
blue tone - leat & pond
pink tone - leat bank
pale blue tone - probable tail race
other symbols as Figure 1

Produced: 26/11/09	Scale: 1:500 @ A4

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