

# Shafton By-pass/Engine Lane Improvement

## *Shafton*

## *South Yorkshire*

### *Archaeological Evaluation*

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*Archaeological evaluation along the proposed route of Shafton By-pass identified the presence of a large enclosure ditch, linear and discrete features. Little artefactual evidence was recovered from the excavations to indicate precise dates for the majority of the features or assist in establishing the function of the enclosure. However, it is likely that the enclosure is of late Iron Age or early Roman date, and consequently of potential regional importance.*

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## **1. Introduction**

- 1.1 Archaeological Services WYAS was commissioned by Dr. A. Chymera of Barnsley Metropolitan Borough Council (Planning and Transportation Service), to undertake an archaeological evaluation along the proposed route of Shafton By-pass. The evaluation concentrated on two sections of land (Fields 1 and 2) situated to the immediate east and west of Engine Lane, Shafton (Figs. 1 and 2). The site is centred on SE 398 100 and comprised an area of approximately 6 hectares. Field 1 is bounded on the east by Engine Lane, by the residential development of Hazeldene Crescent to the north, by waste scrubland to the north west and by an agricultural field to the south. Field 2 is bounded by Engine Lane to the west, a residential development and associated allotment gardens to the north, the waste scrublands associated with a dismantled railway line to the east and a industrial complex to the south.
- 1.2 The underlying geology of the area is Middle Coal Measures comprising Parkgate and Mexborough sandstones and grits (British Geological Survey 1976). The soils are permeable seasonally waterlogged loams of the Bardsey Association (713a, Soil Survey of England and Wales 1983). Currently the land comprises agricultural fields, which at the time of the evaluation had been recently seeded.
- 1.3 The evaluation was undertaken between the 22<sup>nd</sup> March and the 24<sup>th</sup> April 2001 with between two and four archaeologists on site. Mr. Roy Sykes of South Yorkshire Archaeology Service made monitoring visits on the 28<sup>th</sup> March and 13<sup>th</sup> April 2001.

## **2. Archaeological Background**

- 2.1 The proposed route of Shafton By-pass has been subject to a number of previous archaeological investigations, including a desk-based assessment and geophysical (gradiometer) survey, undertaken by Archaeological Services WYAS (Keith 1999; Webb and Whittingham 2000).
- 2.2 Both surveys principally revealed the presence of an infilled sub-circular enclosure, measuring c.80m by c.85m with internal sub-divisions, of possible prehistoric/Romano-British date within Field 2. Further linear features were also indicated by the geophysical survey to survive to the north-east of Engine Lane. In addition, numerous discrete features were identified, which may possibly relate to former coal mining operations known to have been undertaken in the immediate area of the development site (Webb and Whittingham 2000).
- 2.3 A recent excavation undertaken at High Street, Shafton, 0.75km to the north-west, identified a ditched enclosure dating to the 1<sup>st</sup>-2<sup>nd</sup> century, which contained the remains of internal and external structures and hearths (Burgess 2001).

## **3. Method**

- 3.1 The evaluation was undertaken following a brief for archaeological evaluation provided by South Yorkshire Archaeology Service (Appendix VII) and a

- written scheme of investigation produced by Archaeological Services WYAS (Appendix IX).
- 3.2 A total of eight trenches were excavated (Fig. 2) in order to investigate and clarify the presence/absence, nature and extent of any archaeological remains in the area. The total excavated area comprised 1470m<sup>2</sup>.
  - 3.3 The trenches were laid out using a 600 series robotic Geodimeter theodolite following the trench location plan produced as part of the written scheme of investigation (Appendix IX). A 360° mechanical excavator fitted with 1.60m wide toothless ditching bucket was utilised to excavate the trenches. Material was removed in level spits under direct archaeological supervision, to the top of the first archaeological horizon or undisturbed natural. The machine was utilised to extend the eastern limits of Trench 1 in order to fully expose the archaeological remains observed in this area.
  - 3.4 On completion of the machining the trenches were manually cleaned and inspected for archaeological remains. Hand excavation of linear and discrete features followed the strategy outlined in the written scheme of investigation (Appendix IX). Where significantly complex archaeology was observed, for example in Trenches 6 and 8, a decision was made (in consultation with Mr. Roy Sykes of the South Yorkshire Archaeology Service), not to fully excavate all ditch intersections in order not to jeopardise the full understanding of the archaeological remains.
  - 3.5 A soil-sampling programme was undertaken for the identification and recovery of carbonised and waterlogged remains, vertebrate remains, molluscs and small artefactual material. The soil sampling strategy was devised by Dr Jane Richardson PhD, Archaeological Services WYAS environmental specialist, following a site visit conducted on the 3<sup>rd</sup> April 2001. Soil samples of 10 litres were taken from the primary fills of ditches and discrete features where it was possible to demonstrate that truncation had not led to contamination.
  - 3.6 A full written, drawn and photographic record was made of excavated features following Archaeological Services WYAS standard method (Boucher 1995). Plans and sections were made of excavated features at 1:20 and 1:10 respectively and included spot-heights related to Ordnance Survey National Grid. Trench outlines and unexcavated lengths of ditches and features were planned using a 600 series robotic Geodimeter Total Station.
  - 3.7 The paper archive and artefacts resulting from the works are currently stored by Archaeological Services WYAS and will be deposited with the Doncaster Museum within a timescale agreed between Archaeological Services WYAS and the recipient museum.

#### **4. Results**

- 4.1 The results are presented chronologically in trench order in the following section. It should be noted that unless specifically stated within the text all features were found to have a u-shaped profile and were filled with a mid-orange brown sandy silt deposit.

## Field 1

### Trench 1 (Fig. 3)

- 4.2 This trench measured 26m by between 5m and 7m in width and was excavated to investigate a large discrete feature and linear ditch identified by the gradiometer survey. The trench, which rose steadily to the north-east, was excavated to a depth of c.0.35m. Approximately 0.2m of topsoil and 0.15m of subsoil was removed exposing sandy clay natural that was interspersed with sandstone fragments.
- 4.3 A sub-circular feature (105), measuring 5.2m by 5m, was the only archaeological feature observed within this trench. Initial interpretation of this feature was that it represented either the remains of a kiln or bell-pit. In order to establish its form a quarter section was excavated through the north-eastern side of the feature. Single context recording was initially adopted for the excavation of this pit, however, the form and dating evidence obtained from the partial excavation conclusively identified it as a bell-pit and this method of excavation was ceased.
- 4.4 The bell-pit, which was excavated to a depth of c. 0.50m, was filled with a mixture of mud-stone, blue-grey clay and reddened sandstone gravel (104) which appeared to have been deliberately back-filled into the pit. A single fragment of late 17<sup>th</sup>-early 18<sup>th</sup> century pottery was recovered from this deposit.
- 4.5 A linear modern field drain was observed at the very western limit of the trench (not illustrated).

### Trench 2 (Fig. 4)

- 4.6 Measuring 20m by 5m, Trench 2 was excavated to investigate a linear and discrete feature revealed by the gradiometer survey. On average 0.25m of topsoil and 0.05m of subsoil was removed from this trench which sloped gently to the south and south-east, to reveal the sandstone natural. Four linear features, two possible pits and a natural treebowl were noted cutting the natural.
- 4.7 A section through ditch 203 found that it measured c.1m in width by 0.34m deep and contained a single mid-brown clay sand fill. To the south a smaller curvi-linear gully was observed. This gully was found to cut pit 206, the majority of which had been removed, although, it could be discerned that it was sub-oval in shape and measured c.0.50m in length and 0.30m deep. Gully 207 measured c.2.5m in length by c.0.60m in width by between 0.3 and 0.1m deep becoming shallower to the east. This was filled with a slightly lighter deposit (209) than pit 206.
- 4.8 An ephemeral pit (213) located towards the south of the trench was found to be a treebowl.
- 4.9 A concentration of features was identified towards the northern end of the trench. Ditch 204 was found to terminate c.1.40 from the eastern trench edge. It was 0.75m in width and 0.3m deep, with two fills 205 (a mid-grey brown sandy silt) and 210. Pit 215, a shallow irregular feature that measured 0.4m by

0.11m deep was also seen continuing into the eastern trench edge. A further possible ditch (214), which measured 0.7m in width by 0.1m deep, was seen to continue into the north-eastern corner of the trench.

### **Trench 3 (Fig. 5)**

- 4.10 This trench measured 25m by 3m and was positioned on sloping ground that inclined steadily to the east. It was excavated in order to investigate a linear feature identified by the gradiometer survey. At the eastern end of the trench topsoil was observed to a depth of 0.25m and lay directly upon the clay yellow grey natural. The trench deepened towards the west and at its western limit was found to be 1.30m deep and comprised of 0.4m of topsoil and 0.9m of subsoil, overlying a light grey clay natural. Coal outcrops (302 (not illustrated) and 310) were revealed in the central area of the trench.
- 4.11 A total of three linear features and one small pit were uncovered cutting into the exposed natural. Gullies 306 and 305 were very similar and were identified at the eastern end of the trench running into the northern and southern baulk respectively. Gully 306 was 10.5m in length and was excavated to 0.40m in width and 0.17m deep and contained a mid-orange brown silt clay. Only a small proportion (3m length) of gully 308 was exposed. It measured 0.5m in width and 0.13m deep. A light grey brown silt clay deposit filled this feature.
- 4.12 A section through feature 312 found it had very ephemeral and difficult to define edges. The poor weather conditions and consistent waterlogging of this area hampered the excavations and it was only after a box section had been excavated that the edges could be clearly defined in section. At its widest point it measured c.1.5m in width by 0.28m deep. The ephemeral nature of this feature suggests that it is natural in origin, confirming the geophysics interpretation (Webb and Whittingham 2000).
- 4.13 The only discrete feature located within this trench was a small sub-oval pit 304 that measured 0.7m by 0.4m by 0.06m deep.

### **Trench 4 (Fig. 6)**

- 4.14 Trench 4 was situated on land which sloped gently to the west and was positioned to investigate a linear feature and a cluster of discrete features that had been identified by the gradiometer survey. Measuring 20m by 5m a total of c.0.3m of topsoil and c.0.2 of subsoil was removed uncovering a mixed yellow grey clay natural containing ironstone fragments. A single linear feature and small pit were identified cutting the natural.
- 4.15 Similar to others exposed in this area, ditch 404 was found to very shallow (0.15m maximum in depth) and was 1.6m in width. A single light grey brown clay deposit filled this feature. It is possible that this feature is a continuation of gully 308 (noted in Trench 3, see Fig. 5) a relationship tentatively suggested by the geophysics.
- 4.16 Pit 408 was a slightly ephemeral sub-oval pit, which was fairly difficult to define. It was found to measure c.1.2m by 0.9m by 0.25m deep.

**Trench 5 (Fig. 7)**

- 4.17 This trench was located on gently sloping ground that fell-off to the south and was targeted to investigate a linear feature and possible pit that had been revealed by the gradiometer survey. Measuring 15m by 3m, it was excavated to a depth between 0.6m and 0.8m. Topsoil between 0.3-0.5m deep was removed revealing c.0.35m of subsoil, which lay upon degraded sandstone natural. Cutting into the sandstone was a linear ditch and two pits.
- 4.18 Ditch 505 measured 1.75m in width, survived to a depth of 0.41m and was filled with a single mid-red brown silty sand. To the east, sub-oval pit 503 was identified. A section through this feature revealed it to measure 1.95m by 0.95m by 0.28m deep with a v-shaped profile. It was filled with a single mid-red brown sandy silt. Pit 507, a further sub-oval pit, was substantially smaller measuring 0.7m by 0.5m by 0.1m. This was filled with a single mid-brown sand silt.

**Trench 6 (Fig. 8)**

- 4.19 This large trench, measuring 20m by 15m was excavated in order to examine the enclosure ditch, possible entranceways and an internal subdividing ditch. It was also aimed at investigating the areas external and internal to the enclosure and other possible linear and discrete features revealed by the gradiometer survey. Positioned on a gentle decline to the east, 0.3m of topsoil and 0.2 m of subsoil were removed to reveal a shale and clay natural. This was interspersed with coal seams/outcrops concentrated towards the central area of the trench. The archaeology in this central area was complex and defining the archaeology in plan proved problematic due to the nature of the natural in this area, exacerbated by the coal outcropping and poor weather conditions. Thorough cleaning and excavation of sample sections did reveal that at least three phases of activity were present in this area.
- 4.20 The earliest feature identified appeared to be a curvi-linear ditch (6000), which had four sections (622/624/632/638), placed through it along its identified length. It appeared to extend from the central area of the site where a rounded terminus was identified, from which two sherds of possible 1<sup>st</sup>-2<sup>nd</sup> century pottery were recovered. It then continued to the west where it took a 90° turn and then carried on to the south. Further sections are required to clarify the full extent and nature of this feature. It measured on average 0.76m in width by 0.21m deep. Two small sections excavated through this feature established that it was cut by both ditches 6001 and 6003 (Fig 11 S. 85 and 94).
- 4.21 Ditches 6001 and 6003 tentatively terminated within the central area of the trench were they seemed to form an entranceway of the main sub-circular enclosure discussed previously. Ditch 6001 was aligned north/south and extended from the northern baulk for approximately 7.5m, where is believed to terminate (to the south of 627), although this terminus was not clearly defined and its exact location was not identified. It measured 2.6m in width by 1.2m deep and was filled with a series of three deposits that varied between mid-brown and grey clay (Fig. 11 S. 82).

- 4.22 Only a small slot was excavated through ditch 6003 in the area where it appeared to terminate in plan. This section confirmed the presence of a terminus, and although not fully excavated, it was possible to discern that the sides of the feature were sloping gradually to the south (Fig.11 S. 94). A mid-grey brown silt clay (635) filled the excavated part of this feature.
- 4.23 Cutting through both ditches 6000 and 6001 was ditch 6004, a small north-south orientated gully/ditch (Fig 11 S. 82, 83 and 85) which was observed terminating c.10.5m from the northern trench edge. Again it was difficult to establish the line of this feature in plan. It was filled with a single fill, which changed from a mid-brown sandy silt at the south to dark brown silty clay to the north.
- 4.24 Within the central eastern area of the trench ditch 615 was noted for c.7m running into the eastern baulk. A single section excavated through this feature (Fig 11 S.79), revealed that it measured 1.96m in width by 0.65m deep and was filled with a single fill (613/614). Two charred cereal grains were recovered from deposit 614. A probable recut (612) was noted which was filled with two deposits of differing hues of grey clay containing frequent quantities of sandstone. One fragment of slag was recovered from the upper fill of this ditch which was found to be 1.38m in width by 0.71m deep.
- 4.25 Three isolated discrete features were observed within this trench and possibly represent evidence of occupational activity within the internal area of the enclosure. Two possible post-holes were identified, 619 and 640. Both features were sub-oval in shape and were filled with a mid-grey brown clay. Post-hole 619, cut the upper fill of ditch 6000, had dimensions of 0.6m by 0.5m by 0.14m deep. Being slightly smaller, post-hole 640 measured 0.45m by 0.3m by 0.18m deep and 619.
- 4.26 A shallow sub-rectangular shallow pit (634), measuring 1.76m by 0.68m by 0.15m deep, was noted in the north-eastern corner of the trench and was initially thought to represent the remains of a grave. Contained within this fill (a mid yellow grey clay, 633) were fragments of burnt bone, although, it was not possible to identify if they were animal or human in origin due to their fragmentary nature (Richardson, this volume).

### **Trench 7 (Fig. 9)**

- 4.27 Trench 7 was the largest trench measuring 35m by 20m, and was located in order to investigate the internal and external areas of the enclosure, and examine the convergence of the enclosure ditch, possible 'gateway' structure and internal sub-dividing ditch identified by the gradiometer survey. It was situated on ground that sloped downwards steadily to the north and east. On average 0.3m of topsoil and 0.2m of subsoil (which became slightly deeper to the east) was removed to reveal sandstone and clay natural. Seven linear ditches, eleven discrete features and two probable natural features were identified cutting into the natural deposits.
- 4.28 Ditch 7000, which had not been identified by the geophysical survey, was a wide shallow ditch, through which three sections were excavated (707/739/744). It was orientated north-east to south-west and extended across

- the trench for 16.3m. It measured 2.34m in width by 0.27m deep (Fig 12 S.65). Two features, pit 741 and, 709/746 (part of ditch 7001) cut this ditch.
- 4.29 The enclosure ditch (ditch 7003) which had been identified in Trench 6 as ditch 6001 was seen to continue running across this trench in an east-west direction. Three sections were excavated through this feature, one of which (734) provided a full profile of the feature (Fig 12 S. 64). It measured *c.*2.8m in width by 1.54m deep and contained three fills of differing hues of brown grey sand silts.
- 4.30 Forming an internal division to the enclosure was ditch 7001, which was observed cutting through ditch 7000 (Fig 11 S.48). This north-west to south-east aligned linear measured 12.5m (exposed) in length and terminated at its north-western end. Three slots were excavated through this feature. A full profile was established in S. 62, Fig. 11 (738) where the ditch was found to measure 1.85m by 9.82m deep and was filled with two deposits (736), a light grey brown clay sand and (737) a light orange brown silt sand. An L-shaped section excavated to the south-east to investigate its relationship with ditch 7000 (Fig. 11 S.48) identified part of a sub-circular feature (711), filled with charcoal cutting at the base of this ditch. It was not possible to identify if this feature was contemporary with or earlier than the ditch cut (709) or fully establish its form. In this area the ditch was filled with a single light orange brown clay silt (708) in which a large sub-angular cobble *c.*0.4m by 0.35m by 0.25m was revealed. This stone was very different to the surrounding natural and the size and position of the stone indicate that it was probably backfilled into the ditch.
- 4.31 This ditch had then subsequently been cut by ditch 7002, a curvilinear ditch which was traced from the eastern baulk running to the south-west for *c.*16m, cutting through ditch 7003 (a relationship identified in two sections). It then turned in the area where ditch 7001 terminates and continuing to the south east for *c.*5.5m. It was filled with a mid-orange brown clay silt which, similarly to feature 709, contained a large cobble *c.*0.4m in diameter.
- 4.32 To the north, three less substantial linears were identified. Two very shallow north-east south-west aligned gullies, which measured on average 0.5m in width and 0.05m deep formed ditch 7005. Four sections were placed along this feature. A gap noted between the features, may be attributed to heavy truncation and it is probable that they originally formed part of a single ditch.
- 4.33 Further to the north a slightly larger ditch 748 was identified. Measuring 14m (exposed in length) by 2.4m by 0.27m deep, it terminated 0.7m from the eastern baulk. Filled with a dark-brown silty sand, it was originally thought that this feature continued into the eastern baulk, however, excavation revealed a separate feature (750). It measured 1m in width by 0.3m deep and was filled with a slightly redder deposit. This feature is thought to be the earlier feature, being cut by 748, although this relationship is slightly tenuous.
- 4.34 The majority of discrete features were confined to the southern end of the trench, within the internal area of the enclosure ditch 7003.
- 4.35 Pit 741 measured 0.6m in diameter by 0.27m and was found to cut ditch 7000. Excavation revealed that the sides of this pit at the interface with the natural had been heat reddened, although, the base of this pit showed little evidence of



- burning. Concentrated towards the base of the mid-brown sandy silt deposit which filled this feature was a quantity of charcoal flecks.
- 4.36 Cutting ditch 7003 was feature 730, which was observed continuing into the eastern baulk. As so little of this feature was exposed it was not possible to indicate if it was part of a linear or discrete feature. It was established that it measured 1.25m by 0.6m by 0.3m deep and was filled with a single mid-brown sandy silt.
- 4.37 Post-hole 713 was identified at the north-western end of ditch 7001. Measuring *c.*0.45m in diameter and 0.23m deep, this sub-circular feature was filled with a mid-grey brown clay sand from which a fragment of possibly 2<sup>nd</sup> century pottery was recovered. No further post-holes were identified in this area to indicate that it formed part of a structure and the only other discrete feature located in this area was possible pit 756, which remained unexcavated (see Appendix V for details).
- 4.38 A concentration of three discrete features was identified to the south of ditch 7003. Two appeared to be post-holes (715 and 717) with diameters of *c.*0.5m respectively, and shallow depths of *c.*0.15m. A larger pit (719) was observed to the south of these features, which measured 1m by 0.9m by 0.3m deep. All three features contained a similar mid-red brown sandy silt deposit.
- 4.39 A further seven unexcavated features were noted and descriptions can be found in Appendix V.

### Trench 8

- 4.40 This L-shaped trench was orientated east-west and north-south with each arm measuring 20m by 5m. It was positioned to examine the enclosure ditches and possible internal and external features identified by the gradiometer survey. Six linear features and one pit were uncovered cutting through the light/dark grey clay and sandstone natural following the removal of an average 0.30m of topsoil and 0.20m of subsoil. As with Trench 6, all intersections were not fully examined at this evaluation stage due to the time limitations, however, an understanding of the archaeological remains present was procured from careful cleaning and sample excavation.
- 4.41 The ditches forming the main sub-circular enclosure were again identified as ditches 8000 and 8001. Ditch 8001, the probable continuation of ditches 7002 and 6001 was observed to extend for 12.5m from the northern trench edge where a terminus (partially uncovered and unexcavated) was noted. Only one small slot was excavated through this ditch although it is assumed that it had a similar profile as that observed to the north-west as ditch 7002. It was seen to measure 3.5m in width. ? 7003  
7002?
- 4.42 The southern portion of the enclosure ditch (8000) was more difficult to define. Three sections excavated along its exposed length revealed that it terminated *c.*9.3m from the southern trench edge. A section excavated against the southern baulk (Fig 12 S.105), revealed that it measured *c.*2.1m in width by 1.15m deep. Three light clay deposits were observed filling this feature. Cutting the secondary deposits (821/822) was a possible recut (820), which

17th or early 18th century. The fabric is distinguished by the presence of sparse non-crystalline rock fragments up to 2mm in diameter. A similar fabric, although more densely tempered, has been noted from sites in Leeds and the surrounding area.

### **Metalwork by Karen Barker**

- 5.3 A single Cu alloy fragment was recovered from the fill of ditch 755. This small object is believed to be a miscast waster.

#### **Catalogue**

A small cu alloy fragment, possible miscast waster. wgt. 2g, l. 17mm, w. 6mm, th. 6mm  
Context 735, fill of ditch 755.

### **Industrial Residue by Louise Martin**

- 5.4 Two fragments of tap slag weighing a total of 160g were recovered from context 610. A single fragment of cinder weighing 11g from was recovered from context 733.

## **6. *Environmental Record***

### **Introduction**

- 6.1 As part of archaeological evaluation along the proposed route of Shafton By-pass by Archaeological Services WYAS, it was appropriate to undertake the assessment of selected soil samples. Trial trenching had identified the presence of enclosure ditches and linear divisions of possible prehistoric/Romano-British date, in addition to a number of discrete features. It is hoped that an assessment of environmental remains from these deposits may provide some indication of the activities occurring in these enclosures.

### **Method**

- 6.2 A sub-sample of two litres of soil was processed from seventeen ditch, pit and posthole deposits. In addition, twenty litres of soil was processed from Pit 634 that had been identified as a possible grave during excavation. For the purposes of assessment, these sub-samples were subjected to a system of flotation in an Ankara-style flotation tank. The floating remains (the flot) were collected in a 300 $\mu$ m sieve and the heavy fraction (the retent) was collected in a 1mm mesh. The flots, once dry, were scanned using a binocular microscope and the results are presented below in Appendix VI. The retents were scanned by eye and a number of ecofacts and artefacts were noted. These are listed in Appendix VII.

## Results

### *Flot samples*

- 6.3 Three samples (from ditch 615, pit 634 and ditch 755) produced single cereal grains, with two being identified as *Triticum* sp. and the third unidentified. Ditch 615 also produced a single glume base of wheat, but together these provided only scant evidence of crop processing.
- 6.4 Weed seeds of *Silene* sp., *Polygonum* sp. and *Chenopodium* sp. were identified and these may represent cultivated and/or disturbed land. The scarcity of these seeds, however, precludes further interpretation.
- 6.5 Charcoal fragments were present in every sample and were often abundant. These indicate that the conditions for the creation and subsequent survival of charred material were present. The identification of wood charcoal to species would be possible from four samples (see Appendix VI).

### *Retent samples*

- 6.6 A scan of the retents revealed further chaff fragments of *Triticum* sp. from ditch 615 and wood charcoal from all samples. The charcoal fragments were often of sufficient size to be identified and may highlight fuel use and/or provide evidence of the local environment.
- 6.7 Numerous tiny burnt bone fragments were isolated from pit 634. Unfortunately they were too small to be identified as either animal or human remains.
- 6.8 Magnetic material was commonly noted, including a few examples of flake hammerscale and spheroidal hammerslag. These are indicative of iron smithing.

## Conclusions

- 6.9 Given the scarcity of charred cereal grains, chaff or weed seeds, evidence of crop processing was not clearly identified from the environmental record. Certainly the abundance of charcoal suggests that the conditions for preservation were adequate and crop-processing waste would have survived had it been deposited in the area. Some evidence for the concentration of these meagre remains in ditch 615, however, may indicate spasmodic crop processing.
- 6.10 While charcoal fragments can be blown considerable distances, the quantity of charred wood indicates more localised activity. These remains may indicate fuel use for either domestic or industrial (e.g. iron working) purposes and may highlight the availability of certain tree species in the vicinity.

## **Recommendations**

- 6.11 Given further excavation, it is recommended that primary deposits and deposits that appear to be charcoal-rich are systematically sampled. The identification of many charcoal-rich samples has indicated the potential for charred material to survive and further sampling may allow the presence/absence of cereal species and crop-processing waste to be confirmed.

## **7. Discussion and Conclusions**

- 7.1 As indicated by the previous surveys, the main focus of archaeological activity appears to have been concentrated to the east within Field 2, whilst Field 1 was remained relatively devoid of archaeological remains.
- 7.2 The fragmentary and disjointed nature of the features identified in Field 1 limits the interpretation of the archaeology in this area. The features appear to have been either heavily truncated and/or eroded as the majority of them survived to a shallow depth. They may have once formed part of a larger landscape of features, probably attributed to agrarian rather than occupational activity, although the scant evidence recovered cannot confirm this interpretation. The majority of features remain undated with only one feature (105) in this area containing any artefactual material. This large sub-circular pit, conclusively identified as a bell-pit and associated with former coal workings, contained a single sherd of 17<sup>th</sup>-18<sup>th</sup> century pottery.
- 7.3 Although the three trenches positioned to investigate the enclosure within Field 2 were limited to its periphery, the archaeological evidence recovered suggests a fairly complex landscape, more so than revealed by the previous surveys.
- 7.4 In both Trenches 6 and 8 evidence was uncovered to indicate possibly earlier activity, one of which, ditch 6000, contained a fragment of Roman pottery possibly dated to the 1<sup>st</sup>-2<sup>nd</sup> century. The archaeological remains in these areas were complex and difficult to define. Therefore, at present the nature of these earlier ditched features is not fully understood.
- 7.5 The excavated sections through the enclosure revealed them to be the most substantial features excavated during the evaluation with an average width of 2.5m and depth of 1.2m. Two entranceways were identified in the central western and eastern sides of the enclosure, although further work is necessitated in both these areas to fully establish the extent of the ditches in these areas. It may be of some significance that in both these areas evidence of earlier activity was identified.
- 7.6 As excavation was limited to the periphery of the enclosure only a small section of the ditches forming the internal sub-divisions were revealed. However, it was noted that these ditches were also of substantial nature being a c.2m in width by c.0.8m deep. Unfortunately, due to the lack of dating evidence recovered it was not possible to establish if these features were contemporaneous with the enclosure ditch or form later sub-divisions.
- 7.7 As so little artefactual and botanical evidence was recovered it is difficult at this stage to define the date and function of the enclosure. The enclosure ditch

was found to cut ditch 6000, which contained two sherds of possibly 1<sup>st</sup>-2<sup>nd</sup> century pottery, indicating that the enclosure ditch may be attributed to a slightly later date. Although dating on the evidence of two sherds of pottery should be treated with extreme caution.

- 7.8 A number of post-holes and pits were mainly located internally to the enclosure and possibly represent the remains of occupational activity. Features such as 741, a heat affected pit, tentatively support this. It is of some interest that very large boulders were discovered in the fill of two of the ditches in Trench 7. These stones were unusual in that their geology was different from that observed in the rest of the site and may represent imported stone and their size indicates potentially structural use.
- 7.9 The enclosure identified at the High Street, Shafton excavations, just to the north-west of this site revealed evidence of occupational activity within the internal area of the enclosure, which was concentrated towards its western side. Burgess (2001) discusses that areas adjacent to domestic activity tend to have a greater magnetic enhancement than peripheral areas to settlement, a theory supported by both the geophysical and archaeological evidence at this site. If this theory is applied to the geophysical evidence from the Shafton By-pass excavations it may be expected that any domestic activity will be concentrated towards the west where the ditch was clearly defined by the geophysics in contrast to the east.
- 7.10 Similarly to the enclosure at the High Street site, artefactual evidence was recovered to indicate a 1<sup>st</sup>-2<sup>nd</sup> century or later date for the enclosure, although as previously discussed this dating is very tenuous. Further excavation is required in order to establish the nature and date of this feature.
- 7.11 Given the paucity of dateable artefacts recovered from the site, excavation strategies need to be incorporated in any further stage of work in order to maximise their recovery.

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## ***Acknowledgements***

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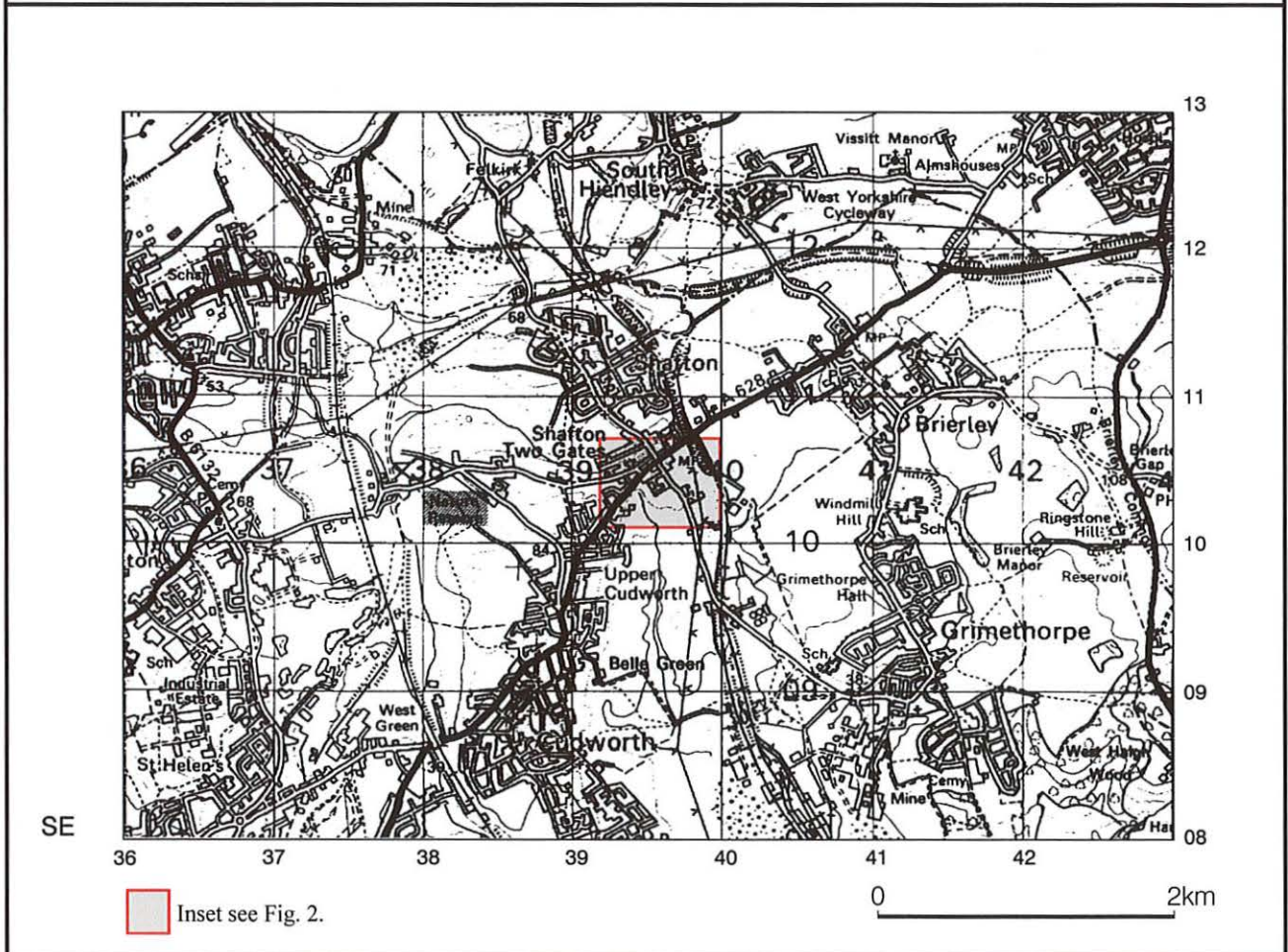


Fig. 1. Site location

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Fig. 2. Site location showing position of trial trenches superimposed onto greyscale gradiometer data

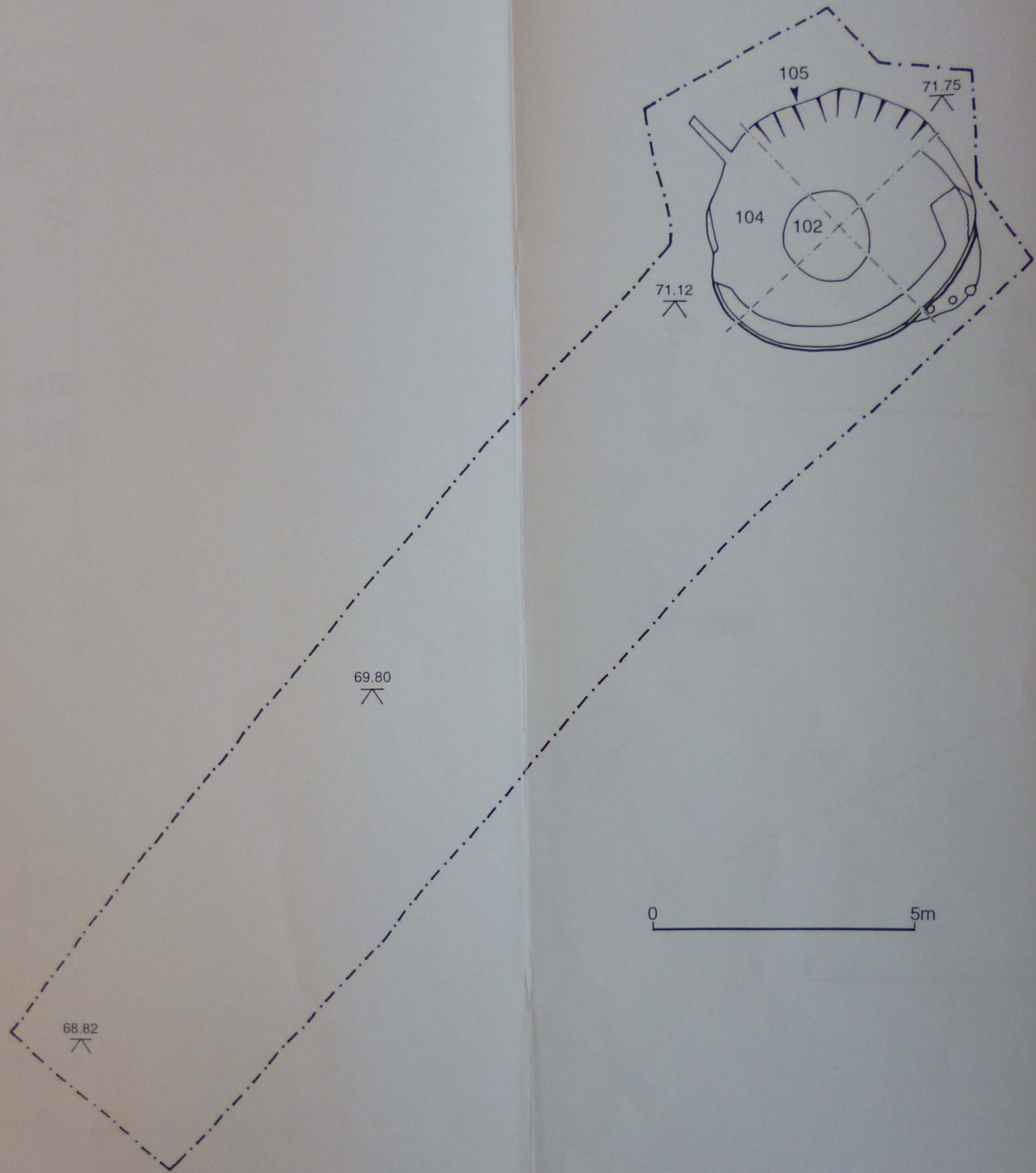


Fig. 3 Plan of Trench 1

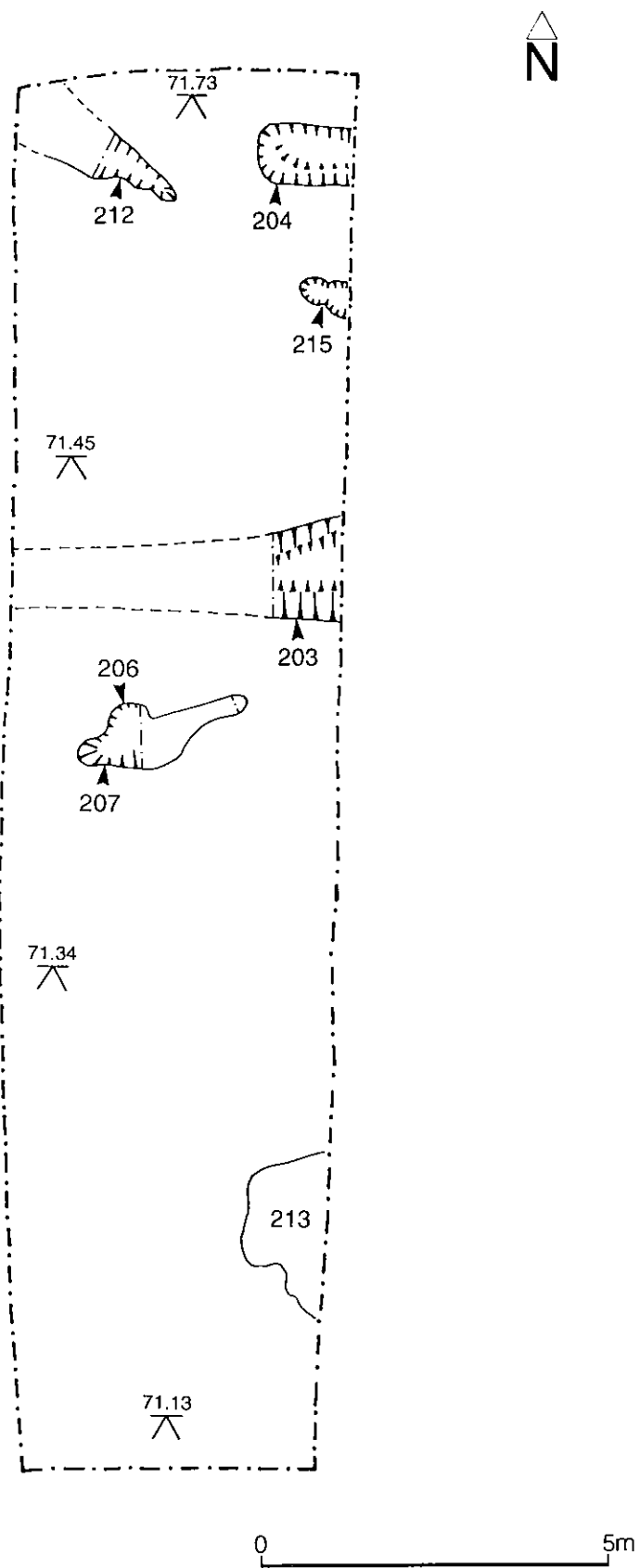


Fig. 4 Plan of Trench 2

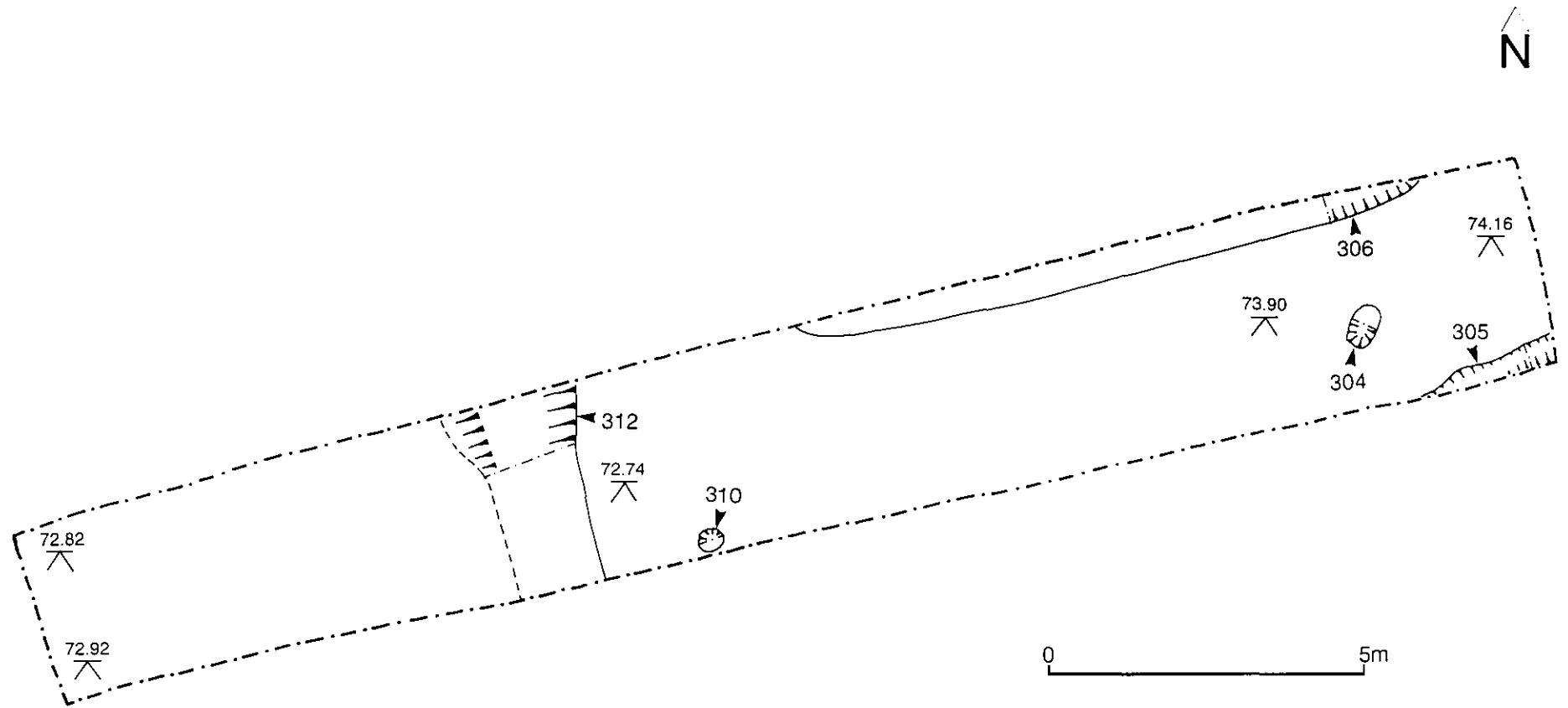


Fig. 5 Plan of Trench 3

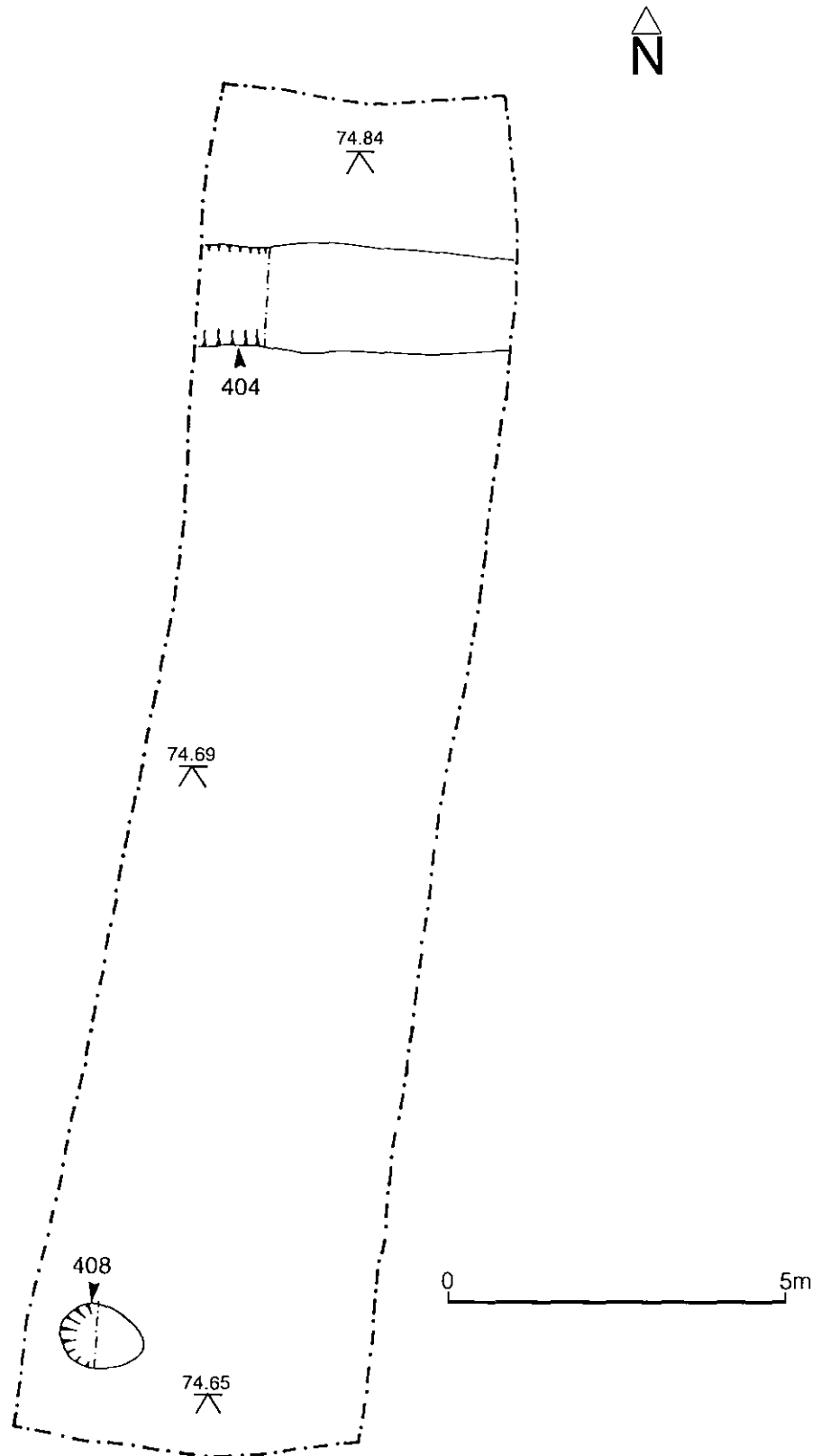


Fig. 6 Plan of Trench 4

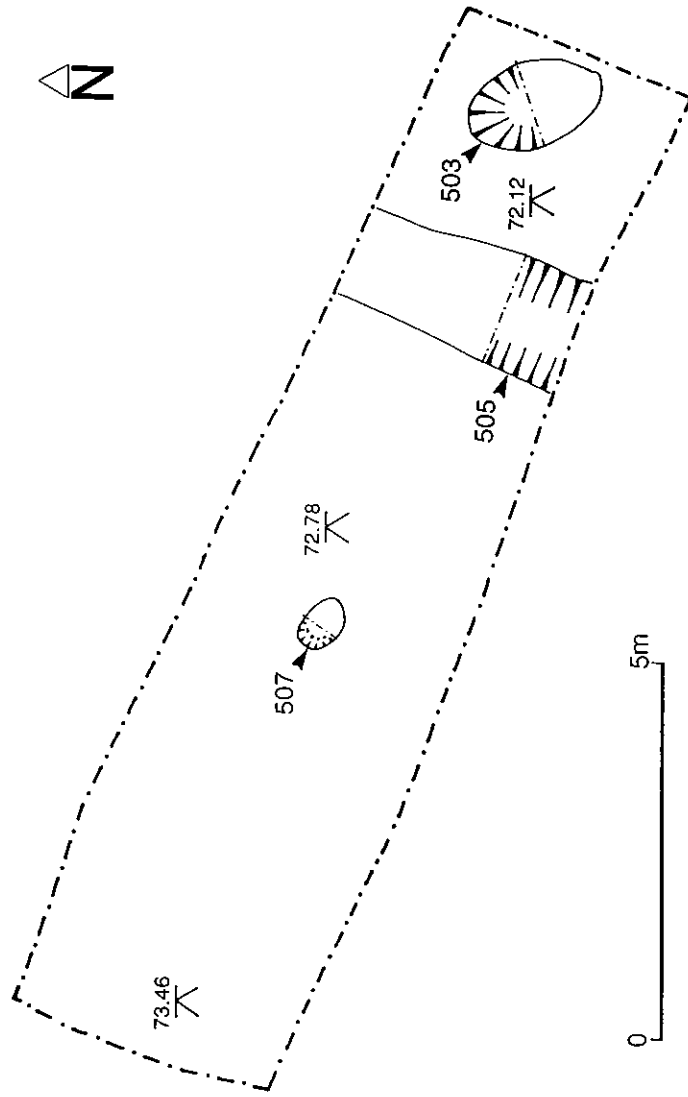


Fig. 7 Plan of Trench 5

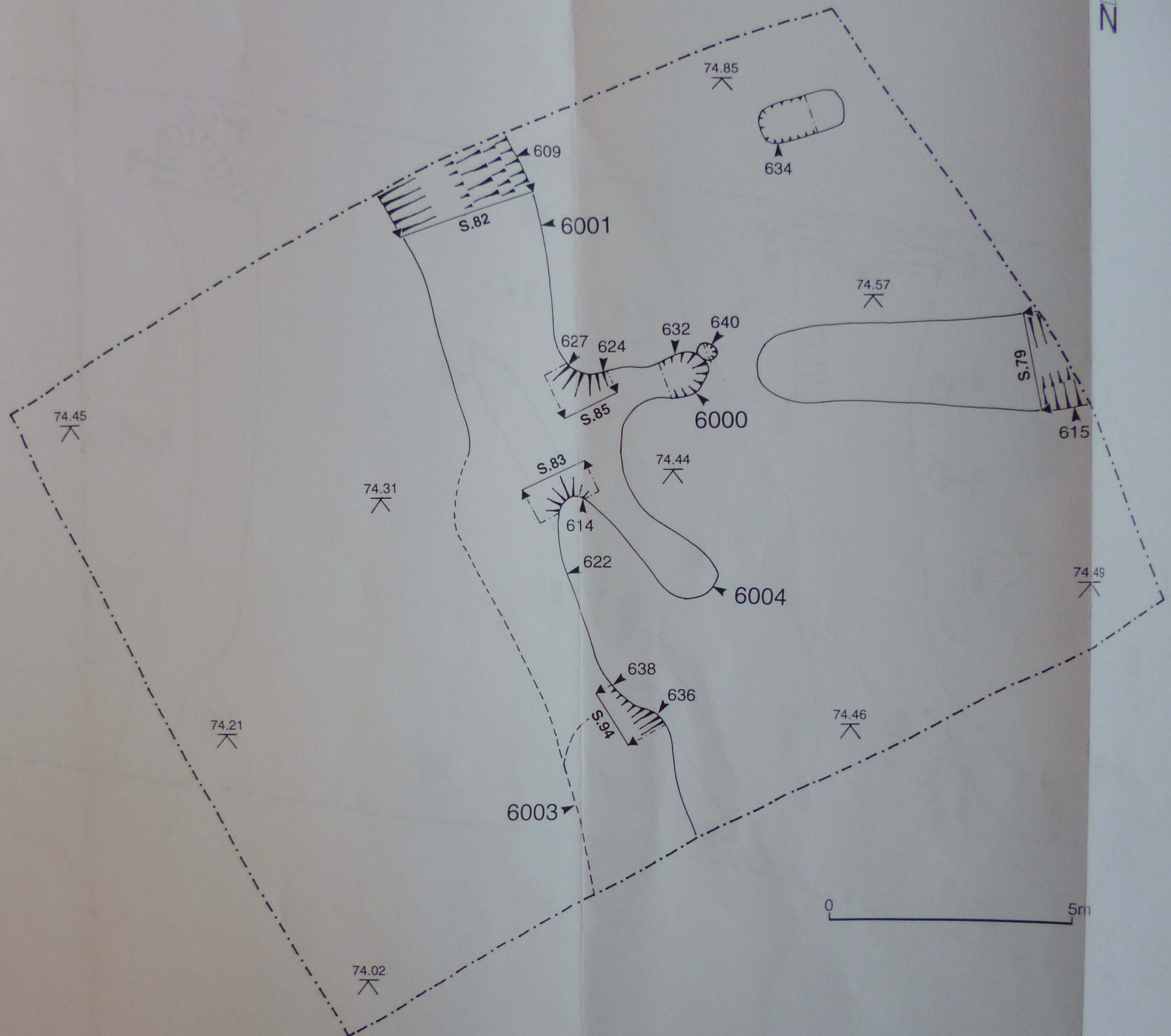


Fig. 8 Plan of Trench 6





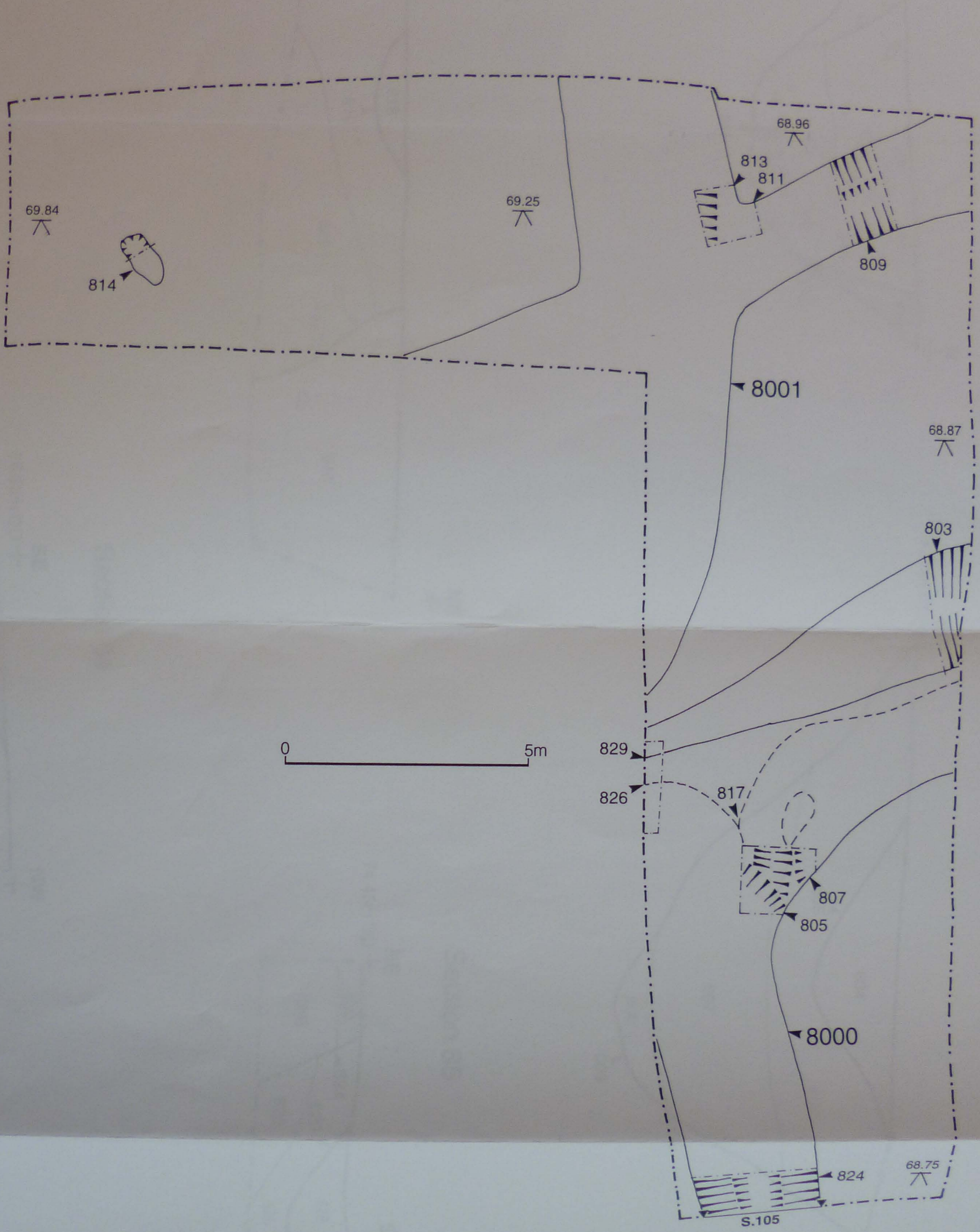
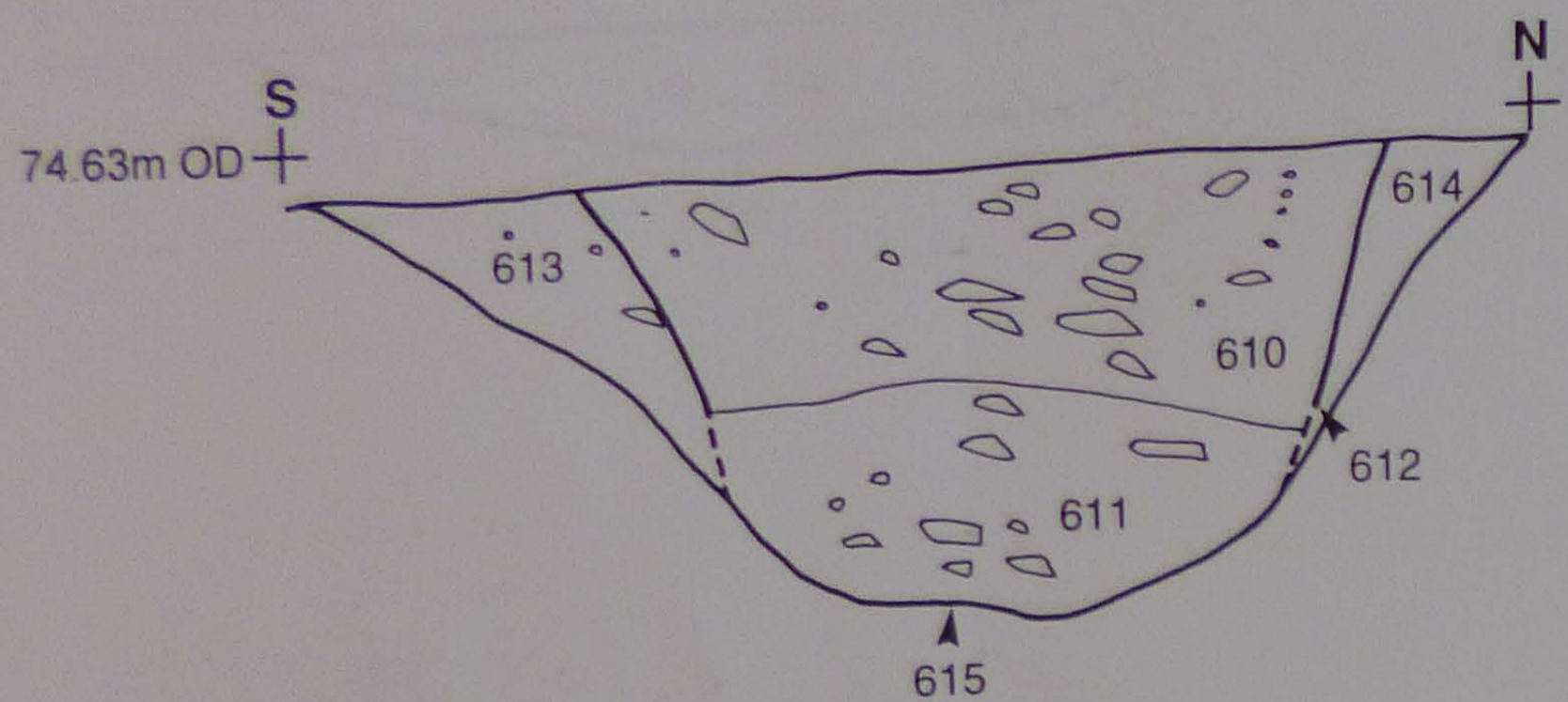
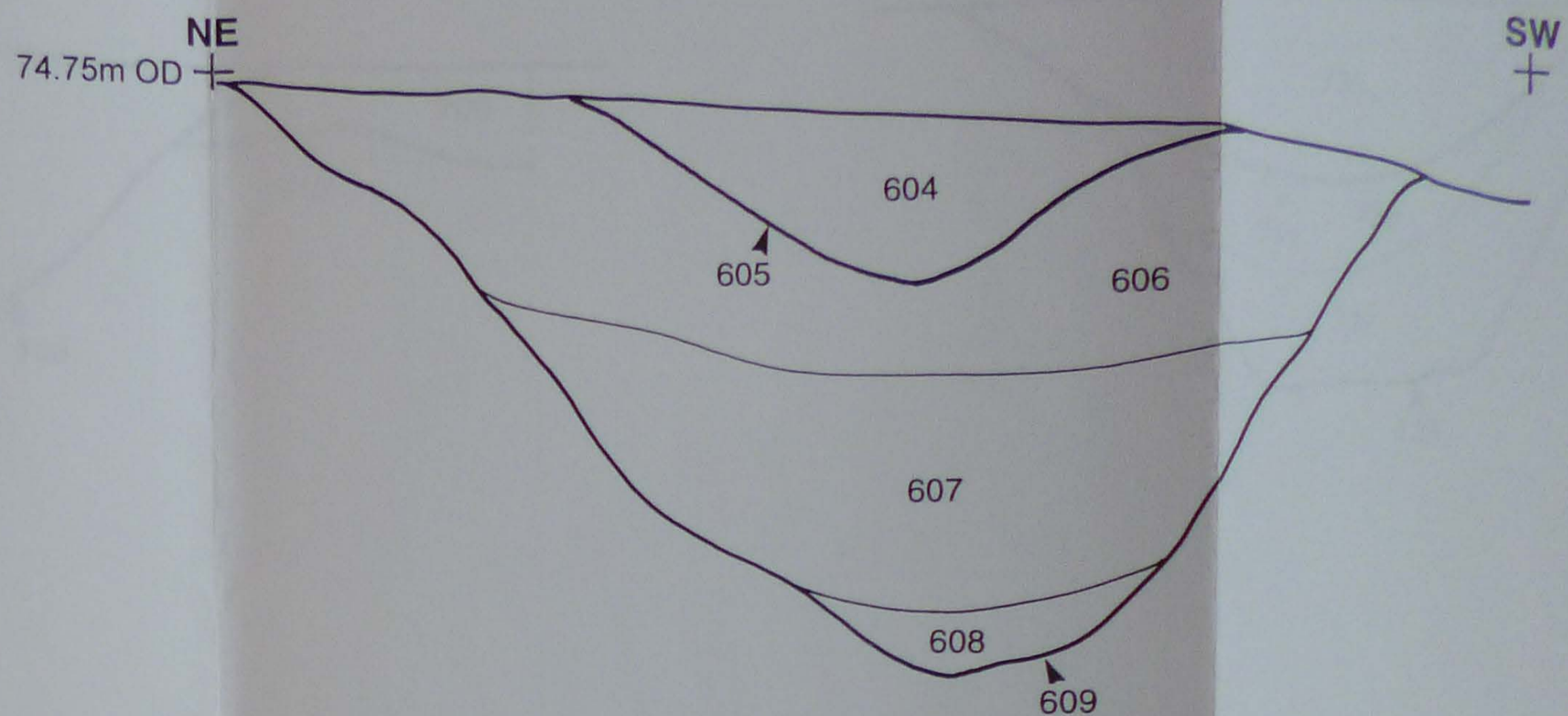


Fig. 10 Plan of Trench 8

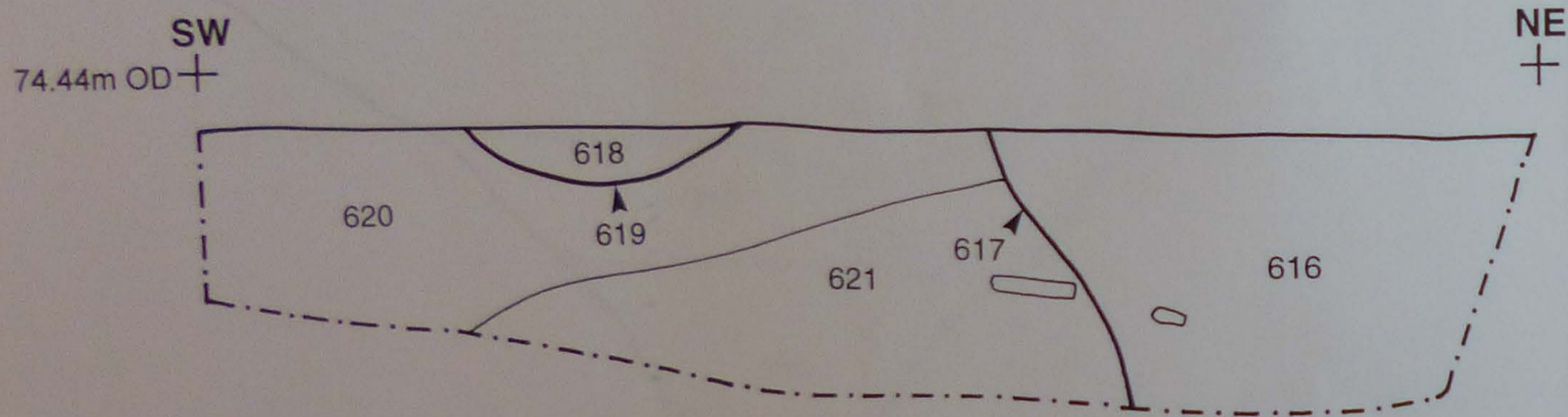
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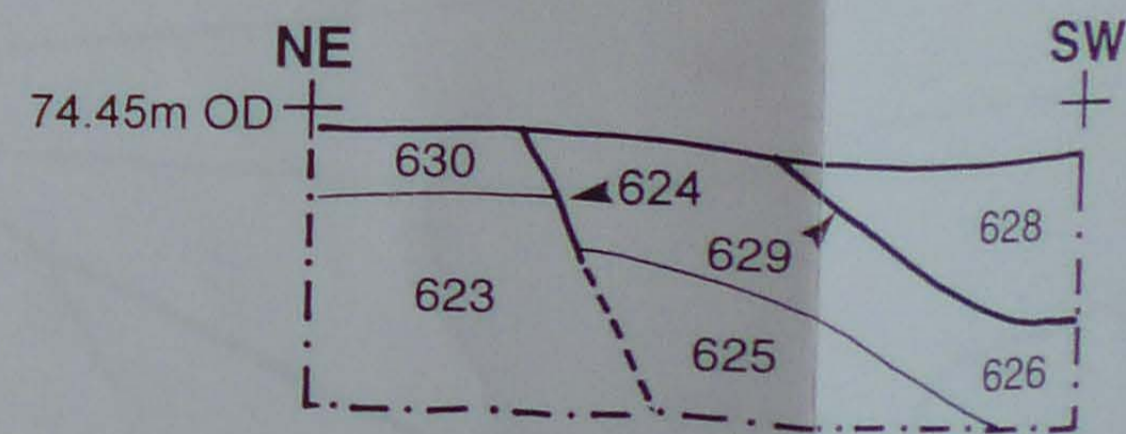
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Section 83



Section 85



Section 94

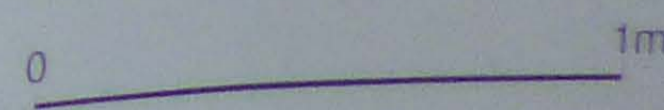
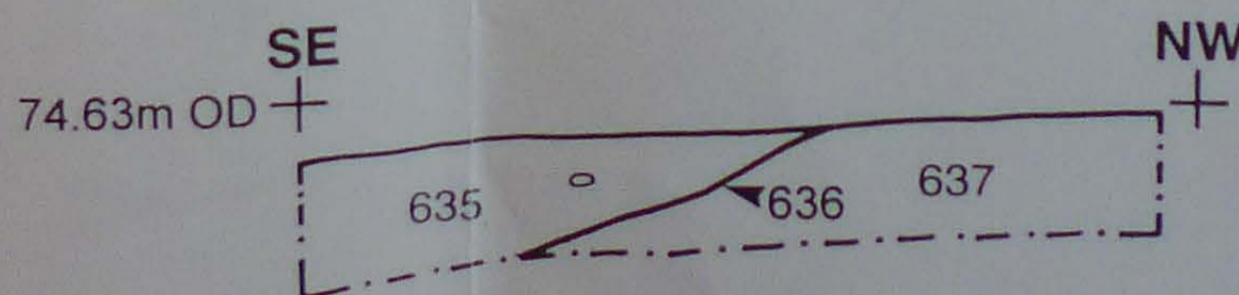
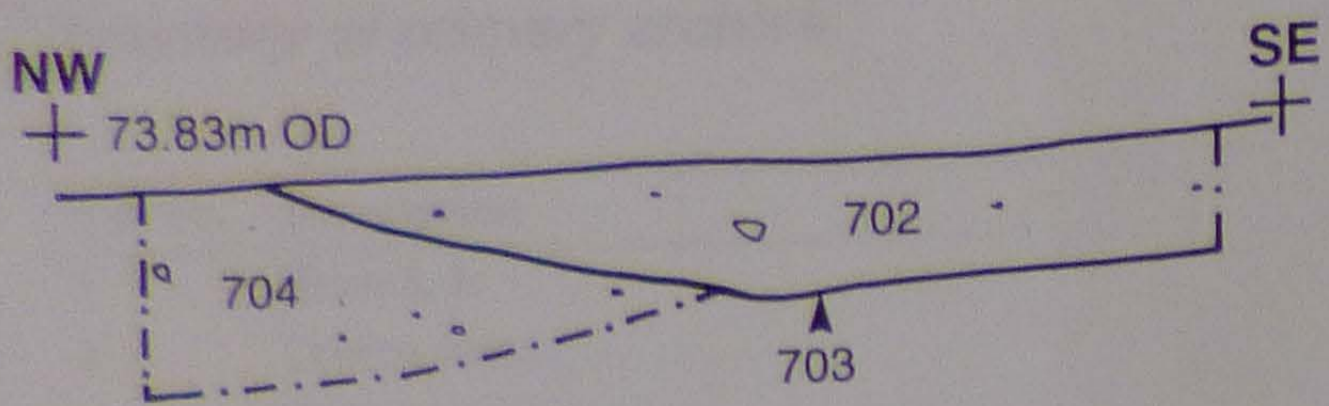
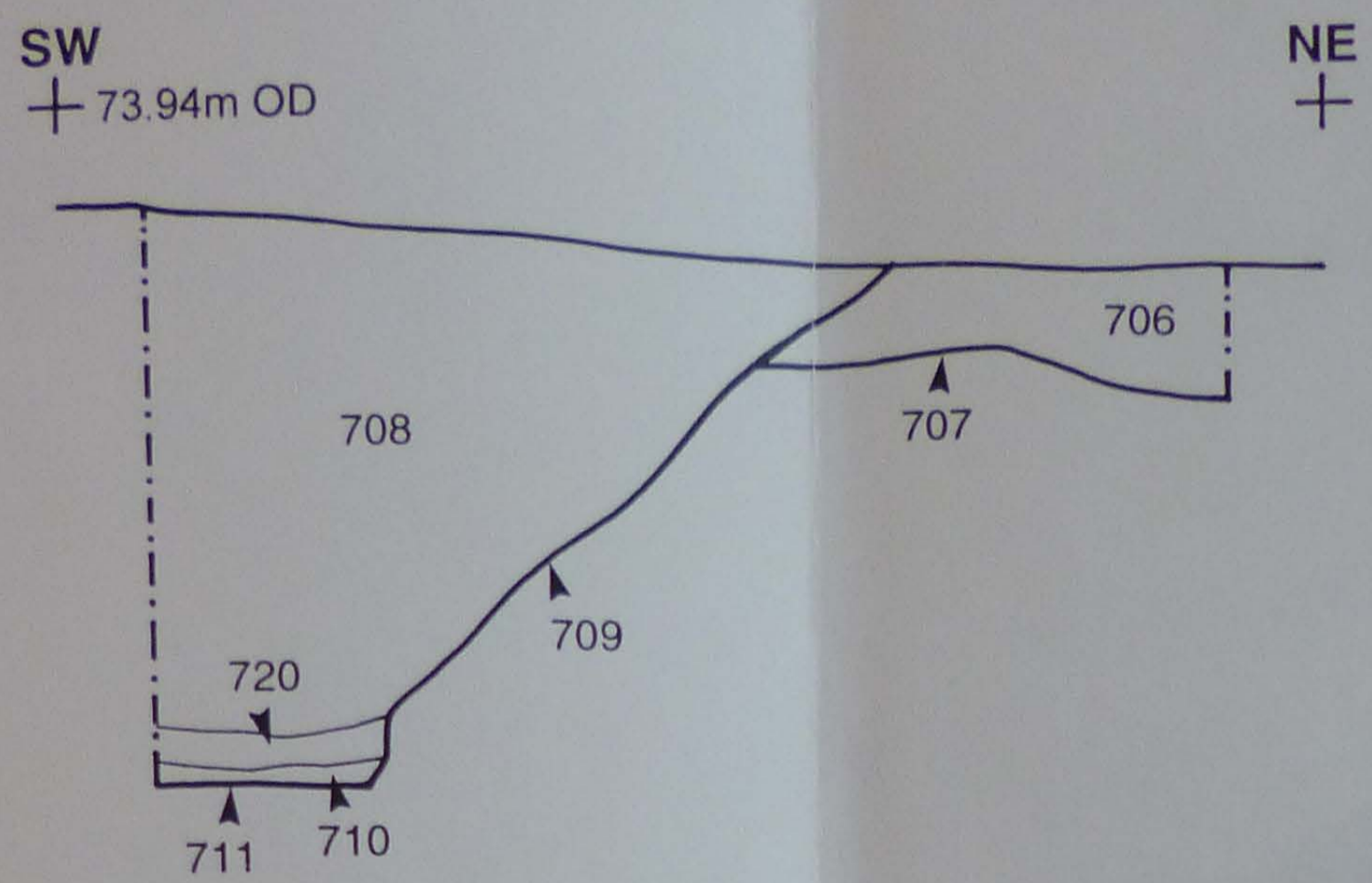


Fig. 11 Trench 6 Sections

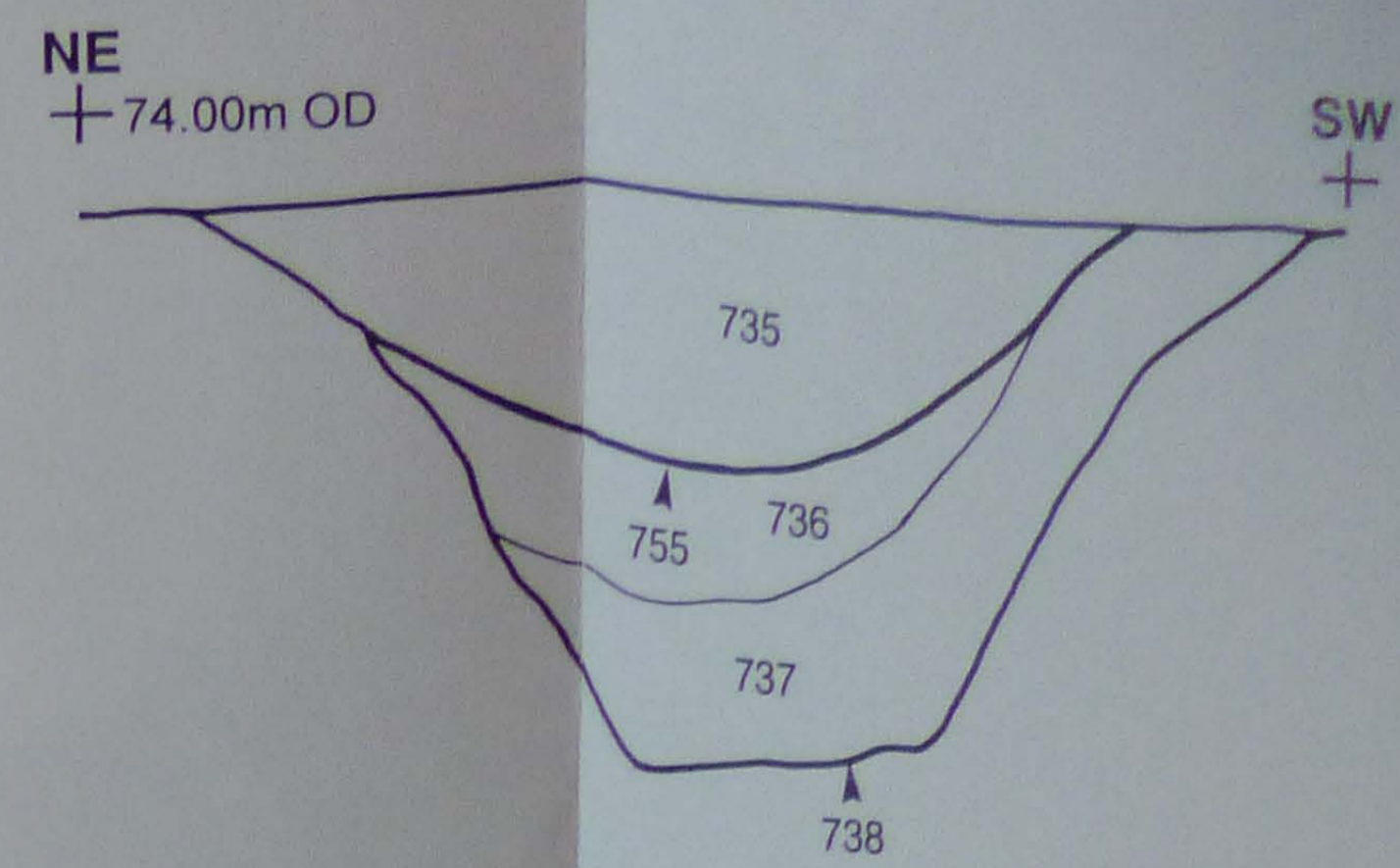
Section 39



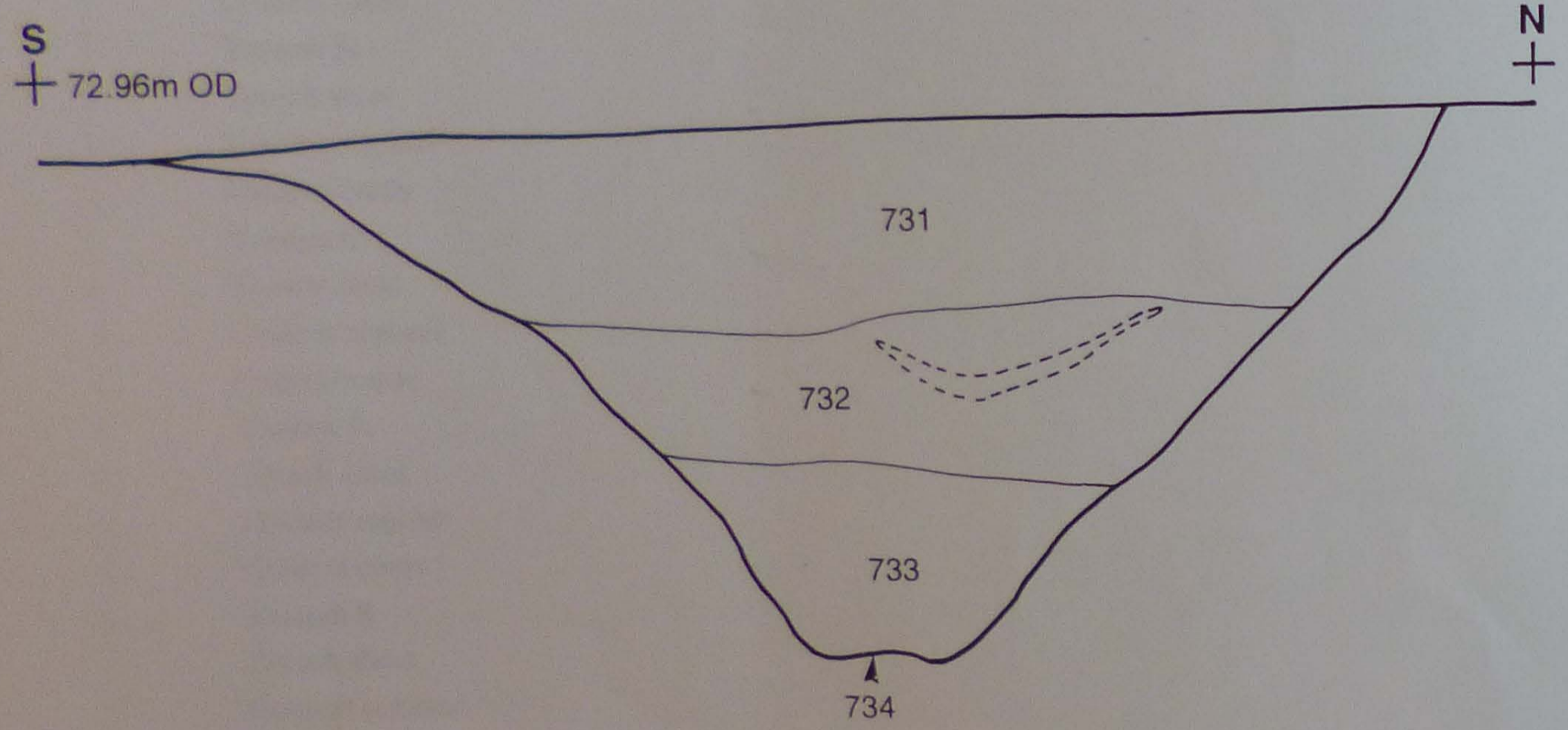
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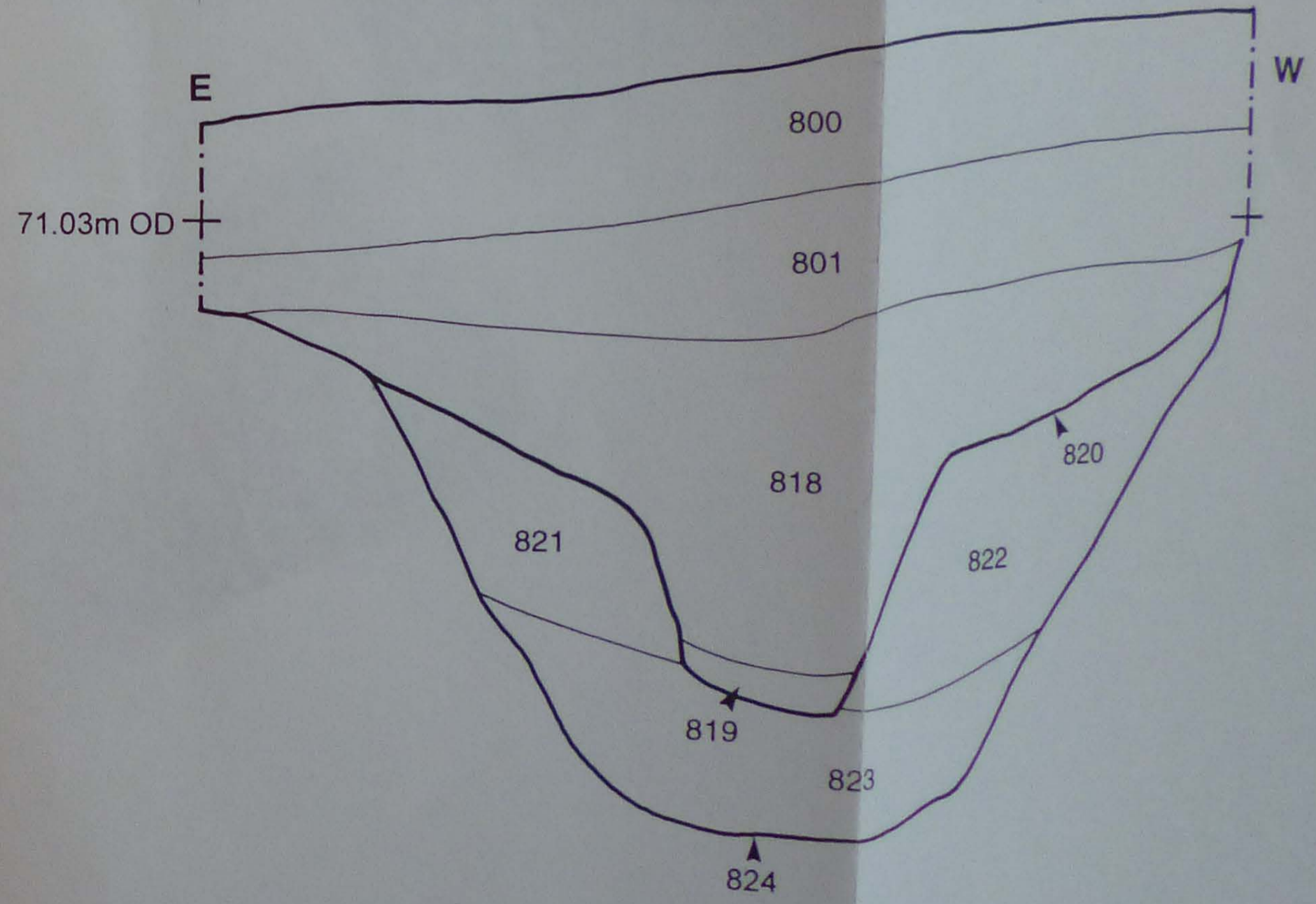
Section 62



Section 64



Section 105



Section 65

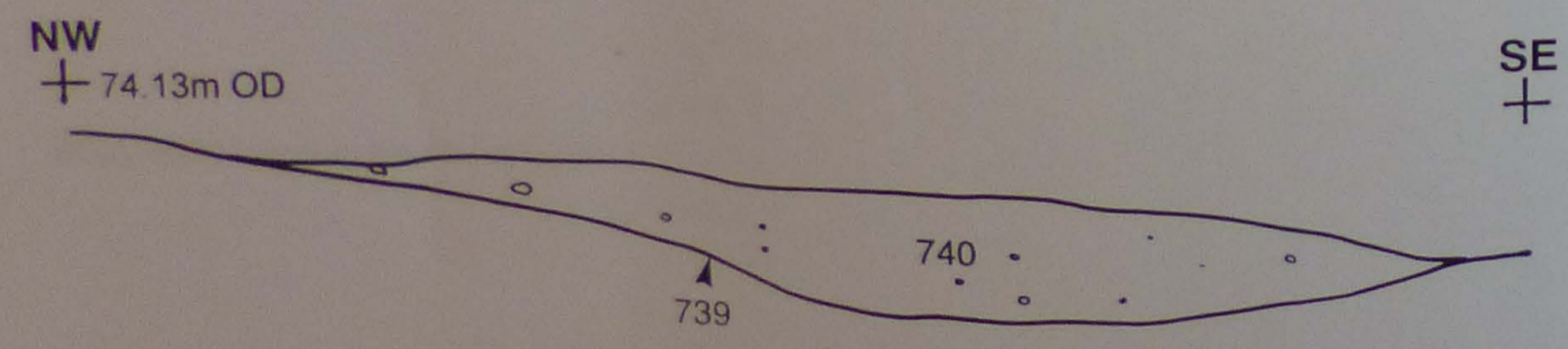


Fig.12 Trenches 7 & 8 Sections

## **Appendix I**

### **Inventory of primary archive**

<b>File no.</b>	<b>Description</b>	<b>Quantity</b>	
1	<b>Trench 1:</b>		
1	Trench sheet	1	
1	Context register	1	
1	Context cards	6	
1	<b>Trench 2:</b>		
	Trench sheet	1	
1	Context register	1	
1	Context cards	16	
1	<b>Trench 3:</b>		
1	Trench sheet	1	
1	Context register	1	
1	Context cards	13	
1	<b>Trench 4:</b>		
1	Trench sheet	1	
1	Context register	1	
1	Context cards	8	
1	<b>Trench 5:</b>		
1	Trench sheet	1	
1	Context register	1	
1	Context cards	8	
1	<b>Trench 6:</b>		
1	Trench sheet	2	
1	Context register	2	
1	Context cards	37	
1	<b>Trench 7:</b>		
1	Trench sheet	3	
1	Context register	3	
1	Context cards	56	
1	<b>Trench 8</b>		
1	Trench sheet	1	
1	Context register	1	
1	Context cards	29	
2	Colour negatives	Film No.5977	1
2		Film No.5979	1
2		Film No. 5981	1
2		Film No. 5989	1
		Film No. 5990	1
2	Black and white contacts and negatives	Film No: 5991	1
2		Film No: 5992	1
2		Film No: 5993	1
		Film No: 5992	1
		Film No. 5998	1

<b>File no.</b>	<b>Description</b>	<b>Quantity</b>
2	Environmental samples register	3
2	Environmental sample forms	41
2	Brief for archaeological evaluation	1
2	Written scheme of investigation	1
2	Risk Assessment	1
3	Drawing register	11
3	Small permatrace sheets	52
Loose	Large drawing sheets	2

## ***Appendix II***

### ***Inventory of contexts***

<b>Context</b>	<b>Trench</b>	<b>Description</b>	<b>Same as</b>	<b>Group</b>
100	1	Topsoil		
101	1	Subsoil		
102	1	Fill of 105		
104	1	Fill of 105		
105	1	Cut of sub-circular feature		
200	2	Topsoil		
201	2	Subsoil		
202	2	Fill of 203		
203	2	Cut of e-w linear		
204	2	Cut of linear		
205	2	Fill of 204		
206	2	Cut of possible post-hole		
207	2	Cut of linear		
208	2	Fill of 206		
209	2	Fill of 207		
210	2	Fill of 204		
211	2	Fill of 212		
212	2	Cut of linear		
213	2	Tree bowl		
214	2	Fill of 214		
215	2	Cut of post-hole		
300	3	Topsoil		
301	3	Subsoil		
302	3	Coal seam		
303	3	Fill of 304		
304	3	Cut of pit		
305	3	Cut of linear gully		
306	3	Fill of 305		
307	3	Fill of 308		
308	3	Cut of linear		
309	3	Fill of 310		
310	3	'Cut' of probable natural feature-coal seam		
311	3	Fill of 312		
312	3	'Cut' of linear-probable natural formed channel		
401	4	Topsoil		
402	4	Subsoil		
403	4	Fill of 004		
404	4	Cut of linear		
405	4	Fill of 406		
406	4	Cut of modern field drain		

Context	Trench	Description	Same as	Group
407	4	Fill of 408		
408	4	Cut of pit		
500	5	Topsoil		
501	5	Subsoil		
502	5	Fill of 503		
503	5	Cut of pit		
504	5	Fill of 505		
505	5	Cut of ditch		
506	5	Fill of 506		
507	5	Cut of post-hole		
600	6	Topsoil		
601	6	Subsoil		
602	6	Cancelled		
603	6	Cancelled		
604	6	Fill of 605		
605	6	Cut of linear ditch	629	6004
606	6	Fill of 609		
607	6	Fill of 609		
608	6	Fill of 609		
609	6	Cut of enclosure ditch	622, 627	6001
610	6	Fill of 612		
611	6	Fill of 612		
612	6	Cut of possible re-cut within ditch 615		
613	6	Fill of 615		
614	6	Fill of 615		6004
615	6	Cut of internal division within enclosure		
616	6	Fill of 617		
617	6	Cut of north-south linear ditch	627	
618	6	Fill of 619		
619	6	Cut of post-hole		
620	6	Fill of 622		
621	6	Fill of 622		
622	6	Cut of ditch	627	
623	6	Fill of 624		
624	6	Cut of ditch	622, 632, 638	6000
625	6	Fill of 627		
626	6	Fill of 627		
627	6	Cut of enclosure ditch	609	6001
628	6	Fill of 629		
629	6	Cut of Shallow ditch	605	6004
630	6	Fill of 623		
631	6	Fill of 632		
632	6	Cut of ditch terminus	622, 624, 638	6000

Context	Trench	Description	Same as	Group
633	6	Fill of 633		
634	6	Cut of rectangular pit		
635	6	Fill of 636		
636	6	Cut of terminus of enclosure ditch		6003
637	6	Fill of 638		
638	6	Cut of linear	622, 632, 624	
639	6	Fill of 640		
640	6	Cut of post-hole		
700	7	Topsoil		
701	7	Subsoil		
702	7	Fill of 702		
703	7	Cut of ditch		7002
704	7	Fill of 705		
705	7	Cut of enclosure ditch		7003
706	7	Fill of 707		
707	7	Cut of ditch		7000
708	7	Fill of 709		
709	7	Cut of ditch		7001
710	7	Fill of 711		
711	7	Cut of possible post-hole		
712	7	Fill of 713		
713	7	Cut of post-hole		
714	7	Fill of 715		
715	7	Cut of post-hole		
716	7	Fill of 717		
717	7	Cut of post-hole		
718	7	Fill of 719		
719	7	Cut of post-hole		
720	7	Fill of 711		
721	7	Fill of 722		
722	7	Cut of truncated linear		7005
723	7	Fill of 724		
724	7	Cut of truncated linear		7005
725	7	Fill of 726		
726	7	Cut of truncated linear		7005
727	7	Fill of 728		
728	7	Cut of truncated linear		7005
729	7	Fill of 730		
730	7	Cut of pit?		
731	7	Fill of 734		
732	7	Fill of 734		
733	7	Fill of 734		
734	7	Cut of enclosure ditch		7003
735	7	Fill of 755		
736	7	Fill of 738		
737	7	Fill of 738		



Context	Trench	Description	Same as	Group
738	7	Cut of ditch		7001
739	7	Cut of ditch		7000
740	7	Fill of 739		
741	7	Cut of burnt pit		
742	7	Fill of 742		
743	7	Fill of 744		
744	7	Cut of ditch		7000
745	7	Fill of 746		
746	7	Cut of ditch		7001
747	7	Fill of 748		
748	7	Cut of ditch		
749	7	Fill of 750		
750	7	Cut of possible pit		
751	7	Fill of 752		
752	7	Cut of enclosure ditch		7003
753	7	Fill of 754		
754	7	Cut of ditch	755	7002
755	7	Cut of ditch	754	7002
756	7	Possible pit unexcavated		
757	7	Possible pit unexcavated		
758	7	Possible pit unexcavated		
759	7	Irregular feature-natural unexcavated		
760	7	Irregular feature-natural unexcavated		
761	7	Possible pit/natural unexcavated		
762	7	Canalled		
763	7	Probable treebowl-ephemeral feature unexcavated		
764	7	Probable treebowl-ephemeral feature unexcavated		
800	8	Topsoil		
801	8	Subsoil		
802	8	Fill of 803		
803	8	Cut of shallow linear-possible ridge and furrow	829	
804	8	Fill of 805		
805	8	Cut of ditch	824/826	8000
806	8	Fill of 807		
807	8	Cut of ditch		
808	8	Fill of 809		
809	8	Cut of shallow linear-possible ridge and furrow	811	
810	8	Fill of 811		
811	8	Cut of shallow linear-possible ridge and furrow	809	
812	8	Fill of 813		
813	8	Cut of enclosure ditch		8001

<b>Context</b>	<b>Trench</b>	<b>Description</b>	<b>Same as</b>	<b>Group</b>
814	8	Fill of 815		
815	8	Cut of possible pit		
816	8	Fill of 817		
817		Cut of curvi-linear ditch		
818		Fill of 820		
819	8	Fill of 820		
820	8	Cut of possible re-cut		
821	8	Fill of 824		
822	8	Fill of 824		
823	8	Fill of 824		
824	8	Cut of linear	805/826	8000
825	8	Fill of 826		
826	8	Cut of ditch	805/824	8000
827	8	Natural?		
828	8	Fill of 829		
829	8	Cut of ditch	803	

### ***Appendix III***

#### ***Inventory of artefacts***

<b>Fabric</b>	<b>Trench</b>	<b>Context</b>	<b>Quantity</b>	<b>Details</b>
Pottery	6	631	4	
	7	712	1	
	7	701	1	
	1	104	1	Post-medieval
Burnt Clay	7	735	1	Possible crucible
Cu alloy obj.	7	735	1	
Slag	6	610	1	
Cinder	7	733	1	

## ***Appendix IV***

### ***Inventory of samples***

<b>Sample</b>	<b>Trench</b>	<b>Context</b>	<b>Type</b>	<b>Processed</b>
1	3	306	GBA	N
2	3	303	GBA	N
3	7	710	GBA	Y
4	3	307	GBA	N
5	3	309	GBA	N
6	3	311	GBA	N
7	4	403	GBA	N
8	2	209	GBA	Y
9	2	205	GBA	N
10	5	502	GBA	Y
11	5	504	GBA	Y
12	5	506	GBA	N
13	4	407	GBA	N
14	7	710	GBA	Y
15	7	714	GBA	Y
16	7	716	GBA	Y
17	7	718	GBA	Y
18	7	718	Charcoal	Y
19	7	733	GBA	Y
20	7	729	GBA	N
21	7	732	Charcoal	Y
22	7	721	GBA	N
24	7	735	GBA	Y
25	7	737	GBA	Y
26	7	740	GBA	N
27	7	742	GBA	Y
28	7	747	GBA	Y
29	7	749	GBA	N
30	6	604	GBA	Y
31	6	608	GBA	Y
32	6	614	GBA	Y
33	6	611	GBA	Y
34	6	610	GBA	N
35	6	631	GBA	Y
36	6	633	GBA	Y
37	8	802	GBA	N
38	8	808	GBA	N
39	6	639	GBA	N
40	8	814	GBA	N
41	8	823	GBA	N

**Appendix V****Details of unexcavated features within Trench 7**

<b>Context</b>	<b>Description</b>	<b>Length (m)</b>	<b>Width (m)</b>
756	Possible pit continues into western baulk filled with a dark brown sand deposit	1.15	0.6
757	Possible pit, a slightly irregular filled with a mid brown sandy silt with charcoal flecks	1.7	0.5
758	Sub-oval possible pit, containing a mid-orange brown sandy silt with frequent sandstone inclusions	0.8	0.6
759	Irregular feature probable natural, very clean mid brown clay silt fill	0.56	0.4
760	Irregular feature filled with a red sand deposit, possibly natural	0.25	0.16
761	Possible post-hole irregular sub-oval feature containing a light orange sand y silt	0.8	0.3
763	Very ephemeral feature filled with a clean red brown silty clay, probable tree disturbance/natural	2.2	1.4
764	Very ephemeral feature filled with a clean red brown silty clay, probable tree disturbance/natural	3.4	1.6

## Appendix VI Results from the flot samples

	Context number	Sample number	Flot volume	Cereal grain	Charred Seeds	Cereal chaff	Charcoal		Uncharred plant	Comments
							qty.	large frags.		
Trench 2	209	8	1 ml				+		++++	tiny charcoal fragments
Trench 5	502	10	1 ml				+		++++	tiny charcoal fragments
	504	11	10 ml				++++		+	tiny charcoal fragments
Trench 6	604	30	50 ml		+		++++	*	+	much charcoal, seed unidentified
	608	31	<1 ml				++		++	tiny charcoal fragments
	611	33	1 ml				++		+++	tiny charcoal fragments
	614	32	2 ml	+	+	+	++		+++	<i>Triticum</i> sp. grain and chaff, <i>Chenopodium</i> sp.
	631	35	20 ml				++		++++	mostly modern material including <i>Sambucus nigra</i> seeds
	633	36	110 ml	+			++++	*	++++	much modern material, grain unidentified
Trench 7	710	3	10 ml				++++		++++	tiny charcoal fragments
	718	17	1 ml				++		+++	tiny charcoal fragments
	732	21	2 ml				++++		+++	tiny charcoal fragments
	733	19	<1 ml				++	*	+	1 larger charcoal fragment
	735	24	30 ml	+			++++	*		much charcoal, <i>Triticum</i> sp. grain
	737	25	<1 ml				+		+	tiny charcoal fragments
	742	27	2 ml		+		++		++++	tiny charcoal fragments, <i>Silene</i> sp. seed
	747	28	<1 ml				++		++	tiny charcoal fragments
Trench 8	823	41	1 ml		+		+		+++	tiny charcoal fragments, <i>Polygonum</i> sp.

Key :      + = rare (0-5), ++ = occasional (6-10), +++ = common (11-50), ++++ = abundant (>50)

\* = sufficiently large fragments of wood charcoal to be identified and to provide AMS dates

## Appendix VII Results from the retents

	Context number	Sample number	Retent volume	Cereal grain	Charred Seeds	Cereal chaff	Charcoal		Bone	Comments
							qty.	large frags.		
Trench 2	209	8	350 ml				++			magnetic material
Trench 5	502	10	300 ml				++++	*		magnetic material
	504	11	650 ml				++++	*		
Trench 6	604	30	300 ml				++++	*		magnetic material
	608	31	200 ml				++			
	611	33	500 ml				++	*		
	614	32	400 ml			++	++++	*		<i>Triticum</i> sp. spikelet base and glume bases, magnetic material
	631	35	250 ml				++++			
	633	36	5550 ml				++++	*	++++	unidentified burnt bone, magnetic material
Trench 7	710	3	750 ml				++++	*		magnetic material
	718	17	550 ml				++++	*		magnetic material
	732	21	350 ml				++++	*		magnetic material
	733	19	500 ml				++++	*		
	735	24	400 ml				++++	*		magnetic material
	737	25	650 ml				+++	*		
	742	27	400 ml				++++	*		magnetic material
	747	28	300 ml				++++	*		magnetic material
Trench 8	823	41	50 ml				+			magnetic material

Key :      + = rare (0-5), ++ = occasional (6-10), +++ = common (11-50), ++++ = abundant (>50)

\* = sufficiently large fragments of wood charcoal to be identified and to provide AMS dates

***Appendix VIII***

***Brief for archaeological evaluation by South Yorkshire Archaeology  
Service***



## **BRIEF FOR ARCHAEOLOGICAL INVESTIGATION**

**Proposal:** Shafton By-Pass Road

**Planning application number:** N/A

**Location:** Engine Lane, Barnsley

**Grid Reference:** SE 398 100 (centred)

**Geology:** Middle Coal Measures

**Area of proposal site:** See Accompanying Plan

### **Summary**

A proposal has been made by Barnsley Metropolitan Borough Council for the above road scheme.

There is reason to believe that archaeological remains exist on the site but little is known as to their extent and state of preservation. The South Yorkshire Archaeology Service has advised that the archaeological implications of the proposal cannot be adequately assessed on the basis of the available information. It has been recommended, therefore, that an archaeological field evaluation should be carried out. This recommendation is in line with government guidance as set out in DOE Planning Policy Guidance on **Archaeology and Planning (PPG16 1990)**.

### **1.0 Archaeological background**

1.1 The site of the proposed road scheme will have a direct impact upon archaeological remains in this area. A desk-top assessment recently undertaken by Archaeological Services WYAS on behalf of Barnsley MBC, has highlighted the high archaeological potential of this area. In particular, cropmarks that are believed to date to the Iron Age/Romano-British period are to be affected. It is possible that the visible cropmarks were part of a broader landscape of activity which may have extended into other parts of the proposed road scheme. It has also been suggested that early coal mining remains, possibly dating back to the mediaeval period may be located in this area.

1.2 There are other sites and finds in the immediate area. Further details can be obtained from the South Yorkshire Archaeology Service.

## **2.0 Requirement for an evaluation**

2.1 The proposed development would severely damage or destroy any archaeological remains which may be present on the site. It has been recommended, therefore, that an archaeological evaluation should take place to obtain further information on the presence and preservation of any archaeological deposits.

2.2 The objectives of the evaluation should be to gather sufficient information to establish presence/absence, character, extent, state of preservation and date of any archaeological deposits within the areas of proposed development.

2.3 The evaluation should investigate the whole of the area indicated on the accompanying plan.

## **3.0 Evaluation Techniques**

The techniques chosen should be selected to cause the minimum amount of destruction and should comply with all health and safety regulations. It is envisaged that the following work would be required:

3.1 Stage 1: a programme of detailed geo-physical survey is to be undertaken to fully survey the three fields highlighted on the accompanying plan.

3.2 Stage 2: depending upon the results of stage 1 of fieldwork, trial excavation may prove necessary.

## **4.0 Evaluation Proposal**

4.1 A detailed evaluation proposal should be formulated by potential contractors and submitted to the South Yorkshire Archaeology Service for approval. The proposal should include:

4.1.1 A description of the proposed methods of excavation and recording system.

4.1.2 An explanation of the sampling strategies to be used.

4.1.3 A projected timetable for work on the site.

4.1.4 Details of the arrangements made for deposition of the finds and site archive (see section 8 below).

4.2 The work shall be carried out by appropriately qualified and experienced staff; details of staff numbers and their relative experience should be included,

plus their responsibilities in carrying out the work. Staff C.V.s should be included (unless already supplied to SYAS SMR in previous project specifications).

## 5.0 Excavation guidelines

Where trenches are to be opened by machine the following guidelines should be observed:

5.1 The health and safety implications of any use of earth-moving machinery on the site should be taken in to account.

5.2 An appropriate machine should be used. The choice should be influenced by the prevailing site conditions, and the machine must carry out a clean and safe job.

5.3 An appropriate bucket should be used.

5.4 All machining is to be carried out under the direct supervision of an archaeologist and should be halted if archaeological deposits are encountered.

5.5 All topsoil or recent overburden should be removed down to the first significant archaeological horizon in successive level spits. Under no circumstances should the machine be used to cut arbitrary trenches down to natural deposits.

5.6 Trenches to be recorded according to the normal principles of stratigraphic excavation.

5.7 The stratigraphy of any trial trench is to be recorded even where no archaeological deposits have been identified. No archaeological deposit should be entirely removed unless this is unavoidable.

5.8 Any human remains which are excavated must initially be left *in situ* and, if removal is necessary, this must comply with the relevant Home Office regulations.

5.9 The actual areas of trenching and any features of possible archaeological concern noted within the trenches, should be accurately located on a site plan and recorded by photographs, summary scale drawings, and written descriptions.

5.10 The archaeological contractors will be responsible for locating any service pipes, cables etc., which may cross any of the trench lines, and for taking the necessary measures to avoid disturbing such services.

## 6.0 Site Monitoring

6.1 The South Yorkshire Archaeology Service will be responsible for monitoring the evaluation. A minimum of one week's notice of the commencement of fieldwork must be given by the archaeological contractor to the South Yorkshire Archaeology Service in order that arrangements for monitoring may be made.

6.2 Site inspections will be arranged so that the general site stratigraphy can be assessed in the initial stage of trial trenching and/or so that the site can be inspected when field work is near to completion, but before any trenches have been backfilled.

## 7.0 Report

7.1 The evaluation should result in a report including background information (with planning application details, where appropriate), methods, detailed results, conclusion and discussion. Section drawings and plans should be included, plus a clear location map and grid references.

7.2 **The report should not give an opinion on whether preservation or further investigation is considered appropriate, but should provide an interpretation of results, placing them in a local and regional context.**

7.3 The report will be made available to the Sites and Monuments Record. As well as a printed copy of the report, copies of the electronic files should be provided in the following formats:

- 1 copy in Word for Windows or compatible format. **(NOT WordStar).**
- 1 copy in text (ASCII) format.

All other documents relating to this work (e.g. geophysical survey reports, survey reports) should also be provided in the same formats. Data files should be provided as a printout, and in an electronic format to be agreed with the Sites and Monuments Record, prior to the commencement of work.

7.4 The results of the work will be published in the appropriate issue of **Archaeology in South Yorkshire**, and, if of regional or national significance, within an archaeological journal.

## 8.0 Deposition of Archive and Finds

8.1 It is required that arrangements for the deposition of the finds and site archive be made with **Doncaster Museum** prior to the commencement of fieldwork. Following agreement with the landowner, the contractor should

contact the relevant museum curator [**Mrs Gill Crawley 01302 734 290**] to discuss archaeological archiving requirements at the initial stage of the project design.

8.2 The accompanying summary document, "Transfer of Archaeological Archives to South Yorkshire Museums", gives brief details of South Yorkshire Museums requirements. Detailed guidelines will be supplied by the appropriate institution.

## ***Appendix IX***

***Written scheme of investigation by Archaeological Services WYAS***

# Shafton By-Pass/Engine Lane Improvement, Barnsley, South Yorkshire

## Written Scheme Of Investigation

### 1. Introduction

- 1.1 An archaeological evaluation has been requested for part of the route of the proposed Shafton By-Pass (Fig. 1). The route of the By-Pass, centred on SE398100, extends north from the vicinity of Hazeldene Farm and mainly follows the route of Engine Lane towards land south of Hazeldene Crescent, where it branches east and west, respectively leading to Weet Shaw Lane and Brierly Road.
- 1.2 This document details the required methodology for further evaluation of the site via trial trenching, and has been prepared following a meeting between Russell Ogden of Barnsley Metropolitan District Council, Roy Sykes of the South Yorkshire Archaeology Service and representatives of Archaeological Services WYAS. This document has been approved by the South Yorkshire Archaeology Service.
- 1.3 There is reason to believe, following a desk-top assessment (Keith 2000) and geophysical survey (Webb 2000) of the proposed route, that archaeological remains are to be affected by the roads construction, but little is known as to their extent and state of preservation. Archaeological Services WYAS, in consultation with the South Yorkshire SMR, has advised that the archaeological implications of the proposed development cannot be adequately assessed on the basis of the available information. It has been recommended therefore that an archaeological field evaluation should be carried out, in line with government guidance as set out in D.O.E. Planning Policy on Archaeology and Planning (PPG16 1990). The results of this evaluation will aim to enable the impact of the proposed development on any archaeological deposits to be assessed.

### 2. Archaeological Background

- 2.1 The site of the proposed road scheme will have a direct impact upon archaeological remains in this area. A desk-top assessment (Keith 2000) undertaken by Archaeological Services WYAS highlighted the high archaeological potential of this area. In particular a cropmark in the field north-east of Engine Lane, is thought to locate an infilled sub-circular ditched enclosure with internal subdivisions, potentially associated with prehistoric/Romano-British activity. The proposed route of the road will cut the northern and western sides of the enclosure, which has a dominant location on the crest of a ridge. It was also suggested that early coal mining remains possibly dating back to the medieval period were also located in this area. Later mine workings of the Shafton Coal Seam have also been recorded in the vicinity.
- 2.2 There are other sites and finds of archaeological interest in the immediate area of the proposed By-Pass. In particular, a staged programme of geophysical survey, trial trenching and excavation has been carried out by Archaeological Services

WYAS on land off High Street, Shafton, some 0.75km to the north-west which has revealed extensive remains dating to the Romano-British period.

- 2.3 On the basis of the results of the desk-top survey an archaeological evaluation was requested by the Sites and Monuments Record of the South Yorkshire Archaeology Service. Stage 1 of the evaluation was a gradiometer survey of 6ha in two fields to the north-east (Field 1, Fig. 2) and the south-west of Engine Lane (Field 2, Fig 3). The gradiometer survey further clarified the extent of the ditched enclosure in Field 2 to the north-east of Engine Lane and probable internal subdivisions, and also identified further linear anomalies potentially representing infilled ditches of prehistoric/Romano-British date, in Fields 1 and 2 to the south-west and north-east of Engine Lane respectively. In addition, numerous discrete features which may represent infilled coal pits or archaeological pits were also identified. On the basis of the results of the survey a second stage of archaeological evaluation via trial trenching (Stage 2) of parts of the application area has been devised.

### **3. Aims and Objectives**

- 3.1 In the area of the proposed development, any below-ground works are likely to impact upon any surviving archaeological deposits within and below topsoil cover. It has been recommended therefore that an archaeological evaluation should take place in order to obtain further information on the presence and preservation of any archaeological deposits.
- 3.2 The aims and objectives of an archaeological evaluation in the area of the proposed development will be:
- to gather sufficient information to establish the presence/absence of archaeological remains within the proposed development area;
  - to determine the extent, condition, character, quality of survival, importance and date of any archaeological remains present;
  - to provide information that will enable an assessment of the potential and significance of the archaeology of the site to be made and the impact which the development will have upon this;
  - to provide information that will enable an informed decision to be taken regarding the future treatment of the remains and any mitigation measures appropriate either in advance of and/or during development.

### **4. Proposed Method**

- 4.1 Experience that has been gained from evaluating this landscape and others of a similar nature and date in the region, suggests that it is more worthwhile opening larger areas to try and isolate possible areas of occupation than simply targeting the field boundary ditches. These ditches are undoubtedly of prehistoric/Romano-British date, but invariably contain little datable remains. Of more interest, is the potential of identifying discrete areas of occupation within, or on the periphery of, the enclosure and potential field system. With this in mind, and with the additional purpose of investigating probable later mining activity, it has been agreed that the evaluation will comprise the excavation of nine large trial trenches



as indicated on Figures 2 and 3. The trenches are positioned to investigate the nature, depth and extent of any features and deposits encountered.

#### 4.2 Proposed trench areas (See Figs 2 and 3)

Field	Trench	Dimensions	Area	Aim of evaluation trench
1	A	25m by 5m	125m <sup>2</sup>	Target large discrete anomaly (probable kiln or coal pit) and linear anomaly (probable ditch)
1	B	20m by 5m	100m <sup>2</sup>	Target intermittent linear anomaly (probable ditch) and small discrete anomaly (possible pit)
1	C	25m by 3m	75m <sup>2</sup>	Target large linear anomaly (possible natural feature)
1	D	20m by 5m	100m <sup>2</sup>	Target linear anomaly (probable ditch) and cluster of discrete anomalies (possible mining pits)
1	E	15m by 3m	45m <sup>2</sup>	Target linear anomaly (ditch) and discrete anomaly (possible pit)
2	F	35m by 15m	525m <sup>2</sup>	Target area internal and external to enclosure; large discrete anomalies (mining remains), enclosure ditch, internal subdividing ditch, external linear anomaly (ditch) and small discrete anomalies internal and external to enclosure (pits)
2	G	20m by 15m	300m <sup>2</sup>	Target area internal and external to enclosure; convergence of enclosure ditch, gateway structure? And internal subdividing ditch,
2	H	20m by 5m	100m <sup>2</sup>	Target enclosure ditch and internal discrete anomaly (pit)
2	I	20m by 5m	100m <sup>2</sup>	Target enclosure ditch, external linear anomaly (ditch)
<b>Total</b>			<b>1470m<sup>2</sup></b>	

4.3 The Archaeological Contractor will establish and set out all trench locations using electronic survey equipment. The location of the proposed trenches will be read from available map data. These co-ordinates will then be used to set out the trenches to maximise the accuracy of the trench locations. However, due to unforeseen nature of the below-ground modern make-up it is proposed that the trench locations may be subject to change at the discretion of the supervising archaeologist, but only in consultation with the South Yorkshire Archaeology Service.

4.4 All trenches to be machine excavated, using an appropriate mechanical excavator with a toothless ditching bucket, under direct archaeological supervision, in level spits to the top of the first archaeological horizon or undisturbed natural. The resulting surface to be inspected for archaeological remains. Where archaeological remains require clarification, the relevant area will be cleaned by hand. Under no circumstances should the machine be used to cut arbitrary trenches down to natural deposits.

4.5 The Archaeological Contractor will hand excavate all archaeological features in an archaeologically controlled and stratigraphic manner in order to meet the aims

and objectives outlined above. A sufficient sample of features will be investigated in each trench in order to understand the full stratigraphic sequence, down to the naturally occurring deposits. Where minor archaeological features such as agricultural boundary ditches are identified, they will be planned and minimally sampled (10% by length). Where more substantial or significant deposits are identified, they will be treated through the following sampling strategies :

- Excavation of any potential industrial, post-medieval, medieval or earlier features will involve a minimum of 10% up to a maximum of 100% hand and machine sampling (where appropriate and only in consultation with the South Yorkshire Archaeology Service) to achieve the objectives of determining the date and function of the site and its components. Sampling and recording strategies will take account of, and reflect any potential for multi-phased occupation. However, in the specific case of encountering what is believed to be a kiln feature, and where single context recording of the whole feature would be the most appropriate strategy, and where this is unlikely to be possible during this phase of evaluation, then the proposal is to simply to locate and define the limits of such a feature.
- Linear features: A minimum of 20% along their length (each sample section to be not less than 1m), or a minimum of a 1m sample section if the feature is less than 10m long, of the deposits within linear features, such as boundary or drainage ditches associated with domestic, agricultural, industrial, funerary or ritual enclosures, or fields, or trackways, will be excavated to their full depth. Where possible one section will be located and recorded adjacent to the trench edge.
- Intersections of linear features: The deposits at the junctions of or interruptions in linear features will be totally removed over a sufficient length to determine the nature of the relationship between the components. Excavation of an 'L'-shaped section will be undertaken in the first instance to demonstrate and record relationships and then expanded to the full widths, planned and recorded.
- Discrete features: Pits, post-holes and other isolated features will normally be half-sectioned to determine and record their form with a minimum sample of 50% of discrete features in each trench. The exceptions will be potential sunken-floored buildings, wall-settings, hearths, kilns, storage pits or other identifiable domestic, agricultural, industrial, funerary or ritual structures or buildings. Huts, barns, kilns, gateways, causeways, working hollows, floor levels, hearths will be subject to a 100% sample by volume, and excavated to a degree whereby their extent, nature, form, date, function and relationship to other features and deposits can be established. The complete excavation of such features may be suitably left to a further stage of excavation, but only following consultation with the South Yorkshire Archaeology Service.
- Built structures, such as walls, will be examined and sampled to a degree whereby their extent, nature, form, date, function and relationship to other features and deposits can be established.

- 4.6 The Archaeological Contractor shall make a full written, drawn and photographic record of all material revealed in each trench during the course of the evaluation, even where no archaeological features or deposits have been recognised. The trench limits will be surveyed using electronic survey equipment with larger scale hand drawn plans of features at 1:20, as appropriate. Sections of linear and discrete features will be drawn at 1:10. All sections, plans and elevations will include spot-heights related to Ordnance Datum in metres as correct to two decimal places and survey tie-in information will be undertaken during the course of the evaluation and will be fixed in relation to nearby permanent structures and roads and to the National Grid (located on the 1:2500 map of the area).
- 4.7 The Archaeological Contractor shall record all finds, where practicable, three dimensionally using appropriate electronic survey equipment. The resulting data will be downloaded and processed using appropriate software. All artefacts recovered will be retained and removed from the site for conservation and analysis. Non-modern artefacts will be collected from the excavated topsoil and subsoil, and a metal detector scan of all topsoil and subsoil will be made and any finds included in any subsequent finds assessment. Finds material will be stored in controlled environments, where appropriate. All artefacts recovered will be retained, cleaned, labelled and stored as detailed in the guidelines laid out in the IFA Guidelines for Finds Work. Conservation, if required, will be undertaken by approved conservators. UKIC guidelines will apply.
- 4.8 The Archaeological Contractor shall fully record all excavated archaeological contexts by detailed written records giving details of location, composition, shape, dimensions, relationships, finds, samples, and cross-references to other elements of the record and other relevant contexts, in accordance with best industry practice and in accordance with methods previously approved by the South Yorkshire Archaeology Service. All contexts, and any small finds and samples from them will be given unique numbers. Bulk finds will be collected by context. Colour transparency and monochrome negative photographs will be taken at a minimum format of 35mm. Provision should be made by the archaeological contractor for the assembly of a photographic tower on site to record enclosures, structures or other features, to be determined in consultation with the South Yorkshire Archaeology Service at the outset of the project.
- 4.9 The Archaeological Contractor shall undertake a soil-sampling programme during the course of the evaluation for the identification and recovery of carbonised and waterlogged remains, vertebrate remains, molluscs and small artefactual material. Environmental and soil specialists, who satisfy the criteria for an Archaeological Specialist as defined in paragraph 12.1.4 below, will be consulted during the course of the excavation with regard to the implementation of this sampling programme. At least one site visit will be made by at least one of the aforementioned specialists to view each of the trial trenches whilst open, with regard to the implementation of the sampling programme. Provision should be made by the Archaeological Contractor for the removal of soil samples of between 10 and 30 litres (where appropriate), from all excavated contexts, and larger samples from any rich carbonised deposits. Particular attention will be paid to the sampling of primary ditch fills and any surviving buried soils beneath banks or other positive features (if any of the latter are found to survive) and for the recovery of material suitable for radiocarbon, thermoluminescence and/or

dendrochronological determinations, as appropriate. If buried soils or other appropriate deposits are encountered; column samples will be taken for micromorphological and pollen analysis. Environmental material removed from site will be stored in appropriate controlled environments. The collection and processing of environmental samples will be undertaken in accordance with guidelines set out in the Association for Environmental Archaeology's (1995) Working Paper No. 2, "*Environmental Archaeology and Archaeological Evaluations - Recommendations concerning the environmental archaeology component of archaeological evaluations in England*". In addition, the processing of environmental samples will only take place within facilities approved for such purposes by the Regional Science Advisor, Ian Panter.

- 4.10 In the event of human remains being discovered during the excavation these will be left *in situ* by the Archaeological Contractor, covered and protected, in the first instance. The removal of human remains will only take place under appropriate Home Office and environmental health regulations, and in compliance with the Burial Act 1857. If human remains are identified, the Archaeological Contractor will inform the SMR and Coroner immediately. A Home Office licence will be obtained prior to the removal of the remains and contingency provision will be made for the specialist reports on the remains by a recognised osteo-archaeologist who satisfies the criteria for an Archaeological Specialist as defined in paragraph 12.1.4 below.
- 4.11 The Archaeological Contractor will make provision for the recovery of samples suitable for scientific dating. Provision will be made for thermoluminescent dating, radiometric/AMS dating, archaeomagnetic and dendrochronological dating. If required these provisions will be utilised in consultation with the South Yorkshire Archaeology Service.
- 4.12 All finds that fall within the purview of the Treasure Act 1996 will be reported by the Archaeological Contractor to HM Coroner according to the procedures outlined in the Act, after discussion with the client and the SMR.
- 4.13 The Archaeological Contractor will supply to the client a detailed timetable for completion of the fieldwork and post-excavation reporting as part of the tender for the evaluation. The archaeological personnel will consist of only professional archaeologists whose details have been previously supplied to the South Yorkshire Archaeology Service, and will comprise at the very least an Archaeological Project Manager, an Archaeological Project Supervisor and Archaeological Site Assistants who satisfy the criteria for the respective positions as defined in paragraphs 12.1.1-12.1.4 below.

## **5. Archive preparation and deposition**

- 5.1 The site archive will contain all the data collected during the exploratory work, including records, finds and environmental samples. It will be quantified, ordered, indexed and internally consistent. Adequate resources will be provided during fieldwork to ensure that all records are checked and internally consistent. Archive consolidation will be undertaken immediately following the conclusion of fieldwork:

- the site record will be checked, cross-referenced and indexed as necessary;

- all retained finds will be cleaned, conserved, marked and packaged in accordance with the requirements of the recipient museum;
  - all retained finds will be assessed and recorded using pro forma recording sheets, by suitably qualified and experienced staff. Initial artefact dating will be integrated with the site matrix;
  - all retained environmental samples will be processed by suitably experienced and qualified staff and recorded using pro forma recording sheets, to identify at this stage presence or absence of environmental remains.
- 5.2 The archive will be assembled in accordance with the specification set out in English Heritage's "*Management of Archaeological Projects 2*" (English Heritage, 1991; Appendix 3). In addition to the site records, artefacts, ecofacts and other sample residues, the archive shall contain:
- site matrices where appropriate;
  - a summary report synthesising the context record;
  - a summary of the artefact record;
  - a summary of the environment record.
- 5.3 The integrity of the primary field record will be preserved. Security copies will be maintained where appropriate.
- 5.4 Provision will be made for the deposition of the archive, artefacts and environmental material, subject to the permission of the relevant landowner (and if no further archaeological work is to be initiated), in the appropriate recipient museum, in this case Doncaster Museum. The museum curator Mrs Gillian Crawley (01302 734 290) will be advised of the timetable of the proposed investigation prior to evaluation commencing and the Archaeological Contractor will adhere to any reasonable requirements the museum may have regarding conservation and storage of the excavated material and the resulting archive. The archive will be prepared in accordance with the guidelines published in "*Guidelines for the preparation of Excavation Archives for long-term storage*" (United Kingdom Institute for Conservation, 1990) and "*Standards in the Museum care of archaeological collections*" (Museums and Galleries Commission, 1994). Provision will be made for the stable storage of paper records and their long-term storage on a suitable medium, such as microfilm.
- 5.5 Should further archaeological evaluation be initiated and/or additional archaeological work undertaken, the evaluation archive will be prepared accordingly for incorporation into the final archive.
- 5.6 Archive deposition will be arranged in consultation with the recipient museum and the South Yorkshire SMR and will take into account all requirements of the recipient museum and of the relevant guidelines outlined above. The timetable for deposition will be agreed on completion of the site archive and narrative.

## 6. Report preparation, contents and distribution

- 6.1 Upon completion of the evaluation, the artefacts, ecofacts and stratigraphic information shall be assessed as to their potential and significance for further analysis.
- 6.2 A post-excavation assessment report will be prepared and include the following :
- a non-technical summary of the results of the work;
  - a summary of the project's background;
  - the site location;
  - an account of the method;
  - the results of the evaluation, including phasing and interpretation of the site sequence and an assessment of ceramics;
  - a post-excavation assessment of the stratigraphic and other written, drawn and photographic records;
  - a catalogue and post-excavation assessment of each category of artefact recovered during excavation, each undertaken by a relevant Archaeological Specialist, as defined in paragraph 12.1.4 below;
  - a catalogue and post-excavation assessment of any faunal remains recovered during the excavation, each undertaken by an Archaeological Specialist as defined in paragraph 12.1.4 below;
  - a catalogue of soil samples collected and a post-excavation assessment of the results of the soil sampling programme, undertaken by a relevant Archaeological Specialist as defined in paragraph 12.1.4 below;
  - catalogues and post-excavation assessments and/or summary reports of all scientific dating procedures or other analyses carried out;
  - an appendix containing a list and summary descriptions of all contexts recorded;
  - a summary of the contents of the project archive and its location;
- 6.3 The report will be supported by an overall plan of the site, accurately identifying the location of trenches on Ordnance Survey Landline data; individual trench plans as excavated, indicating the location of archaeological features with supporting section drawings where appropriate; and photographs.
- 6.4 The report will also contain the specialist assessments of the all categories of artefacts and ecofacts recovered with a view to their potential for further study.
- 6.5 Finally, the post-excavation report will outline the archaeological significance of the deposits identified, and provide an interpretation of the results in relation to other sites in the region. In particular, the results of the evaluation will make reference to other known archaeological sites in the close vicinity of the development.
- 6.6 The Archaeological Contractor will submit copies of the report to the Client, the Local Planning Authority, and the Sites and Monuments Record within an agreed timetable, notwithstanding any contractual requirements on confidentiality (see section 8 below).

- 6.7 The Archaeological Contractor will supply copies of electronic files containing the report to the Sites and Monuments Record in the following formats
- 1 copy in Word for Windows or compatible format (NOT WordStar)
  - 1 copy in text ASCII format

## **7. Publication and Dissemination**

- 7.1 The information contained within the assessment report will enable decisions to be taken regarding the future treatment of the archaeology at the site and any material recovered during the evaluation.
- 7.2 If the outcome of the evaluation results in a decision not to initiate any further works, it is to be appreciated that the assessment may produce results of sufficient significance to merit publication in their own right.
- 7.3 Where no further work is envisaged, allowance will be made for the preparation and publication of the work in the appropriate issue of *Archaeology in South Yorkshire*, and, if of regional or national significance, within an appropriate journal.
- 7.4 Should further archaeological excavation be undertaken, a synopsis of the results of the assessment will be prepared for publication with the final results of any further fieldwork.
- 7.5 It is understood that the results of the excavation may be of interest to the wider public and as such may be disseminated by means of occasional talks.

## **8. Copyright, Confidentiality and Publicity**

- 8.1 All aspects of copyright, publicity and confidentiality will be agreed between the Archaeological Contractor and the client at the outset of the project. The Archaeological Contractor will make the results of archaeological work known to the wider archaeological community within a reasonable time. Copies of the report should be submitted to the client and to the Sites and Monuments Record Office.

## **9. Health and Safety**

- 9.1 The Archaeological Contractors will have their own Health and Safety policies compiled using national guidelines and which will conform to all relevant Health and Safety legislation. A paper copy of the Archaeological Contractors Health and Safety policy will be supplied to the client prior to fieldwork commencing.
- 9.2 In addition, the Archaeological Contractor will undertake and submit a 'Risk Assessment' to the client, which sets project specific Health and Safety requirements to which all members of staff are made aware of, prior to on-site work commencing.
- 9.3 The Archaeological Contractor will ensure that Health and safety will take priority over archaeological matters. Necessary precautions will be taken over underground services and overhead lines at the outset of the project.

## **10. Insurance**

- 10.1 The Archaeological Contractor will provide details of insurance cover prior to fieldwork commencing.

## **11. Monitoring**

- 11.1 The work will be monitored by the Sites and Monuments Record office of the South Yorkshire Archaeology Service, who will be consulted before the commencement of any site works and afforded the opportunity to inspect the site and the records during any stage of the work.
- 11.2 A minimum of one weeks notice of the commencement of the fieldwork will be given by the Archaeological Contractor to the South Yorkshire Archaeology Service in order that arrangements for monitoring can be made
- 11.3 As a minimum requirement, the South Yorkshire Archaeology Service will be afforded the opportunity to visit the site at the beginning, during and prior to completion of the on-site works so that the general stratigraphy if the site can be assessed at each stage of the works and prior to any possible backfilling of the trenches.

## **12. Resources and Programming**

- 12.1 The Archaeological Contractor shall ensure that the relevant archaeological personnel involved in the evaluation are professionals, are competent to undertake the work required and meet the requirements set out in paragraphs 12.1.1-12.1.4 below.
- 12.1.1 The Archaeological Contractor shall ensure that the general management and oversight of the archaeological evaluation is carried out by an Archaeological Project Manager. The Archaeological Project Manager will be a graduate archaeologist with at least ten years relevant experience since graduation and a proven academic publication record, who is a Member of the Institute of Field Archaeologists with the registered area of competence of Archaeological Field Practice.
- 12.1.2 The Archaeological Contractor shall ensure that a an Archaeological Project Supervisor will be in full time attendance on site throughout the course of the evaluation fieldwork and shall be responsible for the technical direction and output of the evaluation. The Archaeological Project Supervisor will be a graduate archaeologist with at least five years relevant experience since graduation and a proven client publication record.
- 12.1.3 The Archaeological Contractor shall ensure that the Archaeological Site Assistants involved in the hand-excavation and recording of archaeological features and deposits have at least one years cumulative experience on archaeological field projects and are preferably graduate archaeologists.
- 12.1.4 The Archaeological Contractor shall ensure that all Archaeological Specialists who are likely to be involved in the project whether through site visits or in the assessment of artefacts or ecofacts recovered should be a graduate with a second degree in the field of specialist contribution, at least five years relevant experience in that field and a proven academic publication record in that field.



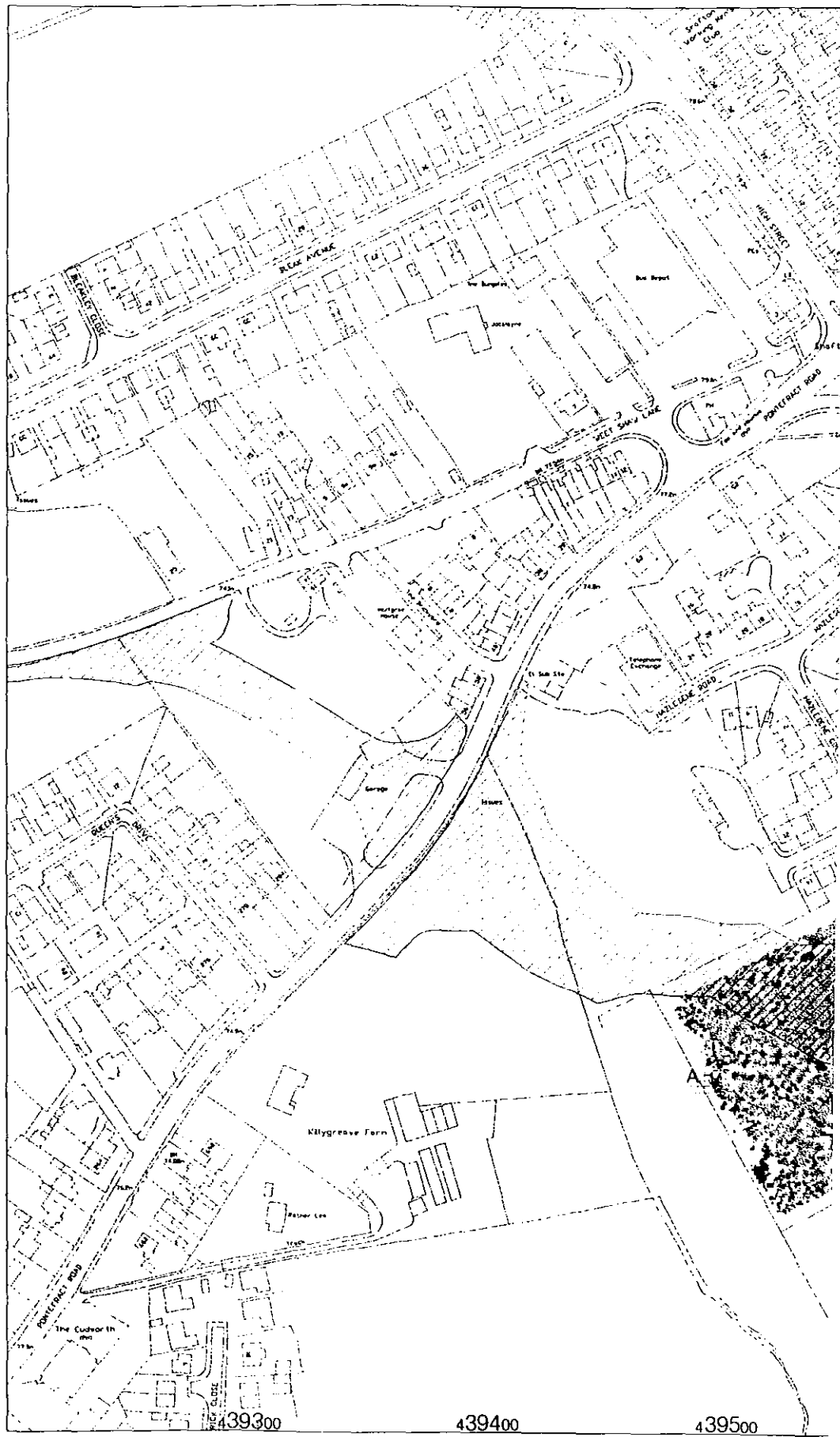


Fig. 1. Site location showing greyscale gradiometer data (Field 1 to the s



Fig. 3. Proposed trial trench locations in Field 2