

**LANCASTER**  
UNIVERSITY  
**ARCHAEOLOGICAL**  
UNIT



February 1997

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**SELLAFIELD**  
**NORTH TIP EXTENSION**  
**Cumbria**

**Archaeological Evaluation Report**

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Commissioned by:

**British Nuclear Fuels plc**

Sellafield - North Tip Extension  
Seascale  
Cumbria

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Archaeological Evaluation Report

Checked by Project Manager. ..... Date
Passed for submission to client. ..... Date

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February 1997

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## ACKNOWLEDGEMENTS

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The field work was greatly helped by the kind assistance of a number of people, particularly Keith Stalker, Ken Edmonds and Jack Jackson of British Nuclear Fuels plc who considerably aided the administration of the project. Jackie Slater of G and A M Lawson Ltd displayed a delicate touch with a mechanical excavator.

The field work was undertaken by Graham Mottershead and James Wright, Figures 1 and 3 were prepared by Dick Danks, and Figure 2 by Graham Mottershead. The report was written by James Wright. Jamie Quartermaine managed the project and along with Rachel Newman edited the report.

## EXECUTIVE SUMMARY

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The Lancaster University Archaeological Unit (LUAU) was commissioned by British Nuclear Fuels plc to undertake an archaeological evaluation at Sellafield (NY 03450492) on the site of a proposed topsoil tip in January 1997.

This was a green field site, with no previous archaeological information available, but was in the vicinity of significant archaeological remains of prehistoric date, which occur along the western coastal plain of Cumbria. An evaluation programme was therefore required by the County Archaeologist to establish if the area of the proposed development had any archaeological potential. LUAU prepared a project design for this evaluation (*Appendix 2*), in accordance with a verbal brief from the County Archaeologist.

The evaluation involved the excavation of 32 machine-cut trenches on an alternate 30m grid pattern to sample the study area in a methodical manner. Small sherds of post-medieval and later pottery were recovered during machining in several trenches, and it is possible that these had been deposited during manuring and subsequent ploughing. One trench was located across the stone and earth bank which formed the southern field boundary. This revealed that the bank had two phases, the first being an earthen bank with an adjacent slight ditch which had provided the material. The bank had then slumped, partially filling the ditch; the height of the bank after slumping was 0.70m. Subsequently a second bank, on the same alignment, was constructed to a height of 1.50m. This had an earth core, and was revetted along both sides and top with large rounded stones, but no ditch or other source for the soils of this bank could be seen. No dating evidence for either phase of bank was recovered.

In three adjacent trenches, below the steep escarpment, scoops containing coal and charcoal were located at c0.60m below the present ground surface. There were no associated finds to provide any dating evidence, but these shallow features may be the remains of ridge and furrow ploughing, which have been protected from later damage by a build-up of hill wash.

No lithics or other evidence of prehistoric activity were recovered, although this site, on the coastal plain of Cumbria, adjacent to the River Calder, and with the shelter provided by the steep escarpment is likely to have been attractive for early settlement.

Any archaeological features are likely to be disturbed by the landscaping of the site prior to its use for dumping. However, no structural features were recorded, and there was no positive evidence that the shallow scoops, at the bottom of the escarpment, were not a product of ploughing. The boundary earthwork provided no dating evidence, and the loose nature of the component layers suggests that further work will not significantly inform our understanding of the feature. However, it is likely to have originated as part of the enclosure, which occurred in this area from the sixteenth century onwards.

It is therefore considered that no further archaeological investigation or recording will be necessary over the extent of the study area.

## 1. INTRODUCTION

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- 1.1** In December 1996, at the request of British Nuclear Fuels plc, the Lancaster University Archaeological Unit (LUAU) was commissioned to undertake an archaeological evaluation at the proposed location for the new part of the proposed North Tip at Sellafield, Cumbria. The work was carried out to specifications detailed in a project design (*Appendix 2*), compiled by LUAU in accordance with a verbal brief provided by the County Archaeologist.
- 1.2** The greenfield evaluation involved the excavation of an alternate grid of 30m long trenches. The fieldwork took place between 20th and 23rd January 1997.

## 2. METHODOLOGY

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### 2.1 PROJECT DESIGN

- 2.1.1 A project design (*Appendix 2*) was compiled by LUAU in accordance with a verbal brief from the County Archaeologist for an evaluation of land that will be affected by a proposed topsoil tip at Sellafield, Cumbria.
- 2.1.2 The project design provided for the exploration by greenfield trenching of the study area, to examine the archaeological potential of the area. The work has been carried out in accordance with the project design.

### 2.2 FIELD EVALUATION

- 2.2.1 **Greenfield Evaluation:** A programme of trial excavation was formulated in consultation with the County Archaeologist. The County Archaeologist requested that the trenches be excavated in a 30m grid pattern across the survey area, but which would exclude steep terrain. This was intended to examine c5% of the terrain to be affected by the proposed development. As far as possible, within the constraints of the topography, it was intended to provide a uniform examination of the study area. The orientations were varied to enable the identification of linear features.
- 2.2.2 **Excavation Methodology:** A total of 32 trenches was excavated measuring 30 by 1.60m; on average the trenches were 0.3m to 0.5m deep. Turf, topsoil and subsoil were separated during the excavation and replaced in reverse order to ensure that the reinstatement was to as high a standard as possible.
- 2.2.3 The excavation was undertaken by a wheeled mechanical excavator fitted with a 1.6m toothless ditching bucket, and this was followed by hand cleaning for the purposes of examining archaeological detail. Excavation was undertaken to the depth of geological deposits in all trenches. The trenches were mechanically backfilled.
- 2.2.4 All excavation was carried out stratigraphically, whether by machine or by hand, and recorded in the appropriate manner. The recording methods employed by LUAU accord with those recommended by English Heritage's Central Archaeology Service (CAS). Recording was in the form of *pro forma* Trench Sheets for each trench, which recorded the orientation, length, and depth of machining, and described the nature of the topsoil, subsoil (where applicable), and geological deposits. Where potential features were observed they were manually sampled with a full textual, drawn, and photographic record being maintained. Any finds recovered were bagged and recorded by either the trench number or, where appropriate, by the context number from where they were recovered.
- 2.2.5 The positions of the trenches were recorded using a Global Positioning System (GPS). The GPS consists of two receivers, one stationary in a known location and a second mobile one used in the field, both of which recorded data transmitted from earth-orbiting satellites. Comparison of the data from the two receivers

enables the location of the mobile one to be determined to an accuracy of better than *c*1m.

## **2.3 HEALTH AND SAFETY**

- 2.3.1 Both Lancaster University and LUAU maintain Safety Policies, the latter based on the SCAUM (Standing Conference of Unit Managers) Health and Safety Manual (1991). The stringent safety policy enforced by British Nuclear Fuels plc (BNFL 1996) was also adhered to. In keeping with current Health and Safety at Work Regulations, prior to commencing on-site work, a risk assessment for each activity was completed. Due regard was given to all Health and Safety considerations during all aspects of the project, with service information having been gained from the client. However, it is LUAU standard practice to scan the positions of all trenches for underground cables using a U-scan meter.
- 2.3.2 The presence of two over-head electricity lines necessitated erecting 'goal posts' of 4.0m height to ensure that there was no possibility of arcing from the power lines to the mechanical excavator during movement around the site. Similar care was taken not to excavate near the cables. Safety helmets, boots, and reflective jackets were worn by LUAU staff at all times.



### 3. TOPOGRAPHIC AND HISTORICAL BACKGROUND

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#### 3.1 TOPOGRAPHY

- 3.1.1 The site was situated on the coastal plain of Cumbria, in a field immediately to the north of the Sellafield complex. At the southern edge of the site was a steep scarp below which the ground was broadly level, although a shallow linear hollow could be observed to run from west to east. The eastern boundary of the site was formed by the River Calder. The flood plain of this could be seen to be c50m wide, whilst there was a cliff of an estimated 4m height between the field and the river.

#### 3.2 GEOLOGY AND SOILS

- 3.2.1 The solid geological deposits were New Red Sandstone of the Permian Age, and were overlain by a complex succession of glacial or post glacial deposited gravel, sand, silt, and clay.
- 3.2.2 The soils are mapped as being of the Wick 1 Series, typical brown earths (Jarvis *et al* 1984, end map). These soils are not subject to waterlogging, and, where excess stones are not a problem, they have a high agricultural potential.

#### 3.3 HISTORICAL BACKGROUND

- 3.3.1 Sellafield is on the West Cumbrian coastal plain, an area which was intensively occupied and farmed throughout the later prehistoric period. Some of the most important prehistoric sites in the county are on this plain, including the internationally important Mesolithic sites at Eskmeals and Drigg, and the Grey Croft Bronze Age stone circle which is to the south of the Sellafield site. Probably the most important Neolithic settlement site in Northern Britain is at Ehenside Tarn, which is only 3.5km to the north of the study area. At High Sellafield, to the west of the plant, an assemblage of Mesolithic and Bronze Age artefacts was recovered by field walking, undertaken by Jim Cherry (1984).
- 3.3.2 The Sites and Monuments Record (SMR) has identified bridge and ford crossings of the River Calder, which are of post-medieval date, but the crossing may have earlier origins. There are no known medieval settlements within the immediate vicinity of the study area and any field systems are likely to relate to the enclosure movement, which occurred in this region from the sixteenth century onwards.

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## 4. EVALUATION RESULTS

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**4.1** A total of 32 trenches was excavated to evaluate the archaeological potential of the proposed land fill site at Sellafield, Cumbria. The locations of the trenches are shown in Figure 2. The generalised summary of the evaluation results are assessed in *Section 4.2* and the detailed descriptions for each excavated trench are given in *Appendix 1*.

### **4.2 GENERAL STRATIGRAPHY**

**4.2.1** All trenches were 30m long unless constrained by topography or health and safety requirements. Trench 1 was 16.4m long, Trench 5 was 21.1m, and Trench 3 was 21.6m, and all were shortened to insure an adequate separation of the machine from the overhead power lines. Trenches 29 and 32 were respectively 8.5m and 6.0m long and were targeted to resolve specific uncertainties.

**4.2.2** The geological deposits encountered were gravels, sands, silts, and clays, all of a glacial or post glacial origin. No solid deposits were exposed in the trenches, although the New Red Sandstone bedrock could be seen in the cliff above the River Calder, and the steep escarpment in the southern portion of the site suggests an underlying solid bedrock. The drift deposits were probably laid down in a complicated succession of fast and slow flowing water.

### **4.3 TRENCH DESCRIPTIONS**

**4.3.1** **General:** No dateable archaeological features were identified within any of the evaluation trenches. However, small quantities of post-medieval or industrial pottery were recovered from Trenches 2, 3, 4, 5, 8, 9, 10, and 19, and these may have been deposited during manuring.

**4.3.2** The topsoil in Trenches 3, 7, and 9 was deeper than average, particularly Trench 7 which was 0.50m in depth. This may have been the result of ploughing on the steep escarpment loosening soil and causing it to move downhill, although this migration of soil could have occurred after the natural forest cover was felled. It is likely that there had been manuring and ploughing in post-medieval times.

**4.3.3** **Field boundary:** Trench 29 was positioned to intersect the earthen bank which once formed the south-western boundary of the field. This showed that the bank had been constructed in two phases, with the original bank [2903] being 1.3m wide and 0.64m high. It comprised a sandy silt loam with many small stones [2904], whilst large rounded stones were placed as cladding to the bank.

**4.3.4** The source of [2904] was a shallow ditch [2906] to the south of the bank. Ditch [2906] was 0.7m wide and 0.25m deep, and had a rounded base. The ditch had filled with a brown sandy silt loam [2905], which, in part, was derived from slumped material from the bank.

**4.3.5** The second phase of the bank [2901] was more substantial, being about twice the height of the first phase, and had an almost continuous facing of large rounded

stones. Bank [2901] was 1.07m high and 2.56m wide, and it covered both the bank [2903] and its adjacent ditch [2906].

4.3.6 Layer [2902], which made up the bank, was a loose brown sandy silt loam containing many small stones and abundant roots. Although the trench extended 3m on either side of this bank no cut feature was visible as a source for this material. Trees were growing from the top of the bank, and the many roots in layer [2902] made it extremely loose, consequently a vertical section was difficult to obtain; this precluded any close inspection of the layer. However, both the sides and the top of bank [2901] were revetted with large rounded stones, giving it the superficial appearance of a stone wall with vegetation growing between the stones.

4.3.7 **Shallow Scoops:** In Trenches 17, 18, and 32 wide shallow scoops were observed. In Trench 17 scoop [1701] ran from north-east to south-west in the western end of the trench; it was observed for a length of 5.8m, had a width of 2.75m, and was cut to 0.18m below geological deposits. Fill [1702] was a grey brown silty clay loam containing occasional large stones and coal, some of which was burnt. The same feature was seen in Trench 32, whilst in Trench 18 scoop [1801] could only be followed for a length of 0.55m. This had, however, a similar profile being 1.6m wide and 0.16m deep, and having gently sloping sides with no significant break of slope. Fill [1802] was also a greyish brown silty clay loam, at the top of which was a 4mm thick layer of burnt coal or charcoal. No dating evidence occurred in any of the three segments; however, these scoops all had a similar profile to the furrow of ridge and furrow ploughing. It is possible that this agricultural practice survived only in these trenches below the escarpment, where the hill wash preserved them from later ploughing.

4.3.8 **Animal bones:** In Trench 27 a quantity of animal bones was recovered during machining, but after careful manual cleaning no cut feature could be observed, and it must be assumed that the bones were either in the topsoil or immediately below it. The bones were from a dog and were relatively recent in date, they comprised six long bones, four vertebrae, and approximately nine ribs and their close association of the bones would suggest that this was the product of a deliberate burial.

## 5. DISCUSSION

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- 5.1** The evaluation has demonstrated that the boundary of the field was a bank of two phases. Sufficient time had elapsed after the first bank was constructed for it to have weathered and filled in the shallow quarry ditch at its side. The second more substantial bank was built over the earlier bank and ditch suggesting that the boundary was still in use. The lack of pottery from the limited excavation and the virtual impossibility of dating the rate of collapse of earthworks makes it almost impossible to date the original construction of the bank.
- 5.2** It is possible that the shallow scoop, seen in Trenches 17, 18, and 32, and the charcoal seen in the bottom of Trench 10, were the only remains of ridge and furrow ploughing. As they were situated at the bottom of the steep escarpment they may have been covered by soil washing down the slope. Hence they would have been protected from subsequent ploughing which could have destroyed any such relics in the rest of the field.
- 5.3** The evidence for activity of earlier periods was entirely negative, with a total lack of material of prehistoric or Roman periods. Although it is possible that there was early agricultural activity in the area, the remains are often ephemeral and may have not survived subsequent more intensive farming activity.
- 5.4** In the medieval period the study area was owned by Calder Abbey and was known as 'Calder Lordship' (Winchester 1987, 152). In 1278 the abbey had a grange at 'Sele' and this probably corresponds with Sella Park, which is 0.4km from the study area. The medieval hamlet of Yottenfews by 1611 had four holdings, and had shared open field and meadow. By virtue of the proximity of the study area it is probable that it was within the intake of Yottenfews, but in any case the whole area around these hamlets had been enclosed by 1793 (*ibid* 156). The boundary bank identified during the fieldwork is not dissimilar in form from early enclosure boundaries of the early post-medieval period, but equally could be part of a medieval field system associated with Yottenfews.

## 6. IMPACT STATEMENT AND RECOMMENDATIONS

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### 6.1 IMPACT

- 6.1.1 LUAU conducts evaluations in accordance with the Institute of Archaeologists' Code of Conduct and best practices, and also in the light of *The Management of Archaeological Projects* (English Heritage 2nd edition 1991). Our concern must be to protect and preserve archaeological sites wherever possible, and only where this is not feasible are destructive techniques of record advocated. Our aim is to recommend the appropriate action which will achieve recording objectively, without the waste of resources.
- 6.1.2 The proposal to develop the study area into a tip for topsoil will result in the complete destruction of all but the deepest negative archaeological features. However, the limited study undertaken of the boundary suggests that further work would not be productive as the soils, especially of its second phase, were so loose that it would not be possible to confirm that any recovered finds were *in situ*; further trenching would not necessarily produce any more information than has already been established during the present programme of evaluation. The study area has been subjected to c5% sampling without any significant negative features having been uncovered.
- 6.1.3 The small quantity of post-medieval pottery and the few animal bones recovered are no more than background noise and of little significance.

### 6.2 RECOMMENDATIONS

- 6.2.1 As the evaluation of the proposed landfill site at Sellafield Tip Extension has not revealed any dateable archaeological features which would be compromised by the proposed landfill scheme, it is recommended that no further archaeological recording will be necessary.

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## APPENDIX 1

### DETAILED TRENCH DESCRIPTIONS

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**Trench No.** Tr 1

**Alignment** north/south

**Length** 16.4m

Natural deposits of reddish brown gravel (large to small rounded stones) were identified at a depth of 0.38m below surface. Two ceramic drains and a concrete pipe were located. The natural deposits were overlain by a reddish brown sandy subsoil of 0.18m depth, and the topsoil was a greyish brown sandy loam.

**Trench No.** Tr 2

**Alignment** north/south

**Length** 33.1m

Natural deposits of gravel were established at a depth of 0.38m. The colour was reddish brown which was darker to the south. A ceramic drain crossed the trench. The subsoil was a reddish brown sandy loam, and above was the greyish brown sandy loam topsoil.

**Trench No.** Tr 3

**Alignment** north-east/south-west

**Length** 21.6m

Natural deposits of dark reddish brown sand containing much gravel were established at a depth of 0.3m below the surface. This was overlain by a dark sandy loam topsoil.

**Trench No.** Tr 4

**Alignment** east/west

**Length** 29.2m

Natural deposits were established at a depth of 0.3m. They comprised reddish brown gravels with areas of yellowish brown sand. Topsoil was a dark sandy loam.

**Trench No.** Tr 5

**Alignment** north/south

**Length** 21.1m

Natural deposits of dark reddish brown gravel were established at a depth of 0.3m. A 6.1m wide strip of sand ran across the middle of the trench, but the two segments excavated through this confirmed that the sand was of a natural origin, and was 0.4m deep. The topsoil was a dark sandy loam.

**Trench No.** Tr 6

**Alignment** east-north-east/west-south-west

**Length** 29.5m

Natural deposits were established at a depth of 0.33m. They comprised dark reddish brown gravels with patches of paler reddish brown sands. The topsoil was a dark sandy loam.

**Trench No.** Tr 7

**Alignment** east/west

**Length** 30.2m

Natural deposits of pale yellowish brown fine sandy clay (or silty clay) were established at a depth of 0.5m below the surface. Above this, with a depth of 0.5m, was the greyish brown fine sandy clay loam topsoil.

**Trench No.** Tr 8

**Alignment** north/south

**Length** 31.3m

Natural deposits of reddish brown fine sand containing some boulders and medium stones were established at a depth of 0.3m. The topsoil was a greyish brown sandy loam.

**Trench No.** Tr 9

**Alignment** east/west

**Length** 28.3m

Natural deposits of brown sand were established at a depth of 0.5m. Overlying these was a subsoil, or relict plough-soil, of brown sandy loam 0.2m thick. The topsoil was a dark sandy loam with a thickness of 0.3m.

**Trench No.** Tr 10  
**Alignment** north/south  
**Length** 33.9m

Natural deposits were established at a depth of 0.49m. They comprised in the south of the trench reddish brown sand, and in the north of the trench gravel of the same colour. An area containing charcoal was examined in the southern end of the trench, but no cut feature could be discerned, and it was decided that the charcoal was redeposited during soil movement down the escarpment. A relict plough-soil of brown sandy loam, 0.22m deep, overlay these deposits, and this was overlain by the dark sandy loam topsoil, which was 0.27m deep.

**Trench No.** Tr 11  
**Alignment** east/west  
**Length** 28.6m

Natural deposits of reddish brown sand containing small patches of gravel, were established at a depth of 0.5m. A ceramic drain was observed at the western end of the trench. The geological deposits were overlain by 0.2m thickness of brown sandy loam subsoil, and above this was the 0.3m deep dark sandy loam topsoil.

**Trench No.** Tr 12  
**Alignment** north/south  
**Length** 32.7m

Natural deposits of banded sands and gravels were established at a depth of 0.3m. In the centre of the trench was a concrete sewer pipe, and in the south was a ceramic field drain. The topsoil was a 0.3m deep dark sandy loam.

**Trench No.** Tr 13  
**Alignment** north-east /south-west  
**Length** 30.8m

Natural deposits were established at a depth of 0.5m. They comprised bands of sand and gravel, and were overlain by a subsoil of a 0.27m thick dark brown sandy loam. The topsoil was a 0.23m deep sandy loam.

**Trench No.** Tr 14  
**Alignment** north/south  
**Length** 29.5m

Natural deposits were established at a depth of 0.5m. They comprised a reddish brown fine sandy silt loam containing an area of small gravels and a second area of large gravel. A ceramic pipe was uncovered in the southern end of the trench; the trench for this could be seen as a slight linear hollow across the surface of the field. The topsoil was a 0.35m thick grey sandy silt loam, and between this and the geological deposits was a 0.15m thick subsoil which appeared to be a bioturbated mixture of topsoil and natural.

**Trench No.** Tr 15  
**Alignment** north-west/south-east  
**Length** 28.9m

Natural deposits were established at a depth of 0.45m. They comprised an area of medium and small gravel with a second area of reddish brown fine sandy silt loam. The topsoil was a 0.3m deep grey sandy silt loam, and between natural and topsoil was a 0.15m zone of uncertainty caused by bioturbation.

**Trench No.** Tr 16  
**Alignment** west-north-west/east-south-east  
**Length** 27.5m

Natural deposits of sandy silt loam, and gravel graded from small to large were established at a depth of 0.25m. The trench was machined less deeply where a sewer pipe was observed. The topsoil was a 0.25m deep grey sandy silt loam.

**Trench No.** Tr 17  
**Alignment** east/west  
**Length** 33.2m



Natural deposits of fine sandy silt loam, Small and medium gravel were established at a depth of 0.3m. A shallow scoop in the eastern end of the trench was investigated, and is described in *Section 4.3.7*. The topsoil was a 0.3m deep grey sandy silt loam.

**Trench No.** Tr 18  
**Alignment** north/south  
**Length** 35.0m

Natural deposits of reddish brown fine sandy silt loam and gravel were established at a depth of 0.4m. A shallow scoop was investigated, and is described in *Section 4.3.7*. The topsoil was a 0.4m deep grey sandy silt loam.

**Trench No.** Tr 19  
**Alignment** east/west  
**Length** 34.0m

Natural deposits of very fine sand or silty clay loam with occasional patches of gravel were established at a depth of 0.35m. Topsoil was a grey silty clay loam.

**Trench No.** Tr 20  
**Alignment** north/south  
**Length** 32.2m

Natural deposits of gravel, large gravel, and reddish brown fine sandy silt loam were established at a depth of 0.3m. Topsoil was a grey sandy loam.

**Trench No.** Tr 21  
**Alignment** west-north-west/east-south-east  
**Length** 33.9m

Natural deposits of reddish brown fine sandy silt loam and a band of gravel were established at a depth of 0.35m. The topsoil was a grey brown sandy loam.

**Trench No.** Tr 22  
**Alignment** east-north-east/west-south-west  
**Length** 32.9m

Natural deposits of gravel and reddish brown fine sandy silt loam were established at a depth of 0.35m. Above was the grey brown fine sandy loam topsoil.

**Trench No.** 23  
**Alignment** east/west  
**Length** 33.0m

Natural deposits of gravel and reddish brown silty clay were established at a depth of 0.35m. Above was the greyish brown fine sandy clay loam topsoil.

**Trench No.** Tr 24  
**Alignment** east/west  
**Length** 29.7m

Natural deposits of reddish brown sandy silt loam, gravel, and sandy silt loam with gravel were established at a depth of 0.33m. Above was the grey silty loam topsoil.

**Trench No.** Tr 25  
**Alignment** west-north-west/east-south-east  
**Length** 29.7m

Natural deposits of coarse sand, gravel and fine sand were established at a depth of 0.3m. The topsoil was a grey sandy loam.

**Trench No.** Tr 26  
**Alignment** east-north-east/west-south-west  
**Length** 30.2m

Natural deposits of gravel, fine sand, coarse sand and fine gravel, and sandy silt loam were established at a depth of 0.25m. Topsoil was a grey sandy loam.

**Trench No.** Tr 27

**Alignment** north-west/south-east

**Length** 33.4m

Natural deposits of small gravel, fine sand, coarse sand and fine gravel were established at a depth of 0.3m. The topsoil was a grey sandy loam.

**Trench No.** Tr 28

**Alignment** north-east/south-west

**Length** 30.0m

Natural deposits of fine sand, gravel, and sand with fine gravel were established at a depth of 0.35m. Topsoil was a grey sandy loam.

**Trench No.** Tr 29

**Alignment** north-west/south-east

**Length** 8.5m

Natural deposits of sand and gravel were established at a depth of 0.3m. The topsoil was a grey sandy clay loam with many large (<30mm) roots. This trench was located to intersect the field boundary and is described in more detail in *Section 4.3.3*.

**Trench No.** Tr 30

**Alignment** east/west

**Length** 31.0mm

Natural deposits of reddish brown silty clay loam and a band of gravel were established at a depth of 0.35m. The topsoil was a grey silty clay or silty clay loam.

**Trench No.** Tr 31

**Alignment** north-west/south-east

**Length** 31.3m

Natural deposits of fine gravel, reddish brown silty clay, and greyish brown silty loam were established at a depth of 0.3m. A segment was manually excavated through the silty loam, but its homogeneous nature suggested it was redeposited natural. A ceramic field drain was observed in this trench. The topsoil was a grey fine sandy silt loam.

**Trench No.** Tr 32

**Alignment** north-east/south-west

**Length** 6.0m

Natural deposits of fine sand with gravel inclusions were established at a depth of 0.35m. The trench was located to intersect the shallow scoop seen in adjacent Trenches 17 and 18, which is discussed in *Section 4.3.7*.

## APPENDIX 2 PROJECT DESIGN

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November 1996

Lancaster  
University  
Archaeological  
Unit

SELLAFIELD - NORTH TIP EXTENSION

CUMBRIA

ARCHAEOLOGICAL EVALUATION

### ***Proposals***

*The following project design is offered in response to a request from Mr Keith Stalker, of BNFL, for an archaeological evaluation in advance of a proposed landfill site at Sellafield, Cumbria.*

1. INTRODUCTION

1.1 British Nuclear Fuels Ltd (BNFL) have requested that an archaeological evaluation be undertaken at the Northern Tip of the Sellafield site, in accordance with the conditions of a planning consent for developing a landfill facility.

1.2 The Sellafield plant is on the West Cumbrian coastal plain, an area which was intensively occupied and farmed throughout the later prehistoric period. Some of the most important prehistoric sites in the county are on the Coastal plain, including the important Mesolithic sites at Eskmeals and Drigg and the Grey Croft Bronze Age stone to the south of the Sellafield plant. Probably the most important Neolithic settlement site in Northern Britain, is at Ehenside Tarn, which is only 3.5km from the study area. At High Sellafield, to the west of the plant, an assemblage of Mesolithic and Bronze Age artefacts was recovered by field walking, undertaken by Jim Cherry (1984). The area has considerable archaeological potential and consequently the County Archaeologist has recommended a programme of trial trenching in advance of the proposed development.

1.3 The Lancaster University Archaeological Unit (LUAU) has considerable experience of the evaluation and excavation of sites of all periods, having undertaken a great number of small and large scale projects during the past 15 years. Evaluations have taken place within the planning process, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. LUAU has undertaken assessments and evaluations for BNFL at Drigg and acts as a consultant for BNFL on its Human Intrusion study for the Drigg low level waste site. LUAU has the professional expertise and resource to undertake the project detailed below to a high level of quality and efficiency. LUAU and all its members of staff operate subject to the Institute of Field Archaeologists (IFA) Code of Conduct.

2. OBJECTIVES

2.1 The following programme has been designed, in accordance with standard evaluation practice as recommended by the County Archaeologist, although he was not available for consultation prior to submission. This is intended to provide an accurate archaeological evaluation of the designated area, within its broader context. The required stages to achieve these ends are as follows:

2.2 **FIELD EVALUATION**

2.2.1 A limited programme of trial excavations, as recommended by the County Archaeologist, will be undertaken to establish the nature, extent, chronology, and preservation of any archaeological deposits encountered. Suitable samples recovered will be assessed for their palaeoenvironmental potential. The configuration of trenches will be on a standard alternate 30m x 30m grid arrangement.

2.3 **EVALUATION REPORT**

2.3.1 A written evaluation report will assess the significance of the data generated by this programme within a local and regional context. It will advise on the mitigation measures necessary to protect and/or record (to appropriate levels) identified archaeological features and deposits, including any appropriate further evaluation, excavation, and recording strategies.

3. METHOD STATEMENT

3.1 The following work programme is submitted in line with the stages and objectives of the archaeological work summarised above.

3.2 **FIELD EVALUATION**

- 3.2.1 **Access:** Liaison for basic site access will be undertaken with the client. The precise location of any services within the study area will also be established.
- 3.2.2 **Greenfield evaluation:** This programme of trenching will establish the presence or absence of any previously unsuspected archaeological deposits and, if established, will then briefly test their date, nature, and quality of preservation. Excavation will normally be limited to the upper surface of significant archaeological deposits, unless further work is regarded by ourselves and the County Archaeologist as essential in order to complete the full evaluation. This element of the trial trenching is invaluable in order to assess those accessible plots, within the proposed study area, where there is a potential for archaeological deposits to survive which are not visible on the surface. This also reduces the possibility of the discovery of any important archaeological features within those designated plots during groundworks, so as to minimise the possibility of any disruption at that late stage.
- 3.2.3 The 'greenfield' trenching would be undertaken using a conventional 30m alternate trench configuration. This would involve the excavation of trenches measuring 30m in length, by 2m in width, and the orientations of the trenches would be varied to improve the likelihood of them crossing linear features. The area of evaluation is approximately 3.6 hectares and it is required that 5% of the area be evaluated by trial trenches and would necessitate the excavation of about 31 trenches. The precise locations of the trenches would be determined in discussions with the client and County Archaeologist at the outset of the project.
- 3.2.4 **Methodology:** To maximise the speed and efficiency of the operation the removal of overburden will be undertaken by machine with a six foot toothless ditching bucket if available, otherwise a five foot bucket will be used. Where areas of ephemeral remains are encountered elements may be hand dug.
- 3.2.5 All trenches will be excavated in a stratigraphical manner, whether by machine or by hand. Trenches will be accurately located with regard to surrounding features, by use of a total station survey instrument.
- 3.2.6 Full regard will, of course, be given to all constraints (services etc) during the excavation of the trenches, as well as to all Health and Safety considerations. LUAU provides a Health and Safety Statement for all projects and maintains a Unit Safety policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (1991) and risk assessments are implemented for all projects. As a matter of course the Unit uses a U-Scan device prior to any excavation to test for services. It is assumed that the client will provide any available information regarding services within the study area, if available.
- 3.2.7 Land disturbed as a result of this work will be reinstated to the Client's satisfaction, although LUAU as a matter of course replaces material in a stratigraphic manner and relays the surface, if possible. It is presumed that the Client will have responsibility for site security. LUAU would take responsibility for temporary fencing arrangements to exclude livestock or any other farming activities. In addition, any deep sections of open trench would be fenced off to prevent any accidents occurring to LUAU/client staff.
- 3.2.8 **Timetable:** All excavation will be undertaken within constraints agreed with the client.
- 3.2.9 **Recording:** All information identified in the course of the site works will be recorded stratigraphically, with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.
- 3.2.10 Results of the field investigation will be recorded using a system, adapted from that used by Central Archaeology Service of English Heritage. The archive will include both a photographic record and accurate large scale plans and sections at an appropriate scale (1:50, 1:20, and 1:10). All artefacts and ecofacts will be recorded using the same system, and will be handled and stored according to standard practice (following current Institute of Field Archaeologists guidelines) in order to minimise deterioration. Samples will be collected for

technological, pedological, palaeoenvironmental and chronological analysis as appropriate, but it is only intended to process such material for assessment at this stage. If necessary, access to conservation advice and facilities can be made available. LUAU maintains close relationships with Ancient Monuments Laboratory staff at the Universities of Durham and York and, in addition, employs artefact and palaeoecology specialists with considerable expertise in the investigation, excavation and finds management of sites of all periods and types, who are readily available for consultation.

### 3.3 EVALUATION REPORT

- 3.3.1 **Archive:** The results of the fieldwork will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*The Management of Archaeological Projects, 2nd edition, 1991*). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. It will include summary processing and analysis of all features, finds, or palaeoenvironmental data recovered during fieldwork. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IFA in that organisation's code of conduct. LUAU conforms to best practice in the preparation of project archives for long-term storage. This archive can be provided in the English Heritage Central Archaeology Service format, both as a printed document and on computer disks as ASCII files, as appropriate, and a synthesis (in the form of the index to the archive and the report) will be included in the Cumbria Sites and Monuments Record. A copy of the archive can also be made available for deposition with the National Archaeological Record in Southampton. LUAU practice is to deposit the original record archive of projects (paper, magnetic and plastic media) with the appropriate County Record Office (Carlisle), and a full copy of the record archive (microform or microfiche) together with the material archive (artefacts, ecofacts, and samples) with an appropriate museum. The actual details of the arrangements for the deposition/loan and long term storage of this material will be agreed with the landowner and the receiving institution. Wherever possible, LUAU recommends the deposition of such material in a local museum approved by the Museums and Galleries Commission.
- 3.3.2 **Evaluation report:** One bound and one unbound copy of a written synthetic report will be submitted to the Client, and a further copy submitted to the Cumbria County Archaeologist. The report will include a copy of this project design, and indications of any agreed departure from that design. It will present, summarise, and interpret the results of the programme detailed above and will include a full index of archaeological features identified in the course of the project, with an assessment of the overall stratigraphy, together with appropriate illustrations, including detailed plans and sections indicating the locations of archaeological features. Any finds recovered from the excavations will be assessed with reference to other local material and any particular or unusual features of the assemblage will be highlighted and the potential of the site for palaeoenvironmental analysis will be considered. The report will also include a complete bibliography of sources from which data has been derived.
- 3.3.3 This report will identify areas of defined archaeology, the location of trenches, and whether the results of the sampling were positive or negative. An assessment and statement of the actual and potential archaeological significance of the site within the broader context of regional and national archaeological priorities will be made. Illustrative material will include a location map, section drawings, and plans if appropriate; it can be tailored to the specific requests of the client (eg particular scales etc), subject to discussion. The report will be in the same basic format as this project design; a copy of the report can be provided on 3.5" disk (IBM compatible format).
- 3.3.4 **Proposals:** The report will make a clear statement of the likely archaeological implications of the development. It will highlight whether, as a first option, the preservation *in situ* of significant archaeological features should take place and possible strategies for the mitigation of the impact of the development will be considered. When preservation is neither possible, nor practical, a further stage of archaeological work may be required. In this case, recommendations for such mitigation measures will be submitted. It should also be made

clear that the results of this archaeological evaluation should only be considered as representative of the below ground archaeological potential of those areas presently accessible for trial trenching.

- 3.3.5 **Confidentiality:** The evaluation report is designed as a document for the specific use of the Client, for the particular purpose as defined in the project design, and should be treated as such; it is not suitable for publication as an academic report, or otherwise, without amendment or revision. Any requirement to revise or reorder the material for submission or presentation to third parties beyond the project brief and project design, or for any other explicit purpose can be fulfilled, but will require separate discussion and funding.

#### 3.4 PROJECT MONITORING

- 3.4.1 **British Nuclear Fuels Ltd:** LUAU will consult with BNFL regarding access to land within the study area. Whilst the work is undertaken for BNFL the Cumbria County Archaeologist will be kept fully informed of the work and its results. Any proposed changes to the project design will be agreed with him in co-ordination with the Client. LUAU will arrange a preliminary meeting, if requested, and the Cumbria County Archaeologist will be informed in writing at the commencement of the project.

- 3.4.2 **Cumbria Sites and Monuments Record:** Any proposed changes to the project brief or the project design will be agreed with the Cumbria County Archaeologist in coordination with the client. LUAU will arrange a preliminary meeting, if required, and the Cumbria SMR will be informed at the commencement of the project.

#### 4. WORK TIMETABLE

The phases of work would comprise:

- 4.1 **Evaluation**  
A four day period is required to undertake the trenching programme.
- 4.2 **Prepare evaluation report**  
A four day period would be required to complete this element.
- 4.3  
LUAU can execute projects at very short notice once an agreement has been signed with the client. LUAU would be able to submit the report to the client within two weeks from the commencement of the project.

#### 5. OUTLINE RESOURCES

The following resource base will be necessary to achieve the proposals detailed above.

- 5.1 **Evaluation**  
4 man-days Project Supervisor  
4 man-days Project Assistant
- 5.2 **Evaluation report**  
4 man-days Project Supervisor

1 man-days Draughtsman

- 5.3 The project will be under the direct line management of **Jamie Quartermaine, BA, Surv Dip, MIFA** (Unit Project Manager) to whom all correspondence should be addressed.



## ILLUSTRATIONS

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Fig 1 Site Location Map

Fig 2 Trench Location Plan

Fig 3 Trench 29, Section through Revetted Boundary Bank

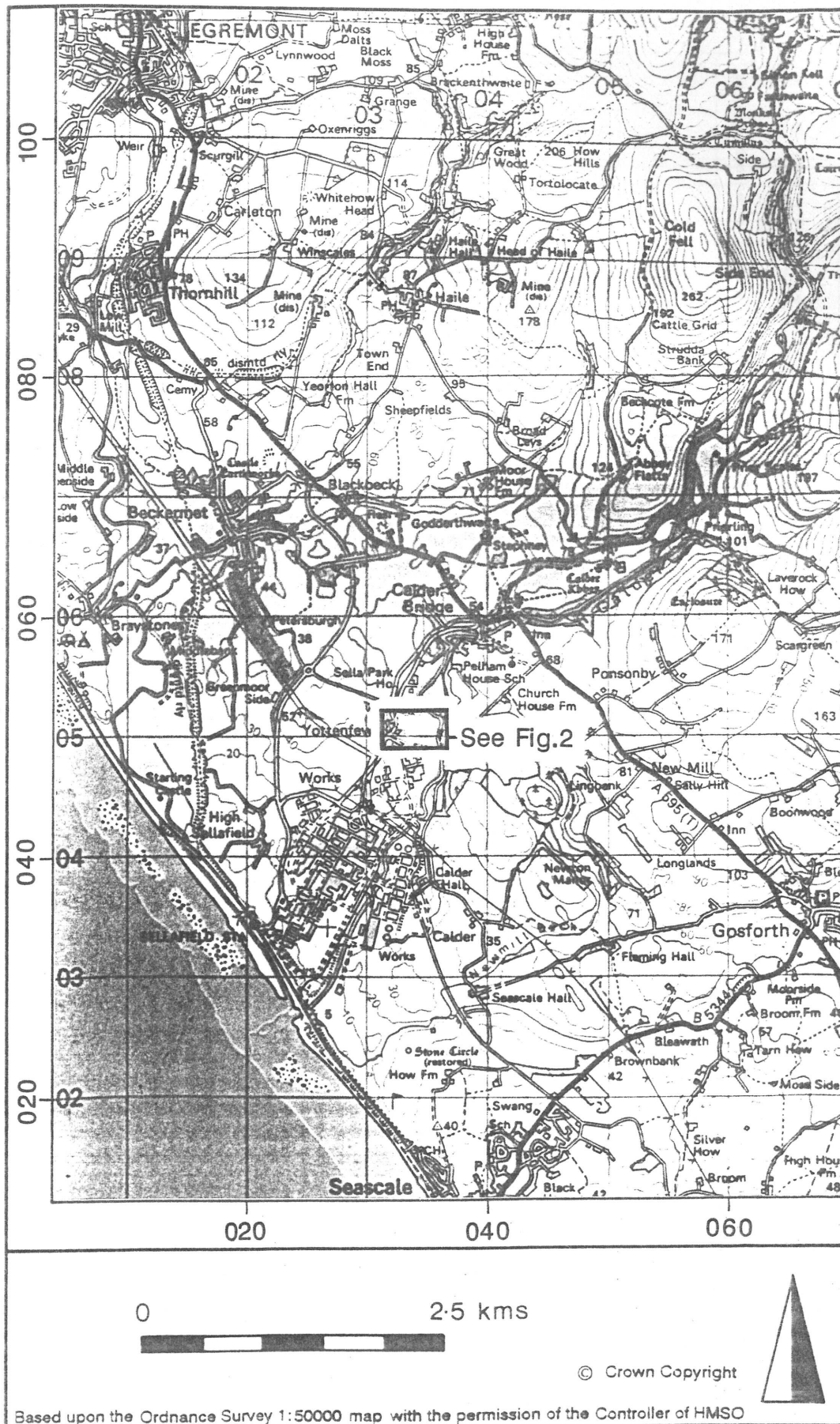


Fig.1 Site location map

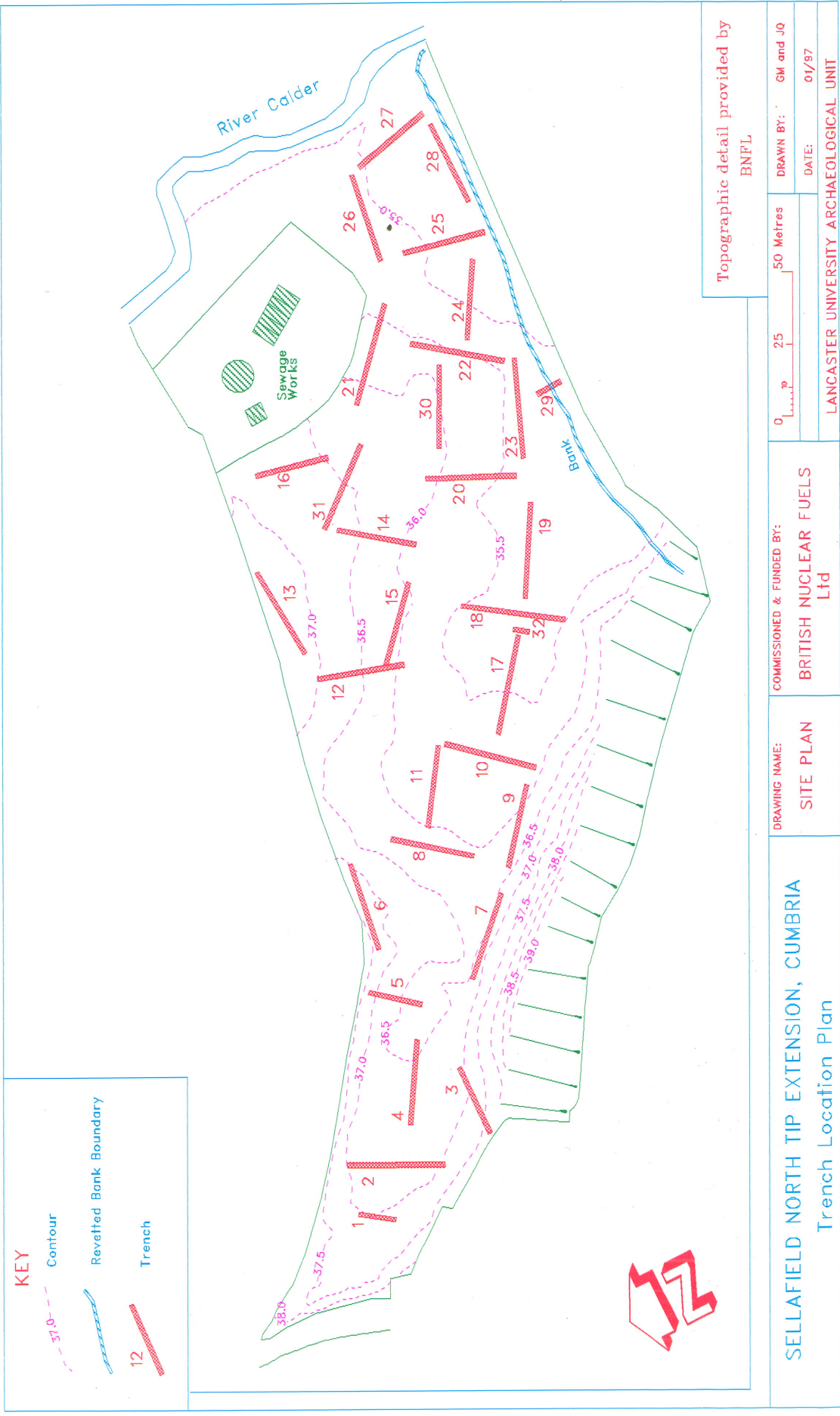


Fig 2 Trench Location Map

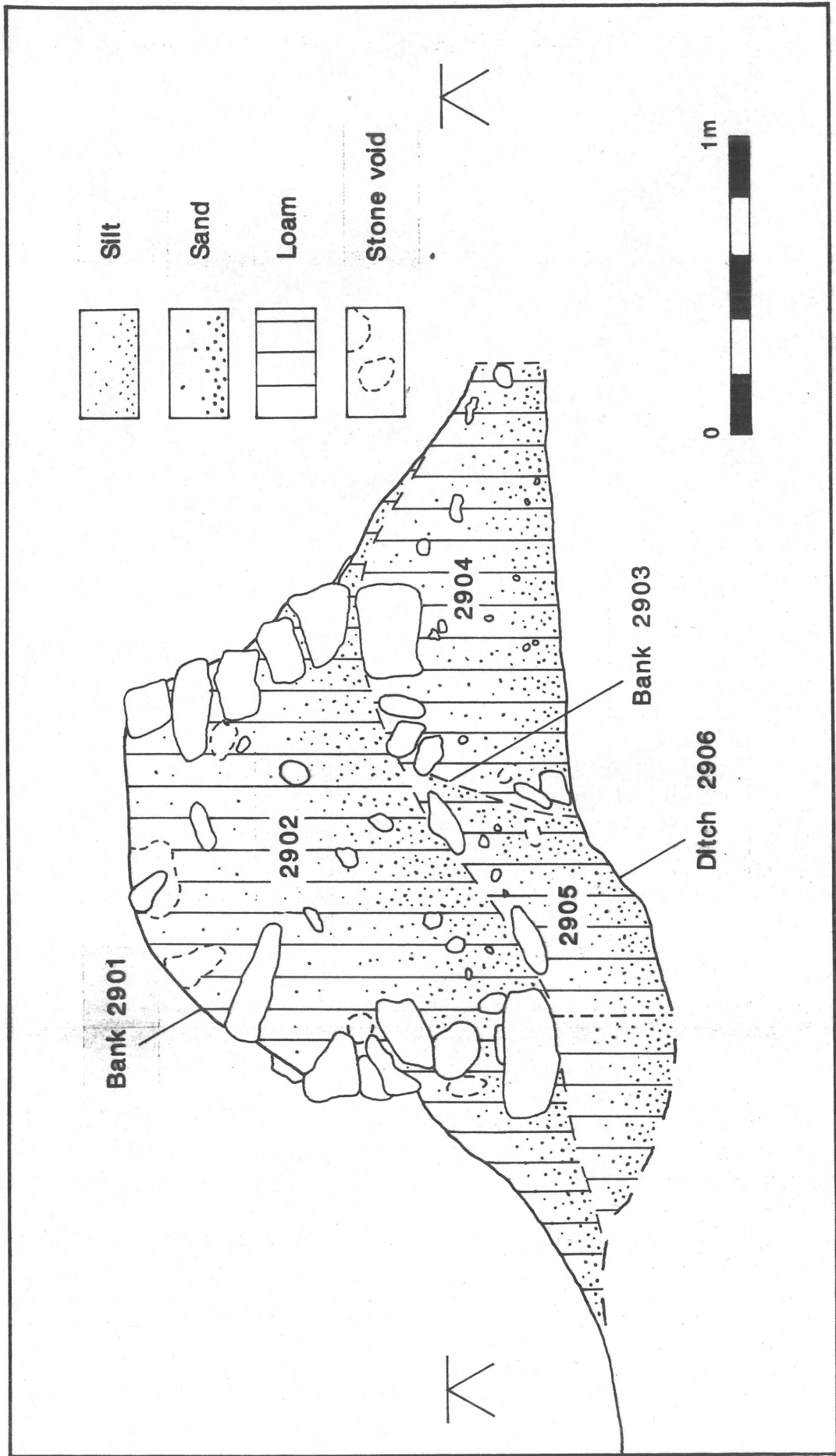


FIG 3 Trench 29, Section through revetted bank