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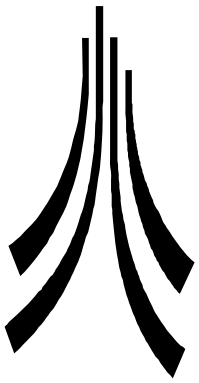

May 2000

ELTERWATER SEWAGE OUTFALL
CUMBRIA

Watching Brief Report

Commissioned by: North West Water Ltd

Elterwater Sewage Outfall
Ambleside
Cumbria

Archaeological Watching Brief

Report no 1999-2000/080/ AUA8907

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SUMMARY

An archaeological watching brief has been undertaken in summer 1999 by Lancaster University Archaeological Unit (LUAU) in response to a request from North West Water Ltd, and in accordance with a project brief by the Lake District National Park archaeologist and a project design by LUAU. The programme of observation was undertaken during the laying of a pipeline associated with the construction of a new sewage outfall between the existing sewage works at Fletchers Wood (NY 326 041) and a point on the River Brathay (NY 339 037), Cumbria. The aim of the watching brief was to record any significant archaeological deposits exposed during the laying of the pipe, and to recover environmental samples from waterlogged deposits. It was carried out between August and November 1999.

The first stage of the project, a desk-top assessment, was undertaken using historic maps and other documentary sources. It provided an insight to the historic land-use and identified a limited number of sites along the line of the proposed pipeline, which included an adit and associated spoil heap, a potash kiln, two pitsteads, and the reported location of a fulling mill.

The watching brief was undertaken during all trenching operations and examined every previously identified feature affected by the pipe laying operations. The pipe trench was narrowed through the line of the mine spoil heap (Site 01), in order to minimise the impact, and a record was made of the section through it. Two pitsteads in Rob Rash Wood were affected by the use of a site access track, and the features were subject to detailed survey. In addition, the trenching revealed a relict dry-stone wall, that was shown of the OS first edition map (1862), and a number of drainage culverts throughout the course of the pipeline.

The trenching in particular revealed well-preserved peats, particularly in the northern and central sections of the pipeline where it followed the River Brathay. A series of monoliths was taken through the exposed trench section and these were subject to palaeoecological assessment. This was undertaken on the easternmost core (C3), which revealed a good preservation of pollen. The range of pollen demonstrated the presence of secondary woodland with some open ground. the proportion of which varied in the four samples assessed. Given the limited data, however, no firm conclusions can be drawn about the long-term vegetational history of the environs of Elterwater, but there are suggestions of increasing clearance through time.

ACKNOWLEDGEMENTS

Thanks go to Roy Rhodes and Simon Lewis of North-West Water Ltd for commissioning the project. LUAU gratefully acknowledges the assistance of staff at the Cumbria Record Office, Kendal, and of Bette Hopkins at the county Sites and Monuments Record Office. Our thanks are also due to John Hodgson, Lake District National Park Archaeologist for his support.

Thanks also go to Andrew Leech (Bechtel Site Engineer) and the staff of P&H Plant Hire, in particular Nigel Pearson (co-director), Alastair, Frank, David, Alan, Ian, Gary, Brian, and Martin for their cooperation and assistance during the watching brief.

The desktop survey was undertaken by Jo Bell, and the fieldwork by Peter Redmayne, Chris Scurfield and Nick Hair; the palaeoenvironmental assessment was undertaken by Elizabeth Huckerby; the drawings are by Graham Suggett. The report was compiled by Jo Bell, Peter Redmayne and Elizabeth Huckerby, and was edited by Jamie Quartermaine and Rachel Newman. The project was managed by Jamie Quartermaine.

1. INTRODUCTION

1.1 CONTRACT BACKGROUND

1.1.1 A permanent presence watching brief was undertaken by Lancaster University Archaeological Unit (LUAU), on behalf of North West Water Ltd, between 23rd August and 26th November 1999, in the course of the laying of a new sewage outfall pipe between Elterwater Sewage Works (NY 3262 0402), and a point on the River Brathay, Cumbria (NY 3388 0359) (Figs 1 and 2). Since the laying of the outfall pipe inevitably involved considerable ground disturbance in areas where archaeological sites are known to exist, the archaeologist at the Lake District National Park Authority (LDNPA), Mr John Hodgson, required that an archaeological watching brief be carried out. This involved supervision of contractors by a qualified archaeologist to enable the recording of archaeological remains encountered, and to allow for the implementation of mitigative strategies as appropriate.

1.1.2 The watching brief was informed by the results of a brief desk-top assessment, in which historic sources (particularly maps of the study area) were studied and reference sources consulted, to identify areas of potential archaeological significance. Five sites listed on the Cumbria Sites and Monuments Record (SMR) lay close to or on the route of the pipeline: these comprised a mine and associated workings (Site 01), the findspot of a sword (Site 02), the site of a former fulling mill (Site 03), a potash kiln (Site 04), and two charcoal pitsteads (Sites 05 and 06).

1.1.3 A detailed survey was undertaken of the two pitsteads (Fig 4) that were affected by an access route leading to the line of the easement corridor. Considerable deposits of peat were also identified, particularly adjacent to Elterwater, and a programme of palaeoenvironmental assessment was undertaken to record the character, formation, and chronology of these deposits.

1.1.4 A full archive of the watching brief has been produced to a professional standard in accordance with current IFA and English Heritage guidelines (*Management of Archaeological Projects*, 2nd edition 1991).

2. METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 A project design (*Appendix 2)* for a programme of archaeological watching brief during the laying of the sewage pipe was submitted by LUAU in response to a request from North West Water Ltd. The project design was prepared in accordance with a brief (*Appendix 1*) from the Lake District National Park Authority Archaeologist. This provided for a desk-based study, and the observation during all ground works in the course of the laying of the pipe. A written report was to interpret the data discovered during the project and assess the implications of the development.

2.1.2 A programme of environmental analysis was undertaken to examine peat deposits exposed in the course of the ground works. In addition to the defined programme, a survey was undertaken of two charcoal pitsteads, that were directly affected by an access road leading to the line of the pipe. In all other respects the watching brief has been carried out in accordance with the project design.

2.2 DESK-TOP SURVEY

2.2.1 The desk-top survey comprised a rapid scan of available historical documentation for the study area, including nineteenth century maps and aerial photographs. The documentary research involved a visit to the Cumbria County Record Office (CRO) (Kendal), where historic maps (Ordnance Survey and tithe maps), published histories of the county and of the ward in which the study area lies, were examined. Available maps and plans were restricted to the Ordnance Survey 6" and 25" to one mile, first edition maps of 1862, the second edition 25" to 1 mile maps (1900), and the tithe map for the area (CRO(K) WDRC/8/238).

2.2.2 The Cumbria Sites and Monuments Record (SMR) in Kendal was consulted, which aims to supply a brief record of all known archaeological sites in the county. In addition, LUAU's own archive of material relating to the study area and its vicinity was studied.

2.2.3 ***Aerial Photographic Study:*** the SMR held no oblique photographs that were pertinent to the study. A cover search for vertical air photographs from the National Monuments Record (NMR) in Swindon was requested, but this did not reveal any significant archaeological detail.

2.3 PIPELINE EXCAVATION

2.3.1 Topsoil stripping was undertaken with a tracked 360^{o} mechanical excavator using a wide toothless ditching bucket. Trench excavation was generally undertaken with a 0.9m wide toothed bucket, and the spoil piled to one side of the trench. The trench was usually 0.9-1.3m in width, with the excavated depth between 1-2m below surface.

2.3.2 Topsoil stripping was generally restricted to areas of pasture, although in some cases it was decided to trench directly through the grass due to prevailing ground conditions. Marshy areas were not stripped due to the lack of a distinct topsoil horizon.

2.3.3 Areas where topsoil stripping took place were carefully examined for evidence of buried archaeological features, using a shovel and hand trowel. Spoil from topsoil stripping, and trenching, was also checked visually for artefacts, where accessible. In some cases spoil was re-checked after a number of days for further artefacts as these became exposed as a result of weathering.

2.3.4 Where wood was present in the waterlogged deposits, this was examined for tool signatures, and evidence of modification. No worked wood was recovered in the event, but the pieces examined represented only a sample of the total present, the rest being either inaccessible, or buried within the spoil heap.

2.4 ARCHAEOLOGICAL RECORDING

2.4.1 The watching brief involved an archaeologist working on site alongside contractors. All ground-disturbing work was supervised, and its compliance with the proposed route was checked. Any archaeological remains were either recorded *in situ* by means of sketch plans, elevations, record sheets and photographs, or excavation was halted and consultations were held with the developer to agree an appropriate action, such as avoidance or undertaking more detailed archaeological recording.

2.4.2 The stratigraphy and archaeological features were recorded using methods in accordance with those recommended by English Heritage's Centre for Archaeology (CFA). Records of the work were made using LUAU *pro-forma* watching brief sheets. Scale drawings (plans at 1:50) were made where appropriate. Any finds were handled and stored according to standard practice (following current Institute of Field Archaeologists' guidelines) in order to minimise deterioration.

2.4.3 A 1:2,500 OS plan was digitised into the CAD system as a base for recording the sites and archaeological deposits (Figs 2 and 4). The archaeological features and extent of interventions were superimposed onto the base CAD mapping.

2.4.4 ***Photographic Record:*** a photographic record was made using 35mm Pentax K1000 cameras with fixed 28mm, and 50mm lenses. Monochrome film was used as the basis for the photographic archive, with colour print and slide films taken for report illustration, and lecture purposes. Photographic record sheets were used with a description of the location, and orientation of each frame and cross referenced with the descriptive sheets.

2.5 SURVEY RECORDING

2.5.1 The pitsteads in Rob Rash Wood (Fig 4, Plates 5 and 6) were subject to a LUAU Level 3 survey (LUAU 1993), which is equivalent to RCHM(E) level 3. This involved the detailed mapping of all surface features within the study area and recorded all extant earthworks.

2.5.2 Survey control was established over the site by closed traverse and internally was accurate to +- 15mm; the control network was located onto the Ordnance Survey (OS) National Grid with respect to the field boundaries.

2.5.3 The surface features were surveyed by EDM tacheometry using a total station linked to a data logger, the accuracy of detail generation being appropriate for a 1:250 output. The digital data were transferred onto a portable computer for manipulation and transfer to other digital or hard media; film plots were output via

a plotter. The archaeological detail was drawn up in the field as a dimensioned drawing on the plots with respect to survey markers. Most topographic detail was also surveyed, particularly if it was deemed to be archaeologically significant or was in the vicinity of archaeological features.

2.5.4 The survey data were superimposed with the base topography digitised in from a 1:2500 map base in order to provide a topographic context for the site beyond the limits of the study area; the mapping was then created within a CAD system (AutoCAD 14).

2.6 PALAEOECOLOGICAL ASSESSMENT

2.6.1 Three 0.50m deep monoliths (C1, C2, and C3) were taken from the trench in the area of the supposed fulling mill (NY 33361 04390, NY 33374 04392 and NY 33461 04383). The monolith from the eastern part of this area (C3) was sampled to a greater depth (0.35-0.85m) and it was decided to assess the pollen from this core.

2.6.2 Four samples were taken from the monolith at 0.35-0.36m, 0.50-0.51m, 0.65-0.66m and 0.84-0.85m for palynological assessment. The samples were prepared chemically using the standard techniques of sodium hydroxide, hydrofluoric acid and acetolysis (Faegri *et al* 1989). The samples were then mounted in silicone oil and examined with an Olympus BH-2 microscope using x400 magnification routinely and x1000 for critical grains. Counting was continued until at least 150 grains had been examined on two or more complete slides. This was done to reduce the possible effects of differential dispersal under the coverslips (Brooks and Thomas 1967). Pollen was identified using the standard keys of Faegri *et al* (1989), Moore *et al* (1991) and the LUAU reference collection. Damaged grains were recorded using the criteria of Birks (1973). The data are given as percentage values of a pollen sum, which includes all land pollen, and are shown in Table 1 (*Section 6*).

3. BACKGROUND

3.1 TOPOGRAPHICAL BACKGROUND

3.1.1 Elterwater lies at the eastern end of the Great and Little Langdale valleys, at the confluence of the River Brathay and Great Langdale Beck which run into the lake. The lake itself is divided into three interconnected lagoons and is joined to Lake Windermere by the eastern part of the River Brathay. The valley bottom is largely under pasture; the lower slopes are covered in mixed coniferous and deciduous woodland giving way to coarse grass, bracken and rock outcrops on the upper slopes.

3.1.2 The study area lies in the Lakes parish and the historic township of Langdale Chapelry, including the settlements of Great and Little Langdale, Elterwater and Elterwater Bridge. It formerly fell within the boundaries of Westmorland, but is now within Cumbria and the Lake District National Park.

3.2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.2.1 Cumbria in general is poorly documented historically. The study area, falling within a particularly rural and isolated zone, has seldom been mentioned in historical sources, and little is known about it before the nineteenth century. A few very general statements can be made about important patterns of development in the county but it would be mistaken to extrapolate firm conclusions from these as to what may have happened in the study area.

3.2.2 ***Prehistory:*** the area has been subject to localised prehistoric exploitation, particularly during the Neolithic when there was extensive extraction of a fine-grained volcanic tuff for axe manufacture at Great Langdale. The distribution of isolated working sites and lost axes would suggest that at least one communication route out from the quarries extended along the Langdale valley and therefore through the environs of the study area (Claris and Quartermaine 1989).

3.2.3 During the later prehistoric period exploitation of the marginal uplands in the Lake District was concentrated around the periphery of the Central Fells, notably along the western uplands, adjacent to the coastal plain, and the evidence from palaeobotanic cores from Langdale would suggest that there was less disturbance of the forest cover in the central uplands of the Lake District during the Bronze Age (Pennington 1970) than in the peripheral areas on the margins of the Central Fells. However, this is based upon cores taken from the head of Great Langdale (Angle Tarn and Blea Tarn) and there is no body of data specifically to inform the prehistoric land-use of the lower and agriculturally more viable area around Elterwater.

3.2.4 ***Roman:*** during the Roman period forts were established at Ambleside (*Galava*), at the head of Lake Windermere, Hardknott, and Ravenglass, on the west coast, in order to maintain control of the region forming the hinterland to the frontier zone of the province. The forts were linked by a road extending through Hardknott and Wrynose passes, passing not far to the south of the study area.

3.2.5 ***Early Medieval:*** the pattern of early medieval settlement in the region is poorly documented and the historian is '*left with a small and not entirely consistent body of*

material' (Higham 1986, 242). Until recently the available documentary and archaeological evidence has been at odds with place name evidence which demonstrated a scattering of Anglian and Scandinavian place names throughout the Lake District. However, recent work, incorporating the use of radiocarbon dating, has demonstrated a potentially significant presence through the second half of the first millennium. Excavations by Search at Bryant's Gill, in Kentmere, revealed rectangular structures dated to the early medieval period (Dickinson 1985). A palaeoecological assessment of the fill of the ditch of Shoulthwaite hillfort, in Thirlmere, produced radiocarbon dates for the last cutting of the ditch of cal AD 538-676 (1435±50 BP, AA-33591, Gu-8251) and cal AD 560-690 (1400±50 BP AA-33592, Gu-8250 LUAU 1999). In addition, excavation and associated pollen analysis of a cairn within a cairnfield at Devoke Water, West Cumbria, revealed that the structure overlay deposits dated by radiocarbon assay to the early medieval period (G Wimble, pers comm).

3.2.6 Evidence for Scandinavian settlement in the Lake District is largely confined to place names, which give the impression of a 'major push into the under utilised wastelands of the Central Lakeland Massif and other marginal areas' (Higham 1986, 325). The limited archaeological evidence would suggest some activity in the central fells during this period. In Little Langdale, on the principal communication artery through the centre of the Lake District and near the study area, is a very characteristic mound, comparable to the Tynwald Hill on the Isle of Man. This traditionally has been interpreted as a thingmount, which served as a meeting place for the Norse community; its location in the centre of the Lake District would have allowed for the gathering of distant communities (LUAU 1994). This does not necessarily indicate Scandinavian communities in the Langdale area itself, but there is a settlement at Mickleden, at the head of Great Langdale, which was subject to pollen analysis by Reading University, and this revealed that the character of the pollen percentages suggested a medieval or early medieval date (M Edmonds, pers comm). The settlement remains are overlain by a field system which potentially has its origins in the twelfth century (*Section 3.2.7*; R Maxwell, pers comm), and thus the settlement is likely to be earlier.

3.2.7 ***Medieval:*** the area was subject to agricultural exploitation during the medieval period, both in the valley bottoms and on the higher marginal ground, with the establishment of shielings (Quartermaine and Leech forthcoming). Research by the National Trust has demonstrated that at least some parts of the field systems of Langdale incorporate considerable complexity and history, and are likely to extend back to the twelfth century (R Maxwell, pers comm).

3.2.8 During this period the woollen industry was important throughout the Lake District, which saw an increase in fulling mills, often associated with potash kilns which produced lye (a sort of soap) used in the processing of woollen cloth.

3.2.9 ***Post-Medieval:*** continuing into the post-medieval period the local economy was one of self-sufficient pastoral and arable farming, like those in most such isolated rural areas, although from the later medieval period onwards there was an increase in woodland industries, mining, and quarrying. Whellan's history of the county (published in 1860) gives some indication of the study area's character up to and including the first half of the nineteenth century, and asserts that '*agriculture is the chief employment*' (Whellan 1860, 824) in the township of Langdale at large. Census returns show a remarkably constant population for Langdale township in

the first 30 years of the nineteenth century, rising from 300 in 1801 to only 314 in 1831, suggesting a fairly stable rural economy (Census Returns, CRO(K)). The tithe map of 1839 also shows (*Section 4.2.1*) that there was little pressure on the land, with much of the study area unenclosed at that date.

3.2.10 From the 1830s, the township population began to rise - to 442 in 1841 and 530 in 1851 (Census Returns, CRO(K)). These figures of course refer not only to the study area, but to a catchment area around it. The rising numbers of the mid-nineteenth century probably reflect the increasing population of Elterwater village, where '*about ninety of the inhabitants are engaged in the Elterwater gunpowder manufactory*' opened by David Huddeston *c*1824 (Brunton 1998, 96; Whellan 1860, 824). Map evidence (OS first edition map (1862)) confirms that a small community grew around the gunpowder mill, *c*0.5km north-west of the study area.

3.2.11 In the southern Lake District there was a depression in farming from the late 1870s to well beyond the First World War (Brunton 1998, 96). This is reflected in census records for the parish of Langdale during this period, where only seven out of approximately 147 households record the head of the family solely as farmer. Many heads of households combined farming with mining, quarrying, basket making, carting, handiwork, building, and selling produce (*ibid*).

3.2.12 Increasing industrialisation resulted in a decline in traditional domestic craft industries such as spinning and weaving, which had been a source of extra income. These crafts were subsequently revived by people such as John Ruskin, and Albert Fleming, and St Martins Cottage at Elterwater became a centre for teaching spinning and weaving. Spinning wheels and bobbins were made by a carpenter at Skelwith Bridge (*Op cit*, 97-101).

3.2.13 The resulting thread was bought from the individual households, and sold for use in the weaving industry, so providing an extra income for families. The motivation of people such as Ruskin for encouraging this industry was, however, not entirely altruistic, but based on the Victorian maxim for finding work for idle hands, and the idea of the rural idyll as a reaction against increased mechanisation. (*ibid*).

3.2.14 The numerous outcrops of rock have been subject to intensive extraction for many centuries. In the vicinity of Elterwater there were numerous quarries during the nineteenth century, such as Robinson Quarry, and Lords Quarry to the west of the village, with three sites marked 'old level' close by on the OS first edition map (1862).

3.2.15 Today, quarrying is still carried out but on a much reduced scale, agriculture is almost entirely involved in sheep and cattle grazing, with tourism as the main industry.

4. DESK-TOP SURVEY RESULTS

4.1 SITES AND MONUMENTS RECORD, KENDAL

4.1.1 Information kindly furnished by Bette Hopkins of the Cumbria Sites and Monuments Record (SMR) shows that a number of sites or findspots lay in the immediate path of the pipeline; these are described in A*ppendix 3* and shown on Figure 2. They include three sites which were affected by the outfall: a mine at NY 3279 0429, thought to be of late nineteenth century date (Site 01 (SMR 3703)), and two pitsteads (Sites 05 and 06) at NY 3379 0411 and 3384 0407, which were identified on the line of, or immediately adjacent to, an access track that was utilised by North West Water Ltd. A programme of mitigative recording was agreed with the Lake District National Park Authority in advance of the development.

4.1.2 A further site in the immediate line of the outfall was the location of a former fulling (woollen) mill at NY 3341 0440, of post-medieval date (Site 03 (SMR 30699)). The mill is on a map dated to 1824 in the possession of Mr Michael Davies-Shiel. A field to the north is apparently called 'Tenter field' on the same map, a name given to the fields where damp cloth was hung on tenter hooks to dry.

4.1.3 Three sites are recorded by the SMR which were not under immediate threat by the outfall. These include a findspot of an 'ancient sword' at approximately NY 328 045, about which little is known (Site 02 (SMR 4061)). Rectangular earthworks are recorded at *c*NY 329 039, about which again little is known (SMR 4638), and there is also a nineteenth-century quarry at NY 328 039, adjoining the minor road to the west of Elterwater ((SMR 17219)), but both of these sites were outside the study area and were therefore not incorporated within the site gazetteer (*Appendix 3*).

4.2 SOURCES SEEN AT CUMBRIA RECORD OFFICE, KENDAL

4.2.1 ***Tithe Map (CRO(K) WDRC/8/238):*** the tithe map and apportionment for Langdale Township dates to 1839. A map and field-by-field account of ownership were drawn up for most parishes in England and Wales in the first half of the nineteenth century, to help in assessing the monetary value of dues formerly paid to the church in kind by each landholder. The map shows only a part of the study area, which was largely unenclosed at this date. The tithe apportionment names the fields and records whether they were in use at the time as arable, pasture, meadow, or for other functions. Only one field marked on the tithe map was affected by the outfall (field 25, Rakestraw Meadow) which was bisected by the northern section of the pipeline. It was owned and farmed in 1839 by John Harden, and used partly as meadow and partly as arable land. Other enclosures were used as pasture, arable, or meadow land.

4.2.2 ***(CRO(K) WDR/35/129:*** a plan of 1838 showing the landholdings of the Revd Fletcher Fleming may have been prepared in anticipation of the tithe apportionment, but adds no information to the 1839 tithe map.

4.2.3 ***Census returns for 1851 (CRO (K), unreferenced):*** these record several of the farmers whose landholdings had been registered 11 years earlier by the tithe map. The William Tyson who farmed two small enclosures to the west of the study area on the tithe map (nos 20 and 21) may be the same man registered in 1851 as a

'waller and bee house keeper' in his fifties. The occupations of the township's populace demonstrate that by 1851 the local economy was a mixture of agriculture and industry, with many people combining work in both sectors, such as Henry Stable - '*shoemaker and farmer of 18 acres*'. Several slate miners are listed in the township, and occupations listed in Elterwater include farmer, agricultural labourer, cooper, porter and a number of 'powder mill lab[ourer]s'.

4.2.4 ***Ordnance Survey (OS) First Edition maps:*** these were surveyed in 1859-60 and published in 1862, and were seen at scales of 6" to the mile and 25" to the mile; however, maps were not available for the easternmost part of the study area. These maps show a path running north of the lake, on the same alignment as the present path. The lake's outline is as at present, although the 'Nab' was at this date not entirely cut off, forming a promontory which almost divided the lake in two. No buildings are shown within or very close to the study area, but there is a cluster of houses including Elterwater Hall (now the Elterwater Hotel) at the Y-junction of roads to the north-west of the lake. Roughly at the point where the outfall crossed this road, a field boundary is visible.

4.2.5 ***Second Edition OS maps (1899):*** these show 'Nab Island', now marooned by the water, and a 'level' immediately west of the lake. This indicates a drainage outlet or access passage to a mine.

4.2.6 ***Third Edition OS maps (1920):*** these were available only in the 6" to one mile scale. They show a boat house in the south-west corner of the lake, and a landing stage in the north-west corner. The level is now shown as an 'Old Level' and has evidently fallen out of use.

5. WATCHING BRIEF RESULTS

5.1 INTRODUCTION

5.1.1 The line of the route has been divided into a number of sections prefixed with a letter, and grid references/or named points denoting the end of each section (Fig 2). The divisions for the most part relate to lengths of the pipeline where a similar stratigraphy was observed over a significant distance, hence, for example, Section B is the line of pipe over the extent of the western peat deposits.

5.2 SECTION A: SEWAGE WORKS (NY 3260 0411) TO NORTH OF ROAD CROSSING (NY 3280 0436)

5.2.1 Two tracks were cleared through the woods to the south of the sewage works. Below the leaf litter deposits, the horizon of bright orange/brown silty loam was clearly natural subsoil.

5.2.2 Excavation of the pipe trench (Fig 2) though the woodland, and field to the north, revealed a consistent stratigraphy of a layer of turf/topsoil above the bright orange/brown natural subsoil. Below the subsoil was a layer of pale grey silty clay overlying bedrock. No cut features were recorded after topsoil stripping, or during trenching, although occasional sherds of ceramic material, glass, and clay pipe were recovered from the topsoil, all of modern date.

5.2.3 The line of the pipe cut through the linear spoil heap to the east of the adit (Site 01). The section there showed a 0.6m deep deposit of very fine stone/gravel, with a stone culvert on the northern side.

5.3 SECTION B: NORTH OF ROAD CROSSING (NY 3280 0436) TO RIVER CROSSING AT ELTERWATER VILLAGE (NY 3282 0468)

5.3.1 The extent of this section was through areas of poorly-drained peat deposits. The areas of particularly boggy ground were not stripped in advance of excavation of the pipe trench, but the better-drained areas were stripped using a wide toothless ditching bucket. The pipe trench was typically 0.9m wide, with an excavated depth of between 1.35m and 1.8m. The spoil was piled on the eastern side of the easement with the western side kept clear for machinery.

5.3.2 It had been intended to take a series of column samples of the peat, but this did not prove possible, due to the upper strata being churned and compressed by the machinery, the rapid filling of the trench with ground water, and the associated health and safety considerations. However, the peat depth at the southern end of the section was tested with an auger, and found to be 6.8m in depth.

5.3.3 At the northern end of the section, a series of field drains crossed the easement (NY 3281 0461 - 3281 0467). These consisted of four main types: culverts constructed with side walls and capstones; soakaway/french drains in the form of linear cuts filled with stone; ceramic pipe; and corrugated plastic drains, several of which were connected to the stone culverts.

5.3.4 For most of the length of the trench, the section comprised waterlogged peat deposits disturbed only by surface cuts for field drains and a farm track. Bedrock was only encountered immediately adjacent to the road, opposite the barn, north of the Elterwater Hotel (at NY 3282 0457), where there was a rock outcrop, and on the bank of the river (NY 3282 0468) (Plates 2 and 3).

5.3.5 Several large sections of tree trunk were encountered, particularly in the northern part of the trench. Some had been placed into the cuts for the field drains, while others were within undisturbed peat deposits. All branch/trunk sections were checked for tool signatures as far as was practical, but none were observed.

5.4 SECTION C: ELTERWATER VILLAGE (NY 3282 0468) TO NY 3312 0448

5.4.1 The turf/topsoil of the northern part of this section was stripped with a wide toothless ditching bucket. The turf/topsoil was a dark brown silty loam with an average depth of 0.25m, below which was a layer of fine reddish brown silty loam with occasional stones. Where the newly exposed surface was smeared by the bucket, it was cleaned to check for features. Despite the large area stripped, only a small assemblage of artefacts was recovered, consisting of nineteenth century potsherds, lengths of clay pipe stem, and modern glass vessel fragments.

5.4.2 The stratigraphy was generally consistent along the whole length of the section, typically comprising a layer of bright orange/red silty loam above well-sorted bands of very fine to medium-sized river gravels. At the extreme western end of the section was a very distinct pale grey band of silt between the orange/red silts and the river gravels.

5.4.3 In some places there were thin river gravel deposits in the upper surface of the silt, and immediately to the west of the easternmost field boundary in this section, was an old stream bed 1.2m deep and 1.95m wide, comprising fine to small-sized river gravels. No intrusive features were present, and no artefacts were recovered from either the silt or river gravel deposits.

5.5 SECTION D: NY 3312 0448 TO NY 3331 0438

5.5.1 Trenching was undertaken without topsoil stripping in this section, the trench generally being 0.9m wide with a maximum depth of 2.1m. The line (Fig 2) continued at a similar height to that in Section C to the west, before rising at the eastern end onto an earlier river terrace. Trenching was started at the eastern end of the section, which corresponds to the western side of a man-made stream/drain channel, which would appear to be the same as that identified in Section C (*Section 5.4.3*).

5.5.2 The section at the eastern end revealed a 1.25m depth of bright orange/red silty loam above a band of plastic, pale grey silty clay which was 0.65m+ in depth. To the west, as the line dropped from the river terrace, the material changed, comprising an orange/red silty loam overlying fine to medium-sized river gravels as seen in Section C. No artefacts were recovered from this section.

5.6 SECTION E: NY 3330 0438 TO NY 33420440

5.6.1 Section E of the pipeline (Fig 2) crossed an area of peat bog between the western end of Section D and the supposed mill site (Site 03), on ground gradually rising to the east. Two column samples were taken from the centre of the area (C1 and C2 - Fig 2).

5.6.2 The western end of the section, immediately to the east of the stream/drain (NY 3333 0438), comprised a 0.3m deep layer of reed mat and uncompacted organic matter, over peat deposits which were 1.4m+ in depth. Further to the east (*c*30m) the base of the peat was exposed, the section consisting of 0.3m of reed mat and uncompacted organic material above a 0.55m deep band of peat, overlying fine to small-sized river gravels.

5.6.3 At the eastern end of the section, the peat deposit was intercalated with lenses of river gravel; some unmodified tree and branch sections were present in both the peat and the river gravels.

5.6.4 No evidence for the fulling mill (Site 03) was recorded; there was no trace of structural masonry or other building materials, and no remains of an associated race or leat. To check if there was any error in the grid reference for the site, the stream was inspected up to and beyond the road, but no features were identified.

5.7 SECTION F: NY 3342 0440 TO NY 3371 0429

5.7.1 The pipeline crossed relatively level ground, including an extensive peat bog in the centre, and pasture at either end. The trench was generally 0.9m wide and was excavated to a depth of 1.1-1.8m. None of the area was stripped in advance of trenching. A single column sample was taken from the centre of the mire (C3) (Fig 2).

5.7.2 Immediately to the east of the reported mill site (Site 03), the section consisted of a 0.18m deep layer of mid brown silty loam above gravels and boulder clay. After *c*50m a peat horizon was present within the gravels changing to a consistent 1m (average) deep deposit (Plate 3) overlying angular bluish grey gravels.

5.7.3 The section remained basically unchanged to a point 28m east of the small stream (NY 33668 04303) where the peat deposit tapered off, giving way to boulder clay and gravel deposits, similar to those seen at the western end of the section.

5.7.4 No finds were recovered from any of the deposits. The only intrusive feature recorded was a substantial stone-built culvert immediately to the west of the field wall. The culvert was cut 0.68m into the upper peat deposit. It was constructed of local stone, with angular blocks on the sides, flat thinnish slates at the base, and more substantial slabs for the capstones.

5.8 SECTION G: ROB RASH WOOD; NY 3371 0429 TO 3378 0399

5.8.1 The pipe trench followed the line of the footpath (Fig 2) through the wood close to the lake margin. The trench was 0.9m wide with a depth of between 1.25m and 1.85m. The woodland is situated on steeply-sloping ground and is currently dominated by sycamore with some oak, beech, birch, and hazel. On the lake margin were areas of overgrown alder coppice.

5.8.2 The wood contained three SMR sites, comprising a potash kiln (Site 04), and two charcoal pitsteads (Sites 05 and 06; Plates 5 and 6). The wood for the charcoal burning would have been provided by the coppiced woodland evidenced particularly at the lake edge. The potash kiln (Site 04) was on the slope above the line of the pipeline and was not affected by the construction works; it was therefore not subject to detailed survey. The charcoal pitsteads (Sites 05 and 06) were affected by the use of a pre-existing track for construction traffic; the lower and better-preserved pitstead (Site 05) was crossed by the track and the higher pitstead (Site 06) was adjacent to a works compound and was thus affected by erratic traffic. Both pitsteads were subject to survey (Fig 5) and are described in further detail in *Appendix 3*. In between the two pitsteads was a curved section of very-decayed dry-stone walling, comprising mainly large stones (Site 07). The function of this walling was not evident from the visible structural remains but, given the proximity to two pitsteads, there is a possibility that this reflects the very decayed remains of a third pitstead.

5.8.3 The stratigraphy identified within the trench was generally consistent throughout the wood, comprising reddish/brown gravels and boulder clay, with some pockets of fine silt (Plate 4). The only intrusive feature was a modern corrugated plastic drain located immediately to the east of the access track.

5.9 SECTION H: NY 3378 0399 TO NY 3390 0381

5.9.1 The pipe trench followed close to the line of the existing footpath (Fig 2) at the base of a steep slope, in an area of pasture. The topsoil was stripped in advance of trenching, and inspected for features and/or artefacts. The trench was 0.9m wide, and excavated to a depth of 1.4-2.2m.

5.9.2 The stratigraphy initially continued as observed in Section G, with red/orange silty loam above boulder clay. As excavation progressed to the south, the stratigraphy gradually changed to a banded silt and fine gravel deposits; the ground water seeped through the lower gravel bands, filling the trench and thereby limiting observation of the stratigraphy.

5.9.3 No artefacts were recovered from the topsoil strip, or trenching. The only cut feature recorded was an active stone-built culvert which emptied into the River Brathay.

5.10 SECTION I: NY 3390 0381 TO 33920375

5.10.1 The trench was excavated to the west of the footpath close to the River Brathay (Fig 2), crossing an area of boggy ground. The trench was 0.9m wide, and 1.5-1.7m in depth. The area was stripped in advance of trenching.

5.10.2 Stripping revealed a wall foundation (Site 08; Plate 7) on a north-east/south-west alignment, from the angle of an existing field wall to the bank of the River Brathay. A silted-up culvert-type field drain was also exposed, apparently terminating at the wall foundation and aligned parallel to the river.

5.10.3 The section comprised a 0.7-0.8m deep peat deposit (Plate 8) above pale grey angular gravels and bedrock. Environmental sampling was not possible due to the

rapid filling of the trench with water from two substantial concrete drains that were intersected by the trench.

5.11 SECTION J: NY 3392 0375 TO NY 3397 0354

5.11.1 This section of the trench was an extension from the site of the original intended outfall to a new outfall where the river flow was greater. The line of the trench cut across level pasture in a bend of the River Brathay to a point upstream from Skelwith Force.

5.11.2 The topsoil was stripped in advance of trenching, and no intrusive features were visible; all artefacts present were of nineteenth / twentieth century date. The trench was 0.9m wide, and 1.4-2.2m in depth.

5.11.3 The stratigraphy was generally consistent comprising a deposit of orange/brown silty loam overlying a band of pale grey silty clay, overlying bedrock. At the location of the outfall, the orange/brown silty loam overlay deposits of banded fine to medium-sized river gravels, which extended for 12.5m north from the outfall. Beyond this point the grey silty clay and bedrock underlay the orange/brown silty loam.

6. PALAEOECOLOGICAL ASSESSMENT

6.1 INTRODUCTION

6.1.1 Three monoliths (C1, C2, and C3) were taken from the trench in the area of the supposed fulling mill (Sections E and F); the deepest of these was monolith C3, which was taken from a depth of 0.35m-0.85m and from this four samples were extracted for palynological assessment, at 0.35-0.36m, 0.50-0.51m, 0.65-0.66m and 0.84-0.85m.

6.2 ASSESSMENT RESULTS

6.2.1 Monoliths C1 and C2 were not assessed palynologically but were recorded as having 0.2m of unconsolidated material above amorphous peat (0.22-0.36m). Below this lay organic mud with an increasing quantity of small pebbles and grit.

6.2.1 ***Monolith C3:*** the uppermost deposit was a raft of unconsolidated sedge peat (0.22m-0.35m) which was not incorporated within the monolith. Below the sedge peat, forming the highest deposit within the monolith, was an organic mud (0.35m - 0.61m), above a moss and monocot peat (0.61-0.85m), which was resting on river gravels (0.85m-).

6.2.2 The four pollen samples all contained abundant pollen and the pollen preservation was mixed but predominantly good; this would allow further analysis to take place if required. The range of pollen is presented in Table 1. The pollen in all four samples suggests that the area around the supposed fulling mill supported secondary woodland with some cleared ground at the time when the sediments were forming. Tree and shrub pollen ranges from 78% to 58.2% and that of herbs from 37.6% to 17%. The pollen in the lower sediments (Sample 4) above the river gravels suggests that sedges, grasses, and weeds, such as meadowsweet (*Filipendula*), invaded the land as the river channel shifted or decreased in size. This open ground, where the sedges were growing, was possibly invaded by alder (*Alnus*) and oak (*Quercus*) although there is still evidence of grassland around the site. At the top of the monolith (Sample 1) there are indications that the area of Elterwater itself may have expanded, with pollen and spores from aquatic plants eg quillwort (*Isoetes*), yellow water lily (*Nuphar lutea*) and alternate water-milfoil (*Myriophyllum alterniflorum*) recorded. Quillwort grows today in Cumbria in rocky or peaty tarns (Halliday 1997, 92) and alternate water-milfoil is found in nutrient-poor waters (*op cit*, 307). As the lake level rose there are indications of woodland declining with reductions in tree pollen, in particular of oak.

6.2.3 ***Chronology:*** the age of the deposits is difficult to assess, but the low values of elm (*Ulmus*) pollen suggest that they were formed at some time after the elm-decline, which is thought to have occurred regionally around 3000 BC (Hibbert *et al* 1971) in the late Mesolithic / early Neolithic period, and as such reflects a *terminus post quem* for the lower samples. The possible identification of larch pollen (*Larex*) suggests that the upper part of the monolith is comparatively recent, as larch was only introduced into Britain in the eighteenth century.

Taxa	Sample 1	Sample 2	Sample 3	Sample 4
	0.35-0.36m	**0.50-0.51m**	**0.65-0.66m**	**0.84-0.85m**
Trees and shrubs	67.8	78	68.1	58.2
Herbs	27.8	17	29.7	37.6
Heathers	0.8	2.5	0.7	3
Bracken	3.8	2.5	1.5	1.2
Alnus	31	40.8	20.5	17.6
Corylus avellana-type	18.1	16	18.3	21.2
Quercus	10	16.3	21.6	9.7
Betula	4.6	2.1	4.4	4.2
Ulmus	0.8	0	0.7	1.8
Tilia	0.3	0	0	0
Pinus	0.3	0.4	0.4	0.6
Fraxinus	0.5	0.4	0.7	2.4
cf *Larix*	1.6	0.7	0	0
Juniperus	0	0.4	0	0
Salix	0.3	1.1	0	0.6
Sorbus	0	0	0.4	0
Ilex	0.3	0	0.4	0
Sambucus	0	0	0.4	0
Lonicera	0	0	0.4	0
Calluna	0.8	2.5	0.7	3
Gramineae undiff	17	11.3	14.7	10.3
Cyperaceae	3.8	2.8	7.3	17.8
Plantago lanceolata	0	0	0.4	1.8
Plantago Sp	0.3	0.4	0	0
Urtica	0	0	0	0.6
Filipendula	0.3	0	1.5	4.2
Rumex acetosa-type	0.5	0	0	0.6
Tubuliflorae	0	0	0.4	0
Succissa pratensis	0	0.4	0	0.6
Solanum dulcamara	0	0.7	0.4	0
Ranunculus sp	1.1	0	1.1	0.6
Caryophyllaceae	0.3	0.4	0.4	0
Umbelliferae	0.3	0	0	0
Potentilla	3	0	0	0.6
Rubiaceae	0.5	0.7	2.2	0.6
Melampyrum	0.5	0.4	0.7	1.2
Pedicularis-type	0	0	0.4	0
Cruciferae	0	0	0.4	0.6
Undifferentiated	0	0	0.4	0
Myriophyllum alterniflorum	0.3	0	0	0
Isoetes	3.7	0	0	0
Nuphar	0.3	0	0	0
Nymphaea	0	0	0	0.6
Sparganium	0	0	0.4	0
Sphagnum	0.5	0.7	1.1	0.6
Tilletia	0.3	0	0	0
Pteridium aquilinum	3.8	2.5	1.5	1.2
Polypodium vulgare	8.9	4.6	4.8	6.1
Ferns undiff	16.4	13.8	13.6	14.5
Corroded grains	12.9	7.1	4.4	3
Crumpled grains	8.1	3.9	7.3	7.3
Broken grains	0.3	0	0.4	1.2
Concealed grains	2.2	1.4	3.7	3
Charcoal	1.3	0	1.4	1.2

Table 1: Percentage pollen values from monolith C3

6.3 CONCLUSIONS

6.3.1 The assessment of the organic deposit provides evidence for the good preservation of pollen, allowing full analysis to take place if agreed. This might provide evidence of the landscape during the time when the deposits were forming. If

further work is required it would be necessary to date the deposits by radiocarbon assay to provide a chronology for the data.

6.3.2 The limited pollen assessment work suggests that this area was relatively well-wooded in the later prehistoric and historic periods but with more evidence of clearance than at Blea Water, between Great and Little Langdale (Pennington 1964; 1965; 1970). It should be remembered, however, that the peat sampled was in a river valley and therefore it can be difficult to establish reliably the provenance of the pollen rain. Pollen from deposits formed in a river valley may be derived from three sources: the first is the local pollen from the flood plain; the second is from the river catchment, which at this site would include the uplands above Great Langdale; and the third is from airborne sources (Moore *et al* 1991). In the case of the river catchment pollen, it may have been contemporary with the deposits or be the result of secondary deposition from earlier sediments which had been eroded into streams before being transported down to the site of deposition. If pollen is derived from the river catchment area, however, the percentage of damaged grains, particularly of folded or crumpled ones, is generally higher than in other deposits. In the samples from Elterwater, the values of damaged grains is not high, which suggests that the pollen may be derived from non-fluvial sources. This means that the palynological results from the site may generally provide a record of the local and regional vegetation.

6.3.3 The Langdale valley has been extensively studied palaeoecologically by Pennington (*ibid*) although the number of radiocarbon dates from her sites was not large thereby restricting the value of her work. She studied sites from the uplands, for instance at Langdale Combe, Red Tarn, Blea Tarn (at 180m AOD), between Little Langdale and Great Langdale. The upland sites provided evidence of extensive land clearance from the Neolithic onwards but that from Blea Tarn suggests that, after the initial clearance in the Neolithic, secondary woodland developed and survived till recent times. Elterwater, at an altitude of 50m AOD, lies part way down the Langdale valley towards Ambleside and would therefore be a site that might provide evidence of land management from the valley bottom when archaeological evidence is more limited. It also lies close to a possible route between the two Lakeland valleys of Langdale and Grasmere.

7. CONCLUSIONS

7.1 WATCHING BRIEF

7.1.1 No significant new archaeological features were exposed during the trenching/topsoil stripping. The principal features recorded were exposed on the surface and had been previously identified; these included the spoil mound from the mine adit (Site 01), and the pitsteads (Sites 5 and 6) in Rob Rash Wood. Similarly, the wall foundation in Section I (Site 08) was shown on the first edition OS map (1862) continuing to the bank of the river. The only other intrusive features recorded were field drains (mostly stone culverts) which are difficult to date securely as this type of drain has been used over a long period of time, the only secure dating method being the recovery of datable artefacts from the cut made at the time of the drain's construction. The artefacts identified during the trenching operations were randomly distributed, being present within the topsoil; as such they reflect a low level of essentially agricultural, night-soil activity, rather than providing evidence of any occupation sites. All the artefacts present were of nineteenth and twentieth century date, consisting of potsherds, clay pipe stem, and glass vessel fragments; the implication is therefore that the drainage features and the agricultural activity was of relatively recent date. All wood recovered from waterlogged deposits was examined for evidence of working, but no evidence of anthropogenic origin was identified.

7.1.2 ***Agricultural land-use:*** the palaeobotanical and documentary evidence provide a level of accord. The documentary evidence suggests that much of the study area was unenclosed, reflecting the generally poorly drained ground around the lake; it was therefore subject to only low-level grazing. It also suggests that the land-use and occupation had been relatively static, with an emphasis on broadly low intensity pastoral farming. The palaeobotanical evidence demonstrated the presence of secondary woodland with some open ground, the proportion of which varied in the four samples assessed. Given the limited data, however, no firm conclusions can be drawn about the long-term vegetational history of the environs of Elterwater, but there are suggestions of increasing clearance through time.

7.1.3 ***Industrial activity:*** over and above the evidence of agricultural activity within the study area, there was also a clear indication of industrial activity. There was a mine adit and spoil heap (Site 01) at the western end of the study corridor; although this does not appear on the OS 1st edition map (1862), it is on the 2nd edition OS map (1900) and therefore seems to have been established in the late nineteenth century. A fulling mill had been reported to the north of the study area, but there was no evidence of this in the reported location, or in the general locale, and it cannot be corroborated. Such mills are prevalent in the area, being used to compress coarsely woven wool and cotton cloths to strengthen them. In the Lake District the early woollen industry was stimulated by such houses as Furness Abbey and fulling mills are thought to have become numerous by the fourteenth century, extending well into the post-medieval period. There was a particular concentration of fulling sites in the area of Grasmere, Rydal and Ambleside (Marshall and Davies-Shiel 1969, 91-3).

7.1.4 A potash kiln (Site 04) was identified on the north-eastern side of the lake, which reflects a medieval and, to a lesser extent, post-medieval industry. The potash was made by burning green bracken, and was used to make a crude soap or lye; it was

sold to fullers and cloth merchants and hence there was a possible link between this site and the reported fulling mill (Site 03).

7.1.5 Finally, there was a series of pitsteads, or charcoal burning platforms which are typically found within areas of coppiced woodlands and were used to provide a fuel source for limeworking or iron production; within this area they often provide a raw material in the production of gunpowder (*Section 3.2.10*). The first edition OS map of 1862 shows powder mills located on the road to Great Langdale, a short distance beyond the village (Marshall and Davis-Shiel 1969, 163-4). The main surviving evidence of coppicing is on the lake margin, where there is an area of overgrown alder coppice.

8. IMPACT

8.1 The watching brief has not identified any significant archaeological resource that is new to the record, but it has identified a potentially significant ecological resource in the form of the waterlogged peats around the lake. These provide a record of the vegetational and ecological history of the environs. There is some concern that the pipe trench, which is in part filled with a permeable material, will act as a deep drain (particularly in Section B) which, over time, may cause some drying out/shrinkage of the peat deposits and would therefore have a negative impact upon this potentially important palaeoenvironmental material.

9. BIBLIOGRAPHY

9.1 SECONDARY SOURCES

Birks, HJB, 1973, *Past and present vegetation of the Isle of Skye: a palaeoecological study*, Cambridge

Brooks, D, and Thomas, KW, 1967 The distribution of pollen grains on microscope slides, The non randomness of the distribution, *Pollen and Spores*, **9**, 621-629

Brunton, J, 1988 The late nineteenth-century revival of the Langdale linen industry, in E Roberts (ed), *A History of Linen in the North-West*, 93-118, Lancaster

Claris, P, and Quartermaine, J, 1989 The Neolithic quarries and axe factory sites of Great Langdale and Scafell Pike: a new field survey, *Proc Prehist Soc*, **55**, 1-25

Dickinson, S, 1985 Bryant's Gill, Kentmere: Another 'Viking-period' Ribblehead? in JR Baldwin, and ID Whyte (eds), *The Scandinavians in Cumbria*, 83-88, Edinburgh

English Heritage, 1991, *Management of Archaeological Projects* 2nd edn, London

Faegri, K, Kaaland, PE and Krzywinski, K, 1989 *Textbook of modern pollen analysis*, 4th edn, Chichester

Halliday, G, 1997 *A flora of Cumbria*, Lancaster

Hibbert, FS, Switzer, VR, and West, RG, 1971, Radiocarbon dating of Flandrian pollen zones at Red Moss, Lancashire, *Proc Roy Soc, London,* **B 177**, 161-76

Higham, N, 1986 *The northern counties to AD 1000*, London and New York

Lancaster University Archaeological Unit (LUAU), 1994 *Thingmount, Little Langdale, Archaeological Survey,* unpubl rep

Lancaster University Archaeological Unit (LUAU), 1999 *Shoulthwaite Hillfort, Thirlmere, Stratigraphic Survey*, unpubl rep

Machell, T, 1691 *An antiquary on horseback*, J Ewbank (ed), Kendal

Marshall, JD, and Davis-Shiel, M, 1969 *Industrial Archaeology of the Lake Counties*, Beckermet

Moore, PD, Webb, JA, and Collinson, ME, 1991, *Pollen analysis*, 2nd edn, Oxford

Pennington, W, 1964, Pollen analysis from the deposits of six upland tarns in the Lake District, *Phil Trans Roy Soc B,* **248**, 205-44

Pennington, W, 1965, The interpretation of some post-glacial vegetation diversities at different Lake District sites, *Proc Roy Soc B*, **161**, 310-23

Pennington, W, 1970, Vegetation history in North West England, in *Studies in the vegetational history of the British Isles* (D Walker and RG West (eds)), 41-80Cambridge

Postlethwaite, J, 1975, *Mines and mining in the English Lake District*, Leeds

Quartermaine, J, and Leech, R, forthcoming *The later prehistory of the Lake District, results of recent surveys*

9.2 CARTOGRAPHIC SOURCES

CRO WDRC/8/238, 1839 Tithe Map of Langdale

Ordnance Survey 1862, 6": 1 mile 1863 1st edition Sheet NY 30 SW

Ordnance Survey 1900, 25": 1 mile 1900 2nd edition Sheet 25.12

APPENDIX 1
PROJECT BRIEF

APPENDIX 2
PROJECT DESIGN

Lancaster University Archaeological Unit

March 1999

ELTERWATER OUTFALL, AMBLESIDE

CUMBRIA

ARCHAEOLOGICAL WATCHING BRIEF

Proposals

The following project design is submitted in response to a request from Mr Roy Rhodes of North West Water, in accordance with a brief by the Lake District National Park Archaeologist, for an archaeological watching brief in conjunction with the laying of a sewage outfall at Elterwater, Cumbria.

1. INTRODUCTION

1.1 CONTRACT BACKGROUND

1.1.1 North West Water Ltd (NWW) is constructing a new sewage outfall between the Sewage Works at Fletcher's Wood and the south-eastern side of Elter Water, near Ambleside, Cumbria. Lancaster University Archaeological Unit have been invited to submit a project design and costs for a watching brief during the top-soil strip for the pipeline.

1.1.2 The pipeline will extend around the north side of Elter Water lake, along the north side of Langdale Beck; it crosses the beck near Elterwater village and extends parallel to a 'C' road past Elterwater Hotel to the sewage works. The route passes close to a number of archaeological sites recorded within the Cumbria Sites and Monuments Record. These include a charcoal pitstead (SMR 1290), a potash kiln (SMR 3702), a mill site (SMR 30699), and a mine complex (SMR 3703). There is the potential that further sites will be exposed in the course of the top-soil strip. Because of the archaeological potential of the area the Lake District National Park Archaeologist has recommended the implementation of an archaeological watching brief during the laying of the sewer.

1.2 LANCASTER UNIVERSITY ARCHAEOLOGICAL UNIT

1.2.1 The Lancaster University Archaeological Unit 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 18 years. Fieldwork has taken place within the planning process and construction programmes, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. Numerous watching briefs have been undertaken during initial site preparations for both landscape projects (eg the North West Ethylene Pipeline for Shell UK Limited etc) and construction (eg Lancaster Market Hall and numerous small developments in Ribchester). LUAU has undertaken an assessment at South Hilton, nr Sunderland, for Northumbrian Water and has just completed a major watching during the laying of a North West Water Ltd water main along Hadrian's Wall (Banks to Birdoswald).

1.2.2 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 a project brief produced by the Lake District National Park Archaeologist, to provide a suitable level of archaeological observation, recording, and response during the excavation works for the proposed sewage pipe. The required stages to achieve these ends are as follows:

2.2 DESK-BASED STUDY

2.2.1 An examination of cartographic, aerial photographic, SMR records and any pertinent background material.

2.3 PERMANENT PRESENCE WATCHING BRIEF

2.3.1 The implementation of a watching brief to record accurately any surviving archaeological features or deposits by means of detailed observation and recording. To record the presence of buried features by appropriate recovery techniques, where applicable. Sampling will be undertaken of materials for environmental analysis.

2.4 ARCHIVE/REPORT

2.4.1 A written report will assess the significance of the data generated by the entire programme of work, in a local and regional context, and will be suitable for deposition as a permanent archive of the work undertaken.

3. METHOD STATEMENT

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

3.2 DESK-BASED STUDY

3.2.1 The data generated during the desk-based study will provide the basis for an assessment of the nature and significance of the known surface and subsurface remains. The following will be undertaken as appropriate, depending on the availability of material and with due regard to budgetary and timetable constraints.

3.2.2 The documentary study will consult the Cumbria Sites and Monuments Record and also documentary and cartographic records held by the County Record Office at Kendal. The emphasis will be on cartographic records as these have the potential to provide the locations of sites and will include early maps, (including estate plans and tithe maps etc), and surveys.

3.2.3 ***Aerial Photography:*** a survey of the extant air photographic cover will be undertaken. This will aid the identification of surviving archaeological and structural features. Aerial photographic collections to be consulted will include obliques and verticals held by the Royal Commission on the Historical Monuments of England based in Swindon, and photographs held by the County SMR and the Lake District National Park Authority.

3.3 PERMANENT PRESENCE WATCHING BRIEF

3.3.1 ***Methodology:*** a permanent programme of field observation will accurately record the location, extent, and character of any surviving archaeological features during the top-soil strip for the new sewer. This work will comprise the observation of the process of excavation for these works, the systematic examination of any subsoil horizons exposed during the course of works, and the accurate recording of all archaeological features and horizons, and any artefacts, identified during observation.

3.3.2 During this phase of work, recording will comprise a full description and preliminary classification of features or materials revealed, and their accurate location (either on plan and/or section, and as grid coordinates where appropriate). All archaeological information collected in the course of fieldwork will be recorded in standardised form, and will include accurate national grid references. Features will be planned accurately at appropriate scales and annotated on to a large scale plan provided by the Client. A photographic record will be undertaken simultaneously. The recording techniques and procedures employed by LUAU for such detailed recording represent current best practice.

3.3.3 It is assumed that LUAU will have the authority to stop works for up to one hour to enable the recording of important deposits, and to call in additional archaeological support if a find of particular importance is identified. This would only be called into effect in agreement with the Client and the National Park Archaeologist and will require a variation to costing. In normal circumstances, field recording will also include a continual process of analysis, evaluation, and interpretation of the data, in order to establish the necessity for any further more detailed recording that may prove essential.

3.3.4 ***Environmental Sampling and Analysis:*** a programme of environmental sampling will be undertaken. Areas of the route that contain waterlogged deposits will be sampled and if sufficient section of the stratigraphy is exposed a box core will be taken. Other scientific samples will be taken as the opportunity arises. The level and degree of any analysis will be subject to the environmental and archaeological potential of the samples. The analysis of the samples is costed as a contingency and the implementation of any analysis will be subject to agreement with the client and the National Park Archaeologist.

3.3.5 ***Health and Safety:*** full regard will, of course, be given to all constraints (services etc), as well as to all Health and Safety regulations. 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 Unit Managers (1991) and risk assessments are now being implemented for all projects. All operatives would be fully aware of the particular needs of working in conjunction with plant.

3.4 ARCHIVE/REPORT

3.4.1 ***Archive:*** the results of all archaeological work carried out during fieldwork will form the basis for 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 and finds. Palaeoenvironmental analysis will be subject to the results and is costed as a contingency. 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. LUAU practice is to deposit appropriate elements of the original record archive of projects (paper, magnetic and plastic media) with the appropriate County Record Office, 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.

3.4.2 ***Report:*** one bound and one unbound copy of a written synthetic report will be submitted to the client and the Lake District National Park Archaeologist within five weeks of completion of fieldwork, and a further copy submitted to the Cumbria Sites and Monuments Record following any comments from the client. The report will consist of an acknowledgements statement, list of contents, introduction, methodology, summary assessment of the results, gazetteer of sites and conclusions. The report will include a copy of the agreed 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.

3.4.3 This report will identify areas of defined archaeology. 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. This report will be in the same basic format as this project design.

3.4.4 ***Confidentiality:*** all internal reports to the client are designed as documents for the specific use of the Client, for the particular purpose as defined in the project brief and project design, and should be treated as such. With the agreement of the Client, reports may be circulated to the Lake District National Park Archaeologist for discussion and approval, but are not suitable for publication as academic documents 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.

3.5 PROJECT MONITORING

3.5.1 ***Lake District National Park Authority:*** any proposed changes to the project design will be agreed with the Lake District National Park Archaeologist in coordination with the Client. The Lake District National Park Archaeologist will be informed at the commencement of the project. All significant developments will also be related to the Lake District National Park Archaeologist..

3.5.2 ***North West Water Ltd:*** an initial meeting of all parties will be arranged at the commencement of the project, if the Client so desires. LUAU will consult regularly with the Client during fieldwork, and this will include the attendance of a representative of the Client, if required, at any meetings convened with the Lake District National Park Archaeologist, to discuss the report or any other matter. Any decision to invoke a rapid response team would be taken with the Client and Lake District National Park Archaeologist.

4. WORK TIMETABLE

4.1 The phases of work would comprise:

4.2 DESK-BASED STUDY

4.2.1 A one day period is allowed to extract the relevant sources and assimilate the material for the watching brief.

4.3 PERMANENT PRESENCE WATCHING BRIEF

4.2.2 Monitoring of excavation of top-soil strip, and observation and recording of any archaeological features and materials revealed. The timescale of this phase will be dictated by the construction programme.

4.4 ARCHIVE/REPORT

4.4.1 LUAU generally calculates a 1:0.5 ratio of fieldwork: post-fieldwork (archive, analysis, and report preparation).

4.5 LUAU can execute projects at very short notice once an agreement has been signed with the client. The date for completion of the works would be dictated by the site construction programme. The report will be submitted to the Client within five weeks of the completion of field work.

4.6 The project will be managed by **Jamie Quartermaine BA SurvDip** (Unit Project Manager), to whom all correspondence should be addressed. All Unit staff are experienced, qualified archaeologists, each with several years professional expertise.

APPENDIX 3
SITE GAZETTEER

Site number **01**
Site name Birch Hill Wood
NGR NY 3277 0431
Site Type Mine, Adit and Spoil Tip
SMR number 3703
Description These are the remains of a mine, including an adit extending into the slope and a linear spoil tip which extends towards the lake. It is shown on the OS second edition map (1900) but not on the OS 1st edition map (1862) and it is to be presumed that it was established between these dates. The adit comprises a barrel-vaulted, dressed stone aperture, which is *c* 1.3m across and is largely overgrown. Turf-covered earth-retaining walls extend out from the aperture towards the linear spoil heap which is *c*9m away. The spoil tip is a low linear mound, which was also heavily turf covered. The pipe trench crossed the line of the spoil tip, and showed it to comprise fine stone chippings cut or sunk into the peat deposit, with a stone culvert to either side.

Site number **02**
Site name Elterwater Hotel
NGR NY 3276 0448
Site Type Sword Find
SMR number 4061
Description A sword was reported by Machell (1691) at Elterwater Hall (now Elterwater Hotel). It had a 40" long blade, but had *c*1" broken off the tip. The present whereabouts are not known.

Site number **03**
Site name Langdale Beck
NGR NY 3341 0440
Site Type Fulling Mill (Site of)
SMR number 30699
Description The site of a fulling mill is depicted on a map, dated to 1824, and reported by Mike Davies Shiel (SMR 30699). There is no evidence of the site shown on the OS 1st edition map (1862). A field to the immediate north of the reported location is called 'Tenter Field'. No evidence for this site was recorded, despite an extensive examination of the supposed site and surrounding area. Fulling mills were used to compress coarsely woven wool and cotton cloths to strengthen them. In the Lake District the early woollen industry was stimulated by monastic houses such as Furness Abbey, and fulling mills are thought to have become numerous by the fourteenth century, and continued into the post-medieval period. There was a particular concentration of fulling sites in the area of Grasmere, Rydal and Ambleside (25 in total) (Marshall and Davis-Shiel 1969, 91-3).

Site number **04**
Site name Elterwater Lake
NGR NY 33756 04300
Site Type Potash Kiln
SMR number 3702
Description The remains of a potash kiln is cut into sloping ground within an area of deciduous woodland. The kiln has a diameter of 3.8m, and part of the internal stone lining is visible on the north side. Potash kilns were typically ten feet in diameter, and nine feet in depth with an air inlet at the base. The potash was usually made by burning green bracken, and was used to make a crude soap or lye which was sold to fullers and cloth merchants (Marshall and Davis-Shiel 1969, 93-4).

Site number **05**
Site name Rob Rash Wood
NGR NY 33798 04111
Site Type Charcoal Pitstead
SMR number 1290
Description The remains of a charcoal pitstead are visible in Rob Rash Wood. The pitstead has been crossed by an established track, and has caused limited damage to the structure. There is still, however, an obvious apron and a recessed scarp edge forming the internal upslope edge of the platform. The lower western edge has exposed dry-stone revetment walling, comprising large stones, although this element is substantially overgrown. The track has exposed a limited amount of surface small stone material which is in a greater concentration in this location than elsewhere on the track, suggesting that this is a component of the pitstead rather than simply metalling for the track. The height of the platform above the external ground surface is *c*0.45m and the internal diameter of platform is *c*8.6m. There is a substantial deposit of stone extending from the northern revetted slope of the pitstead.

Site number **06**
Site name Rob Rash Wood
NGR NY 33848 04073
Site Type Charcoal Pitstead
SMR number 1290
Description The remains of a charcoal pitstead are visible in Rob Rash Wood. The pitstead is located near the top of an access track, leading from the Elterwater / Ambleside road. It comprises a sub-circular platform, with an ill-defined, scarp slope around the eastern up-slope side of the feature. The western side comprises a series of large and medium stones defining the forward revetted edge of the platform; there is a further spread of generally smaller stones extending downslope from the apron edge. The platform has been crossed by recent works traffic, which has caused limited damage to the structure and has reduced the definition of the forward apron edge. The structure is covered by woodland surface litter, which has further limited the definition of the monument. There is a 0.3m fall from the forward edge of the platform to the lower surface, and the internal diameter of the platform is 6.5m.

Site number **07**
Site name Rob Rash Wood
NGR NY 33815 04100
Site Type Section of walling
Description A short alignment of mainly large and medium stones was orientated north-west/south-east through Rob Rash Wood. The stones would appear to be the decayed remains of a section of walling, and there is a marked curve in the centre of the structure. The largest stones are up to 0.45m in height and the stones are not dressed; the remains reflect a generally poorly - constructed feature. The wall section is only visible for a length of 7.5m and there is no evidence of an continuation beyond the observed extent. There is no obvious platform on the upper side of the walling, but as it is approximately equidistant between pitsteads 05 and 06, there is a slight possibility that this was the decayed remains of a third platform.

Site number **08**
Site name Yew How
NGR NY 3380 0381
Site Type Wall foundation
Description A wall foundation was exposed in the course of the excavation of the pipe trench on a north-east/south-west alignment leading from the angle of an existing field wall, to the bank of the River Brathay. It comprised two parallel lines of undressed field stones, and in places the line was discontinuous, reflecting the fact that sections of the wall have been subject to intensive robbing. The wall is shown on the Ordnance Survey 1st edition map (1862). A silted-up culvert-type field drain was also exposed, apparently terminating at the wall foundation and this was aligned parallel to the river.

ILLUSTRATIONS

Fig 1: Location Map

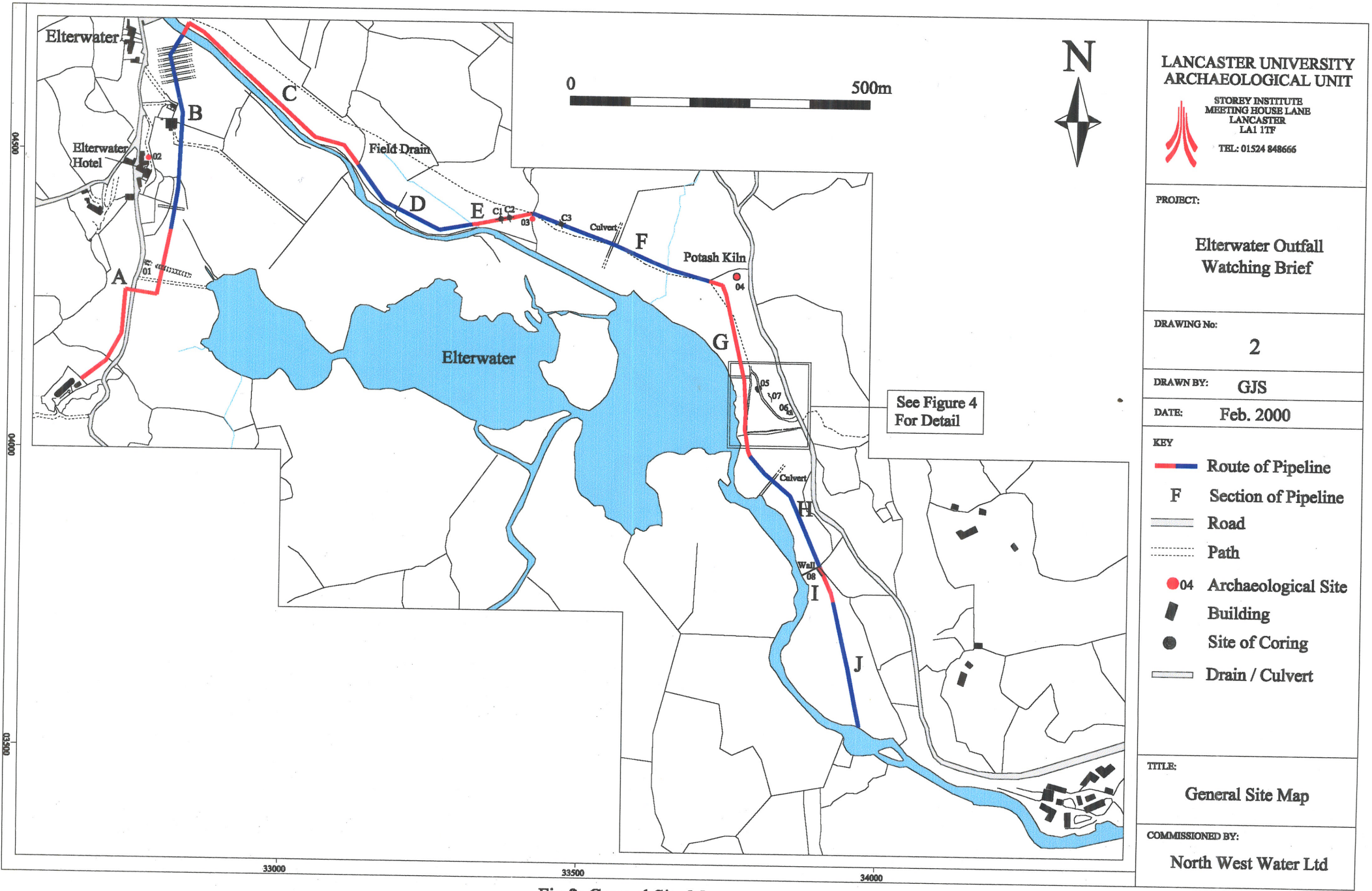

Fig 2: General Site Map

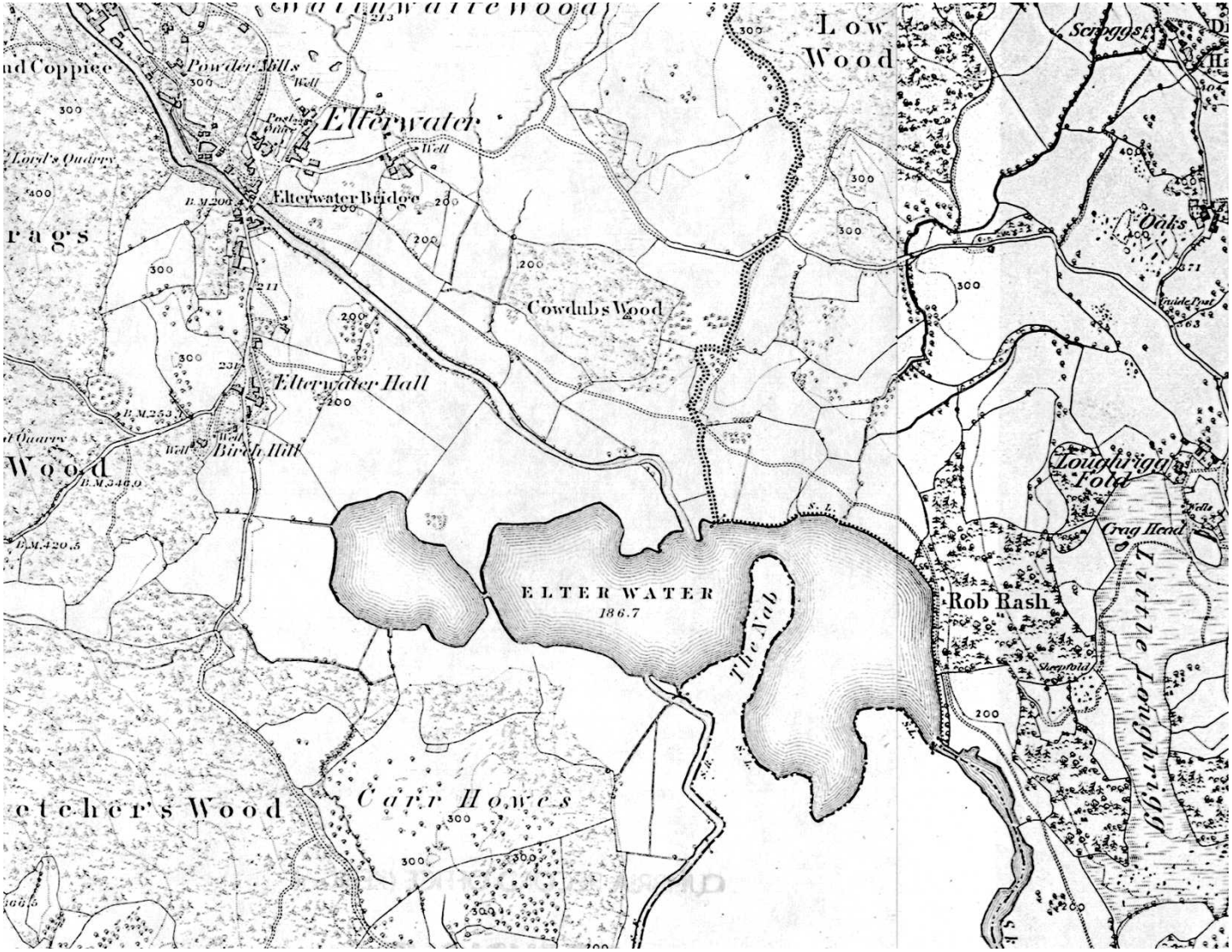

Fig 3 Extract from the First Edition Ordnance Survey map of 1862

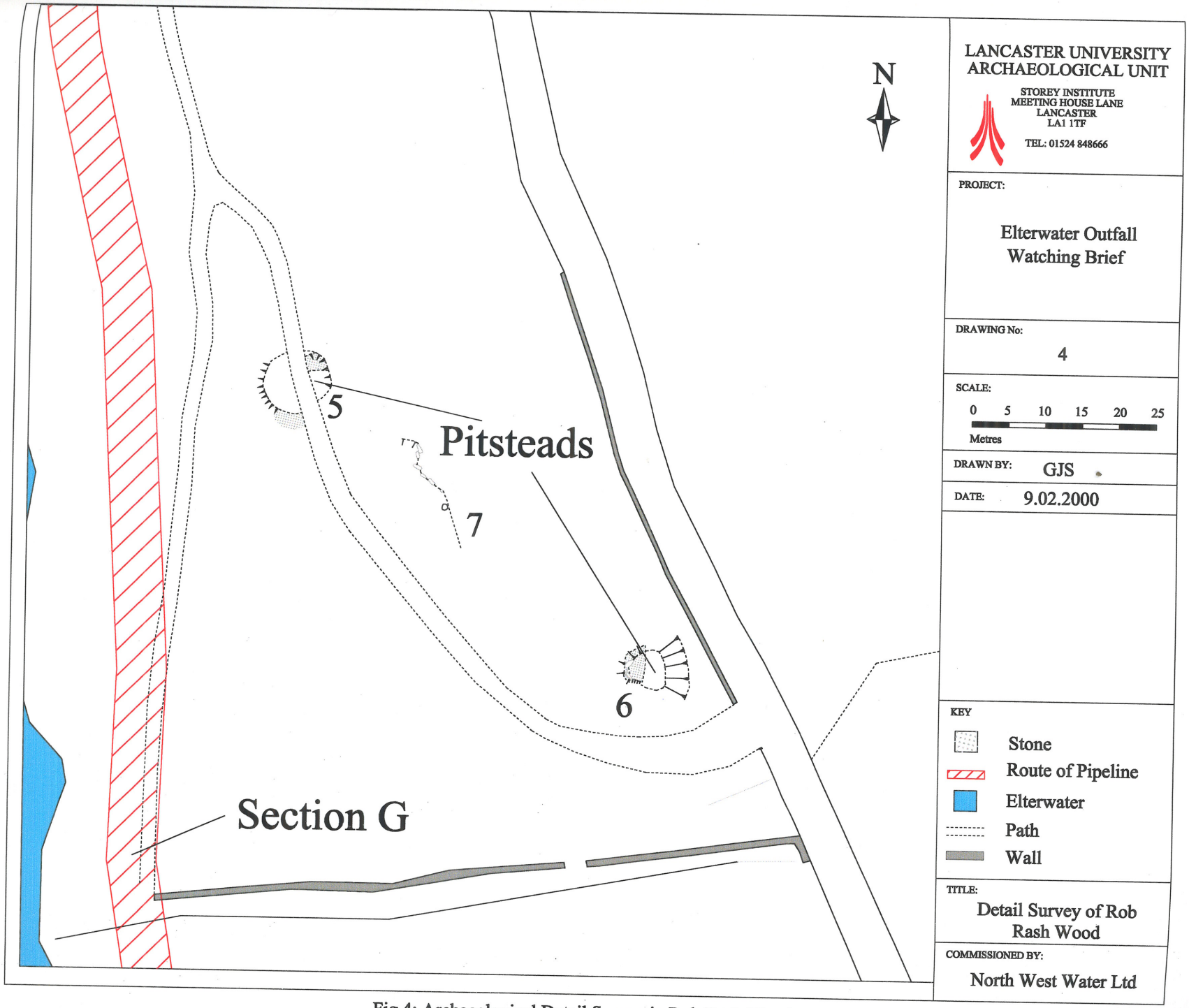

Fig 4: Archaeological Detail Survey in Rob Rash Wood

PLATES

Plate 1 Trench in Section B west of river crossing

Plate 2 River crossing

Plate 3 Peat deposit Section F

Plate 4 Trench in Rob Rash Wood

Plate 5 Retaining wall of pitstead in Rob Rash Wood (Site 05)

Plate 6 Platform of pitstead Site 06

Plate 7 Wall foundation Section I (Site 08)

Plate 8 Trenching through peat deposit Section I