



SHAP TO WATCHGATE PIPELINE

CUMBRIA

**Topographic Survey,
Evaluation, Watching
Brief and Stratigraphic
Survey**



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SUMMARY

Oxford Archaeology North (OA North) was commissioned by United Utilities to carry out a programme of archaeological investigation along the proposed route of a pipeline between Shap, Cumbria (NY 5615 1256) and Watchgate, Cumbria (SD 5307 9815). The work entailed a topographic survey of a cairnfield at Wickers Gill/Turnmire Bottom, an archaeological evaluation along the entire route and an archaeological watching brief was maintained during groundwork in areas considered to be archaeologically sensitive. A stratigraphic survey was carried out through a natural basin at Demings moss followed by a palynological assessment of paleobotanic cores from this area. The fieldwork was carried out between March and September 2004.

The cairnfield survey identified 56 individual monuments which were accurately mapped; this was required so as to inform the design of an alternative route for the pipeline around the monument. The survey demonstrated that the cairnfield had a complex development, which was initially a small randomly scattered group of cairns. This developed with the introduction of a small field system and a stone-founded round house. There was subsequent activity on the site during the medieval and post-medieval periods.

The evaluation was originally to have consisted of 94 trenches, comprised approximately 5% of the overall length of pipeline. However, because of access restrictions in the event only 49 trenches were excavated. Archaeological deposits were noted in six of the 49 trenches (8, 13, 24, 37-9).

A discrete dump of burnt material was noted in Trench 8 (Plate 3). No dating evidence was recovered from the dump and no other features were noted in the trench. Cultivation marks, probably dating to the nineteenth/twentieth century, were seen in Trench 13 (Plate 4), in a field now only used for pasture.

The Shap to Kendal Turnpike boundary bank, which was identified in the rapid appraisal and walkover survey, was examined in the evaluation (Trench 24) and in the course of the watching brief. The bank was constructed of earth and stone and showed no indications of having been anything other than a simple boundary bank defining the road edge. The turnpike itself could not be examined by the evaluation trenching as it was still being used for farm access but was recorded in section in the course of the watching brief.

A low stone bank was revealed in Trenches 37 to 39 within the pipeline corridor to the south of Turnmire Bottom. Although no dating evidence was recovered, the bank was on a different alignment to the present field boundaries, and had the characteristics of a stone bank suggesting that it was part of an earlier field system, which may have related to that belonging to the cairnfield at Wickers Gill/Turnmire Bottom surveyed in the initial phase of the project.

The watching brief was maintained as a permanent presence during the stripping of topsoil in six areas (A to E) which were considered to have a high archaeological potential or were areas where it had not been possible to excavate evaluation trenches. The only archaeological features to be encountered in the course of the watching brief relate to the 1753 turnpike, which ran between Shap and Kendal. Where the pipeline crossed the turnpike near to High Borrow Bridge (Area B) the watching brief demonstrated that the 1753 road survives below the extant road and that the turnpike appeared to have been constructed along the line of an earlier unmetalled track. A musket ball and other assorted metal objects, along with two sherds of post-medieval pottery, were recovered in the

vicinity of Demings House. The Palynological Assessment of Demings Moss entailed the taking of a series of palaeobotanic cores in two transects across a natural basin, in an area which was to be impacted by the development. The assessment demonstrated the good survival of pollen from the samples and that there is a long sequence of peat formation. The deposits within the basin started forming at some date after the beginning of the Neolithic and the pollen diagram provides a record of changing land-use around the mire itself and in the wider landscape. As such it has the potential to provide an indication of how man has interacted with the landscape, by clearing woodland or initiating farming.

Given the good survival of the pollen record in the basin it is recommended that more detailed palynological analysis of the peat be undertaken, together with radiocarbon dating of the most significant deposits.

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Oxford Archaeology North would like to thank Barbara Cardie of United Utilities for commissioning the project and to Kate Brown of MWH (Montgomery Watson Herza) for her help. We should also like to thank the curators Eleanor Kingston of the Lake District National Park Authority and Jeremy Parsons of the Cumbria County Archaeology Service for their considerable assistance and support.

The evaluation was undertaken by Paul Gajos who was assisted by Nicola Gaskell and Martin Sowerby. The cairnfield survey was conducted by Peter Schofield. The watching brief was undertaken by Andy Bates, Kathryn Blythe, Jason Clark, Sean McPhillips, Tony Platt, Peter Schofield, Martin Sowerby and Matt Town. The stratigraphic survey of Demings Moss was undertaken by Denise Druce. The pollen preparation and assessment was undertaken by Frances Claxton. The report was written by Paul Gajos with contributions by Peter Schofield, Tony Platt and Elizabeth Huckerby. The drawings were produced by Emma Carter and Peter Schofield. Jamie Quartermaine and Alan Lupton edited the report and the overall project management was by Jamie Quartermaine.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

- 1.1.1 A proposal by United Utilities to lay a new pipeline between the wastewater treatment works at Watchgate (SD 5307 9815) and Shap (NY 5615 1256) (Fig 1) necessitated the below ground disturbance of a large area of land. It was considered that there was a high probability that archaeological deposits would be disturbed during this work. It was therefore requested by the Cumbria County Council Archaeological Service (CCCAS) and the Lake District National Park Authority that a programme of archaeological assessment be undertaken in advance of the works.
- 1.1.2 This assessment comprised a rapid appraisal in conjunction with a rapid identification walkover survey (OA North 2003), and was intended to appraise the likely archaeological value of the specified area, and to locate and record potentially important features in the landscape, whether or not they were visible as surface remains.
- 1.1.3 The rapid appraisal and walkover survey also identified four discrete earthwork sites highlighted for topographic survey to inform on the routing of the pipeline and record upstanding features as a mitigative measure before potential destruction. Due to re-routing of the pipeline, however, it was only necessary to conduct a topographic survey of one area, the Wickers Gill/Turnmire Bottom cairnfield.
- 1.1.4 Following on from, and informed by, the rapid appraisal and walkover survey, a full programme of evaluation trenching was implemented primarily targeted on sites identified by the appraisal. This entailed the excavation of 49 20m x 1.7m trenches (Fig 3-6) and examined the areas around documented sites, but also a lower density of trenches in between the documented sites to investigate the potential for previously undiscovered sites. Following the programme of trial trenching five areas (Areas A-E) were identified to be subject to watching briefs (Fig 3-6).
- 1.1.5 The topographic survey, evaluation, watching brief, stratigraphic survey and were all carried out between March and September 2004. The results of the archaeological works are presented in the form of a report outlining the results of findings followed by a statement of the archaeological potential of the area.

1.2 TOPOGRAPHY, GEOLOGY AND LAND-USE

- 1.2.1 The pipeline route lies at the eastern edge of the Cumbria High Fells as defined by the Countryside Commission (1998). The southern section, between Watchgate and Demings Moss, lies at around 170mOD and is typified by moderately undulating ground intersected by occasional deep valleys. The land then rises to around 400mOD at Demings Moss where the land is more gently undulating and gradually drops down to a height of 300m at Wasdale Foot and then further down to 250mOD at the Wet Sleddale road (*ibid*).
- 1.2.2 The underlying geology of the pipeline route comprises banded mudstones from Watchgate to Demings Moss, which change to greywackes, mudstone and limestone in the area of Wasdale Foot before changing in turn to Shap granite

around the areas of the Shap Pink Quarries and finally finishing on andesite lavas at Turnmire Bottom (British Geological Survey 1992).

- 1.2.3 Land-use along the route of the pipeline can be broadly divided into three areas: Watchgate to Demings Moss, which is mostly improved pasture, Demings Moss to Shap Wells which is mostly unimproved moorland and Shap Wells to Turnmire Bottom which is rough pasture.

1.3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

- 1.3.1 The following is intended only as a brief summary of the archaeological and historical background of the area, a more detailed background is provided in the rapid appraisal report (OA North 2003).

- 1.3.2 **Prehistory:** at the northern end of the route in the marginal uplands and valleys of the Shap area there is evidence of activity since at least the Neolithic period and potentially even earlier. The Shap Stone Avenue represents the main Neolithic remains in the vicinity of the study area, and is dated to the late Neolithic period by analogy with more securely dated monuments (Clare 1978). At the southern end of the route, to the north of Kendal, there are a few indications of Neolithic activity, but these are restricted to a few stone axe finds.

- 1.3.3 Five prehistoric sites consisting of settlements and cairnfields in the areas of Turnmire Bottom and Shap Blue Quarry were identified in the rapid appraisal (OA North 2003). Although these sites remain undated cairnfields of this type are commonly attributed to the Bronze Age (Quartermaine and Leech forthcoming). The first mention of the identification of the cairnfield at Wickers Gill/Turmire Bottom, along with that at Shap Blue Quarry, was from aerial survey work of the Upper Lune valley conducted in the 1970s (Higham 1979; Hart 1985). The construction of the British Gas, Longtown to Lupton gas pipeline across the Wickers Gill/Turmire Bottom cairnfield was preceded by a detailed topographic survey at 1:2500 scale (British Gas 1984). This identified major archaeological features within both Wickers Gill and Shap Blue Quarry cairnfields (Hart 1985). Many archaeological features were missed in the initial survey, but three putative hut circles were identified at Wickers Gill.

- 1.3.4 Closely following on from this topographic survey, the Cherrys conducted a field-walking exercise along the backfilled easement of the gas pipeline (Cherry and Cherry 1987). It was envisaged that they would walk the machine-stripped easement but they arrived after it had been reinstated; they did, however, discover four discrete but backfilled lithic scatters that ran close to the east side of the cairnfield (Wickers Gill 1-3 and Turnmire Bottom 4). The four sites were limited to a 350m long strip adjacent to the cairnfield, with discrete lithic scatters totalling over two thousand flints, (Cherry and Cherry 1987). The flint assemblage had evidence of Mesolithic, Neolithic and early Bronze Age affinities and it was suggested that the assemblage reflected activity on the site that predated the cairnfield (*ibid*).

- 1.3.5 In marked contrast to the Wickers Gill cairnfield, the cairnfield 1km to the south at Shap Blue Quarry has had additional phases of work subsequent to the British Gas survey (Hart 1985). The threat of quarry expansion led to a more complete topographic survey being carried out and a hut circle was subject to a rescue excavation (CLAU 1984; Turner 1991, 10).

- 1.3.6 The Iron Age is not well represented in the study area, although multivallate hillforts are known from the surrounding region at Castlesteads to the south of Kendal (Bingham 1995) and the Wasdale Foot settlement, discussed below (*section 1.3.7*), may have had Iron Age origins.
- 1.3.7 **Roman:** no confirmed sites from the Roman period have been identified within the assessment area, although on the east side of Wasdale Fell several settlements, with enclosures and field-systems have been documented. Two of the settlements lie within the assessment corridor: Wasdale Foot settlement (NY 57700 09600) has possible Iron Age/Romano-British enclosures and field-systems and Castle Howe earthworks (NY 57890 09100) has similar (but undated) enclosures and field-systems. The nearest Roman forts are at Watercrock in Kendal, over 8km beyond the southern end of the route, and Low Borrowbridge, 6km to the east.
- 1.3.8 **Early Medieval:** as is the case throughout Cumbria, evidence for early medieval activity from excavations and surviving remains is extremely limited. Following the cessation of organised Roman military occupation in Britain, most of Cumbria, became part of one of the rapidly fluctuating early medieval kingdoms: firstly Rheged in the sixth and seventh centuries and then the expanding and quarrelsome kingdoms of Northumbria and Strathclyde (Higham 1986; Bingham 1995). Evidence for rural settlement is beginning to emerge at sites, such as Fremington, 3km south-east of Penrith (Oliver *et al* 1996, 127-169), Bryant's Gill in Kentmere (Dickinson 1985) and at Shap itself (Heawood and Howard-Davis 2002). However, no early medieval sites have been positively identified in the immediate vicinity of the pipeline corridor.
- 1.3.9 **Conquest:** it would appear that Norman centres were established in the area around Kendal shortly after the Conquest. It was not until 1092 that the Normans were able to take full control of Cumbria (Bingham 1995), and it appears that the political divisions were based on already existing entities (Winchester 1987).
- 1.3.10 **Later Medieval:** there is very little surviving evidence of medieval settlement in the vicinity. The only site identified in the rapid appraisal is at Kids Howe, which is listed on the Cumbria SMR (SMR 5143) as being the site of a possible medieval house. To the north of the route lies Shap Abbey, founded in the late twelfth to early thirteenth centuries. Close to the south end of the route and immediately to the east are Whitwell and Selside Halls. These are known to have existed in the fourteenth century and were still in existence in the seventeenth century, both were associated with deer parks at this time. The associated villages of Whitwell and Selside are mentioned in fourteenth century documents but nothing remains of them today (RCHME 1936).
- 1.3.11 **Post-medieval:** to the north of the area are numerous quarry sites and associated limekilns, some of which survive in good condition. However, only one quarry and associated limekiln was noted from the environs of the proposed pipeline. The majority of the quarries were located along the central part of the proposed route, south of Shap. There is plentiful evidence from surviving remains, landscape features, maps and documentary sources to demonstrate the extent of the lime industry in the area.
- 1.3.12 A significant development of the seventeenth to nineteenth century period in the Shap area was that of wheeled traffic, in conjunction with the turnpiking of the Old Shap Road in 1753. Until this point most traffic between Kendal and Penrith had travelled by packhorse up the Kentmere valley, over the Nan Bield Pass and into

the Haweswater valley (LUAU 1997; Hindle 1998). The road continued from Kendal to Penrith, skirting east of the valleys of Longsleddale and Swindale, encouraging the development of the market town of Shap. Later, in the nineteenth century, the route enabled the development of large-scale quarrying for Shap granite, slate and limestone.

- 1.3.13 A number of mills developed along the line of the turnpike exploiting the communication line and the abundant water supplies. In particular, great use was made of the River Sprint to the west of the southern end of the pipeline route; which was utilised by manufacturers in the textile industry, producing bobbins in vast quantities and provided a route by which flour was supplied to an ever-expanding population.

2. METHODOLOGY

2.1 PROJECT DESIGN

- 2.1.1 A project design (*Appendix 1*) was submitted by OA North to United Utilities for an archaeological evaluation along the Shap to Watchgate section (SD 5307 9815 - NY 5615 1256) of the Hayeswater pipeline. The work provided for trial trenching, which was for the most part targeted on sites identified by the earlier appraisal (OA North 2003), a topographic survey of selected sites and a watching brief during topsoil stripping targeted on areas highlighted by the evaluation as needing further work. A stratigraphic survey of peat deposits on Demings moss was also included in the scheme of works.
- 2.1.2 The project design for the appraisal of the Hayeswater pipeline was produced in accord with a verbal brief from Eleanor Kingston of the Lake District National Park Authority (LDNPA). The project design was adhered to in full and the work was consistent with the relevant standards and procedures of the Institute of Field Archaeologists, and generally accepted best practice.

2.2 TOPOGRAPHIC SURVEY

- 2.2.1 **Instrument Survey:** a level 2b survey (OA North 2002), equivalent to RCHM (E) level 2, was undertaken of the sites identified by the appraisal. By the time the archaeological programme was undertaken three of the sites requiring topographic survey (house and yard on Demings Moss, boundary bank at Bleabeck and the earthworks at Tunnel Bridge) had been avoided by rerouting the pipeline and therefore did not require survey. The remaining site was the Wickers Gill/Turnmire Bottom settlement and cairnfield, which was subject to a detailed topographic survey. All appropriate topographic detail was recorded to provide an appropriate context for the archaeological detail.
- 2.2.2 **Control:** survey control was established over the site by closed traverse and internally is accurate to +/- 15mm; the control network was located onto the Ordnance Survey National Grid by the use of Global Positioning Survey (GPS), which is accurate to +/- 0.25m.
- 2.2.3 **Detail:** 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 1:500 output. The digital data was transferred onto a portable computer for manipulation and later transferred to other digital or hard mediums. Film plots were outputted via a plotter. The archaeological detail was drawn up in the field as a dimensioned drawing on the plots with respect to survey markers. The survey drawings were generated within a CAD system and were merged with existing topographic data, and with the results from earlier surveys.

2.3 TRIAL TRENCHING

- 2.3.1 The programme of trial trenching aimed to establish the presence or absence of archaeological deposits and, if established, test their date, nature and quality of preservation. The evaluation assessed the character of archaeological deposits to the depth of the natural subsoil.

- 2.3.2 The project design (*Appendix 1*) required the excavation of 94 trenches, typically 20m x 1.7m, though some trenches were varied in length to suit the investigation and landscape. The trenches were spread evenly along the study area to gather as much information as possible from the area as a whole. Trenches were also located in areas highlighted by the initial appraisal (OA North 2003) as being of high archaeological potential (Figs 3-6). An assessment of service plans was undertaken so that live services could be avoided.
- 2.3.3 In the event a reduced number of trenches were excavated for a number of reasons. Ten proposed trenches to the south of Selside Memorial Hall were not excavated as the pipeline easement had been stripped prior to the commencement of the evaluation trenching. Twenty-three proposed trenches along the line of the Shap to Kendal turnpike across Demings Moss were not excavated due to access being restricted by ongoing groundwork. It was agreed with the Lake District National Park Archaeologist that this area should instead be subject to a watching brief. A further 12 trenches, spread out along the length of the pipeline, could not be excavated due to problems of accessibility, terrain and forestry.
- 2.3.4 The trenches were excavated mechanically with a toothless ditching bucket 1.7m wide to the level of the natural subsoil or to the level of potential archaeological deposits under close archaeological supervision. Where potential archaeological deposits were encountered, the trenches were hand cleaned and the deposits were excavated manually in order to test their date, character and extent. The trenches were accurately located by Global Positioning System (GPS) (accurate to +/- 0.25m).
- 2.3.5 **Recording:** all information identified as potentially archaeological in nature was recorded stratigraphically with accompanying documentary evidence (plans, sections and colour, slide, and black and white print photographs).
- 2.3.6 Results of the evaluation were recorded using a system devised from that used by the Centre for Archaeology of English Heritage. The archive includes both a photographic record and accurate large-scale plans and sections at an appropriate scale (1:10 and 1:20). Recording was principally in the form of a *pro forma* Trench Record sheet for each trench, which notes the orientation, dimensions and description of the topsoil and subsoils present in the trench. Features thought to be of possible archaeological potential were recorded using *pro forma* Context Record sheets.

2.4 STRATIGRAPHIC SURVEY

- 2.4.1 The stratigraphic survey of Demings Moss was undertaken in order to record the peat type and its depth, and the underlying topography of the basin.
- 2.4.2 A 30mm bore Eijkelkamp gouge auger was used to obtain fifteen cores to record the depth of the peat and a rapid field description of the peat type. The cores were taken at 10m intervals from two transects, one in a west/east orientation (A-B) and the other one south/north (C-D), across the area of peat to be effected by the development (Fig 9).
- 2.4.3 This field data was used to draw two stratigraphic sections one from west/east and the other from south/north across the area of peat to be effected by the development (Figs 10 and 11).

2.5 PALYNOLOGICAL ASSESSMENT

- 2.5.1 A core was taken for palaeoenvironmental analysis from the greatest depth of peat, which was taken from an open section with the aid of a mechanical digger. This corresponds to Core 5 from the stratigraphic survey and was at the point of intersection of both cores (Fig 9).
- 2.5.2 The monoliths were examined in the laboratory and the stratigraphy described. Twelve subsamples, at depths of 0.08m, 0.16m, 0.24m, 0.32m, 0.64m, 0.96m, 1.28m, 1.60m, 1.76m, 1.92m, 2.04m and 2.12m from the surface, were taken for palynological assessment.
- 2.5.3 The twelve samples were prepared for pollen analysis using the standard techniques of potassium hydroxide, hot hydrofluoric acid treatment and acetolysis (Faegri and Iversen 1989). The residues were mounted in silicone oil and examined with an Olympus BH-2 microscope using x400 magnification routinely and x1000 for critical grains. All the samples were assessed for pollen and counting continued until a sum of between 68 and >100 pollen grains from land pollen types had been reached on two or more complete slides, to reduce the possible effects of differential dispersal under the coverslip (Brooks and Thomas 1967). Pollen identification was carried out using the standard keys of Faegri and Iversen (1989) and Moore *et al* (1991) and a small reference collection held at OA North. Cereal-type grains were defined using the criteria of Andersen (1979); indeterminate grains were recorded using groups based on those of Birks (1973). Plant nomenclature follows Stace (1991). Charcoal particles greater than 5µm were also recorded following the procedures of Peglar (1993). The results are presented as a percentage value of the pollen sum, which includes all land pollen types and bracken spores (see Table 2).

2.6 WATCHING BRIEF

- 2.6.1 A watching brief was maintained during the groundworks for the laying of the pipeline, and was undertaken following the initial topsoil strip. This entailed the removal of no more than a 0.25m depth of soil, down to the level of the subsoil, but did not expose the underlying natural. The topsoil was excavated with a 360° mechanical excavator. Observation of the work was undertaken, as well as examination of any soil horizons exposed, and the accurate recording of all archaeological features, horizons and any artefacts found during the excavations.
- 2.6.2 The watching brief was undertaken on selective sections of the pipeline route which had been highlighted as having archaeological potential by the evaluation and the earlier assessment (OA North 2003). It was also required on those sections of the route where evaluation trenching had not been possible because construction works had preceded the evaluation, in particular, along the section of the 1753 turnpike over Demings Moss.
- 2.4.3 **Recording:** the recording comprised a full description and preliminary classification of features or materials revealed, on OA North *pro forma* sheets, and their accurate location, either on plan and/or section. Records were kept of all the sections of the watching brief even if the results were negative. All areas of archaeological interest were fully photographed, both in general terms and in specific details.

2.7 FINDS

- 2.7.1 *Artefacts:* the finds recovered were bagged and recorded by context number, retained for assessment, processed and stored according to current standard practice based on guidelines set by the Institute of Field Archaeologists (IFA 1992). The finds have been analysed by the OA North in-house specialist, and are listed in *Section 4.4*.

2.8 ARCHIVE

- 2.8.1 A full professional archive has been compiled in accordance with the project design (*Appendix 1*), and in accordance with the current IFA and English Heritage guidelines (English Heritage 1991). The paper and digital archive will be deposited in the Cumbria Record Office, Whitehaven, on completion of the project.

3. TOPOGRAPHIC SURVEY

3.1 INTRODUCTION

- 3.1.1 By the time of the current phase of archaeological investigation three of the sites highlighted for survey in the rapid appraisal, the house and yard on Demings Moss, the boundary bank at Bleabeck and the earthworks at Tunnel Bridge had been avoided by re-routing the pipeline around them or by changing the course of the pipeline completely. The final site, the cairnfield at Wickers Gill/Turnmire Bottom, which is designated an Environmentally Sensitive Area (SMR 4281), was still under perceived threat as it was envisaged that the use of the easement of a previously inserted water pipeline that crosses the site would still entail some impact upon this very important archaeological landscape.
- 3.1.2 From an investigation of aerial photographs it was evident that the easement of the earlier water pipeline was narrow, and passed through the middle of the cairnfield; however, it was not evident on the ground. The original proposed route of the current pipeline would have undoubtedly caused further destruction to archaeological features immediately adjacent to the old easement and further disrupted the integrity of the already disturbed cairnfield. For this reason it was agreed by United Utilities that the pipeline be re-routed to the west of a water channel. In order to inform the decision as to where the new route should go, and to provide a mitigative record in the event of some limited impact, a full topographic survey of all archaeological features and the general environs was conducted prior to the evaluation phase of investigation.

3.2 WICKERS GILL / TURNMIRE BOTTOM CAIRNFIELD – SETTING AND CONTEXT

- 3.2.1 **Topographic Setting:** the cairnfield is located on the edge of rolling open moorland rising up from Shap village, 2.5km to the south. The immediate locality is on the west side of the A6 in a relatively low lying dip that is more sheltered than the raised ground around it. The cairnfield is on a naturally raised and flattened area of ground just above the floodplain of Wickers Gill to the west; the gill demarcates the western and southern limits of the cairnfield. To the north it is edged by a small hill and a boggy area at Turnmire Bottom and to the east the ground rises uphill towards the north/south orientated A6 road. The cairnfield is similar in form but less extensive than one located 1km to the south on a more exposed position above Shap Blue Quarry (Turner 1991).
- 3.2.2 **Previously Known Disturbance:** the cairnfield at Wickers Gill has been unfortunate in that it has suffered from at least three known extensive pipeline easements that cross it in various directions. The earliest known example is an underground aqueduct that runs north-west / south-east on the south side of the cairnfield and divides Sites **100.X** and **100.XI** from the main part of the site. The pipeline is shown on the current Ordnance Survey mapping as a line of air vents and is also shown on aerial photographs taken in 1978, so must be earlier than this (MU CS 150, 25 – 26). There are thirteen site groupings (Site **100.I** to **100.XIII**) located within the cairnfield and these comprise at least 56 individual monuments (Fig 2).

- 3.2.3 The next intrusion was for the Longtown to Lupton gas pipeline constructed for British Gas in 1984, which had a 20m wide easement (British Gas 1984; Hart 1985, 111; Cherry and Cherry 1987). This runs south-west / north-east over Wickers Gill and turns north-north-east to pass the quarry; part of the original easement fence has also been retained as a field boundary. This pipeline cuts the south-east end of the cairnfield and much of the archaeological features to the east are fragmented and denuded by this.
- 3.2.4 The latest pipeline easement was constructed for a water pipeline that runs south-east / north-west and follows the course of a current footpath that passes through the cairnfield and then along the western side of the barn. The pipeline easement cannot be seen on the 1978 aerial photographs (MU CS 150, 25-26), but is evident on the latest aerial photograph taken in 1989 (CCC 3023, 7). It was originally envisaged that the route of the present pipeline easement would be sufficiently wide to allow for the present United Utilities pipeline route; however, inspection of the air photographs indicated that it was relatively narrow, and it was anticipated that the proposed pipeline would cause additional damage to that already inflicted by the water pipeline. For this reason it was agreed that the present pipeline should be re-routed to the west of Wickers Gill.

3.3 SURVEY RESULTS

- 3.3.1 The earthwork features, fields, and cairns identified within the cairnfield survive as slight to moderately-raised grass-covered stone features, with occasional protruding stones (Fig 2). Within the general area, moderate amounts of clearance stones have been placed at the lower edges of breaks of slope, and this is most evident on the well-defined north to south running break of slope above the Wickers Gill floodplain to the south of the barn, and containing Site group **100.VIII**. The edges of the cairnfield are difficult to discern as much damage has been caused by previous pipeline easement corridors crossing the site, and it is not clearly evident if an observed edge reflects the actual edge of cleared ground or an edge caused by pipeline disturbance.
- 3.3.2 **Site 100.I:** this group consists of eleven circular and sub-circular clearance cairns located on a flat and raised cleared area in the north-west of the cairnfield and above the break of slope defining the edge of the floodplain to the west (Plate 1). They are larger than the majority of clearance cairns within the cairnfield being at least 3m in diameter by up to 0.4m in height. Their arrangement is not entirely random and appears to be aligned around three sides of a possible rectilinear plot.
- 3.3.3 **Site 100.II:** this group is a continuation of Site **100.I** but to the south-east of the banks of Sites **100.III/IV**. It consists of five sub-circular clearance cairns within a putative field defined by stone banks (Site **100.IV**); they are located on the edge of a flat, apparently cleared, area but with one cairn further east on the opposite side of a narrow dry streambed. They are (along with Site **100.I**) larger than the majority of clearance cairns within the cairnfield being at least 3m in diameter by up to 0.4m in height.
- 3.3.4 **Site 100.III:** this feature is a sinuous linear field bank running roughly north/south for approximately 30m along the cleared area containing Sites **100.I** and **100.II**. Five of the cairns from Site **100.I** are located close to either side of the bank, and do not seemingly respect it; as such they would appear to relate to an earlier phase of activity. The field bank contains several areas at the north end where the bank has

incorporated earlier clearance cairns and the bank fluctuates in width as well as direction. The field bank is probably the northernmost surviving element of the field-system associated with the hut circle Site **100.V**.

- 3.3.5 **Site 100.IV:** this group consists of the remnants of a sub-triangular field, that is approximately 57m x 51m in extent, and is located to the north-west of, and associated with, a probable hut circle (Site **100.V**); the field is divided by a south-west / north-east dry streambed. The putative field is defined by fragmentary stone banks on the west, north and east sides, but the field/plot is open to the south. On the north and east sides, the stone banks have incorporated substantial clearance cairns within the build, and on the west side are two adjoining small sub-circular enclosures set against the internal face of the stone bank.
- 3.3.6 **Site 100.V:** this feature is the earthwork remains of an embanked putative round house platform that is approximately 13m in diameter. The earth banks do not apparently contain any stone within their build and there are two breaks within the circle. The gap to the south-east is a definite entrance, and the gap to the north is consistent with an area of erosion, as the banks become more denuded at this end. The interior of the structure is artificially flat and suggests that it has been levelled. The structure is an unenclosed round house, associated with a moderately extensive field-system that incorporate two divided sub-triangular fields to the north-west and south-east (Sites **100.IV** and **100.VI**) along with remains of more irregular stone banks and clearance features (Sites **100.III** and **100.VII**).
- 3.3.7 **Site 100.VI:** this group consists of the remnants of a sub-triangular plot containing the associated roundhouse (Site **100.V**), and is located to the south-east of a similar embanked sub-triangular field (Site **100.IV**). The field measures approximately 64m long by 34m wide. The plot field is divided from the former field by a denuded stone bank on the north-west side; to the north-east the bank is fragmentary, possibly because of the proximity of a previous pipeline easement corridor. The field is located on a flat cleared area and the field is occupying the top break of slope in the north-west, east and south-west. At the southern side, the plot is well defined with stone banks containing small protruding orthostatic stones. At the south-eastern point of the plot is what appears to be an entrance with possible external banks running to the south-east comprising a parallel-sided approach that incorporates both banks and cairns.
- 3.3.8 **Site 100.VII:** this group consists of twelve fragmentary features located to the immediate south of the southernmost sub-triangular field (Site **100.VI**). There is an L-shaped field bank running south towards Wickers Gill which is presumably a denuded continuation of the larger field system associated with the round house (Site **100.V**). There are eight further potential clearance cairns located here at the mouth of the entrance into the triangular plot (Site **100.VI**). Some of the more amorphous of these are erratic, irregular areas of cleared stone, but are not as substantial as the clearance cairns to the north-west (Sites **100.I** and **100.II**); they have a maximum diameter of 3m and are only 0.2m in height. The ground here is undulating and has been disturbed by a pipeline easement to the east and a trackway to the south, although there are the potential remains of three further clearance cairns located on the edge of Wickers Gill but are separated from the cairnfield by a trackway.
- 3.3.9 **Site 100.VIII:** this group consists of three small fragmentary stock enclosures on the north / south break of slope that marks the eastern side of the Wickers Gill

floodplain; the overall area measures approximately 90m long north / south by only 15m wide. The enclosures consist of narrow banks running downslope and curving around partially to enclose ground just above the floodplain. In several places the foundations of double-faced revetments can be seen at the base of these banks, indicating that they were originally dry-stone walls as oppose to stone banks. This would indicate that these enclosures were walled and could, therefore, have had a stock control function.

- 3.3.10 **Site 100.IX:** this site consists of the low earthwork remains of two small rectangular structures, with a surrounding sub-circular earth and stone-banked enclosure. The overall area is approximately 22m long north to south by 15m wide and up to 0.2m high. The site is located on a raised area to the east of the core of the cairnfield and is separated from other features on the south, west and east by previous pipeline easements.
- 3.3.11 **Site 100.X:** this is the very denuded earthwork remains of two adjoining small rectangular platforms, located on the southern edge of the floodplain overlooking Wickers Gill and is at the south-west edge of the cairnfield. The form of the site is difficult to discern as the ground undulates at this point, but it would appear to measure approximately 12m long north to south by 8m wide and up to 0.15m high. The monument is, along with another structure (Site **100.XI**), separated from the main cairnfield by a previous pipeline easement.
- 3.3.12 **Site 100.XI:** this site consists of the earthwork remains of a small two-celled sub-rectangular structure. It measures approximately 13m long south-west to north-east by 9m wide and up to 0.3m high. The site is located on the southern edge of the floodplain overlooking Wickers Gill and is sat on the sloping edge of ground adjacent to the floodplain at the south-west edge of the cairnfield. It is, along with another structure (Site **100.X**), separated from the main cairnfield by a previous pipeline easement.
- 3.3.13 **Site 100.XII:** this group consists of the fragmentary remains of features located on the eastern edge of the cairnfield. They are separated from the cairnfield to the north-west and south-west by previous pipeline easements and are at the foot of a long slope descending from the A6 to the west. The ground immediately to the east is cut by a trackway leading towards the quarry and a limekiln to the north. The features consist of an embanked, sub-rectangular putative hut structure that is cut by a trackway and a short section of wall foundation that runs east from it. It measures approximately 14m long north to south by 8m wide and is 0.5m high on the downslope side. The hut is probably associated with a section of linear walling that extends north-west from the putative hut, before being cut by the pipeline easement. The ground undulates within the general area of the group and seven amorphous piles of clearance can be seen here, most if not all of these mounds were associated with the construction and reinstatement of the pipeline easements.
- 3.3.14 **Site 100.XIII:** this feature consists of a fragmentary, amorphous earthwork incorporating a large amount of stone within its build; it measures approximately 9m long by 8m wide and is up to 0.3m high. The feature could potentially have a stock management use, although it does seem to have been damaged and denuded at some stage. It is located at the south-eastern edge of the cairnfield and the area between it and the main part of the cairnfield has been impacted by the construction of a trackway and two pipeline easements. The ground to the south of the feature

has been cleared of stone, which has then been placed on the northern edge of Wickers Gill.

- 3.3.15 **Site 100.XIV:** this group consists of the foundations of a long section of walling running west to east for 140m before turning north on the eastern end for 25m. It is located on the north edge of the cairnfield. On the immediate northern side of the wall are the low foundations of a rectangular sheep shelter with adjoining wall; it measures approximately 7m long north to south by 5m wide and up to 0.25m high.

3.4 SUGGESTED PHASING

- 3.4.1 The cairnfield at Wickers Gill incorporates elements of several demonstrable phases of land-use and occupation. The phasing is somewhat tentative, as none of the features within the cairnfield as a whole have been securely dated by archaeological investigation. The phasing is based upon perceived associations seen within the field and with analogy to similar previously identified regional examples.
- 3.4.2 **Phase I:** the initial phase of the site would appear to be the sixteen moderately large circular and sub-circular clearance cairns located upon the raised and flat area on the north side of the cairnfield (Sites **100.I** and **100.II**). The area has been cleared of stone and the break of slope down to the floodplain to the west, and it is probable that the stone has been deposited within these cairns. The cairns extend in a broad north-west to south-east orientated band, and which has been incorporated within the later phases of field-system (Sites **100.III** and **100.IV**). The cairns are not directly associated with the field-systems (Site **100.IV**) and do not appear to be contemporary with the banks.
- 3.4.3 **Phase II:** this consists of the hut circle (Site **100.V**) and its associated field-system (Sites **100.III**, **100.IV**, **100.VI** and **100.VII**). The field-system runs in the same general north-west to south-east direction as the earlier clearance cairns and indeed seems to incorporate a handful of potentially earlier clearance cairns within the fabric of the field banks. The implication is that the field system was established onto an already existing cairnfield. The field-system forms two sub-triangular fields with dividing stone bank, with the hut circle in the southern field. There are fragmentary outlying stone banks to both the north and south (Sites **100.III** and **100.VII**). To the south are smaller clearance cairns, which were potentially associated with this phase of use (Site **100.VII**). The field-system bears a passing resemblance to the more extensive field-system and hut circles at the Shap Blue Quarry cairnfield (British Gas 1984; CLAU 1984; Turner 1991, 10; Hart 1985, 111)
- 3.4.4 **Phase III:** this consists of the peripheral stock management features associated with the floodplain to the west (Sites **100.VIII**, **100.X** and **100.XI**), and further features on the east side of the cairnfield (Sites **100.IX**, **100.XIII** and possibly **100.XIII**). The open area of the floodplain is served by a two-celled sub-rectangular structure (Site **100.XI**), and an adjacent platform structure (Site **100.X**). The Site **100.XI** has the potential to be domestic in origin, possibly a shepherds bothy or a shieling. There is also a group of stock enclosures hugging the break of slope above the floodplain in the north, which were potentially related to Sites **100.X** and **100.XI**. On the eastern side of the cairnfield is a possible stock shelter with associated structure (Site **100.IX**) and on the east side of the site is a further possible hut structure (Site **100.XII**). The ground is disturbed on the east side of the cairnfield and other amorphous features (such as Site **100.XIII**) may be associated with this phase, or probably modern disturbance. The features of this phase would appear to

be of a later phase to the main cairnfield, and if structure Site **100.XI**, is genuinely a shieling then it would suggest that this phase broadly dated to the medieval period.

- 3.4.5 **Phase IV:** the latest phase of earthworks includes the long linear boundary wall foundations with associated sheep shelter, located in the north of the cairnfield (Site **100.XIV**) and possibly the linear wall foundation associated with the hut type structure to the east (Site **100.XII**). Additionally, there are the larger sites of the upstanding barn to the north and the earthworks of the quarry and limekiln to the east. This phase is ascribed to the post-medieval and modern periods and focuses on the historical and current use of the land in the region for sheep rearing and limestone extraction (OA North 2003, 16).

4. EVALUATION AND WATCHING BRIEF RESULTS

4.1 INTRODUCTION

4.1.1 In total, 49 trenches were excavated, and were located, where possible, in areas regarded as being of high archaeological potential based on results from the initial assessment and subsequent walkover survey (OA North 2003) (Figs 3-6). A minority of trenches were located in between areas of documented potential to investigate the possibility of identifying previously unrecognised sites. Typically, the trenches were 20m long x 1.7m wide, although trench lengths varied on occasion where circumstance dictated. A total of approximately 1km of trenching was opened. Only trenches containing archaeological deposits or features are discussed in this section; full trench summaries are presented in *Appendix 2*.

4.2 TRIAL TRENCH RESULTS

- 4.2.1 **Trench 2:** Trench 2 (Plate 2), was located to the north of Selside Memorial Hall and Low Bridge Hall and was targeted on the site of a rectangular ruined building (Site **131**), identified by the SMR. No evidence of this site was identified in the walkover survey. Trench 2 revealed a layer of clay (**201**), predominantly light-grey in colour but with occasional orange patches and containing approximately 10% sub-rounded stone inclusions. This layer was 0.1m thick and extended across the full extent of the trench directly overlying the natural. It is thought that **201** represents earlier disturbance of the area, possibly associated with the construction of the original pipeline. If there had been a building at this site, it is considered that the construction of the earlier pipeline may well have removed any traces of it.
- 4.2.2 **Trench 8:** Trench 8 (Plate 3), located to the south of Kids Howe Bridge, was found to contain a discrete patch of burnt material, **802**, comprising a dark-grey sandy silt with frequent burnt mud-stone and charcoal inclusions. The deposit measured c0.8m by 0.6m and was located at the lower break of slope of a naturally formed terrace; it underlay 0.2m of topsoil (**800**) and directly overlay sub-soil deposits (**803**). The deposit would appear to be a dump as there was no discoloration of the underlying soils, which would indicate burning *in situ*. No dating evidence was recovered. No other archaeological features or deposits were encountered in the trench.
- 4.2.3 **Trench 13:** Trench 13 (Plate 4) was located towards the southern end of a section of the 1753 turnpike that had been bypassed by the 1826 turnpike (now the A6). The trench revealed faint traces of cultivation furrows, which were aligned north / south; they were c0.3m wide and were spaced at 0.5m intervals, cut into the natural to a maximum depth of 0.03m. Each furrow was filled with material that was identical to, and derived from, the topsoil, which was a grey-brown silty sand with sparse small stones. No dating evidence was recovered from the fills. The furrows could be faintly traced on the surface of the field and extended over the area of Trench 14. However, on excavation of Trench 14, it was found that the furrows were not of sufficient depth to impact upon the natural and subsoil.
- 4.2.4 **Trench 23:** Trench 23 (Fig 4), located to the east of Crookdale Bridge, revealed topsoil to a depth of 0.2m overlying a thick layer of hardcore containing modern debris (included crisp packets and a plastic pipe) which was at least 1m deep but

was not fully excavated due to health and safety considerations. It is probable that this deposit related to works associated either with the construction of an earlier water pipe.

- 4.2.5 **Trench 24:** Trench 24 was located adjacent to the southern end of a section of the 1753 turnpike road (Site **154**), that was bypassed by the 1826 turnpike (modern A6); this earlier turnpike linked up with the Shap Wells road. The southern end of the trench was extended to the east in order to examine the turnpike boundary bank, which ran along the eastern side of the track. The bank, **2403**, comprised c80% large sub-angular stones, up to 0.5m in diameter, in a matrix of dark, humic silts with occasional patches of yellow sand. The bank was a maximum of 1.9m wide and 0.3m high and constructed directly on top of the topsoil (**2400**), a dark-grey, very organic silty sand up to 0.44m deep. Beneath the topsoil a layer of sub-soil, **2401**, a mid grey sandy clay was seen to overlie the natural.
- 4.2.6 **Trenches 27-9:** Trenches 27, 28 (Plate 5), and 29 (Plate 6), were located adjacent to the same section of the 1753 turnpike road (Site **154**) (Section 4.2.6), but towards its northern end. All three trenches contained similar sequences of deposits consisting of natural boulder clay overlain by dark-grey peaty/humic silts (**2702**, **2803**, and **2902**), which were up to 0.25m thick. These deposits represent a relict land surface buried by a 0.4m thick, mixed deposit of coarse orange-brown sand with approximately 30% yellow and light grey clay lenses (**2701**, **2801**, and **2901**). It is considered that this sand and clay layer was used to level the ground for the construction of the turnpike. The whole sequence was sealed by a 0.2m depth of dark grey, very humic, topsoil.
- 4.2.7 **Trenches 36-7:** four trenches (Trenches 36-9) were located in the field bounded to the north-east by Wickers Gill and settling pond. Of these, Trenches 37, 38 and 39 were targeted to examine a boundary bank which was visible on the surface of the field. Trench 37 cut through the portion of bank that was orientated north-east to south-west. The bank, **3701**, which crossed the full width of the trench, measured c1m wide by 0.4m high and was constructed of large granite stones up to 0.4m across in a dark-grey sandy silt matrix. The lower stones of the bank lay directly on the natural with top-soil covering the feature. There was no clear structure to the stones suggesting that it was a stone bank rather than a collapsed wall.
- 4.2.8 **Trenches 38-9:** Trenches 38 and 39 both cut through the north-west to south-east oriented section of the bank, which could be seen as a vague positive feature on the surface of the field. The bank (**3801**, **3901**) at this point only stood to a height of 0.1m and was constructed of earth (dark-yellow-brown clay silt with up to 40% small to medium stone inclusions) rather than stone. A shallow ditch (**3803**, **3903**) was located on the immediate north-east side of the bank. The bank would seem to have been constructed by the dumping of up-cast material from this ditch. The ditch was a maximum of 0.25m deep by 1.2m and filled with a dark-yellow-brown clay silt with sparse inclusions (**3804**, **3904**) which would appear to have been formed by the bank being eroded or ploughed into the open ditch. No dating evidence was recovered.

4.3 WATCHING BRIEF RESULTS

- 4.3.1 **Introduction:** the watching brief involved monitoring the removal of the topsoil across the total width of the easement in six separate areas (Areas A to E) (Figs 3-6) from Watchgate Water Treatment Plant northwards towards Shap. The excavation

was undertaken with a mechanical excavator fitted with a 1.5m ditching bucket, between March and September 2004.

- 4.3.2 **Area A:** Area A extended from Watchgate water treatment plant north to Forest Hall (Fig 3), which was a 3.8km length of pipeline. This section was subject to a watching brief because the topsoil strip for the pipeline had been initiated in this area prior to the evaluation. An average thickness of 0.1m-0.25m of topsoil was removed within the 15-20m wide easement. The topsoil was typically a mid-brown silty clay with the subsoil appearing as a bright-orange silty clay. Patches of topsoil were frequently observed to have remained on the easement after the stripping; this was most frequent downslope.
- 4.3.3 Two fragments of post-medieval pottery were recovered from Field 2 (SD 52950 49925). In addition, a sherd of seventeenth century pottery was retrieved from the spoil heap in the field opposite Plough Farm west of the A6 (SD 53075 99825, see *Appendix 3*), but no other archaeologically significant finds or features were observed.
- 4.3.4 **Area B:** Area B was located where the pipeline crossed the section of the 1753 turnpike approximately 350m south of High Borrow Bridge (Fig 4) and was undertaken for a length of 370m. It was intended to provide a record of the fabric of the earlier turnpike. The turnpike had been assumed to lie beneath the extant road into Crookdale and when the pipe-trench was excavated an earlier road was revealed. This (Plate 8) lay directly underneath the tarmac of the modern road and consisted of a layer of compacted stones (**5000**), 0.4m thick, and had an undulating interface with the underlying natural. This layer of stones was bounded on either side by large limestone blocks (**5001**), measuring approximately 0.4m by 0.4m (the length of the blocks is not known as they were only seen in section), which formed roadside kerbs. The kerb on the eastern side of the road was set within a cut (**5002**), that cut the fill of a road side ditch (**5003**), which measured approximately 1.2m across by 0.8m deep with a 'V' shaped profile and was filled with a dark humic deposit (**5004**). The ditch evidently predated the kerbs, and, given the very undulating surface of the natural below **5000** which could be a result of traffic erosion, there is a possibility that the earliest phase of the road was an unmetalled track with accompanying track-side ditches.
- 4.3.5 **Area C:** Area C was located adjacent to the A6 on Demings Moss and involved monitoring the stripping of the peat in an area of 100m (north-south) x 80m (east-west) for the construction of a new service reservoir and compound. The peat varied greatly in depth but was typically deeper in the southern and western areas of site where depths of up to 2.2m were encountered. To the north and east, the peat was generally shallower, typically between 0.3m and 1m. Frequent small branches and other wood fragments were observed at the base of the peat across the site. The peat was found to overlie a blue-grey stony/gravelly clay. No archaeologically significant deposits were observed.
- 4.3.6 **Area D:** Area D comprised the stretch of pipeline running from the A6 (near Red Crag (NY 5537 0623) north to Old Wasdale Bridge (NY 5654 0857), a distance of 2.8km. The pipeline followed the route of the 1753 turnpike road and because this section could not be evaluated (*Section 2.3.3*) was subject to archaeological monitoring during the topsoil strip.
- 4.3.7 The pipeline route was laid parallel to the turnpike, at a separation of 3m, and skirted around the south side of the ruinous Demings House (Site 155). The

easement was scanned with a metal detector within a 30m radius of Demings House (*Appendix 3*) and a lead musket or pistol ball and two unidentified iron artefacts were retrieved. Two post-medieval pottery sherds were also recovered.

- 4.3.8 The earthen bank running along the south side of the turnpike was truncated by the mechanical excavator in several places around Demings House. This revealed that the feature was composed of 0.42m of redeposited natural clay (**5011**) overlain by a 0.26m depth of topsoil (**5010**) (Fig 7).
- 4.3.9 Approximately 300m to the north-east of Demings House the pipeline route crossed over to the north side of the turnpike, revealing a cross-section of the eighteenth century road (Fig 7). The section revealed that 0.20m of modern hardcore road surface (**5005**) overlay a 0.2-0.25m thick metalled surface (**5006**) that related to the construction of the 1753 turnpike. This comprised approximately 30% large angular stones, typically 0.1m length, and 10% small angular stones, typically 10mm length, within a light grey-green clay. The layer also included frequent small angular stones. A 0.2m thick layer of buried topsoil (**5007**) was observed below the road surface and overlay a 0.35-0.4m layer of grey-green alluvium (**5008**) and 0.85m+ of orange-brown sandy clay natural subsoil (**5009**).
- 4.3.10 Approximately 150m east from where the pipeline crossed the turnpike, the terrain became much more sloping; the southern edge of the easement cut into the northern edge of the bank that had been created to provide level ground for the turnpike. A 0.74m layer of redeposited clay natural (**5012**), possibly the same as layer **5006** but used to raise the turnpike to a much greater extent, was observed and this overlay a 0.25m thick layer of buried topsoil (**5013**), which was the same as **5007**.
- 4.3.11 **Area E:** Area E was located at the northernmost end of pipeline between Wickers Gill and the road to Wet Sleddale, and an 850m length of the pipeline was examined (Plate 9). This section of the pipeline passes to the immediate west of Wickers Gill / Turnmire Bottom cairnfield. The northernmost 270m of this section of this stretch of pipeline was excavated and backfilled before an archaeological presence was established on site. The southern section of the pipeline revealed peat, deposits varying in depth between 0.6m and 1.2m, directly overlying natural deposits of grey clay. No archaeological features or finds were encountered.

4.4 FINDS

- 4.4.1 **Introduction:** a small assemblage of artefacts, which was dominated by fragments of pottery, was produced from the various elements of the project, of which the great majority was of a late post-medieval or modern date, and comprised small and abraded fragments that were recovered from the topsoil, indicative of night-soiling activity. Consequently, most of the fragments were recorded in the field, and only a selected sample was retained for analysis. In summary, the majority of the discarded material comprised small fragments of coarseware vessels, representing typical nineteenth century kitchenware forms, such as dark-glazed earthenware jars. The discarded material also included a few fragments of dinnerware and teaware forms, including transfer-printed and white-glazed earthenware bowls and plates. In total, 15 artefacts recovered from the site were retained for further analysis, and these comprised pottery and chert (see Table 1).

Location/ Trench	Context	Quantity	Material	Description	Date range
Trench 2	1	1	Pottery	Delft earthenware	Eighteenth century

Trench 8	1	3	Pottery	Brown-glazed red earthenware	Late seventeenth – early twentieth century
Trench 23	1	2	Pottery	White-glazed white earthenware	Late eighteenth – twentieth century
Trench 36	1	1	Pottery	Brown-glazed red earthenware	Late seventeenth – early twentieth century
Trench 37	1		Chert	Fragment	Prehistoric
Field 2 (SD 52950 49925)	Topsoil	1	Pottery	White-glazed white earthenware	Late eighteenth – twentieth century
Field 2 (SD 52950 49925)	Topsoil	1	Pottery	Brown-glazed red earthenware	Late seventeenth – early twentieth century
West of A6 opposite farm north of Watchgate south of yellow hut (SD 53075 99825)	U/S	1	Pottery	Yellow-glazed cream earthenware	Seventeenth century
Within 30m of tinned building (Site 155)	U/S	2	Pottery	Brown-glazed red earthenware	Late seventeenth – early twentieth century
Within 30m of tinned building (Site 155)	U/S	1	Lead	Pistol or musket ball	Seventeenth – nineteenth century
Within 30m of tinned building (Site 155)	U/S	2	Iron	Unidentified objects	Post-medieval

Table 1: Range of finds

- 4.4.2 **Pottery:** the finds assemblage was dominated by fragments of pottery (14 sherds), all of which may be dated to the medieval period. The pottery was not in very good condition, the gritty wares being particularly badly abraded and rolled, suggesting that they had been subject to disturbance within ploughsoil. Analysis of the pottery was based solely on visual inspection of individual sherds.
- 4.4.3 The 14 sherds were found within unstratified topsoil deposits from trenches or watching brief locations along the line of the pipeline. The pottery comprised small fragments of bone china and transfer-printed ware, representing common domestic forms. The material extended within a broad range between the seventeenth century (yellow glazed cream ware) and the twentieth century. Given that the material was scattered and predominantly from the topsoil the pottery offers little in aiding the interpretation of the sites and is of little archaeological importance.
- 4.4.4 **Lithics:** the lithic assemblage consists of an undiagnostic chunk of black chert, which appears to have been removed from an irregular core.

5. STRATIGRAPHIC SURVEY AND PALYNOLOGICAL ASSESSMENT

5.1 INTRODUCTION

5.1.1 The stratigraphic survey and palynological assessment was required to examine a basin which was to be severely impacted in the course of the development. The intention was to establish the character of the basin and the peat deposits filling it. It was also intended to establish the potential of the peat deposits for further analysis.

5.2 RESULTS OF THE STRATIGRAPHIC SURVEY

5.2.1 The stratigraphy of the peat and its depth from the west/east (A-B) transect is shown in Figure 10 and the peat depths from the south/north (C-D) transect is in Figure 11. The survey demonstrated that in the area of the proposed reservoir, the peat developed in a steep-sided basin with the land falling away quite steeply to the east. The peat developed on a sandy substrate, which became a blue-grey, stony/gravelly clay in some places (*Section 6.1*). The stratigraphic survey suggested that the peat developed from a plant community rich in monocotyledonous plants *eg* sedges, rushes and grasses rather than bryophytes (mosses), although there are some discrete bands of moss peat. Wood fragments were recorded in the lower part of the stratigraphy. The maximum depth of peat recorded in the coring survey was 2.19m, which was confirmed when the peat stripping was monitored (*Section 4.2.3*).

5.3 RESULTS OF PALYNOLOGICAL ASSESSMENT

5.3.1 The lithology of Core 5, taken from the deepest part of the basin and at the intersection of the two transects (*Section 6.2*), is presented in Table 3 below:

Depth in metres	Description
0-0.16	Humified peat with modern roots
0.16-0.18	Very fibrous peat
0.18-0.23	<i>Eriophorum</i> peat
0.23-0.25	Very fibrous peat
0.25-0.375	Monocot peat with some <i>Calluna</i>
0.375-0.395	<i>Eriophorum</i> peat
0.395-0.645	Very fibrous peat
0.645-0.735	As above but more humified
0.735-0.76	As above plus <i>Calluna</i>
0.76-0.96	Very fibrous monocot peat
0.96-0.97	<i>Eriophorum</i> peat
0.97-1.07	Very fibrous monocot peat
1.07-1.19	Very fibrous monocot peat plus occasional <i>Calluna</i> fragments
1.19-1.40	Very fibrous monocot peat
1.40-1.46	Very fibrous monocot peat plus occasional <i>Calluna</i> fragments
1.46-1.90	Very fibrous monocot peat
1.90-1.99	Very fibrous monocot peat plus wood fragments
1.99-2.05	Very humified peat becoming sandy
2.05-2.19	Sandy peaty soil

Table 3 Demings Moss, Cumbria: Lithology of monolith samples for palynological assessment. Monocot is an abbreviation of monocotyledon.

- 5.3.2 The palynological assessment is displayed in Table 4 below. All the samples contained abundant well-preserved pollen. The values of tree pollen recorded were from 13%-84% and for herbaceous pollen from 15%-84%. In the lower part of the sequence, oak (*Quercus*), alder (*Alnus*), and hazel-type (*Corylus avellana*-type), which includes hazel and bog myrtle (*Myrica gale*), were the major pollen taxa recorded, with some grass (*Poaceae*) and increasing values of heather (*Ericales*) pollen. Tree pollen values decrease to a minimum of 13% at 0.64m, when heather pollen rises to a maximum of 65% associated with high values of charcoal. Tree pollen recovers to 48% towards the top of the sequence.
- 5.3.3 High values of charcoal were recorded at 0.08m, 0.64m, and 0.96m suggesting that burning occurred on the surface of the mire or in the wider landscape. The cause of this burning may be anthropogenic in origin but might also be as a result of the natural burning of the mire surface.
- 5.3.4 **Discussion of Palynological Assessment:** although no firm dating of peat initiation is possible without the benefit of absolute dating, the limited palynological data does suggest that peat initiation may have occurred in the prehistoric period after the beginning of the Neolithic. This is supported by the very low values of elm (*Ulmus*) pollen recorded in this assessment, which suggests that it post-dates the elm decline which typically dates to the beginning of the Neolithic period.
- 5.3.5 The increasing numbers of pollen grains from herbaceous taxa in the upper part of the sequence, together with the high number of charcoal fragments, indicates that the peat stratigraphy provides a record of changing land-use around the mire itself and in the wider landscape.
- 5.3.6 The comparatively high values of tree pollen towards the top of the sequence suggests that the mire surface was not intact and that some peat cutting has taken place in the past. The pollen spectra towards the top of the sequence would probably have recorded a much more open landscape if the mire surface had been intact than is indicated by the actual data.

Depth (m)	0.08	0.16	0.24	0.32	0.64	0.96	1.28	1.60	1.76	1.92	2.04	2.12
Total Trees + Shrubs	48	36	43	28	13	46	53	56	66	54	73	84
Total Herbs	49	60	56	72	84	53	47	44	32	46	25	15
<i>Pteridium aquilinum</i> -bracken	2	5	1		3	1			2		1	0.5
<i>Betula</i> – birch	5	2	7	5	2	8	16	9	5	1		6
<i>Ulmus</i> - elm		1	1					1	2	1	2	1
<i>Pinus</i> - pine			1	1	2						0.3	5
<i>Quercus</i> - oak	7	10	8	4	2	4	8	12	10	7	11	18
<i>Alnus</i> - alder	15	5	6	7		12	9	9	12	11	21	15
<i>Tilia</i> - lime									1	1	0.3	
<i>Corylus avellana</i> -type-hazel/bor myrtle	20	15	14	10	8	21	17	17	36	35	38	39
<i>Corylus/Betula</i> – hazel/ birch			6		2	1	3	7				1
<i>Salix</i> - willow	2	2		1								
<i>Ilex aquifolium</i> - holly			1									

Poaceae - grasses	19	31	11	15	15	9	7	4	6	4	22	10
Ericales – ericaceous plants	27	13	35	42	65	37	39	40	25	42	1	0.2
<i>Plantago</i> sp. - plantain		3	5		4	4	1		1		0.3	
<i>Rumex</i> – dock/ Sorrel		1										
<i>Filipendula</i> - meadowsweet											2	
Apiaceae - carrot family											0.3	
<i>Succisa pratensis</i> – devil’s-bit scabious											0.8	2
Other herbs	3	12	6	16		3						3
<i>Potamogeton</i> – pondweed											0.3	
<i>Sphagnum</i> – sphagnum moss	20	41	5	15	6	4	12		3	1	0.3	
Bryophyte sp. – moss	7	2										
<i>Polypodium</i> – polypody									1		3	6
Pteridopsida (trilete) – trilete ferns	2	5	1		3	1			2		1	1
Pteridopsida (monolete) – monolete ferns	1		1	1					2	2	11	4
Indeterminate grains	18	14	34	42	16	58	23	13	20	29	44	32
Charcoal	63	4	7	1	48	32	18	5	0	1	5	13
Pollen sum (total number of pollen grains)	89	87	89	83	68	76	102	75	100	168	356	400

Table 4 Demings Moss, Cumbria: results of the palynological assessment (Data is calculated as percentages of the pollen sum with the exception of the charcoal values which are calculated as a percentage of the pollen sum plus charcoal fragments).

6. DISCUSSION

6.1 OVERVIEW

- 6.1.1 Although the rapid appraisal and walkover survey has provided evidence of a rich archaeological heritage within the environs of the study area, the evaluation, when targeted on the eventual route of the pipeline, identified only a low level of archaeology. Relatively few of the trenches identified any features at all, and those that were identified were for the most part of limited archaeological significance. Six trenches revealed features or deposits that were not previously identified in the appraisal. Two of these were dumps of burnt material, one of which was demonstrably modern (**102**, Trench 1), and the other (**802**, Trench 8 (Plate 3)) remains undated. The cultivation marks seen in Trench 13 (Plate 4), and visible on the surface of the field provides evidence of changing land-use, as the field is currently under pasture. The nature of the cultivation marks, being fairly narrow and closely spaced indicates a post-medieval date.
- 6.1.2 When the trenches were targeted to examine specific sites that had been identified in the rapid appraisal (OA North 2003), these did indeed reveal the expected archaeological resource. For example, the trench through the turnpike boundary bank (Trench 24) revealed a low earth and stone bank, which was as expected and nothing about the feature suggested anything other than the original interpretation of a boundary bank associated with the turnpike.
- 6.1.3 The general lack of archaeology encountered in the watching brief and evaluation of what is an area of relatively rich heritage, would suggest that the previous phases of work (OA North 2003) and the corresponding re-routing and avoidance mitigation options have been successful in avoiding the more significant archaeological resource. This is most evident at the Wickers Gill cairnfield where there was a very obvious archaeological resource identified on the surface, but the nearby trenches along the re-routed pipeline identified no significant archaeological resource. Sites identified in the rapid appraisal were not encountered in any of the other targeted trenches, which would appear to be because the documented sites were quite localised and the easement did not directly impact on them. The exception to this is Cooper House, where it would seem that earlier disturbance, possibly associated with the construction of the existing water main, had removed all traces of the structure.
- 6.1.4 These results would appear to fit into a recognisable pattern observed in upland contexts such as along the Shap to Watchgate pipeline, and on the A66 Stainmore road scheme (LUAU 1993), whereby the topsoil is very thin and there is very little stratigraphy above the natural subsoils. The result is that any archaeological features that do exist show up as surface features, and there is only a reduced potential for the new identification of sub-surface features that do not already show up as earthworks. This is best typified by the evaluation through a clearly defined, narrow boundary bank on the upland sections of Stainmore (*ibid*), which was not evident at all in the trench once a 50mm to 100mm depth of topsoil had been excavated off. The effect of this is that such pipeline routes can be effectively diverted away from most significant features primarily on the evidence of a surface survey; however,

when surface features are excavated they often have very little stratigraphic substance.

6.2 WICKERS GILL / TURNMIRE BOTTOM CAIRNFIELD

- 6.2.1 The survey of the Wickers Gill/ Turnmire Bottom cairnfield demonstrated four phases of development, of which two (Phases I and II) were seemingly of prehistoric origin. The first (Phase I) was an area of essentially random cairnfield, which potentially reflects an initial clearing within an area of forest (Quartermaine and Leech forthcoming). The random distribution of the cairns reflects an attempt to create a primary area of pastoral land from the forest, and there is the probability that the cairns were on the sites of former trees, as they filled the craters formed by the removal of the root bowl with waste stone. Such a primary cairnfield could potentially be created at any date; however, the majority of dated examples would indicate that they were formed in the Bronze Age (*ibid*). As the occupation on the site became more established so a field system was established (Phase II), in conjunction with a domestic stone-founded round house. As a generalisation, stone-founded round houses do not appear before the late Bronze Age. In the middle and later Iron Age settlements were typically enclosed in response to a period of tension. This would suggest either a late Bronze Age/ early Iron Age date or Romano-British date for this phase.
- 6.2.2 In Phase III there were a number of stock management features associated with a two-celled sub-rectangular structure, which has the potential to be a shepherds bothy or a shieling. This phase incorporates no reuse of the Phase II components and the implication is that it represented a reoccupation of the site rather than a development of Phase II. Given the rectangular nature of the hut, which could potentially be a transhumant structure this phase was potentially of medieval date. The final phase represents a post-medieval stock management usage of the site and again represents a reoccupation of the site rather than any continuity from Phase III.
- 6.2.3 **Evaluation Evidence:** the field boundary bank, seen in Trenches 37 to 39, produced no artefactual dating evidence; however, the bank lies on a different alignment from the current field boundaries, which is an indication that it pre-dates them. The evaluation revealed that there was no structure to the stone material within the bank and therefore it was not a stone wall; instead it would appear to be a stone bank, which is a linear deposition of waste stone along the line of a field boundary. Such features are common features of cairnfields and therefore there is a possibility that this was a component of the cairnfield on the other side of the beck.
- 6.2.4 Trenches 41-49 were positioned along the line of the pipeline which was located so as to avoid the cairnfield and extended through the flood plain of the beck. It is perhaps not, therefore, surprising that the excavation of these trenches did not reveal any archaeological features, reflecting that this low lying, marshy ground was marginal at the time when the settlement was in use and was, therefore, not utilised. Peat deposits were noted in two of these Trenches (44 (Plate 7) and 45) which have the potential to contain environmental evidence relating to the cairnfield.
- 6.2.5 **Cairnfield Conclusion:** the physical remains at the site are a palimpsest of agricultural activity that potentially extends back to the Bronze Age and such a complexity of remains is relatively rare in the eastern part of the Lake District; the only comparable example is the Tewsett Pike Cairnfield/Settlement (SMR 8326, NGR 5615 1079) which is on the north-west edge of Shap Blue Quarry (Turner

1991) and is relatively close to the present site. Although the site has been disturbed by two previous pipelines, it has still maintained its essential integrity, and, the site's complexity coupled with its local rarity make it of considerable archaeological importance.

6.3 TURNPIKE

- 6.3.1 The programme of evaluation and watching brief provided the opportunity to examine the form and development of one of the earliest post-medieval roads in the region, the 1753 Shap to Kendal Turnpike. The condition of the turnpike was variable, for example the section of turnpike examined in Area B, to the south of High Borrow Bridge, appears to survive in much better condition than that in watching brief Area D; in particular kerbstones and a metalled surface were present at Area B where as there was a marked absence of such features at Area D. This is probably due to the fact that this section of road had been covered with tarmac whereas the turnpike in Area D was only covered by hardcore. What is particularly significant is that the Area B kerbstones were observed to be overlying, and cut in to, an earlier road side ditch. As there was no evidence of an earlier metalled surface and the interface with the natural was very undulating, there is an implication that the precursor to the built road was an unmetalled track. This may be taken to suggest that a crossing point of Borrow Beck on the site of High Borrow Bridge pre-dates the 1753 construction of the turnpike and may be of some considerable antiquity.
- 6.3.2 The southern turnpike bank was truncated in several places by the groundwork around Demings House, and inspection of the exposed sections revealed that the feature was chiefly composed of clay; however, the section of the bank examined in Trench 24, to the north of Wasdale Beck, revealed that the bank was primarily constructed of stone. This differing construction is presumably a product of locally available material; many more stones can be seen to be lying in the fields in the vicinity of Trench 24 than can be seen around Demings house.
- 6.3.3 The watching brief revealed a general paucity of archaeological features or finds associated with the turnpike, although several post-medieval artefacts were recovered in the vicinity of Demings House. The lack of any earlier finds in the vicinity of Demings House is consistent with the suggestion that the house post-dated the construction of the 1753 turnpike.

6.4 DEMINGS MOSS BASIN

- 6.4.1 The Palynological Assessment has demonstrated the good survival of pollen in the samples taken from Demings Moss basin and that there is a long sequence of peat formation. The deposits within the basin started forming at some date after the beginning of the Neolithic but before any significant clearance had taken place, therefore probably within the later holocene. The upper levels of the section do appear to have been truncated, probably as a result of peat cutting.
- 6.4.2 The pollen diagram provides a record of changing land-use around the mire itself and in the wider landscape, and as such can provide an indication of how man has interacted with the landscape, for example by clearing woodland or initiating farming. Given that there are a number of cairnfields and prehistoric settlement areas within the environs of Demings Moss, this pollen core has considerable

potential to provide an important insight into the development of the local landscape. The importance of the site is enhanced by the fact that relatively little palaeoecological research has been undertaken within this region. There has been extensive palaeoecological research in the Central Lake District, the Solway Mosses, and South and West Cumbria, but the eastern fringes of the Lake District from Haweswater to Kendal and the Howgill Fells to the west of the Lune Gorge, have in comparison been poorly researched. The work of Peter Cundill, Adrian Harvey and others in the Howgill Fells to the east of Demings Moss has been summarised by Harvey and Chiverrell (2004) and it is recorded that some destabilisation of hillsides took place in the area, possibly as the result of changes in the vegetation. To the west of the River Lune palaeoecological research is more patchy with work at Skelsmergh Tarn and Kentmere (Walker 1955), Wet Sleddale (Chinn and Innes 1995), Littlewater near Haweswater (LUAU 2000) and at Sparrowmire Farm, near Kendal (Heawood and Huckerby 2002). All of the sites mentioned above provide evidence of possible anthropogenic activity in the prehistoric period. It is, therefore, of considerable importance that a palaeoecological record of this former resource, situated in an area rich in archaeological monuments, should be analysed to gain a better understanding of the local interaction between man and landscape.

6.5 RECOMMENDATIONS

- 6.5.1 ***Palaeoenvironmental Analysis:*** following on from the stratigraphic survey and the palaeoenvironmental assessment it is apparent that the Demings Moss basin has considerable potential for furthering an understanding of the palaeoenvironment and the archaeology of the locale. It is therefore recommended that more detailed palynological analysis of the peat, together with radiocarbon dating of the deposits from Demings Moss, be undertaken. At least four samples of either peat or plant macrofossils should be radiocarbon dated from the site prior to any further palynological analysis. Subject to the results of the radiocarbon dating, it is also recommended that a programme of palynological analysis, specifically targeting levels in the stratigraphy shown by the dating to be of archaeological significance, be undertaken.

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APPENDIX 1: PROJECT DESIGN

**Oxford
Archaeology
North**

March 2004

HAYESWATER PIPELINE BETWEEN WATCHGATE AND SHAP

CUMBRIA

EVALUATION

Proposals

The following project design is offered in response to a request from Barbara Cardie, United Utilities, for an evaluation of the proposed route for a pipeline between Watchgate and Shap, Cumbria.

1. INTRODUCTION

1.1 Contract Background

1.1.1 Oxford Archaeology North has been invited by Barbara Cardie, United Utilities, to submit a project design and costs for an evaluation on the line of a proposed Hayeswater pipeline between Watchgate and Shap (OA North 2003). This follows on from an earlier appraisal and walk-over survey which made recommendations for the evaluation of selected sites.

1.1.2 Some sections of the route will follow the line of the road, and will entail no more than a cut through the road surface. In these cases there is no need for a wide top-soil stripped easement corridor and consequently will have a much reduced impact on any archaeology than routes extending across open fields. These sections will therefore not need to be subject to evaluation. The evaluation will be targeted on those sites of the route which will be directly affected by the proposed pipeline.

1.2 OXFORD ARCHAEOLOGY NORTH

1.2.1 Oxford Archaeology North (OA North) has considerable experience of the archaeological survey and evaluation of sites and monuments of all periods, having undertaken a great number of small and large projects during the past 20 years. Projects have been undertaken to fulfil the different requirements of various clients and planning authorities, and to very rigorous timetables. OA North has considerable experience of the recording of historic buildings together with the evaluation and excavation of sites of all periods, having undertaken a great number of small and large scale projects during the past 20 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.

1.2.2 OA North has the professional expertise and resources to undertake the project detailed below to a high level of quality and efficiency. OA North is an Institute of Field Archaeologists (IFA) registered organisation, registration number 17, and all its members of staff operate subject to the IFA Code of Conduct.

2. OBJECTIVES

2.1 The following programme has been designed, in accordance with a verbal brief by Lake District National Park Authority (LDNPA) to provide an evaluation and topographic of selected sites in advance of the laying of the proposed pipeline. The required stages to achieve these ends are as follows:

2.2 EVALUATION TRENCHING

2.2.1 To implement a programme of trial trenching examining 5% of a 20m wide corridor centred on the location of selected sites. To provide an investigation of the background areas where archaeological sites have not yet been investigated.

2.3 TOPOGRAPHIC SURVEY

2.3.1 To implement a programme of mitigative topographic survey of a series of earthwork sites.

2.3 REPORT

2.3.1 A written report will assess the significance of the data generated by this programme within a local and regional context. It will present the evaluation and would make an assessment of the archaeological potential of the area, and would make recommendations for further work.

3. METHOD STATEMENT

3.1 EVALUATION TRENCHING

3.1.1 *Methods:* the programme of trenching will establish the presence or absence of any previously unsuspected archaeological deposits and, if established, will then test their date, nature, depth and quality of preservation. The evaluation will be undertaken within a 20m wide easement corridor which will be of varying length subject to the size and character of the site to be examined. The

evaluation will examine 5% of each evaluation areas and it is proposed to excavate 20m x 2m trenches which will be excavated in accordance with the recommendation of the appraisal report and defined below:

Shap to Watchgate

Site No	Site Type	NGR	Corridor Length For evaluation	Area of evaluation	No of Trenches
W100	Enclosure and Cairns	NY 5635 1212	400m	8000m ²	10
W101	Medieval House	NY 5470 0200	100m	2000m ²	2
W136	Turnpike Road	NY 55100422 – 4770 0266	700m	14000 m ²	10
W140	Earthworks	NY 56558 10357	150m	3000 m ²	3
W146	Boundary Bank	NY 5734409898 57474 09916	30m	600 m ²	1
W172	Turnpike Road	NY5531006830 56900 10560	3670m	73400 m ²	30

- 3.1.2 The layout of the trenches will be configured with predominant trenches along the line of the corridor in conjunction with a series of trenches across the line of the pipeline. The arrangement will be adjusted so as to target surface features of particular significance.
- 3.1.3 In addition it is proposed to examine those areas where archaeological features have yet to be discovered, in between the areas of more intensive evaluation. Excluding those sections of pipeline which have previously been examined, this comprises an overall length of 10,500m of pipeline. It is proposed to examine 10% of this length and would entail the excavation of 50 20m x 2m trenches. These would be uniformly scattered along the line, but targeting any sites or surface features of archaeological potential as identified by the walk-over surveys and the proposed topographic surveys would be further targeted by the evaluation trenches. The layout of the 50 trenches is provisionally shown within the attached plan, but this is subject to change following the surveys and in discussions with the LDNPA.
- 3.1.4 The trenches will be excavated by a combination of mechanised and manual techniques; the topsoil will be removed by mechanical excavator, fitted with a 1.7m wide toothless bucket, and archaeological deposits beneath will be first manually cleaned and then any features identified will be manually excavated. The machine excavation will not intrude into any potential archaeological stratigraphy and all machine excavation will be undertaken under careful archaeological supervision. Following mechanical excavation the floor of the trench will be cleaned by hoe and Manual excavation techniques will be used to evaluate any sensitive deposits, and will enable an assessment of the nature, date, survival and depth of deposits and features. The trenches will not be excavated deeper than 1.25m to accommodate health and safety constraints; any requirements to excavate below this depth will involve recosting.
- 3.1.5 The trench will be excavated in a stratigraphical manner, whether by machine or by hand. The trench will be located by use of GPS equipment which is accurate to +/- 0.25m, altitude information will be established with respect to Ordnance Survey Datum. Archaeological features within the trenches will be planned by manual techniques.
- 3.1.6 **Environmental Sampling:** environmental samples (bulk samples of 30 litres volume, to be sub-sampled at a later stage) will be collected from stratified undisturbed deposits and will particularly target negative features (gullies, pits and ditches). Subject to the results of the excavation an assessment of any environmental samples will be undertaken by the in-house palaeoecological specialist, who will examine the potential for further analysis. The assessment would examine the potential for macrofossil, arthropod, palynological and general biological analysis. The costs for the palaeoecological assessment are defined as a contingency and will only be called into effect if good waterlogged deposits are identified and will be subject to the agreement of LDNPA and the client.

- 3.1.7 Samples will also be collected for technological, pedological and chronological analysis as appropriate. If necessary, access to conservation advice and facilities can be made available. OA North maintains close relationships with Ancient Monuments Laboratory staff at the Universities of Durham and York and, in addition, employs artefact and palaeozoological specialists with considerable expertise in the investigation, excavation and finds management of sites of all periods and types, who are readily available for consultation.
- 3.1.8 **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.
- 3.1.9 Results of the field investigation will be recorded using a paper system, adapted from that used by Centre for Archaeology 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.

3.2 TOPOGRAPHIC SURVEY

- 3.2.1 **Instrument Survey:** it is proposed to undertake a level 2b survey (see OA North survey levels, *Appendix 1*) of the sites identified by the appraisal, which is equivalent to RCHM(E) level 2. All appropriate topographic detail will be recorded to provide an appropriate context for the archaeological detail. Depending on the character of the site, the survey will either be recorded using a total station or a differential GPS.
- 3.2.2 **Sites for Survey**
- Site W100 - Putative enclosure and cairns
 - Site W140 - Earthworks
 - Site W146 - Boundary Bank
 - Site W155 - Relict building and field system
- 3.2.3 **GPS Survey:** in lower order sites detail survey will be undertaken using a post-processed differential GPS, which is accurate to 150mm. The data will then be plotted up and will be subject to manual enhancement.
- 3.2.4 **Total Station Survey:** survey control will be established over the site by closed traverse and internally will be accurate to +/- 15mm; the control network will be located onto the Ordnance Survey National Grid by the use of Global Positioning Survey (GPS), which will locate to an accuracy of +/- 0.5m.
- 3.2.5 The surface features will be surveyed by EDM tacheometry using a total station linked to a data logger, the accuracy of detail generation being appropriate for a 1:500 output. The digital data will be transferred onto a portable computer for manipulation and later transfer to other digital or hard mediums. Film plots will be output via a plotter. The archaeological detail will be drawn up in the field as a dimensioned drawing on the plots with respect to survey markers. Most topographic detail will also be surveyed, particularly if it is archaeologically significant or is in the vicinity of archaeological features. The survey drawings will be generated within a CAD system and will be merged with existing topographic data, and will also be merged with the results from the earlier survey. The results can be output at any scale.
- 3.2.6 **Site Gazetteer:** the survey would be accompanied by a gazetteer description of individual archaeological features, which will relate directly to the survey mapping.
- 3.2.7 **Photographic Survey:** in conjunction with the archaeological survey a photographic archive will be generated, which will record significant features and general landscapes. It will be undertaken in 35mm black and white and colour slide film.

3.3 PALAEOENVIRONMENTAL SAMPLING

- 3.3.1 The sampling will be undertaken by the collection of a monolith or core samples from the organic deposits at Demings Moss in advance of the construction of the proposed new reservoir. This will be sufficient to establish the preservation of deposits, to assess the environmental remains and the degree of humification of the peat. Confirmation of the origins of the peat will be achieved through the systematic analysis of the macrofossils in the monolith, through field observations and by carbon dating of the basal layers of the peat.
- 3.3.2 Subject to the results of the analysis and the results of the overall evaluation programme samples from the core / monolith will be submitted for carbon dating; two samples will be dated to provide a date for the formation of the deposits. These will be submitted to Leibniz laboratory, Kiel, Germany. If larger samples can be retrieved, dating will be achieved by Radiometric analysis of Carbon 14; if only smaller samples are possible this will be achieved by AMS dating.
- 3.3.3 The palynological potential to provide a record of the chronological development of vegetation in the area will be assessed in the deposits from Demings Moss. Samples will be taken systematically throughout the monolith or core at 0.25m intervals or at major stratigraphic changes.
- 3.3.4 **Pollen Methodology:** samples of known volume, measured by volumetric displacement will be prepared for pollen analysis using the standard techniques of KOH, acetolysis and hot 40% HF acid treatment if necessary (Faegri *et al* 1989). Tablets of Lycopodium spores will be added at the start of the preparation so that pollen concentration values can be calculated. The residues will be mounted in silicone oil and examined with an Olympus BH-2 microscope using x400 magnification routinely and x1000 for critical grains. Counting will be continued until a sum of at least 500 pollen grains excluding aquatic and mire types has been reached on two or more complete slides to reduce the possible effects of differential dispersal under the coverslip (Brooks and Thomas 1967). Pollen identification will be carried out using the standard keys of Faegri *et al* (1989), linked to a limited reference collection, which will restrict the identification of the more unusual grains.
- 3.3.5 If macroscopic charcoal is identified it will be examined to determine species and, if possible, whether they are anthropogenic or natural in origin

3.4 REPORT

- 3.4.1 **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, which will be catalogued by context. This archive can be provided in the English Heritage Centre for Archaeology format and a synthesis 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. OA North practice is to deposit 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.
- 3.4.2 **Report:** one bound and one unbound copy of a written synthetic report will be submitted to the Client, and a further two copies will be submitted to the Lake District National Park Authority SMR. 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 present an assessment of the sites history; the report will include photographs of any significant features. The report will also include a complete bibliography of sources from which data has been derived, and a list of further sources identified during the programme of work, but not examined in detail. The report will include a description of the methodology and the results. A list of the finds, and a description of the collective assemblage. Details of any environmental work undertaken.
- 3.4.3 The report will include a frontispiece showing the planning number and the grid reference. It will have a summary and a methodological statement, and it will define any variations to the defined programme. It will include recommendations for further work.

3.4.4 Illustrative material will include a location map, site map, a trench location map, trench plans, and also pertinent photographs. It can be tailored to the specific requests of the client (eg particular scales etc), subject to discussion.

3.4.5 **Publication:** a summary report of the results will be submitted to a regional journal, and information from the project will be fed into the OASIS project (On-line Access to Index of Archaeological Investigation).

3.5 OTHER MATTERS

3.5.1 **Health and Safety:** OA North conforms to all health and safety guidelines as contained in the Lancaster University Manual of Health and Safety and the safety manual compiled by the Standing Conference of Archaeological Unit Managers. The work will be in accordance with Health and Safety at Work Act (1974), the Council for British Archaeology Handbook No. 6, *Safety in Archaeological Fieldwork* (1989).

3.5.2 Full regard will, of course, be given to all constraints (services etc) during the watching brief and fabric survey, as well as to all Health and Safety considerations. OA North provides a Health and Safety Statement for all projects and maintains a Unit Safety policy. A risk assessment will be completed in advance of the project's commencement. If there is a requirement to excavate trenches deeper than 1.25m the trenches will be stepped out to minimise section collapse. 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.

3.5.3 **Insurance:** the insurance in respect of claims for personal injury to or the death of any person under a contract of service with the unit and arising out of an in the course of such person's employment shall comply with the employers' liability (Compulsory Insurance) Act 1969 and any statutory orders made there under. For all other claims to cover the liability of OA North, in respect of personal injury or damage to property by negligence of OA North or any of its employees, there applies the insurance cover of £2m for any one occurrence or series of occurrences arising out of one event.

3.5.4 **Confidentiality:** the 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.

3.5.5 **Project Monitoring:** OA North will consult with the client regarding access to the site. Whilst the work is undertaken for the client, the County Archaeologist will be kept fully informed of the work and its results. Any proposed changes to the project design will be agreed with LDNPA in consultation with the Client.

3.5.6 **Contingency:** costs are defined for the provision of a palaeoenvironmental assessment, and faunal remains analysis. The palaeoenvironmental analysis would be subject to an assessment by the OA North palaeoenvironmental specialist (E Huckerby), the faunal remains would be subject to an assessment by the OA North animal bone specialist (A Bates).

4. WORK PROGRAMME

4.1 The following programme is proposed:

Evaluation Trenching

24 days will be required to complete this element

Topographic Survey

4 days will be required to complete this element

Palaeoenvironmental Sampling Demings Moss

1 day in the field

4 days in the office

Report

A 15 day period would be to complete this element

- 4.2 OA North can execute projects at short notice once an agreement has been signed with the client.
- 4.3 The project will be managed by **Jamie Quartermaine BA Surv Dip MIFA** (Unit Project Manager) to whom all correspondence should be addressed. OA North adheres by the IFA's Code of Conduct and the Code of Approved Practice for the regulation of Contractual Arrangements in Field Archaeology.

APPENDIX 2: TRENCH AND WATCHING BRIEF SUMMARIES

Trench 1	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
<i>100</i>	Topsoil and turf	0.0 – 0.26m
<i>101</i>	Subsoil, mid yellow brown sandy silt, sparse inclusions	0.26- 0.51m
<i>102</i>	Dump of burnt material	0.51-0.55m
<i>103</i>	Natural, slate in sandy clay	0.55m

Trench 2	Dimensions 7m by 1.7m	Orientation north-west/south-east
Context	Description	Depth
<i>200</i>	Topsoil and turf	0.0–0.26m
<i>201</i>	Light grey clay	0.26–0.3m
<i>202</i>	Natural, slate in sandy clay	0.3m

Trench 3	Dimensions 19m by 1.7m	Orientation north-north-west/south-south-east
Context	Description	Depth
<i>300</i>	Topsoil and turf	0.0–0.2m
<i>301</i>	Light grey clay	0.2–0.4m
<i>302</i>	Dark brown organic soil	0.4–0.5m
<i>303</i>	Natural, slate in sandy clay	0.5m

Trench 4	Dimensions 20m by 1.7m	Orientation north-west/south-east
Context	Description	Depth
<i>400</i>	Topsoil and turf	0.0–0.2m
<i>401</i>	Natural, slate in sandy clay	0.2m+

Trench 5	Dimensions 20m by 1.7m	Orientation east/west
Context	Description	Depth
<i>500</i>	Topsoil and turf	0.0–0.3m
<i>501</i>	Subsoil, mid yellow brown sandy silt	0.3–0.45m
<i>502</i>	Natural, slate in sandy clay	0.45m+

Trench 6	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
<i>600</i>	Topsoil and turf	0.0–0.2m
<i>601</i>	Subsoil, Yellow grey silty clay, rare inclusions	0.2–0.4m
<i>602</i>	Natural, slate in sandy clay	0.4m+

Trench 7	Dimensions 20m by 1.7m	Orientation north-north-east/south-south-west
Context	Description	Depth
<i>700</i>	Topsoil and turf	0.0–0.17m
<i>701</i>	Subsoil, light orange grey silty clay, sparse inclusions	0.17–0.35m
<i>702</i>	Natural, slate in silty clay	0.35m

Trench 8	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
<i>800</i>	Topsoil and turf	0.0–0.2m
<i>801</i>	Sandy band in subsoil	0.2–0.45m
<i>802</i>	Dump of burnt stone and charcoal	0.3–0.35m
<i>803</i>	Subsoil, light orange grey silty clay, sparse inclusions	0.2–0.45m
<i>804</i>	Natural, slate in sandy clay	0.35m

Trench 9	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
<i>900</i>	Topsoil and turf	0.0–0.2m
<i>901</i>	Subsoil, light grey sandy silt, frequent inclusions	0.2–0.35m
<i>902</i>	Natural, slate in sandy clay	0.35m

Trench 10	Dimensions 20m by 1.7m	Orientation north-north-east/south-south-west
Context	Description	Depth
<i>1000</i>	Topsoil and turf	0.0–0.17m
<i>1001</i>	Subsoil, light orange grey silty clay, rare inclusions	0.17–0.35m
<i>1002</i>	Natural, slate in sandy silt	0.35m

Trench 11	Dimensions 20m by 1.7m	Orientation north-west/south-east
Context	Description	Depth
<i>1100</i>	Topsoil and turf, very mixed with lots of clay, possibly previously disturbed by a field drain. Fragments of a ceramic field drain present.	0.0–0.17m
<i>1101</i>	Natural, slate in sandy clay	0.17–0.35m

Trench 12	Dimensions 20m by 1.7m	Orientation north-north-west/south-south-east
Context	Description	Depth
<i>1200</i>	Topsoil and turf	0.0–0.1m
<i>1201</i>	Compacted hardcore	0.1–0.35m
<i>1202</i>	Natural, slate in sandy silt	0.35m

Trench 13	Dimensions 20m by 1.7m	Orientation north-west/south-east
Features	Possible ridge and furrow	
Context	Description	Depth
<i>1300</i>	Topsoil and turf	0.0–0.3m

1301	Natural, slate in silty clay	0.3m
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Trench 14	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
1400	Topsoil and turf	0.0–0.4m
1401	Natural, slate in silty clay	0.4m

Trench 15	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
1500	Topsoil and turf	0.0–0.2m
1501	Subsoil, mid grey sandy silt, rare inclusions	0.2–0.3m
1502	Natural, slate in sandy silt	0.3m

Trench 16	Dimensions 20m by 1.7m	Orientation north-north-east/south-south-west
Context	Description	Depth
1600	Topsoil and turf, high humic content	0.0–0.1m
1601	Natural, slate in sandy silt	0.1–0.35m

Trench 17	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
1700	Topsoil and turf	0.0–0.2m
1701	Colluvium, light grey clay with frequent inclusions	0.2–0.27m
1702	Colluvium, grey brown clay silt	0.27–1.0m
1703	Mid brown organic rich deposit	1.0–1.2m
1704	Natural, slate in sandy silt	0.3m

Trench 18	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth

1800	Topsoil and turf	0.0–0.2m
1801	Subsoil, mid grey sandy silt, common inclusions	0.2–0.4m
1802	Natural, river gravel in sandy clay	0.4m

Trench 19	Dimensions 20m by 1.7m	Orientation north/south
Features	Modern land drain filled with stone aggregate, 0.3m wide	
Context	Description	Depth
1900	Topsoil and turf	0.0–0.25m
1901	Very dark peat layer	0.25–0.3
1902	Yellow brown, high organic content	0.3–0.45m
1903	Natural, slate in sandy clay	0.45m

Trench 20	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
2000	Topsoil and turf	0.0–0.16m
2001	Subsoil, mid grey sandy silt, abundant inclusions	0.16–0.33m
2002	Natural, slate in sandy clay	0.33m

Trench 21	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
2100	Topsoil and turf	0.0–0.15m
2101	Subsoil, mid grey sandy silt, rare inclusions	0.15–0.45m
2102	Palaeochannel, light/mid grey clayey silts, rare inclusions	0.45–0.8m
2103	Natural, slate in sandy silt	0.45m

Trench 22	Dimensions 20m by 1.7m	Orientation north/south
Context	Description	Depth
2200	Topsoil and turf	0.0–0.14m
2201	Subsoil, pale grey silty clay	0.14–0.22m

2202	Natural, river gravel in silty clay	0.22m
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Trench 23	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
2300	Topsoil and turf	0.0–0.2m
2301	Small patch of peaty material, dump	0.2m+
2302	Modern compacted hardcore	0.2m+

Trench 24	Dimensions 20m by 1.7m	Orientation north-north-east/south-south-west
Context	Description	Depth
2400	Topsoil and turf	0.0–0.35m
2401	Subsoil, mid grey clay sand	0.35–0.75m
2402	Natural, slate in sandy silt	0.75m
2403	Turnpike boundary bank. 80% large stones in dark silty matrix. 1.9m wide	0.0–0.3m

Trench 25	Dimensions 20m by 1.7m	Orientation north-north-east/south-south-west
Features	Possible wall in the west-facing side of the trench	
Context	Description	Depth
2500	Topsoil and turf	0.0–0.25m
2501	Natural, clayey sand 70% sub-rounded inclusions	0.25m

Trench 26	Dimensions 20m by 1.7m	Orientation north/south
Context	Description	Depth
2600	Topsoil and turf	0.0–0.25m
2601	Natural, clayey sand 70% sub-rounded inclusions	0.25m

Trench 27	Dimensions 20m by 1.7m	Orientation north-north-east/south-south-west
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Context	Description	Depth
2700	Topsoil and turf, humic soil	0.0–0.12m
2701	Mixed deposit of coarse sand and clay	0.12–0.5m
2702	Buried soil horizon, dark humic soil	0.5–0.6m
2703	Natural, clay with frequent rounded boulders	0.6m

Trench 28	Dimensions 20m by 1.7m	Orientation north-north-east/south-south-west
Context	Description	Depth
2800	Topsoil and turf	0.0–0.25m
2801	Coarse orange sand	0.25–0.45m
2802	Buried soil horizon, dark humic soil	0.45–0.55m
2803	Natural, sandy clay with frequent inclusions	0.55m

Trench 29	Dimensions 20m by 1.7m	Orientation north-north-east/south-south-west
Context	Description	Depth
2900	Topsoil and turf, humic soil	0.0–0.2m
2901	Light grey silty sand	0.25–0.3m
2902	Buried soil horizon, dark humic soil	0.3–0.55m
2903	Natural, clay with frequent rounded boulders	0.55m

Trench 30	Dimensions 20m by 1.7m	Orientation west-north-west/east-south-east
Features	Three modern field drains	
Context	Description	Depth
3000	Topsoil and turf	0.0–0.2m
3001	Compacted hardcore	0.2–0.538m
3002	Dark grey silty clay	0.38–0.55m
3003	Natural, silty sand common inclusions	0.55m

Trench 31	Dimensions 20m by 1.7m	Orientation west-north-west/east-south-east
Context	Description	Depth
<i>3100</i>	Topsoil and turf	0.0–0.24m
<i>3101</i>	Grey brown sandy silt occasional large boulders	0.24–0.55m
<i>3102</i>	Natural, compact sandy clay with rounded cobbles	0.55m

Trench 32	Dimensions 20m by 1.7m	Orientation north-east/south-west
Features	Three field drains running east-west, 0.15m wide	
Context	Description	Depth
<i>3200</i>	Topsoil and turf, humic soil	0.0–0.2m
<i>3201</i>	Subsoil, grey brown sandy silt common inclusions	0.2–0.35m
<i>3202</i>	Natural, clay with cobbles	0.35m

Trench 33	Dimensions 20m by 1.7m	Orientation north/south
Context	Description	Depth
<i>3300</i>	Topsoil and turf, peat, very dark grey	0.0–0.8m
<i>3301</i>	Dark reddish brown peat	0.8–1.5m
<i>3302</i>	Natural, grey clay	1.5m

Trench 34	Dimensions 20m by 1.7m	Orientation east/west
Context	Description	Depth
<i>3400</i>	Topsoil and turf, peat, very dark grey	0.0–0.8m
<i>3401</i>	Dark reddish brown peat	0.8–1.2m
<i>3402</i>	Natural, grey clay with occasional boulders	1.2m

Trench 35	Dimensions 20m by 1.7m	Orientation north-west/south-east
Context	Description	Depth
<i>3500</i>	Topsoil and turf, humic soil	0.0–0.2m

3501	Subsoil, grey sandy clay	0.2–0.35m
3502	Natural, grey sandy clay with occasional boulders	0.35m

Trench 36	Dimensions 20m by 1.7m	Orientation north/south
Features	Field drain, 0.2m wide	
Context	Description	Depth
3600	Topsoil and turf	0.0–0.22m
3601	Subsoil, grey brown sandy clay, common cobbles	0.22–0.55m
3602	Natural, mid grey sandy clay, abundant cobbles	0.55m

Trench 37	Dimensions 20m by 1.7m	Orientation north-west/south-east
Context	Description	Depth
3700	Topsoil and turf	0.0–0.45m
3701	Boundary bank, 1.9m wide by 0.45m high, formed of large, un-worked granite blocks	0.0–0.45m
3702	Natural, yellow brown boulder clay	0.45m

Trench 38	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
3800	Topsoil and turf	0.0–0.2m
3801	Boundary bank, dark yellow brown clay silt with up to 40% small to medium stone inclusions	0.0–0.25m
3802	Natural, mid grey sandy clay, abundant cobbles	0.2m
3803	Shallow ditch, associated with bank 3801	0.2-0.3m
3804	Dark yellow brown clay silt with occasional small to medium stone inclusions	0.2-0.3m

Trench 39	Dimensions 20m by 1.7m	Orientation east/west
Context	Description	Depth
3900	Topsoil and turf	0.0–0.2m

3901	Boundary bank, dark yellow brown clay silt with up to 40% small to medium stone inclusions	0.0–0.25m
3902	Natural, mid grey sandy clay, abundant small inclusions	0.2m
3903	Shallow ditch, associated with bank 3901	0.2-0.3m
3904	Dark yellow brown clay silt with occasional small to medium stone inclusions	0.2-0.3m

Trench 40	Dimensions 20m by 1.7m	Orientation north/south
Context	Description	Depth
4000	Topsoil and turf	0.0–0.3m
4001	Natural, mid brown sandy silt, abundant limestone inclusions	0.3m

Trench 41	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
4100	Topsoil and turf	0.0–0.25m
4101	Natural, mid brown sandy clay, abundant limestone inclusions	0.25m

Trench 42	Dimensions 20m by 1.7m	Orientation north-west/south-east
Context	Description	Depth
4200	Topsoil and turf, humic soil	0.0–0.25m
4201	Natural, mid brown sandy silt, abundant gravel	0.25m

Trench 43	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
4300	Topsoil and turf, humic soil	0.0–0.3m
4301	Natural, mid brown sandy silt, abundant gravel	0.3m

Trench 44	Dimensions 20m by 1.7m	Orientation north-east/south-west
Features	Possible palaeochannel	
Context	Description	Depth

4400	Topsoil and turf, humic soil	0.0–0.45m
4401	Dark reddish brown peat	0.4–0.8m
4402	Natural, mid brown sandy silt, abundant gravel	0.8m

Trench 45	Dimensions 20m by 1.7m	Orientation north/south
Features	Small field drain, 0.2m wide	
Context	Description	Depth
4500	Topsoil and turf, humic soil	0.0–0.4m
4501	Dark reddish brown peat	0.45–0.85m
4502	Natural, mid brown sandy silt, abundant gravel	0.85m

Trench 46	Dimensions 20m by 1.7m	Orientation north/south
Context	Description	Depth
4600	Topsoil and turf	0.0–0.3m
4601	Natural, mid grey sandy clay, abundant granite inclusions	0.3m

Trench 47	Dimensions 20m by 1.7m	Orientation north/south
Context	Description	Depth
4700	Topsoil and turf	0.0–0.3m
4701	Natural, mid grey sandy clay, abundant granite inclusions	0.3m

Trench 48	Dimensions 20m by 1.7m	Orientation east/west
Context	Description	Depth
4800	Topsoil and turf	0.0–0.25m
4801	Natural, mid grey sandy clay, abundant granite inclusions	0.25m

Trench 49	Dimensions 20m by 1.7m	Orientation north-east/south-west
Context	Description	Depth
4900	Topsoil and turf	0.0–0.2m

4901	Natural, mid grey sandy clay, sparse granite inclusions	0.2m
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Context	W/B Area	Description	Depth
5000	B	Tightly compacted stone in a sandy matrix. 1753 Turnpike.	0.05–0.45m
5001	B	Kerb stones, c.0.4m by 0.4m (length unknown) seen either side of 5000 .	0.05-0.45m
5002	B	Cut into which the kerb stones have been placed, seen only on the eastern side of the turnpike.	0.05-0.45m
5003	B	Ditch cut with a 'V' shaped profile, 1.2m wide by 0.8m deep.	0.05-0.85m
5004	B	Fill of ditch 5003 consisting of dark humic soil.	0.05-0.85m
5005	D	Modern hardcore, extant road surface.	0.0-0.1m
5006	D	Light grey clay with frequent small, angular stone inclusions. Part of 1753 turnpike.	0.1-0.2m
5007	D	Buried topsoil lying beneath layer 5006 .	0.2-0.31m
5008	D	Blue-grey silty clay, probably colluvial in origin.	0.31-0.5m
5009	D	Orange-brown sandy clay natural.	0.5m+
5010	D	Top soil covering Turnpike bank.	0.0-0.12m
5011	D	Turnpike bank. Redeposited sandy clay natural with occasional angular stone inclusions.	0.12-0.46m
5012	D	Light grey clay with frequent small, angular stone inclusions. Probably associated with construction of 1753 turnpike.	0.1-0.84m
5013	D	Buried topsoil lying beneath layer 5012 .	0.84-1.04m

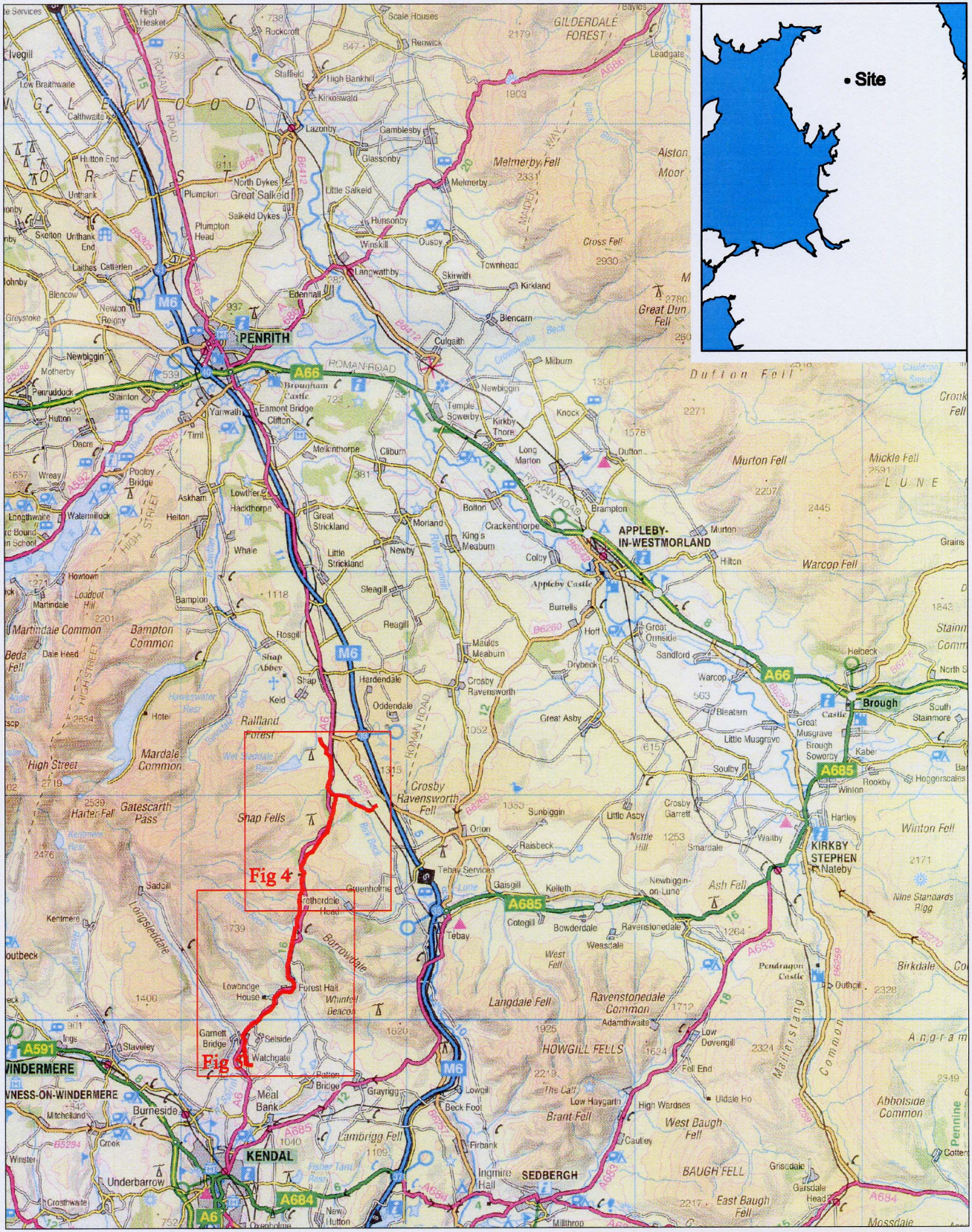
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- Plate 5: West-facing section of Trench 28
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- Plate 7: Trench 44 looking north-east
- Plate 8: Section through the 1763 turnpike in Area B, looking South
- Plate 9: Laying the pipeline during the watching brief in Area E



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 Pipeline Route

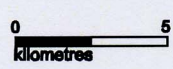
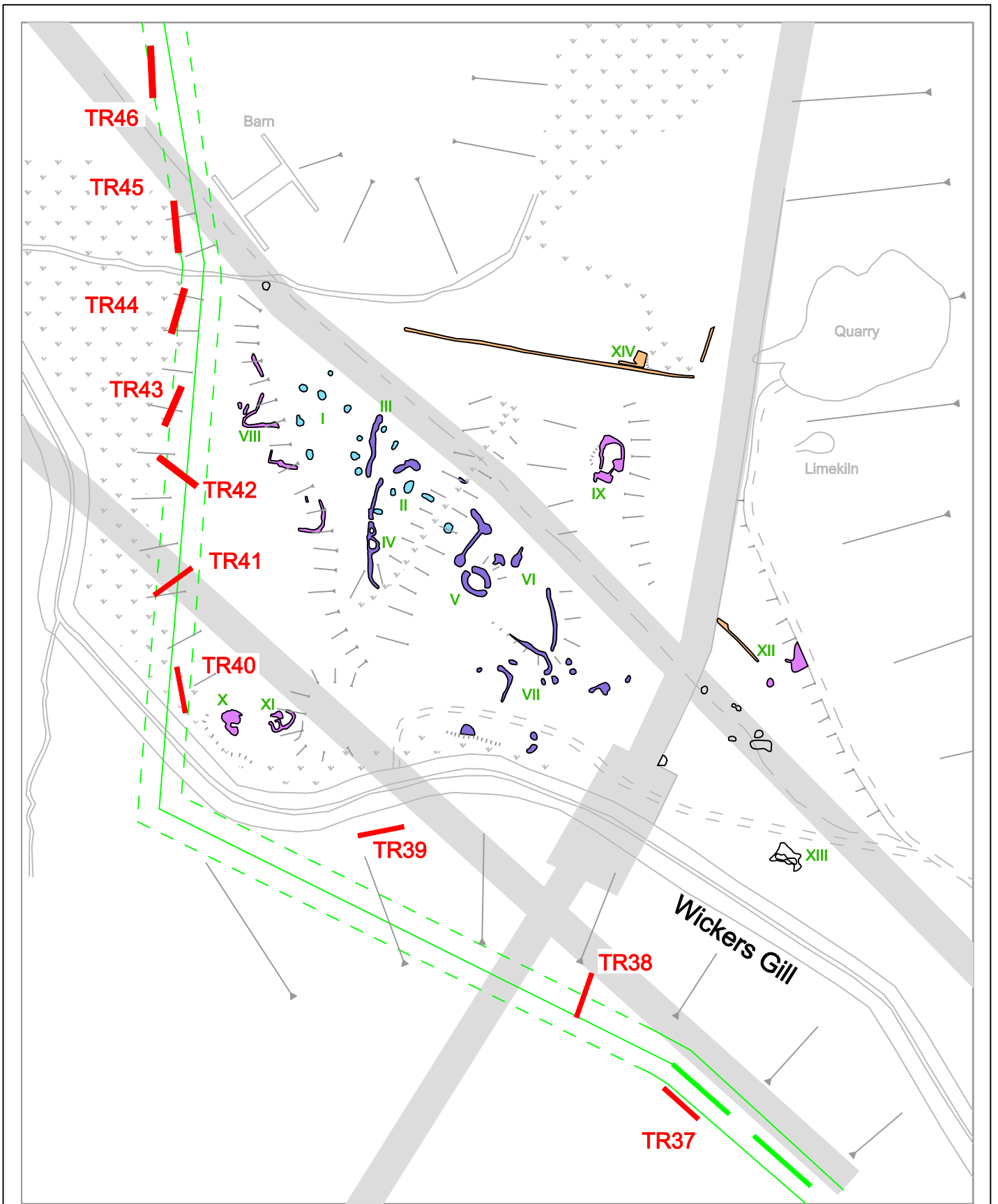


Figure 1: Location Map












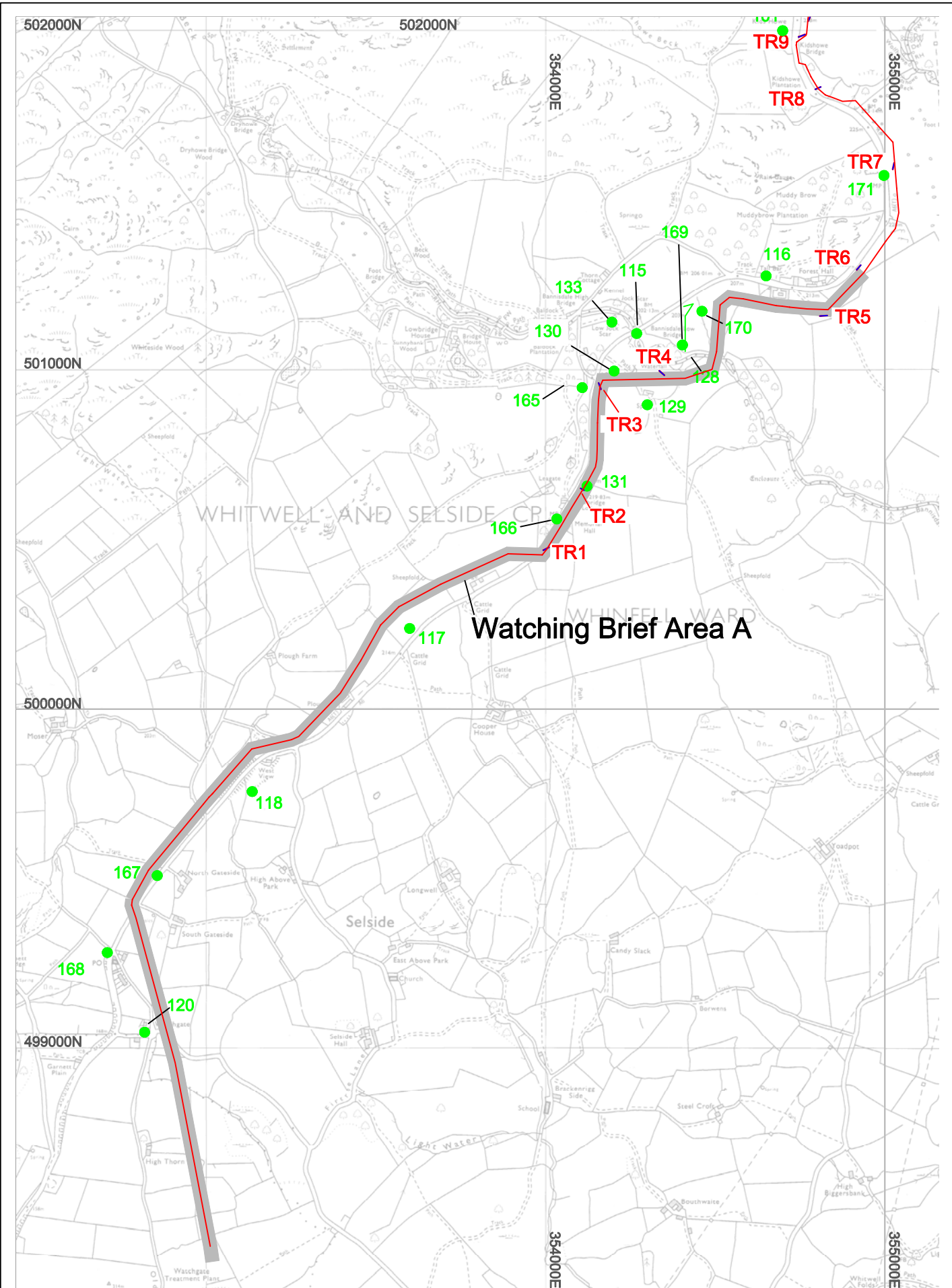
 <p>Oxford Archaeology North Storey Institute Meeting House Lane Lancaster LA1 1TF</p> <p>Tel 01524 541000 Fax 01524 848606</p>	PROJECT:	Shap to Watchgate Pipeline	<p>KEY:</p> <p>Potential Phases:</p> <p>Phase I  Rerouted Pipeline </p> <p>Phase II  Previous Pipelines </p> <p>Phase III  Trial Trenches </p> <p>Phase IV </p> <p>Unknown </p>
	DRAWING No:	02	
	SCALE:	1:2500	
	TITLE:	Wickers Gill / Turnmire Bottom Site 100 - Cairnfield Plan	
	CLIENT:	MWH and UU	
	DRAWN BY:	PJS	
DATE:	May 2004		

Figure 2: Wickers Gill/Turmire Bottom cairnfield survey



WHITWELL AND SELSIDE CP
 WHINFALL WARD
Watching Brief Area A

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- Proposed Pipeline
- Evaluation Trench



0 250m
 Scale 1:15,000



Figure 3: Trench locations and watching brief areas: Watchgate - Kids Howe

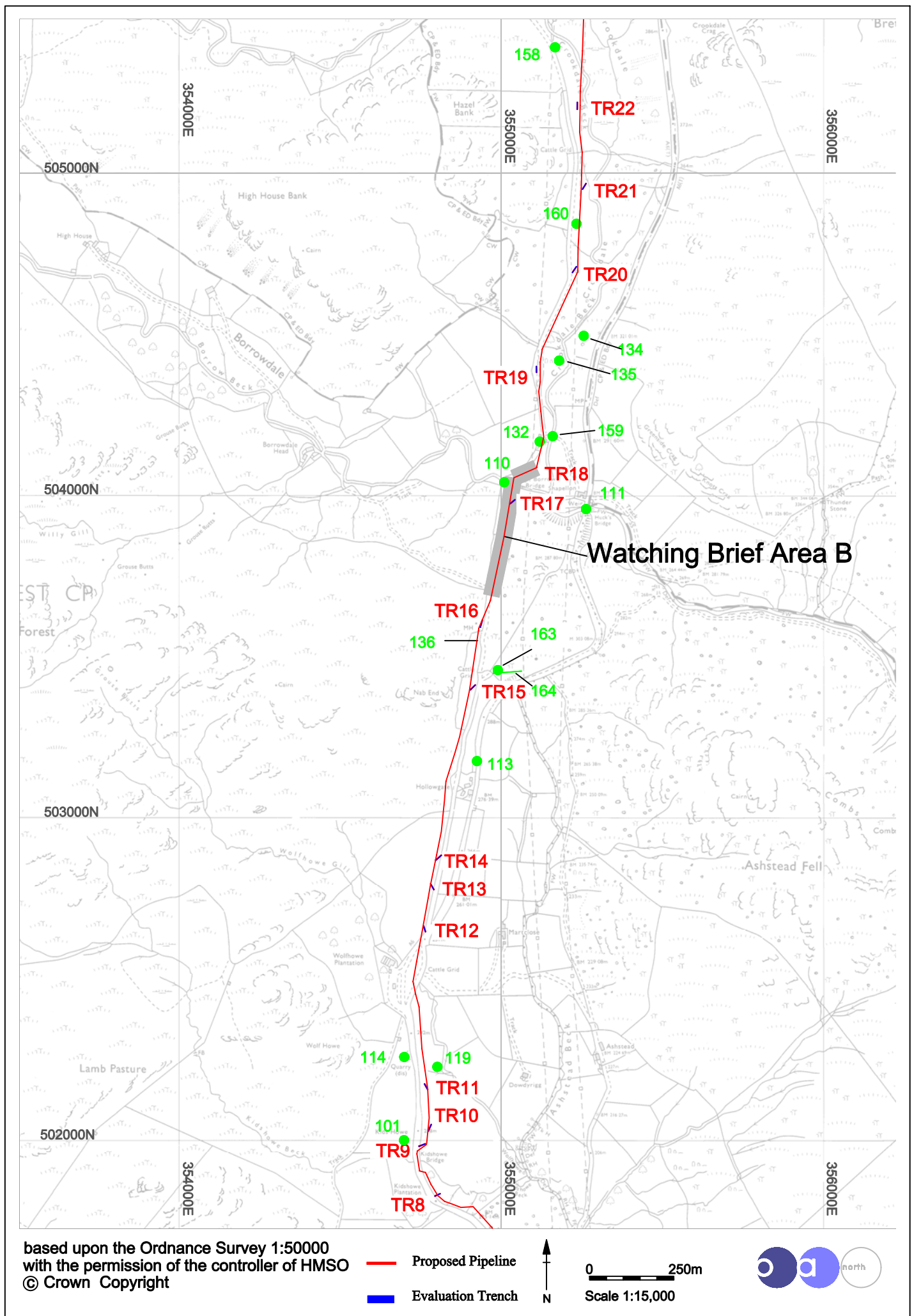
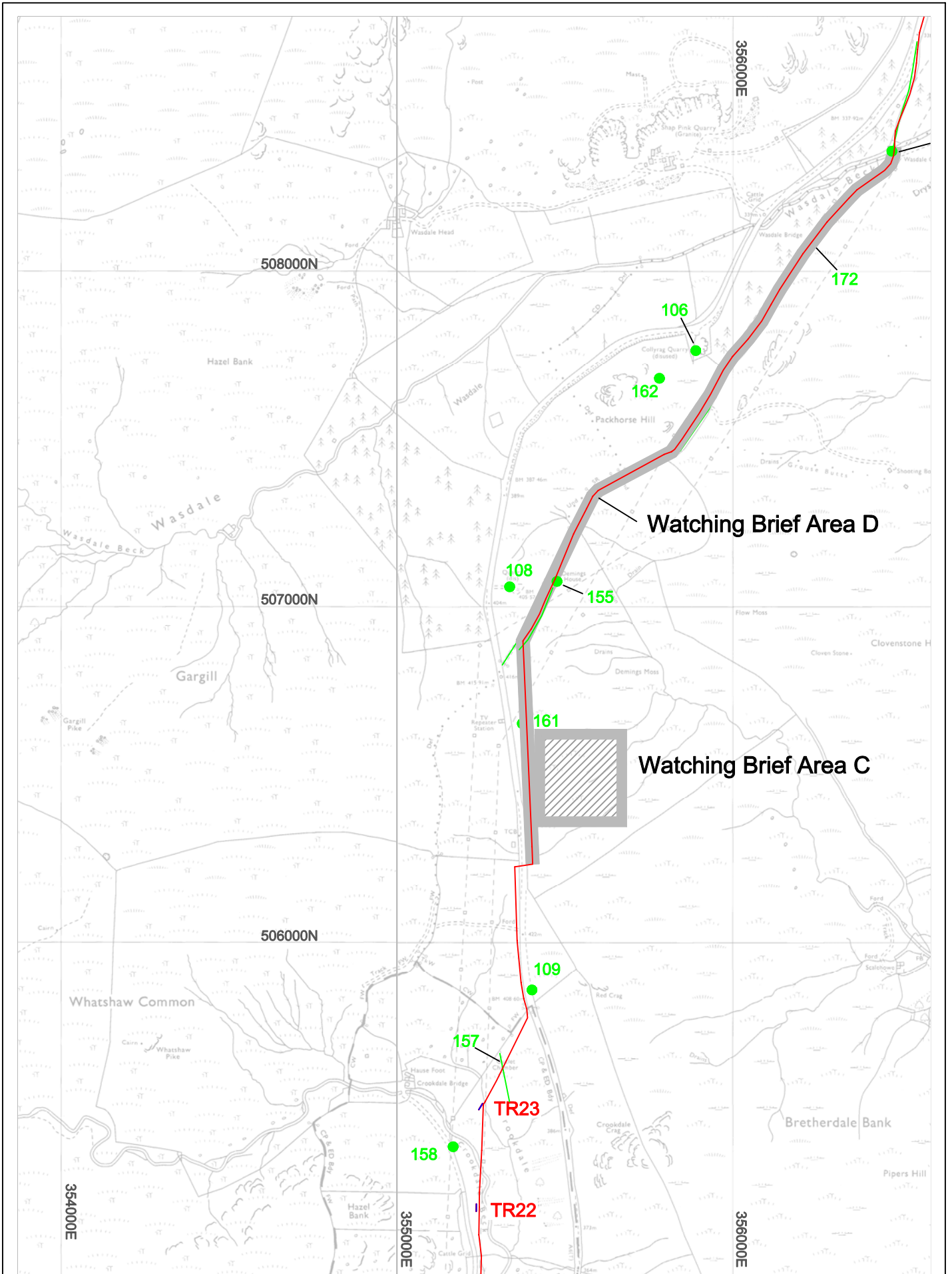


Figure 4: Trench locations and watching brief areas: Kids Howe - Crookdale Bridge



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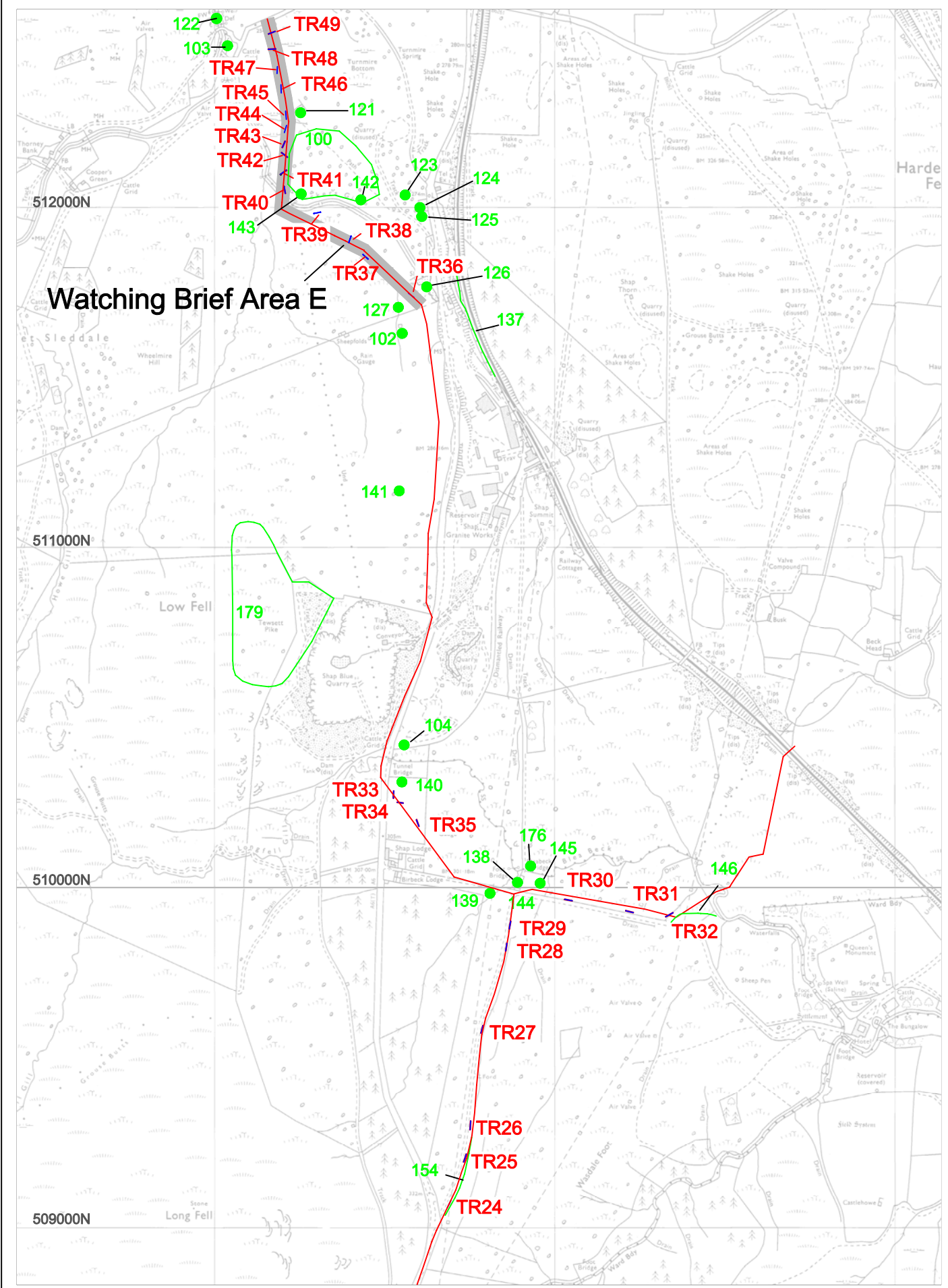
- Proposed Pipeline
- Evaluation Trench



0 — 250m
 Scale 1:15,000



Figure 5: Trench locations and watching brief areas: Crookdale Bridge - Wasdale Old Bridge



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— Proposed Pipeline
 — Evaluation Trench

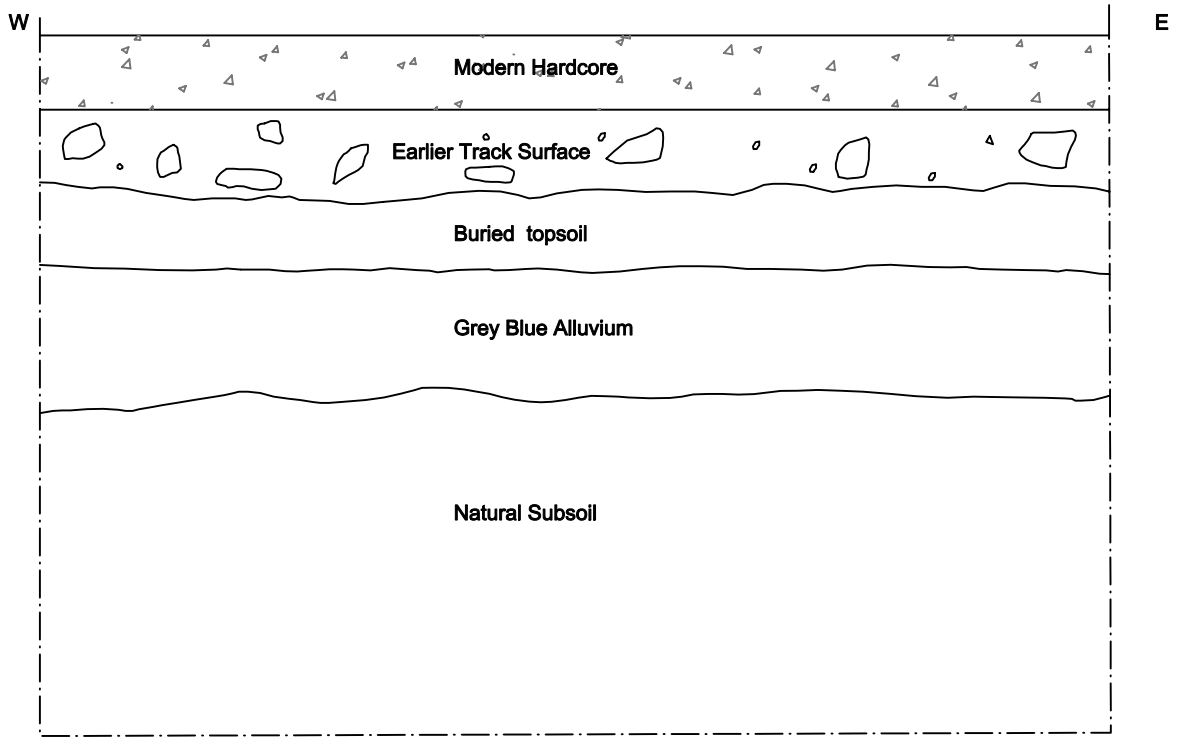


0 250m
 Scale 1:15,000



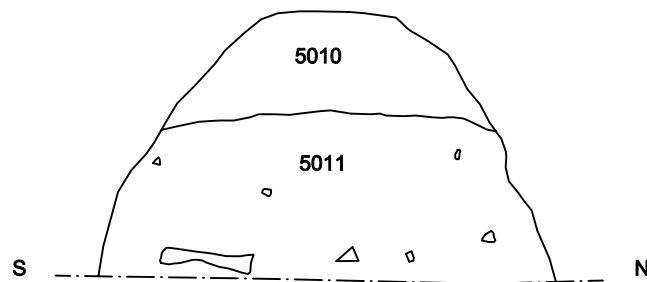
Figure 6: Trench locations and watching brief areas: Wasdale Old Bridge - Turnmire Bottom

South-facing section through Turnpike at Demmings Moss



Section through the Turnpike at Demmings Moss

West-facing section through truncated bank on south side of Turnpike road at Demmings Moss



Section through Turnpike boundary bank at Demmings Moss

0 0.5m
Scale 1:20 @ A4



Figure 7: Sections through the 1753 turnpike and its boundary bank at Demmings Moss

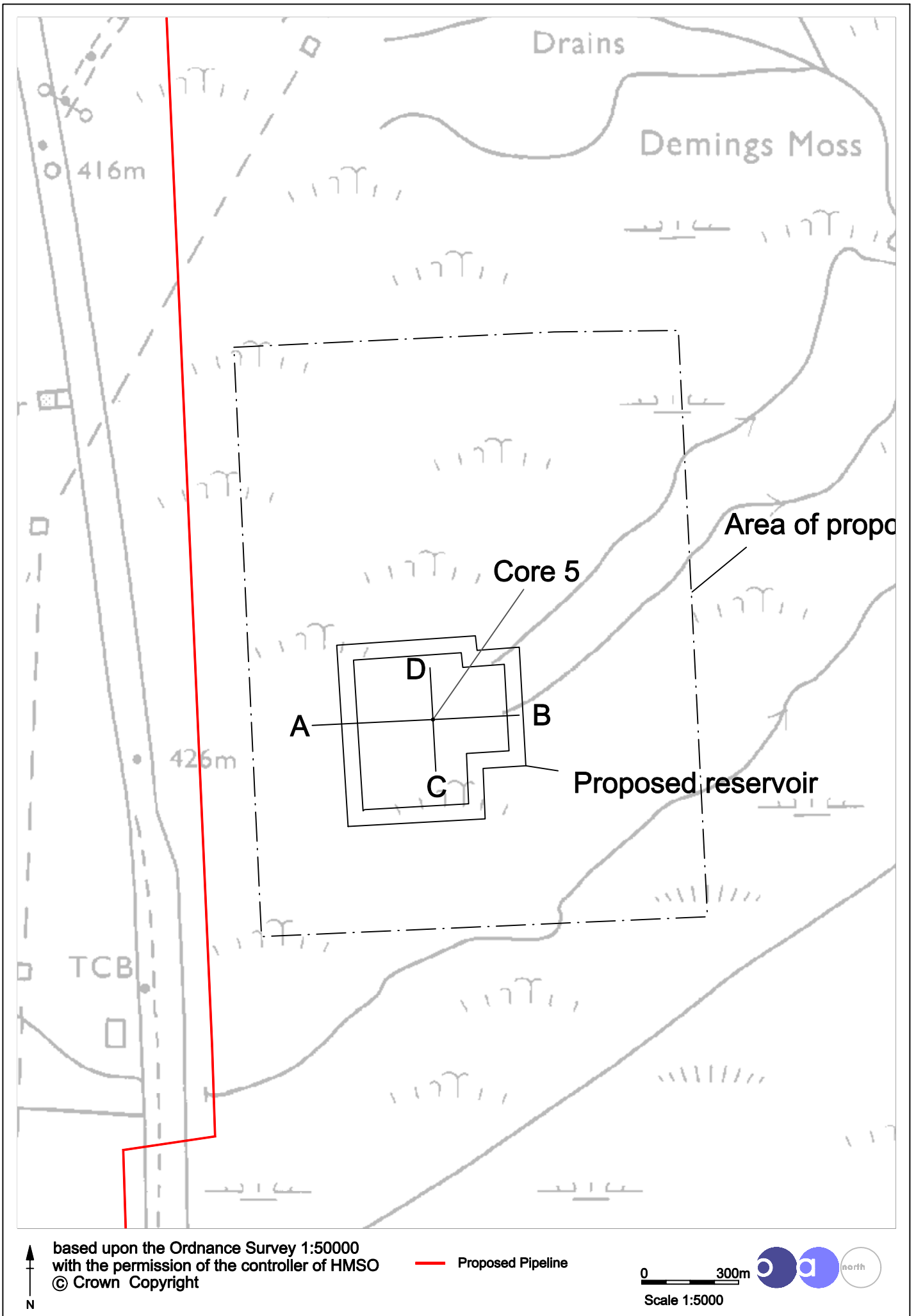
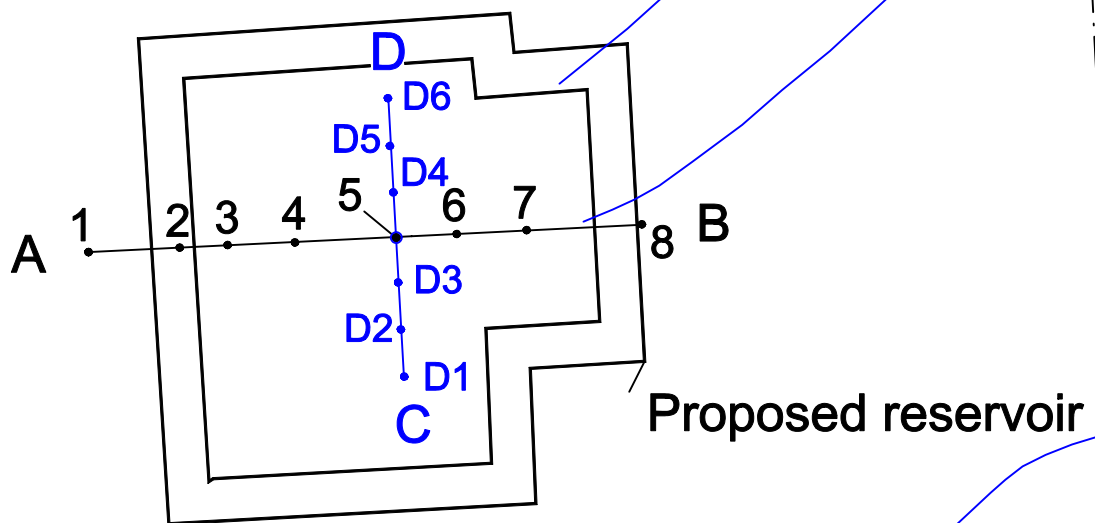


Figure 8: Location of the proposed reservoir at Demmings Moss

Area of proposed development



0 400m



Figure 9: Location of the stratigraphic survey transects

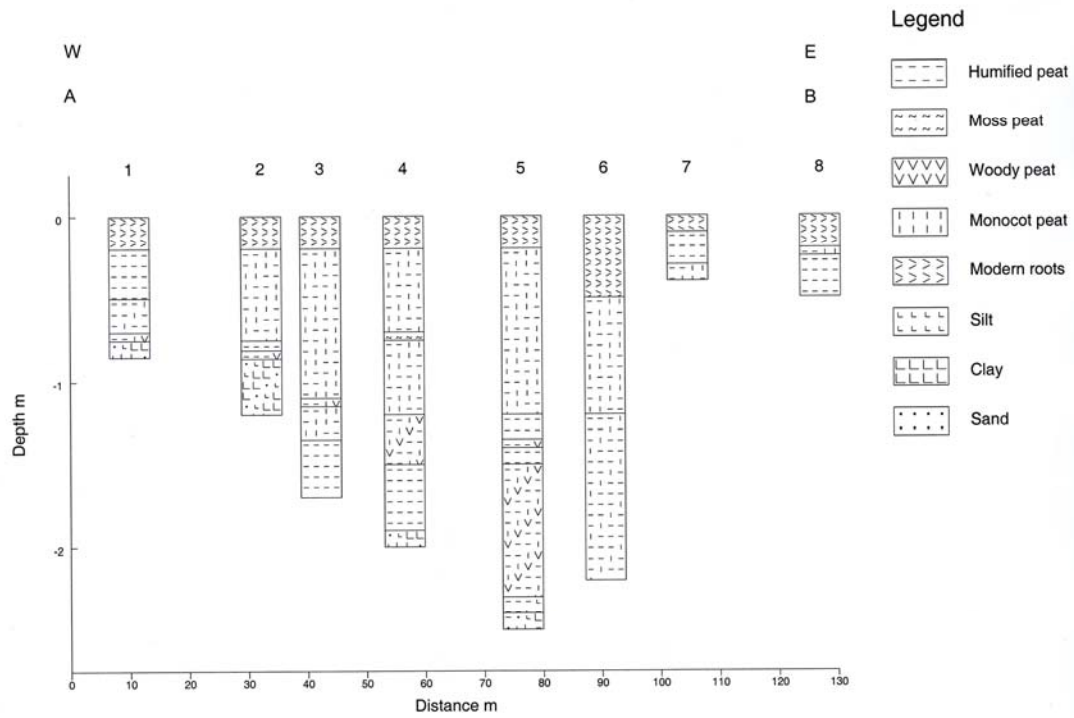


Figure 10: Stratigraphy of the proposed reservoir site from east to west

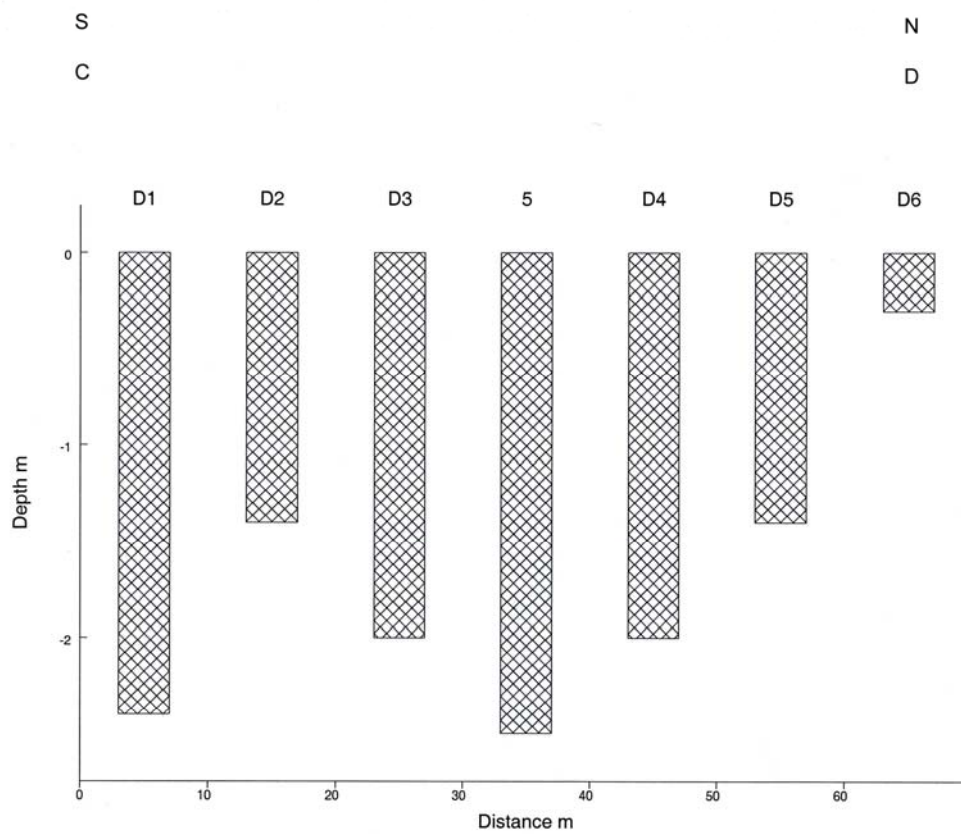


Figure 11: Peat depths of the proposed reservoir site from north to south



Plate 1: One of the component cairns of the Wickers Gill/Turnmire Bottom cairnfield, looking north



Plate 2: Trench 2 looking north-west



Plate 3: Trench 8 looking north



Plate 4: Trench 13 record shot looking North-West



Plate 5: West-facing section of Trench 28



Plate 6: Trench 29 through peat near Bleabek Bridge looking north



Plate 7: Trench 44 looking north-east



Plate 8: Section through the 1753 turnpike in Area B, looking south



Plate 9: Laying the pipeline during the watching brief in Area E