

**Pannal to Nether Kellet
Natural Gas Pipeline**

**ARCHAEOLOGICAL SURVEYS, EVALUATIONS,
EXCAVATIONS AND WATCHING BRIEF**

**POST-EXCAVATION ASSESSMENT OF
POTENTIAL FOR ANALYSIS**

AND

UPDATED PROJECT DESIGN

NETWORK ARCHAEOLOGY LTD

for

ENTREPOSE INDUSTRIAL SERVICES LTD

on behalf of

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EXECUTIVE SUMMARY

An archaeological investigation was undertaken on the route of the 94.09 km Pannal to Nether Kellet gas pipeline constructed during 2006 and 2007. Twenty palaeochannel and peat deposits were investigated. Twenty-three archaeological sites were recorded and excavated, following targeted evaluation trenching and during a permanent-presence watching brief on the topsoil stripping and pipe-trenching. In addition, twenty-seven areas were topographically surveyed, of which seventeen were relict field systems and nine were earthwork sites. All the associated field boundaries were recorded on the route, which included seventy-two remnant medieval field boundaries and three hundred and thirty-five dry stone walls.

The earliest site was a Mesolithic flint scatter found in topsoil at Wham, near Settle. A targeted test pitting programme was also carried out in the lowland zone of the Yorkshire Dales National Park to locate further Mesolithic flint scatters, but did not produce any significant flint distributions.

An oval stone ring was excavated at Bank Newton, near to Gargrave. This monument is currently thought to have been a type of ring cairn constructed during the early Bronze Age or possibly the Neolithic period. Horse bones found during the excavation of the interior of the ring do not seem to belong to any known breed and may represent a previously unrecorded type of horse. No human remains have been identified so far; therefore the monument does not appear to have had a funerary function. Near to the monument, other remains also provided evidence of occupation from the Bronze Age to the Romano-British period; settlement may even have extended into the early medieval period. A large assemblage of broken quern stones was recovered, some of which had been incorporated into the floors of the Romano-British stone buildings, including a particularly large specimen, which had perhaps been used as a millstone.

A semi-circular gully and associated features, excavated at Thorlby Springs, has provisionally been interpreted as the remains of a late Neolithic or the early Bronze Age timber structure. A waterlogged burnt mound with an intact wooden trough, excavated at Turners Hill, and a burnt mound site at Backland Wood are so far undated but may be middle Bronze Age or earlier.

A previously unrecorded example of prehistoric rock art, a cup-marked boulder, was located on the pipeline route in a field between the villages of Embsay and Halton East. After recording, it was preserved by re-siting it as close as possible to its original position.

Three stone-built medieval to post-medieval domestic buildings were excavated at Scales, Halton and Lawkland Green. The late medieval to post-medieval industrial past of the region was represented by an iron smelting bloomery furnace, three early brick clamps and ten kilns, for lime-burning or other functions, excavated in Lower and Upper Wharfedale.

Further documentary, stratigraphical, artefactual and settlement pattern analysis is recommended in order to place the archaeological sites in their cultural heritage context within the landscape and to refine the interpretations of their significance and function. It is recommended that the results of these further studies should be submitted for publication in the Yorkshire Archaeological Society monograph series, with specific findings on industrial and domestic buildings being considered for dissemination as articles in the National Industrial Archaeology Journal and the journal of the Yorkshire Vernacular Buildings Study Group.

1 INTRODUCTION

This document is an assessment of the analysis and publication potential of archaeological data recovered during surveys, evaluations, excavations and watching briefs along the route of the Pannal to Nether Kellet National Grid gas pipeline, in Yorkshire and Lancashire.

This assessment includes a summary of the archaeological sites; a refined research agenda; an itemised proposal for the comprehensive analysis and publication of the recovered data, broken down into specific tasks; and a publication plan.

The document has been prepared in accordance with the guidelines presented in the Management of Archaeological Projects, second edition (MAP 2) (English Heritage 1991) and MORPHE (English Heritage 2006). It represents the seventh stage in a phased programme of archaeological works commissioned by Entrepouse Industrial Services Ltd on behalf of National Grid, and carried out by Network Archaeology Limited. This document represents the post-excavation assessment of the potential for analysis of the survey, evaluation, excavation and watching brief archives.

The archaeological fieldwork, which was carried out by Network Archaeology Limited between January 2006 and August 2007, has been assigned the project codes PNK06 and PNK07. The project archive will be deposited with the Craven Museum and Harrogate Museum: project accession numbers have yet to be assigned.

2 AIMS OF THE ASSESSMENT

The general objectives of the archaeological fieldwork were to:

- mitigate the full effects of the development on identified archaeological sites on the route of the Pannal to Nether Kellet pipeline, by archaeological investigation
- determine and understand the nature, function and character of the archaeological remains identified during previous stages of work in their cultural heritage and environmental setting
- obtain a chronological sequence for the human activity represented by the archaeological remains, and to place it within its local, regional and national context
- investigate how settlements, monuments and agricultural remains are integrated into the landscape within each period
- establish the environmental sequence and context of archaeological deposits and features
- interpret artefacts within their regional context, including contributing to regional, environmental and artefact studies
- recover and analyse dated palaeo-environmental remains for comparison with local and regional material, in order to better understand the local climate of each period and the natural flora and fauna of the region
- identify and record any previously unknown archaeological remains that are revealed by construction work
- undertake a programme of post-excavation assessment, analysis, reporting and publication commensurate with the results and in agreement with the Senior Planning archaeologists.

The aims of this document are to:

- present the background, methodology, results and recommendations for further study relating to the archaeological works undertaken on the Pannal to Nether Kellet pipeline
- assess the potential of the data collected during the fieldwork to contribute to any archaeological research priorities highlighted in current national, regional and local research agendas, and to identify any other pertinent areas of research that the results could address
- create an updated project design consisting of fully costed proposals for further analysis, justifications for carrying out these proposals, proposals for publication and dissemination of the results, and a timetable for completion of the project
- create a structured and accessible project archive, in accordance with current national and local guidelines.

3 PROJECT BACKGROUND

3.1 The Pannal to Nether Kellet pipeline

National Grid (NG) identified the need for an addition to its National Transmission System (NTS) of pipelines within the north-west of England. This will meet predicted load growth and facilitate greater efficiency in the distribution of natural gas, primarily between the eastern and western networks of the UK. This high pressure gas pipeline is 94.09 km long, and runs through North Yorkshire, including part of the Yorkshire Dales National Park; the areas of Leeds and Bradford Unitary Authorities in West Yorkshire; and Lancashire. It connects existing Above Ground Installations (AGIs) at Pannal (SE 252 508) in North Yorkshire and Nether Kellet (SD 520 674) in Lancashire (fig. 1). The pipeline was constructed over two seasons: the eastern part in 2006 and the western part in 2007.

Each plot of land (usually a field) along the course of the pipeline was individually numbered by the principal contractor, Entrepose Industrial Services Ltd (EIS), and the plots are referred to in this report by the contractor's number. Beginning at the Pannal AGI, each road crossing was consecutively numbered 1, 2, 3 etc. Each plot was then given a number consisting of the number of the previous road crossing crossed by the pipe route followed by a suffix indicating its position in the sequence of plots encountered since that road crossing. So, for example plots following road crossing 1 were numbered 1-1, 1-2, 1-3, until road crossing 2 was reached, whereupon the numbering started again at 2-1.

Pipeline construction involved four main phases of work:

- *Rights of way activities*, including hedge removal; cleaning, fluming and temporary bridging of ditches; fencing the working width; topsoil stripping of access areas and the installation of pre-construction drainage
- *Topsoil stripping* across the working width, which would normally be a 43m easement with approximately 33m stripped, as it does not include the area under topsoil storage. This area was increased or decreased for short distances at railway, road and river crossing points and other areas of constraint
- *Excavation of a header trench followed by pipe trench excavation and pipe-laying*. The pipe-trench had a usual excavated depth of 2.5m and width of 1.8m, but was increased to up to 6m where the pipe was bored beneath railways, roads, river crossings and other areas of constraint
- *Reinstatement* involved the replacement of topsoil and the installation of post-construction drainage. After the pipe had been ditched and the pipe-trench backfilled and consolidated, the compacted subsoil surface was normally ripped up to a depth of 0.45m using a heavy-tined plough fitted to the back of a bulldozer, before the topsoil was reinstated.

4 PROGRAMME OF ARCHAEOLOGICAL WORKS

4.1 Staged approach to managing risk

The most cost-effective means of managing archaeological risk is to implement a staged approach to investigation and mitigation, as laid out in Table 1.

Table 1: Summary of the staged approach to investigation

Stage of archaeological investigation		National Grid phase of works
Stage 1	Feasibility study of route corridor options	Feasibility assessment
Stage 2	Desk-based assessment of route corridor and palaeo-environmental assessment	Conceptual design
Stage 3	Field surveys of entire preferred pipeline route	Detailed design
Stage 4	Evaluation of targeted areas along preferred route	Detailed design
Stage 5	Mitigation: excavation and topographic survey	Detailed design/Construction
Stage 6	Watching brief during construction	Construction
Stage 7	Assessment and report	Post-construction
Stage 8	Analysis and publication	Post-construction

This assessment represents stage 7, and is primarily concerned with the results from stages 4, 5 and 6 (evaluation, excavation and watching brief), although some additional stage 3 survey work is also included, and the document makes use of data collected during stage 2. All works were carried out in accordance with the generic archaeological briefs for archaeological desk-based assessments, field surveys, evaluations, excavations, watching briefs and post-excavation works (Transco 1999a, 1999b; National Grid/Transco 2004).

4.2 Stage 1: Corridor investigation study

A Feasibility/Route Corridor Investigation Study was instigated by Transco in April 2001, in order to comply with *The Public Gas Transporter Pipe-line Works (Environmental Impact Assessment) Regulations 1999* (National Grid/Transco 2001).

Objectives and methodology

The study collated information from a 1478 km² area of search, and considered a number of possible route corridors. Archaeology was one of a large number of constraints considered during the study.

Results

Initial appraisal of potential impacts on all of the known constraints resulted in the selection of three *route corridor options* within each of which was identified a *preliminary route*. Comparison with the route options resulted in the selection of a *preferred route* (MWH 2005).

With specific regard to archaeology, the report indicated that the study area contains a high density of archaeological remains, and that none of the route options could be selected as being preferred in terms of least impact on archaeology, given the information available at that time.

Recommendations

A detailed archaeological assessment of the preferred route was recommended, commencing with a desk-based assessment.

4.3 Stage 2: Desk-based assessment

4.3.1 Desk-based assessment

Once a preferred route had been established, an archaeological desk-based assessment (ADBA) was commissioned by Entrepose Industrial Services Ltd (EIS) on behalf of National Grid (Network Archaeology Limited 2005a).

Objectives and methodology

The ADBA collated known archaeological information from national, county and local data-holding bodies, within a 1km-wide study corridor, based on the proposed pipeline centre-line. Further details are presented in the ADBA report itself.

Results

The ADBA listed 1,905 sites of archaeological importance within the study corridor. The assessment identified 394 sites that would be affected by construction along the proposed pipeline route, with a further 113 sites where an impact was possible but uncertain.

Forty-one sites warranted specific consideration. These included enclosures and ring ditches, scatters of Mesolithic and Neolithic flint, Roman roads, motte-and-bailey castles, sites of former buildings and agriculture-related earthworks. Attention was drawn to nearby cup-and-ring marked rocks, as indicating the possibility that further unrecorded examples may exist on the route itself.

The archaeological potential of localised industrial activities, railways, roads was emphasised, along with listed buildings and historic landscapes and boundaries, in particular relict field systems, earthworks and dry stone walls.

Recommendations

The ADBA recommended that the next stage of the project should consist of field surveys, covering the proposed pipeline's working width and the sites proposed for associated engineering works, and comprising a fieldwalking survey in arable fields, a geophysical survey in selected areas, a field reconnaissance survey of the entire route, and a topographical survey of extant settlement and relict field systems identified by the field reconnaissance survey (this last to be carried out as part of Stage 6 mitigation).

Existing 'historic' boundaries and former field boundaries identified as being potentially historic, especially those which proved to incorporate an Important Hedge and/or early dry stone wall, were recommended for detailed recording. A boundary was deemed to be 'historic' if it met the criteria set out in Part 2 of Schedule 1 of the Hedgerows Regulations 1997, whether or not a hedgerow was present.

4.3.2 Palaeo-environmental assessment

A palaeo-environmental assessment of potential was commissioned and undertaken prior to the 2006 construction season (Rackham 2006). The assessment was primarily desk-based, but also included a field visit; it was carried out, after the main field surveys (see 4.4 below). The survey is discussed in detail, and the results laid out, in Appendix E.

4.4 Stage 3: Non-intrusive field surveys

This stage initially comprised field reconnaissance and fieldwalking, geophysical survey and airborne laser altimetry analysis survey, commonly referred to as LiDAR, an acronym of 'Light Detection and Ranging'. Following recommendations made by Robert White, the Senior Conservation Archaeologist within the Yorkshire Dales National Park (YDNP), a metal-detecting survey was also carried out in the parts of the route that were within the YDNP.

4.4.1 LiDAR Survey

Objectives and methodology

The survey was limited to a c. 1km wide corridor (total 9445 ha) centred on the provisional line of the pipe. This study made use of helicopter-collected LiDAR data acquired by Network Mapping, covering a total area of approximately 22,450 ha, and was carried out by the HP VISTA centre, University of Birmingham (Challis 2005).

The study aimed to provide information on the locations and extent of archaeological earthworks, palaeochannels in river floodplains, and other features of archaeological significance within the scheme corridor, identified through the analysis of airborne laser altimetry elevation data.

As well as the LiDAR data, orthorectified digital aerial photographs were provided. The photographs were imported into ArcGIS and used to assist in interpretation of the LiDAR elevation data. Where appropriate, LiDAR elevation data and aerial photography were merged to produce visualisations of archaeological sites.

Results

The outlines of 139 areas of archaeological earthworks were identified, covering a total of 1258 ha. Archaeological remains ranged from prehistoric round barrows and ditched enclosures to post-medieval mining remains. Medieval ridge-and-furrow formed the most common form of archaeological evidence (Challis 2005).

In addition, palaeochannels were identified within floodplains at six of the river crossings along the proposed scheme route.

Recommendations

The results of this study were utilised as a contribution to a complete archaeological and environmental assessment of the proposed pipeline route. It was recommended that all areas of archaeological earthworks identified from LiDAR data within the scheme corridor should be inspected in the field by suitably qualified archaeological staff.

4.4.2 Field reconnaissance and fieldwalking

Objectives and methodology

The purpose of the field reconnaissance and fieldwalking surveys was to confirm the presence and ascertain the importance of sites highlighted by the ADBA, and to locate hitherto unidentified sites. This information was used to assist with route modifications in order to achieve an archaeologically least damaging route, and to provide a basis for further stages of investigation.

Field reconnaissance involved a visual inspection of the working width in every accessible field along the pipeline route in order to check for the presence of upstanding archaeological remains, or signs that archaeology may be present beneath the current ground surface. Basic recording was undertaken of findings such as structures, earthworks, finds concentrations, vegetation marks and topographical variations. Dry stone walls encountered along the pipeline route were individually recorded, and this record is presented and discussed in Appendix F.

Fieldwalking was carried out by a team of four archaeologists walking at 10m spacings within each arable field. Five transects were walked, centred on the centreline of the proposed pipeline. Assuming each walker scanned one metre either side of each survey transect, this gave a 42m wide survey area, and provided 23% coverage of the 43m wide working width.

Recovered artefacts were located with a hand-held GPS system, and given a unique numeric reference. Details of each field walked (including weather/light conditions, ground visibility,

relief, walkers present) were recorded on pro-forma record sheets. The fieldwalking results are presented in the field survey report (Network Archaeology Ltd 2005b).

Results

The survey of the 560 fields along the route identified 239 sites of archaeological potential and recorded 648 field boundaries. All of the sites were found through reconnaissance, since only seven fields were suitable for fieldwalking, and from these, only eight widely scattered artefacts were collected. During the course of the work, 335 dry stone walls were recorded, including 27 identified as the possible pre-enclosure 'wide-top' type.

The surveys corroborated 55 ADBA sites lying on the course of the pipeline route, whilst 210 ADBA sites lying on the route were uncorroborated. Altogether, it was concluded that 200 sites would potentially be affected by the pipeline groundworks; these comprised: remnant medieval field boundaries (72), ridge-and-furrow (49), byways (23), drainage features (24), possible structures (8), agricultural features (9), undiagnostic earthworks (6), mineral extraction sites (6), possible settlement features (1), Melling Tunnel earthworks (1), and a possible burial mound (1).

Recommendations

The survey report made a series of recommendations, for site avoidance, geophysical survey, evaluation, topographical survey, excavation where appropriate, and watching brief during construction.

4.4.3 Site avoidance

The following five sites were initially recommended for avoidance:

LS 323773 and 324186 Boundary stones (NGR 378193 464681 and 378186 464680)

Both these sites are Grade II listed, and were assessed in the DBA as category A. They lay between Plots 32-11 and 33-1, and were close to, but outside, the proposed working width at the time of reporting. Consequently, they were provisionally recommended for avoidance should a change of route bring them within the working width. No such change was made, and an avoidance strategy was not required.

FSU 009 Melling Tunnel and associated banks and spoilheaps (NGR 360558 470759)

The pipeline route crossed these earthworks, assessed as category D, in the northern part of Plot 51-1. The pipeline was bored beneath the Melling Tunnel, and so the earthworks were not affected and no further avoidance strategy was required.

FSU 021 Pair of stones (NGR 367557 471198)

Two limestone monoliths, one horizontal and one vertical, lay approximately 8m apart, in the south-east part of Plot 45-7. The function and date of these stones could not be ascertained, and so they were assessed as category D in the field survey report. Although they lay close to the proposed pipeline route, they proved not to fall within the working width, and no avoidance strategy was necessary.

FSU 192 Earthen mound: possible barrow (NGR 408397 450410)

A circular earthwork was recorded towards the south-eastern corner of Plot 12-3, directly on the proposed pipeline route, and was interpreted as a potential barrow.

Geophysical survey was recommended at this site. No anomalies indicating the presence of a barrow were recorded in Plot 12-3, but distinct linear anomalies and high susceptibility levels, potentially indicative of industrial activity, were noted. As the 1st edition Ordnance Survey map depicts a lime kiln in this field, the site proceeded to evaluation (Appendix G). No archaeological remains other than remnants of collapsed dry stone walls were found, and an avoidance strategy was not judged to be necessary.

4.4.4 Geophysical survey

Network Archaeology Ltd (NAL), on behalf of EIS, commissioned Pre-Construct Geophysics to carry out a programme of geophysical survey along the pipeline route. This covered sites identified by the ADBA and field reconnaissance and fieldwalking surveys, as well as a number of sample areas of unknown potential (Pre-Construct Geophysics 2005a, 2005b).

Objectives and methodology

The survey methodology was based upon guidelines set out in the English Heritage document 'Geophysical Survey in Archaeological Field Evaluation' (David 1995).

A gradiometer survey was undertaken using the zigzag traverse method, with successive instrument traverses spaced 1m apart, with readings taken at 0.25m intervals within 15m, 20m and 30m-wide grids. This data was then supplemented by a magnetic susceptibility survey undertaken along three parallel instrument traverses spaced 10 m apart, with readings taken at 20m intervals.

The raw data was processed to remove or reduce the effect of spurious readings and presented graphically as greyscale images at 1:1250.

Results

The main route survey identified areas of strong archaeological potential. Geophysical survey was also carried out on a previously proposed re-route on the Chatsworth Estate, to evaluate the viability of this route option (Pre-Construct Geophysics 2005b). The Chatsworth survey revealed that the area in question does have archaeological potential, and recommended re-routing away from this area, or carrying out archaeological evaluation trial trenching to determine more fully the nature, extent and significance of the remains.

A geophysical survey of two areas where the presence of archaeological remains could have had severe implications for construction was commissioned by National Grid, and carried out by West Yorkshire Archaeological Services (WYAS 2005). At Embsay the WYAS survey was aimed at locating the possible site of a former medieval priory, whilst at Burton in Lonsdale, it targeted a possible Roman road. Neither survey located anything of significance.

Recommendations

The results of the principal route survey formed one of the bases of the selection of areas for trench evaluation. Following the positive results from the proposed re-route on the Chatsworth Estate, the route option at this location was subsequently abandoned.

4.4.5 Metal-detecting survey in the Yorkshire Dales National Park (YDNP)

Approximately 4.6km of the pipeline was constructed through the YDNP, in two separate stretches amounting to 28 plots. All of these fields were under pasture. The Senior Conservation Archaeologist for the YDNP requested a metal-detecting survey across the 4.6km stretch. This recommendation was made in the light of the discovery of two Bronze Age swords in proximity to the route through the YDNP (Robert White *pers. comm.* 2006). The survey was carried out concurrently with the evaluation programme.

Objectives and methodology

The survey involved one metal-detectorist scanning the topsoil in three parallel transects at 10m separation: one on the pipeline centre-line, the other two either side of this point. Any located metal finds were retrieved and placed within plastic bags marked with the section/plot number. Each artefact was located using hand-held GPS, with a normal accuracy of around ± 5 -10m. Further details are presented in the Written Scheme of Investigation (WSI) for Metal-Detecting Survey (Network Archaeology Ltd 2006b).

Results

The metal-detecting survey produced a small assemblage of metal objects, all of relatively minor significance and with no concentrations of material (Appendix A).

Recommendations

No further work was recommended.

4.5 Stage 4: Evaluations**4.5.1 Trench Evaluation**

The purpose of this stage of work was to evaluate the archaeological potential of sites indicated by previous stages of work. Geophysical survey located a number of discrete areas along the route with different degrees of archaeological potential: those areas with strong archaeological potential, in correlation with ADBA and field survey data, were selected for evaluation. More details can be found in the Trench Evaluation WSI (Network Archaeology Ltd 2005c).

Objectives and methodology

A total of 102 trenches in twenty-one separate areas were initially proposed in 2005, with between three and fourteen trenches per area (see Appendix G). Trenches were either 20m (75 trenches), 30m (25 trenches), or 40m long (two trenches). Twenty of the evaluation areas were in North Yorkshire, with one in Lancashire.

In addition to the works proposed above, a potential stone cairn overlying a possible enclosure was evaluated in 2005 by two 20m trenches. This feature was located in Plot 7-23, in the Parish of Askwith, and coincided with a site recorded in the North Yorkshire Historic Environment Record (HER), reference number MNY22099. It was found to be a relatively insignificant, modern stone dump, overlying an infilled enclosure ditch that may have formed part of a medieval field system (Network Archaeology 2005d).

In 2006, NAL recommended, with the subsequent agreement of the NG Archaeological Advisor, that a further seven areas with geophysical anomalies should be targeted for trench evaluation. Consequently, a total of twelve trenches were opened. In addition, another 20m trench was excavated in Plot 12-2 to investigate a possible barrow anomaly, which was found to be a natural drumlin, and three trenches were excavated in Plots 19-3 and 19-6, targeted on a possible Roman road and medieval earthworks respectively, following the advice of Dr Tim Taylor, consultee of the YDNP. In total, therefore, 120 trenches were excavated, two in 2005 (figs. 2a-2e), 16 in 2006 and 102 in 2007 (for table of evaluation sites, see Appendix G).

For each site, trenches were positioned to examine both the geophysical anomalies and the apparently blank areas in between, in order to locate any geophysically less-responsive archaeology, and to determine the limits of any archaeology within a site. Where an evaluation coincided with a topographic survey site, the topographic survey was carried out first.

Topsoiling of trenches was undertaken using a mechanical excavator fitted with a 2m-wide toothless ditching blade, with topsoil being separated from subsoil.

Results

The following trench descriptions are limited to those areas which subsequently became open area excavations. The full results of the evaluations are tabulated trench by trench in Table 2, Appendix G, and the trenches in which features were encountered are illustrated within the appendix (figs. 1-4).

Plot 3-5

Two linear features and a pit were identified in Trench 49 in Plot 3-5 (fig. 2a): Both ditches ran north to south on the same alignment, and were sealed by the same stone capping, (1012), a

layer of unworked stone fragments ranging in size from 25mm to 550mm. The ends of the ditches abutted, and did not intercut: they were interpreted as being contemporary. Ditch [1010] was 1.10m wide and 0.50m deep; its greyish-brown sandy silt fill, (1011), produced a flint flake and a samian sherd. Ditch [1016] was 1.0m wide and 0.56m deep; no dating evidence was retrieved from brownish-grey sandy silt fill (1017). Ditch [1010] cut sub-oval pit [1028], which was 2.50m long, 0.50m wide and 0.32m deep, with a dark greyish-brown sandy silt fill which produced no finds.

Part of a small burnt feature, [1013], was found in Trench 51. The exposed portion of this feature was 0.27m long, 0.30m wide and 0.08m deep, with two fills: a fired clay lining, (1014), below a charcoal-rich deposit, (1015). The feature contained no dating evidence; its unexcavated portion could not be found when Plot 3-5 went on to full excavation. Trench 51 also contained a north to south running ditch, [1021], 1.60m wide and 0.60m deep; no dating evidence was retrieved from its single fill, mid-brown silty clay (1022). Both features cut a sequence of redeposited subsoils and agricultural banks. Trench 52 sampled an extant earthwork, but produced no dating evidence.

Plot 15-1

A burnt feature, interpreted as a kiln, was encountered in Trench 24 of Plot 15-1 (fig. 2b). Kiln [602] was roughly circular, with a fired clay lining, (603), under a back-fill with burnt stone inclusions, (604). It was excavated in quarter-section, and no dating evidence was found during the evaluation.

Plot 21-18

A linear feature was found in Trench 34 in Plot 21-18 (fig. 2b). Ditch [302] was 0.80m wide and 0.34m deep, oriented east to west; its mid-grey silty clay fill, (303), yielded burnt bone and prehistoric pottery.

Trench 36 investigated a bank and ditch. Shallow ditch [304], 1.30m wide and 0.30m deep, was oriented east to west within the trench, but was visible outside it as a surface earthwork, following the base contour of the hill. It was filled by yellowish-brown sandy clay (305), probably eroded from the associated bank (306), c. 3m wide and 0.6m high.

A visible bank investigated by Trench 37 proved to be a stone ringwork, interpreted as a potential ring cairn. The stony bank, (307), crossed the trench in two places c. 15m apart, with cobbled area (308) in the centre. A stony deposit in Trench 32 was not recorded at the time, but was later interpreted as a deteriorated portion of the stone ringwork.

Plot 28-1

A kiln, with a possibly associated linear feature, was identified in Trench 38, in Plot 28-1 (fig. 2c). Kiln [800] measured 3.30m by 2.80m in plan and 0.90m deep, with a flue at the western end. No lining was identified; the kiln appeared to have been back-filled with redeposited natural, 801. An east-to-west running linear feature, 806, passed close to the north side of the kiln. Its fill contained burnt material, possibly derived from the kiln, but the feature was irregular and very shallow, suggesting that it was a hedgeline. Two shallow sub-circular depressions, resembling the surface feature visible above kiln [800] before the excavation of Trench 38, were noted to the south of the trench, but did not lie within the evaluated area.

Recommendations

Following the trench evaluation, it was thought that four areas in Plots 3-5, 15-1, 21-18 and 28-1 had the potential for containing archaeological remains of sufficient number and extent that their excavation to the standard defined by the agreed WSI could not be guaranteed within the two-week window between the topsoil strip and the stringing out of the pipe lengths. Therefore, at each of these locations, excavations were undertaken in advance of construction. It was also recommended that the entire route should be subject to a watching brief, and that any significant

archaeological remains located by this watching brief should be recorded, if possible, by excavation.

4.5.2 Test pits in the Yorkshire Dales National Park (YDNP)

Previous concentrations of flint scatters have been located in the YDNP around the Malham area. The Senior Conservation Archaeologist for the YDNP therefore suggested that opening a series of hand-dug test pits along the route would be more appropriate than trench evaluation, as these would be more suitable for locating potential prehistoric sites represented by flintwork.

Objectives and methodology

The test-pitting methodology was based on the Yorkshire Dales Hunter-Gatherer Research Project, a scheme principally concerned with studying Mesolithic activity, as well as evaluating the impact of bioturbation on archaeological sites within the YDNP (Donahue 1996, 1997, 1998, 1999). More details can be found in the Test Pit WSI (Network Archaeology Ltd 2005g).

The test pits were located within the 28 fields crossed by the route within the YDNP, a total distance of 4.6km (for test pit locations and results see Table 1, Appendix G). All the fields evaluated were under pasture. It was agreed that test pits would be opened at 100m intervals along the centre-line of the route. A total of 45 test pits, each measuring one metre square, were therefore proposed. Where a proposed test pit appeared to coincide with an obstacle, such as a field boundary or track, the location was shifted slightly to avoid the obstacle. The test pits were uniquely numbered and the national grid reference was measured to the centre of each pit with a Leica System 500 GPS unit, with an accuracy of ± 20 mm. All test pits were hand-dug to the horizon of the natural drift geology, or to a depth of 0.75m if that horizon was not reached. The excavated spoil was passed through a 5mm mesh sieve to retrieve small artefacts.

The test-pitting was carried out in 2006.

Results

An undated stone-lined drain was encountered in TP7 in Plot 16-5. Both TP14 in Plot 17-2 and TP22 in Plot 17-6 contained irregular features, which were interpreted as the result of the disturbance of large stones by deep ploughing. TP16 in Plot 17-3 contained part of the cut of a shallow, curvilinear feature, visible on the field surface, while TP32 in Plot 19-3 contained part of a shallow linear cut, which could tentatively be associated with a visible surface feature. Neither of these features produced any datable material. A narrow linear cut encountered in TP 26 in Plot 17-8 might have been part of a beam slot or a field drain; the feature produced no evidence of its date or function.

A single flint flake was retrieved from TP1 in Plot 16-1, and fragments of heat-affected, but otherwise unworked, flint from TP3 in Plot 16-1 and TP5 in Plot 16-2 (see worked flint and heat-affected flint reports, Appendix C).

Recommendations

No further work was recommended as the results of the test pitting were largely negative.

4.5.3 Mineral extraction trial pits

Four additional trial pits were excavated in the Craven District, in order to investigate hollows in the ground surface that may have represented the positions of abandoned mine workings. Two pits, TPM 034 (NGR: 372192 470653) and TPM 035 (NGR: 372240 470640) were excavated in Plot 40-7, in Clapham cum Newby parish; one, BHM 030 (NGR: 365725 471220) in Plot 44-4 in Ingleton parish, and one, BHM 028 (NGR: 365820 471320) in Plot 44-7, also in Ingleton parish.

The test pits were excavated by machine, and were approximately 2m square and 1.20m deep, with the exception of TPM 035, which was extended to a length of 5.5m in order to avoid three stone drains. No indications of mine workings, or of any other activity, were encountered in any of the pits.

4.6 Stage 5: Excavation and other mitigation

4.6.1 Topographic survey

The field survey report recommended that selected earthwork sites identified by the field reconnaissance survey along the proposed pipeline route should be recorded by topographic survey. In total, 41 sites were targeted, comprising 25 areas of earthwork ridge-and-furrow and 16 other earthwork sites (Network Archaeology Ltd 2005b). The survey is discussed in detail and the results tabulated in Appendix D.

4.6.2 Excavation

Excavation was carried out where significant densities of archaeological material had been located, either by trench evaluation or during the watching brief.

Objectives and methodology

The aim of each excavation was to preserve by record archaeological remains that could not be avoided or that did not merit the additional expense entailed by preservation *in situ*, as well as to address site-specific archaeological research questions. The positioning of each excavation area was agreed with the client and contractor, and set out using a Leica System 500 GPS accurate to $\pm 20\text{mm}$. All archaeological remains were located in relation to a site grid.

In each case, topsoil was removed using a mechanical excavator, fitted with a toothless ditching bucket, working under close archaeological supervision. A sufficient proportion of every archaeological deposit was stratigraphically hand-excavated to meet the stated objectives. Procedures for recording and environmental sampling adhered to the methods given in the Excavation WSI (Network Archaeology Ltd 2006a).

Results

A total of twenty-two sites required area excavation (see Table 4 and figs. 2a-2e). Most of these were investigated in 2006, and this included four substantial sites revealed by trench evaluation. These were in Plot 3-5 in the parish of Farnley, Plot 15-1 in the parish of Halton East, Plot 21-18 in the parish of Martons Both, and Plot 28-1 in the parish of Rimington.

A further six smaller sites requiring area excavation were located during the watching brief: these were in Plot 8-5 in the parish of Denton, Plot 12-4 in the parish of Addingham, Plot 13-19 in the parish of Draughton, Plot 15-8 in the parish of Embsay with Eastby, Plot 19-1 in the parish of Stirton with Thorlby, and Plot 21-10 in the parish of Broughton. Three additional sites requiring area excavation were outside the original surveyed easement: these were Plot 6-7 in the parish of Weston, and two sites in Plot 7-18, in the parish of Askwith.

During the 2007 construction season, no major sites requiring area excavation were identified, either by the two outstanding evaluations, or by the watching brief during topsoil stripping, though the latter did locate nine minor sites which required excavation. A single site was located during the watching brief on the pipe-trench section, in Plot 31-2 in the parish of Rathmell. No excavation could be carried out on this site, but as it features in the report, it has been included with the twenty-two excavation sites in Table 4.

Recommendations

Following the excavations themselves, it was recommended that each site and its immediately adjacent area be intensively monitored during the topsoil strip and pipe trenching, in order to check for any associated features, as well as to record the drift and solid geology.

4.7 Stage 6: Watching brief

The watching brief comprised two main elements: routine monitoring throughout construction to identify and deal with any unanticipated archaeological remains, and intensive targeted monitoring at locations identified by earlier stages of work.

Objectives and methodology

The primary purpose of the watching brief was to locate and record any archaeological remains that had not been identified by earlier stages of archaeological work, and that would be affected by the development.

The construction methods involved the removal of topsoil to subsoil levels across approximately one third of the easement, using back-acting tracked excavators fitted with toothless ditching buckets. Bulldozers were then used to push the topsoil from the remaining two thirds of the working width into a continuous bund up to 3m high and around 10m wide, which was stored along one side of the working width. Subsoil deposits were moved (benched), where necessary, to eliminate side slopes. These procedures were followed by the excavation of a pipe-trench into which the welded pipe was placed before backfilling.

Permanent-presence monitoring of all ground-disturbing activities was maintained by suitably experienced watching brief archaeologists throughout construction and, where necessary, additional excavation teams were mobilised to investigate archaeological remains that could not be dealt with by the watching brief archaeologists.

Monitoring took place during pre-construction drainage at selected sites of archaeological potential, which had not been subject to trench evaluation, or where trench evaluation was inconclusive, for example areas where known or suspected Roman roads cross the route. The suspected Roman Road at Ringers Brow, Wennington (Lancashire), Plot 11-6, (Neil Campling *pers. comm.*, 2006) is one such area.

The main focus of the watching brief was on topsoil stripping of the easement, as well as of mineral extraction trial holes, pipe storage areas, compounds, car parks, and any other similar areas. Any subsoil stripping was also monitored.

The pipe-trench excavations, and any other deep excavations, were also monitored. The objective here was to identify any archaeological remains sealed by subsoils, and consequently not exposed by the topsoil strip. The pipe-trench was excavated by 360° tracked machines fitted with toothed buckets, and was dug to a typical width and depth of 1.8m and 2.5m respectively, though it was normally wider and deeper where the pipe was bored beneath railways, roads, rivers and other areas of constraint.

Results

A total of 570 fields were monitored during topsoil and subsoil stripping and pipe-trenching operations, as well as six pipe-dumps and works associated with the 58 road crossings. Eighteen areas of previously unknown archaeology, of sufficient significance to warrant being labelled a 'site', were identified by the watching brief. In addition, isolated features of minor significance were recorded in 144 plots during the watching brief: these are listed in Appendix B.

5 METHOD OF ASSESSMENT

5.1 Archive

Artefacts recovered during the fieldwork were processed as appropriate, weighed, quantified and catalogued according to accepted professional standards and guidelines. The artefacts were divided according to their material types. The pottery was sub-divided into the four main period groupings of prehistoric, Roman, medieval and post-medieval, and was sent to relevant specialists, initially to obtain spot dates. Full assessment reports were subsequently produced.

The written, drawn and photographic archives were cross-referenced and checked, to create a consistent and coherent paper archive. Site plans and matrices were digitised using AutoCAD. Excavation summaries were drafted.

5.2 Stratigraphic assessment

A matrix of contexts was prepared for each site using the written, drawn and photographic records. Stratigraphic relationships and the finds dates, chiefly pottery spot-dates, were used to sub-divide the matrix into phases. This phasing is currently not definitive, and will need updating where appropriate during the analysis phase of the project.

5.3 Specialist assessments

The following specialists were used:

Assessment	Specialist
Quern stones and worked stone	John Cruse, Elizabeth Wright and Hilary Major
Environmental (soil samples)	Valerie Fryer
Wood	Maisie Taylor
Kilns	David Johnson
Medieval settlement patterns	Stephen Moorhouse and Philip Hudson (North Craven Historical Research Group)
Production waste	Timothy Young
Rock art	Keith Boughey
Prehistoric pottery	Carol Allen and Chris Cumberpatch
Romano-British pottery	Barbara Precious, Jane Young and Ruth Leary
Animal bone	Jennifer Wood
Medieval pottery	Alan Vince
Post-Roman pottery	Jane Young and Alan Vince
Geo-archaeology	Stephen Lancaster (Headland Archaeology Ltd)
Flint artefacts	Tania Holmes
Special finds	Hilary Major
Ceramic building material	Alan Vince
Glass	Andrew Richmond
Artefact conservation	Lincoln Conservation Laboratories
Clay pipes	Alan Peacey

The specialists were commissioned to produce MAP2 assessment-level reports to establish if further study of the assemblages had the potential to address any previously established research questions. The specialists were also invited to flag up any other research aims to which the assemblages might contribute.

The specialists were supplied with site summaries, a context database, matrices, and digitised site plans.

5.4 Integration of data

Background information, and the material provided by the specialists, has been integrated into the site descriptions as appropriate. The results of the assessments and the recommendations of the specialists are incorporated into the section 'Summary of Assessment of Potential and Recommendations', and the full specialist reports are reproduced in Appendix C.

6 QUANTIFICATION OF THE ARCHIVE

Table 3

Phase	Section and Plot	NAL Site Ref.	Contexts	Plot/TP/ trench records	Plans	Sections	Samples	Digital Photos	35mm Films
Excavations	3-5	N494	52	N/A	27	11	0	23	4
Excavations	6-7	N468	22	N/A	2	3	6	0	2
Excavations	7-18	N443	120	N/A	16	17	6	0	10
Excavations	8-5	N428	95	N/A	55	19	35	4	6
Excavations	11-6	N405	5	N/A	1	1	0	0	2
Excavations	12-4	N392	35	N/A	5	6	0	15	6
Excavations	13-19	N375	48	N/A	3	4	0	41	2
Excavations	15-1	N365	49	N/A	17	23	7	24	4
Excavations	14-1	N372	7	N/A	2	1	0	18	30
Excavations	15-8	N348	40	N/A	3	11	1	35	4
Excavations	19-1	N325	123	N/A	17	30	54	118	6
Excavations	21-10	N307	140	N/A	7	10	10	167	10
Excavations	21-18	N286	435	N/A	51	111	77	816	22
Excavations	28-1 & 28-2	N230/231	104	N/A	36	44	7	69	22
Excavations	31-11	N200	14	N/A	2	2	0	14	2
Excavations	31-2	N208	1	N/A	0	0	0	0	1
Excavations	34-5	N178A	72	N/A	12	4	0	62	2
Excavations	35-8	N164	46	N/A	4	14	0	26	2
Excavations	36-3	N156	6	N/A	2	3		0	2
Excavations	50-2	N59	24	N/A	2	6	2	16	2
Excavations	54-2	N32	20	N/A	2	4	4	20	2
Excavations	56-7	N14	50	N/A	6	6	4	52	2
Evaluations	2006	N/A	275	86	82	83	0	200	30
Evaluations	2007	N/A	160	24	23	23	2	20	2
Topographic survey	N/A	N/A	N/A	29	N/A	N/A	N/A	38	8
Test Pits	2006	N/A	101	45	42	44	4	34	8
WBF 2006	2006	N/A	121	485	6	29	1	24	20
WBF 2007	2007	N/A	380	212	0	20	0	872	68
Totals	N/A	N/A	2545	881	425	529	220	2708	281

7 TOPOGRAPHY AND GEOLOGY OF THE ROUTE

The eastern end of the pipeline traverses relatively high ground between Harrogate and Otley. From there, the route drops down into Wharfedale, running along the side of the valley before crossing the river and rising over higher ground into Airedale. Crossing the Aire just west of Skipton, the route traverses the Pennine watershed south west of Gargrave, before descending to cross the Ribble south of Settle. Passing to the south and west of Settle, it crosses the Wenning and Greta into the Lune valley. The western end of the route is near the village of Nether Kellet, between Lancaster and Carnforth.

The route lies over Carboniferous rocks: Millstone Grit, limestones and shales, with coal measures close to the surface in the upper Lune valley. Superficial drift deposits, mostly of boulder clay but also glacial sands and gravels, overlie a large proportion of the route, and there are belts of alluvium in the bases of the river and stream valleys. The route overlies a wide range of soils, the most dominant being Brickfield 1 and Brickfield 2 (Soil Survey of England and Wales 1983), which are slowly permeable, loamy, silty soils.

The route, including its topography, geology and soil types, is described more fully in the Archaeological Desk-Based Assessment (Network Archaeology Ltd 2005a).

7.1 Geoarchaeological considerations

The varied topographical and geological locales of the route influence the archaeology of the pipeline in two principal ways: by affecting the range of activities carried out in the past, and by determining the survival or visibility of the traces of those activities.

A striking characteristic of the pipeline route is the dominance of pasture. Of the 560 plots crossed by the pipeline, only seven were used for arable agriculture, the rest were grassed. Permanent pasture limits the opportunity for detecting sites via fieldwalking, metal detecting or aerial photography, but does promote the preservation of earthworks and buried deposits. However, the present frequency of pasture does not necessarily reflect past landuse: ridge and furrow earthworks were often encountered on the route and suggest arable agriculture was once more common.

Whilst principally following river valleys, the pipeline route does alternate between upland and lowland zones. Generally speaking, lowland sites are prone to burial beneath alluvial or colluvial cover, whereas soil aggradation may be considered less likely in upland zones. Aggradation may preserve sites, and can promote soil conditions conducive to preservation of organic matter, but it can also conceal sites from archaeological prospection, paradoxically making them more vulnerable to eventual disturbance.

Much of the area of the pipeline route may presently be viewed as agriculturally marginal, but the land traversed lay within the altitudinal limits of tolerance for arable cropping for most of the recent human past (Nevell 1999). An assumption that the currently thinly populated upland areas would be bereft traces of past settlement, is not borne out by the evidence (King 1986, 186), although little excavation work has been carried out to determine the nature of this activity. Where upland sites have been excavated, evidence of settlement and the processing (but not necessarily the growing) of arable crops has been recovered, even at relatively high altitudes (e.g. Maude 1999). Generally, however, it may be assumed that lowland river valleys would have been favoured for settlement, as suggested by a recent survey of the archaeological resource of the Ribble valley (OA North and University of Liverpool 2006). Unfortunately, these sites may be vulnerable to shifts in the stream channel, and buildings in the valleys often used timber and are thus harder to identify than stone-built upland examples (White 2005, 27).

The uplands may be less directly exploited now than in the past, but until recently sites here were vulnerable to forestry operations, mining and quarrying. Enclosure of land up to the 300m contour in the eighteenth and nineteenth centuries saw much stone clearance for wall building, which has skewed the distribution of surviving stone-built prehistoric monuments such as cairns and stone circles (Manby, King and Vyner 2003, 99). Grouse moors, such as that near Embsay, do however represent a relatively archaeologically benign use of the higher ground in the gritstone areas.

The solid geology underlying the pipeline route largely dictates its topography and soil cover. For much of the route, acid soil conditions exist, which are inimical to bone preservation. The mineral resources of the area have been heavily exploited in the past, and as indicated above, this has often been to the detriment of the archaeological record. Yet a diverse past use of stone, for quern production, constructing buildings and field walls, and lime burning, contributes to a distinctive local heritage.

Pipelines tend to favour the topographic path of least resistance, although other considerations are important, such as maintaining a distance from population centres. For that reason, the Pannal to Nether Kellet pipeline largely follows a trans-Pennine routeway that has been in use for millennia: the Aire gap and its adjacent river valleys. Such a routeway may be expected to contain a higher than usual density of artefacts and features, ranging from polished stone axes to turnpike milestones. During the Roman period, the road system would have been particularly important in attracting settlement, and contributes much to this 'ribbon of archaeology'.

The geology of the pipeline route is therefore of prime importance in understanding its topography, drainage, soils and patterns of resource exploitation and settlement, and the complex interrelationships between them. The next chapter outlines the local archaeological resource that these interrelationships have produced.

8 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

The Pannal to Nether Kellet pipeline is nearly 100km in length, and its trans-Pennine route carries it through a variety of historically and topographically diverse areas. This chapter gives a necessarily short overview of the known archaeology of this long route, in order to set the results of the excavations (presented later in the report) in their proper local context. This section therefore favours the spectrum of archaeology discovered during the construction of the pipeline, and is not intended to be exhaustive. Drawing on recent secondary sources (e.g. Brennand 2006, Manby et al 2003), regional period overviews are given, and important sites are identified. A more detailed summary of sites from the pipeline study corridor (approximately a kilometre wide) is also presented, which summarises information from the desk-based assessment (Network Archaeology Ltd 2005).

8.1 Palaeolithic c. 500,000 BC – 8000 BC

The limestone scars around Settle, in particular Attermire and Giggleswick Scars, contain over half of all the known archaeological caves in the Yorkshire Dales. A survey of the area, which lies to the east and north of the pipeline corridor, recorded thirty-two caves and two rock shelters. Some of these are well known and have already produced artefacts, but many others were recorded as being of archaeological potential (Holderness *et al.* 2006). Archaeological material retrieved from these caves is chiefly datable to the end of the last glacial period, but the earliest animal bones from Victoria Cave, near Settle, date to the Upper Pleistocene interglacial, more than 120,000 years ago (White 2005, 16). More recent deposits at this site may contain the earliest recorded evidence of human activity in the north of England: butchered horse bone has been dated to shortly after the last glaciation (University of York, n.d.).

No Palaeolithic sites or findspots are known within the pipeline corridor itself.

8.2 Mesolithic c. 8000 BC – 4000 BC

In the central Pennine uplands of Lancashire and Yorkshire, Mesolithic activity is represented by relatively extensive flint scatters with a variety of flint tools and smaller concentrations with only one or two types of microlith. The former are normally interpreted as sites where a band of hunter-gatherers have carried out diverse activities and the latter as ‘hunting camps’ where a small group has prepared weapons (Butlin 2004). However, the theory that the population may have been semi-sedentary, even in the seventh millennium BC, finds increasing support from the pollen evidence. The similarities between the flint assemblages of the Later Mesolithic and Early Neolithic also suggests a gradual transition, with many aspects of Neolithic lifestyle and economy already in place by the fifth millennium BC.

Recorded Mesolithic activity within the pipeline corridor is confined to the moorland areas at the eastern end of the route. Mesolithic hunter-gatherers were attracted to waterside locations, and it is noteworthy that moorland flint sites tend to be located on slopes below crests and not far from spring lines (Butlin 2004).

Flint does not occur naturally in the study area, the closest available sources being the chalk wolds of eastern Yorkshire. Chert, however, occurs in the Carboniferous limestone of the Dales. Although it is a poorer material for tool manufacture than flint, chert was used in the face of flint scarcity by all local cultures until the Bronze Age (Cowling 1973, 9).

Known sites

Two groups of Mesolithic flints have been found on Denton Moor; one scatter was discovered on the ridge beyond Shooting Lodge (MON 50567) and the other was identified above Ben

Rydding toll bridge (MON 50569). Another Mesolithic flint site (MON 50564) was identified on the edge of Langbar Moor.

8.3 Neolithic to middle Bronze Age c. 4000 BC – 1000 BC

In Yorkshire, there is very little evidence of settlement sites of Neolithic date, but pottery of various Neolithic styles is well represented, which suggests that the absence of settlements may be more apparent than real (Pearson 1986). While hunting remained a major activity, both pastoral and arable agriculture was practised, with stock-rearing taking precedence in the early Bronze Age. No Neolithic houses have been identified in the Yorkshire Dales (White 2005, 20): occupation sites did not have substantial structures, but are marked by scatters of flint-working waste, fragmentary pottery and burnt stones. As in the Mesolithic, flint scatters of this period tend to be identified on the moors at the eastern end of the pipeline corridor, while single finds have occurred in the western half. The distribution of other sites, however, indicates that there was activity throughout the corridor.

Prehistoric rock art is found on natural rock outcrops in many areas of upland Britain, chiefly in the north of England, although it is very rare in Lancashire. The commonest form of decoration is the 'cup and ring' marking, where expanses of small cup-like hollows are pecked into the surface of the rock. These cups may be surrounded by one or more 'rings'. The meaning of the designs remains unknown, but they may be interpreted as sacred or religious symbols. They date to the late Neolithic and Bronze Age periods (2800 - c.500 BC) and are often found close to contemporary burial monuments. The main local concentrations of rock art and burial cairns are found in the moorlands crossed by the eastern section of the pipeline; numerous examples of cup and ring markings have been discovered on Middleton Moor, in the area immediately north of the pipeline corridor.

Neolithic burial sites are relatively scarce, and no ceremonial or funerary monuments of this period are recorded within the pipeline corridor, but long barrows in the region have produced evidence of cremations, large axial pits, and kerbed enclosures. From the early Bronze Age, round barrows came into use. Burial mounds, ring cairns and circles of standing stones survive today on the agriculturally marginal moorlands, where no field clearance or ploughing has taken place; the Giggleswick Scar area contains a high density of cairns. It is important to note that not all cairns are burial monuments: some are field clearance cairns, which may be found in groups, associated with the remains of low banks, fields and lynchets. The majority of clearance cairns are found on unenclosed land, possibly indicating the land was farmed in the past (White 2005, 27).

Around 1500 BC the construction of burial mounds ceased and burials took place in unmarked cremation cemeteries. The subsistence basis changed to settled agriculture, with small embanked fields laid out for cereal growing and separated from livestock pasturage. Systems of small rectilinear fields in the Craven district are thought to date from this period, though they continued in cultivation for many centuries.

Characteristic of the middle Bronze Age are 'burnt mounds', composed of fire-cracked stones, the by-product of dropping fire-heated stones into a trough of water. Their purpose has been variously interpreted as communal cooking, felting wool, brewing or as saunas. Bronze Age burnt mounds are relatively frequent in the Dales area, with over seventy recorded in Swaledale and Wensleydale alone (Laurie 2004), although they appear to have been less common to the west of the Pennines (Peter Iles *pers. comm.* and Hodgson and Brennand 2006, 44). Few sites have been excavated regionally, and none were previously known within the pipeline corridor, despite the abundance of watercourses and palaeochannels.

Known sites

Although most of the archaeological material retrieved from caves in the Attermire and Giggleswick Scars and surrounding area is late- or immediately post-glacial, a much later site was excavated in a rock shelter known as ‘Sewell's Cave’ in Lawkland. The cave, which lies in Common Scar, near Buckham Brow, is sufficiently close to the pipeline route to fall within the DBA study corridor. The excavation produced Roman material from the surface soil, but at a lower level, disturbed human remains were discovered, along with animal bone, flints, sherds of Peterborough Ware and two fragments of Beaker pottery. The human remains represented at least six individuals (two children and four adults) and are thought to belong to the late Neolithic or early Bronze Age (DSMR 3637).

A depression adjacent to the Roman road at Old Wennington Farm is thought to represent a prehistoric hut (LSMR 2665), and there is a possible prehistoric settlement at Bull Bank Farm, Wennington (LSMR 2667), with evidence of three possible huts, two of which are extremely large.

A cairn on Weston Moor survives to a height of c.0.8m and measures 6m in diameter (SM 28075). Nearby are two cup-marked gritstone rocks (SM 28072 and 28067). On Farnley Moor, cup marking has been identified on bedrock adjacent to the quarry edge at Crag Plantation (DSMR 19242).

Neolithic stone axes have been found within the pipeline corridor in the parishes of Lawkland (DSMR 3641), Stirton (DSMR 3991 and 27186), Gressingham (MON 42929) and Skipton (PA YORYM-9F26E2), while a stone axe-hammer was found near Hornby Park in Melling (LSMR 1189). Neolithic scrapers and other worked flints have been found on the edge of Middleton Moor over a number of years (MON 50481), indicating a small settlement in the area, and Neolithic and Bronze Age flints have been found in Upper Austby, Nesfield (MON 48324). Late Neolithic or early Bronze Age pottery, disturbed by medieval warrening, was found at Coney Garth in the parish of Rathmell (DBA:ZNR).

Single Bronze Age finds include a flanged bronze axehead found between Rathmell Beck and Hollow Gill (MON 45514) and a bronze socketed and looped spearhead found at Scale Mire Farm, Clapham (DSMR 3706). Three metal-detector finds of early Bronze Age flat axes have been reported to the Portable Antiquities Scheme, derived from the parishes of Hornby with Farleton (PA LVPL578), Nether Kellet (PA LVPL765) and Wigglesworth (PA LVPL1B0202).

8.4 Late Bronze Age to Iron Age c. 1000 BC – AD 70

Earlier Iron Age settlement is represented in the Pennine region by hillfort-type sites. Prominent examples would include Castercliffe (Lancashire) and Almondbury (W. Yorkshire), with the site on the summit of Ingleborough perhaps having more of a bearing on the archaeology of the pipeline route. Relatively few of these sites have been excavated by modern techniques, and questions remain regarding relationships between economy and settlement, and whether or not they were permanently occupied.

With regard to smaller prehistoric settlement sites in the region, these are difficult to identify as they appear to be morphologically very similar to Romano-British examples, and excavated data is again unusual. Earthwork sites containing typical elements such as sub-rectangular banked and ditched enclosures containing one or more round houses, house platforms, trackways and clearance cairns are widespread in the region: over 700 hut circles have been mapped in the Dales (White 2005, 27). Enclosures are numerous in the Pennine uplands, but it is not known to what extent these represent transhumance rather than permanent settlement (Philpott 2006, 73).

However, the precise dating for most is uncertain; it may be possible to date earthwork sites on the basis of structural appearance, but *‘little hard evidence has been published to support the*

dating of such groups' (Martlew 2004, 41). Certainly, on the few settlement sites in the North West where modern excavation has occurred, roundhouses assumed to have been prehistoric on morphological grounds have been found to be of probable Romano-British date, for example at Lancaster (Bagwell 2004) and Lathom (Cowell 2002). By contrast, second millennium BC dates have been produced from excavations in the northern Pennines on sites assumed to be Iron Age or Romano-British in date (Martlew 2004, 43).

Even when excavated, the axiomatic dating of sites from finds of Romano-British material culture may obscure longer histories, where occupation occurred in the less archaeologically visible pre- and post-Roman periods. Recommendations are therefore being made for the increased use of scientific dating techniques to specifically identify such sub-Roman activity (e.g. Sanderson and Wrathmell 2005, 15).

The regional distribution of prehistoric occupation is therefore imperfectly understood, a problem compounded by the fact that differing materials used in construction affects subsequent archaeological visibility. Stone hut circles and enclosures remain visible in the uplands, whilst the sites of buildings using the timber resources of the valleys are less conspicuous (White 2005, 27). Recent surveys have indicated river valleys and terraces were indeed favoured for habitation, but archaeological sites in such locations are easily lost or obscured by factors such as floodplain development and agricultural practice (OA North and University of Liverpool, 2006, 133).

Most remains in the pipeline corridor that have been ascribed to the later prehistoric period are earthworks, all of which are dated on typological grounds or circumstantial evidence, and lie within the western half of the route.

Known sites

An oval ditched enclosure, probably a sheep or cattle fold, has been recorded in Swinden parish (MON 45526). Its irregular form and poor state of preservation suggest a possible Iron Age origin.

There is a possibility that Castle Stede in Hornby (SM 13413) was originally a hillfort, altered in the medieval period to form a motte and bailey (Forde-Johnson 1962, 12).

A depression adjacent to the Roman Road at Old Wennington Farm is thought to represent a prehistoric hut (LSMR 2665) and there is a possible prehistoric settlement at Bull Bank Farm, Wennington (LSMR 2667) with evidence of three possible huts, two of which are extremely large.

Excavations near St. Peter's Church in Addingham in 1975 and 1989-90 located a defensive perimeter bank and ditch. The bank showed evidence of Iron Age or early post-Roman timber reinforcement. Slag and burnt daub from early iron smelting were also found (SM 29996).

The Mount, near Far Highfield Farm in Halton with Aughton, is an earthwork enclosure, nearly square and covering almost two acres (LSMR 542). When the south-east side was drained and levelled in the 1860s, querns and other articles were found, ranging in date from the early Bronze Age to the Roman period. Little remains of the original enclosure, which has been heavily damaged by ploughing.

The Portable Antiquities Scheme records a copper alloy vessel, dating to the late Iron Age, found in Halton with Aughton parish (PA LANCUM-F4F5D6) and a shield (PA YORYMB1781) and a strap fitting (PA YORYMB1782) of probable Iron Age date from Middleton parish.

8.5 Roman c. AD 70 – AD 410

The Roman period is characterised by relatively durable cultural material, in contrast to the preceding and following periods. Nevertheless, the level of material culture within the pipeline corridor appears to be low, and along with poor site visibility contributes to the lack of identification of Roman period remains other than roads.

Within the pipeline corridor and its immediate neighbourhood, the Roman military presence is represented by a supply network of roads linking forts and settlements. These roads may have attracted further settlement: in the Ribble valley, Roman occupation seems to have been focussed on the main trans-Pennine road (OA North and University of Liverpool 2006, 139).

The main road south from Carlisle ran past the fort at Over Burrow, and then across the Bowland Fells to Ribchester and on to Manchester (Margary 7c). A branch road or roads also ran down the Lune valley to Lancaster (Margary 705), and a junction with the Lancaster – Walton-Le-Dale – Wigan road (Margary 70a, 70c). The Aire Gap was crossed by the military highway from York to Ribchester (the ‘York Gate’), defended by forts at Ilkley and Elslack (Pearson 1986). From the York Gate, another road branched north-east at Ilkley to Aldborough, and at Skipton a road left the York Gate to run north-west through Settle and Ingleton. Military occupation in Lancashire may well have begun in the early 70s AD (Philpott 2006, 63), with suggestions of campaign activity pre-dating more formal annexation and fort-building under Agricola in 79 AD. As Philpott points out, *‘the relatively ephemeral character of campaign-camps has meant that few have survived as visible remains except on land that is agriculturally marginal’* (2006, 63) (e.g. at Malham Moor in Yorkshire), and none have been recorded in Lancashire (Peter Iles, *pers. comm.*).

Agriculture in this period may have been based on a system of mixed farming, with larger, less regular fields for stock or fodder crops, and smaller, more regular fields, closer to the settlement enclosures, used for arable cultivation. The difficulties identified above in identifying prehistoric settlement sites, namely largely untested assumptions based on surface morphology and the differential survival of sites dependant on landuse, apply equally to Romano-British sites. Again, earthwork sites are much more common on higher ground, with *‘extensive survival of both enclosures and field systems, the two occurring sometimes in association’* (Philpott 2006, 74). Few native settlements in the region have been excavated by modern techniques. Extensive field systems thought to date from this period have been surveyed approximately 7km to the north of the pipeline corridor, at High Park in Lancashire. These contained enclosures linked by a network of trackways, set within a larger coaxial fieldsystem (Jecock 1997, 31). Little excavation has occurred here, but small amounts of pottery dated to the second to fourth century AD, have been recovered (Lowndes 1963). At Healaugh in Swaledale, house platforms and stone structures dated from the late Iron Age to the Roman period have been investigated more recently (White 2005, 40). The lack of excavated remains is more likely to be due to the circumstances of modern local development, rather than reflecting a genuine absence of activity during the Roman period.

The change from the traditional Iron Age building form, the roundhouse, was slow when compared with many sites in the south and east of England: the roundhouse continued in use well into the Roman period (Philpott 2006, 75; Bagwell 2004). Stone-built forms, including roundhouses, and also rectangular or bow-sided structures have been recorded in upland areas (Philpott *ibid*). The remains of rectangular buildings have been recorded in association with the earthwork settlement complexes at High Park, but these have not been dated. (Jecock 1997, 31) Villas are scarce in this part of the Pennines, and almost unknown in the north-west (Philpott 2006, 77). A prominent example of a villa-type site has been excavated just 2km to the north of the pipeline at Gargrave, where its proximity to the road network may have allowed it easy access to the fort system and other markets.

Numerous sites in the region have revealed evidence of industrial production, including working of iron, lead and copper-alloy, and manufacture of pottery, glass, leather and salt (Philpott 2006). Much activity appears to have been undertaken on a domestic scale, but in many cases the involvement of the military is presumed. Two lead ‘pigs’ dated to AD 81 have been recovered from lower Wharfedale. The early date of these indicates a particularly rapid exploitation of this resource following the Roman occupation, suggestive of Imperial control (YDNPA 2009a). The early exploitation of coal may also be dated at least as far back as the Roman period: coal was used at the villa site at Gargrave and deposits in Lancashire and Cumbria were also exploited in the Roman period, again with likely military involvement (YDNPA 2009b; Philpott 2006, 85).

Known sites

A Roman road is known to have linked Lancaster and Over Burrow, following a route on the north-west side of the River Lune; its exact location is uncertain (DBA:FAA/LSMR 549/LSMR 9199/MON 42496). A linear feature (LSMR 9199) has been recorded running between 353700 468080 and 353930 468450, approximately 250m south-east of the Halton/Nether Kellet parish boundary. There is a possibility that this represents the course of the road, although it may simply be a drainage ditch. The discovery of a Roman milestone near Caton indicates that the present main road, which runs in very straight lengths from Claughton towards Hornby and then through Melling and Tunstall to Over Burrow, is on the route of a Roman road (DBA:EAA, LSMR 15573, Margary 705) that ran along the south-east side of the River Lune. Farther east, the Roman road from Ribchester to Over Burrow is visible in Cantsfield, running north-west to south-east (Margary 7c). A length of the same road is visible just to the north of Old Wennington Farm on the south side of the River Greta, and another section is known on the north side (LSMR 2722 and 2723). The site of a Roman ford, with a road and the abutments of a bridge, has been found where this road crosses the river (LCM 414). Another Roman road is believed to run from Skipton to Ingleton, crossing the pipeline corridor west of Skipton and continuing via Long Preston, Settle, and Giggleswick (MON 1328065, Margary 722). At the eastern end of the pipeline corridor, in Middleton parish, a section of the Roman road from Ilkley to Hampsthwaite is visible as an earthwork on aerial photographs. The road survives as a very slight earthwork bank 9.2m wide and 430m long (MON 1364062, Margary 720b). A crossing point on the River Washburn in the parish of Farnley is believed to be historically significant; no Roman road is known at this point, but the presence of a ford has been suggested (Neil Campling, *pers. comm.*, 2006).

A single Roman villa site is known in the area, at Gargrave, outside the pipeline corridor to the north-east of Plot 21-10, and the Roman fort of Burwen Castle lies at approximately the same distance to the south of Plot 21-10. A road runs from this fort to the fort at Ilkley; it approaches the pipeline corridor again as it passes to the south of Addingham, where it is known as ‘The Street’ (Bradford MDC 2004). Otley, to the south of the western end of the pipeline corridor, also had a Roman fort. There is anecdotal evidence of a Roman settlement in Giggleswick parish, on the far side of Storth Gill Lane, which may be reflected in the names of the two farmsteads Rome and Farther Rome.

A number of Roman coins have been reported to the Portable Antiquities Scheme; most were found by metal-detectorists in Middleton, but there were several from Gressingham (PA LVPL2215-6, LVPL2218-9), Nether Kellet (PA LVPL738-9), and Ingleton (PA NCL-1BF241). A Roman brooch (PA YORYMB1779) has also been found in Middleton.

8.6 Early medieval c. AD 410 – 850

The second half of the first millennium AD witnessed the collapse of Roman administration, the emergence of a succession of small native kingdoms, the advent of Christianity and monasticism, the increased influence of peoples of Germanic and Scandinavian stock, changes in burial rites and material culture, the emergence of an Anglo-Saxon state and a move towards

the social and physical landscape of the feudal Middle Ages. These fundamental changes occurred to a greater or lesser extent nationally, but in the Pennine region under discussion here, the detail of events is particularly obscure, as archaeological evidence for the period is so very rare.

This scarceness of evidence may be partly due to modern landuse regimes and a comparative absence of modern developer-funded excavation. However, it is also likely to be a reflection of a distinctive regional material culture which did not rely as heavily on durable artefacts as others elsewhere in the country (Haselgrove et al 1999, E1). This existed before the Roman interlude – with its monetary economy and the attendant demand and supply of material goods – and resumed afterwards. Certain continuities from the Roman period did occur. Occupation of Roman military centres such as Carlisle (Zant forthcoming) and Birdoswald (Wilmott 1997) is increasingly being recognised as having extended beyond the early fifth century, and the framework of Roman civil settlements and road system can largely be discerned to this day.

There is no great evidence of Romano-British native settlements meeting a violent end and a continuity of population is assumed (Bennett 1983). There seems to be no reason why productive land should have been abandoned, and it is likely that many Romano-British farmsteads continued to operate in the post-Roman period, although the changes in material culture make such later activity difficult to identify. Place-name evidence, for settlements and natural features, particularly rivers, may be one manifestation of the survival of a native component from the Roman period (ibid, 213).

Of the landscape created and occupied by these ‘post Roman Iron Age’ (ibid, 217) natives, very little is known (Newman and Brennand 2007, 79). It is assumed that during this period there was a retreat from more marginal agricultural land and a resumption of a less agrarian and more pastoral economy, probably as a result of the disappearance of the need to produce a large surplus for market and taxation, and also due to a worsening climate (Loveluck 2003, 154, 169). Rectangular buildings and large oval land enclosure blocks are two phenomena that may be indicative of early medieval landuse (Newman 2006). Examples of the former have been identified at Greenber Edge in the Yorkshire Dales (Bowden and Blood 2004), whilst the oval land parcels seem confined to west of the Pennines. Throughout the region, however, it is likely that some land boundary markers, such as those later followed by parishes and townships, may date to this period. Tor Dyke, thought to have formed part of the northeast boundary of the kingdom of Craven (White 2005, 45-46), is a relevant example here.

The kingdom of Craven, along with Rheged and Elmet, emerged in the region traversed by the pipeline. These native British kingdoms are thought to have developed in the power vacuum following the withdrawal of Roman control, but evidence for them is rarely abundant and occasionally speculative (Breeze 2002; Wood 1996). These kingdoms were small and short-lived, their territories soon became subsumed by the Anglo-Saxon Northumbrians. Aspects of their survival have, however, been noted, particularly in the case of Craven, which was (and still is) a unit of the English Church (Wood 1996, 4).

The growth of Christianity was one of the most important developments of the early medieval period: it introduced a new social and cultural force to Britain, and did not necessarily coincide the centres or wielders of secular power. Archaeological evidence for the pre-Conquest Church is relatively abundant, largely due to a local tradition of stone-carving. Crosses, slabs, tomb-covers and architectural ornamentation were produced in some number and were generally used close to their geological source, and so indicate the presence and use of church sites. (Newman 2006, 102). Finds of diagnostic metalwork, such as styli and book clasps, and place-name evidence, particularly the use of the element ‘Eccles’ (derived from the Welsh *eglēs* – ‘church’) may also help to identify early Christian sites (Newman and Brennand 2007, 85; Faull 1981, 174). The use of the Eccles place-name element is particularly prevalent in Lancashire and the West Riding.

In the eighth century, the wealth of the Church may have attracted Viking raiders to the area, which was exposed to attack from both the North and Irish Seas. Some of these raiders or their countrymen, eventually settled. Historical sources, diagnostic metalwork and place-name evidence may all reveal aspects of this, but none of the techniques is without shortcomings. With regard to the Dales, the '-thwaite' place-name element probably indicates Scandinavian settlement on cleared land (White 2005, 48) and a Viking period farmstead has been excavated at Ribbleshead (ibid, 49). The recent discovery of a small but very rare Norse cemetery at Cumwhitton in Cumbria adds to the emerging understanding of the patterns of Scandinavian settlement (OA North n.d.). Dialect terms for shepherding, mining and smelting appear to show strong Scandinavian influence (Newman 2006, 95; Chitty and Brennand 2007, 29), and it is reasonable to assume that Viking settlers engaged in these activities.

Following a series of military campaigns in the tenth century, Norse political control in the north was replaced by Anglo-Saxon kingship, although cultural influence from, and direct migration of Anglo-Saxon peoples had been ongoing for centuries prior to this. Prior to the Viking period, the Anglo-Saxon kingdom of Northumbria was a powerful regional force, although at the eastern end of the pipeline route, Mercian influence was more strongly felt (Sanderson and Wrathmell 2005). Problematic strands of evidence such as material culture, dialect, place-names and historical sources can all illuminate elements of Anglo-Saxon activity, yet a detailed understanding is elusive, particularly in the Pennine region, which lacks the rich material culture of the Anglian eastern seaboard (Loveluck 2003 154, 160). A relatively well-documented Anglo-Saxon estate existed in Wharfedale, centred on Otley (Roberts and Wrathmell 2005, 11) but little archaeological evidence of settlement has so far been encountered.

Sunken-featured buildings or *grubenhäuser* are viewed as distinctively Anglo-Saxon, and these are rare in the north. Examples have been excavated in the approximate areas of the eastern and western extremities of the pipeline: at Parlington Hollins in West Yorkshire (Holbrey and Burgess 2001) and Fremington in Cumbria (Newman 2006, 98). Both these sites show evidence of a continuing focus of settlement from the Roman period. As stated above, it is likely that many early medieval farming settlements continued Late Roman patterns, but by the end of the period the widely scattered farmsteads had come to be replaced by more nucleated settlement, especially in the more fertile lowlands. Elsewhere, strings of farms situated on the division between enclosed field and unenclosed moor existed (Roberts and Wrathmell 2005, 12): an enduring landscape template had begun to emerge by the end of the period.

The land across the pipeline route would have represented a shifting series of geographically and culturally disparate localities during the early medieval period. To the east, the area was influenced by Mercia and Northumbria and from across the North Sea. West of the Pennines, an Irish Sea cultural zone has been identified, with much evidence of intercommunication between Scotland, Ireland, Scandinavia, south-west Britain and southern Europe (Newman and Brennand 2007, 90). This geographical disparity, the length of time in question and the scarcity of evidence precludes anything more than the generalities noted above. The only thing that this report can contribute to the study of this period is a demonstration of how vanishingly rare the evidence is: not a single securely dated early medieval find or deposit was recorded from the pipeline.

Known sites

No settlement evidence of this period has been found in the pipeline corridor, although place names and early charters indicate that the area was populated. Place-names within the pipeline corridor indicate a mixture of Anglo-Saxon and Scandinavian influences.

A decorated silver-gilt cup containing 860 Anglo-Saxon and Danish silver pennies, six pieces of stamped gold and a torc of plaited silver wire was found in 1815 in newly enclosed land on Halton Moor. It is believed to have been deposited c. AD 1025 (MON 42948).

A pre-Norman cross head was found buried in the churchyard at Gressingham in 1912 (LSMR 571). Two fragments of cross-shaft with vine scroll ornament may be from the same cross (LSMR 631).

The settlement of Addingham, bordering the southern edge of the pipeline corridor, can be dated to the late Anglo-Saxon period, and was probably associated with an early estate belonging to the Archbishop of York. Radiocarbon dating of 55 graves near St. Peter's Church has identified a cemetery in use between the eighth and tenth centuries (Adams 1996). There is also part of a late Norse cross in the church, and finds from the site include a Viking bone comb-case and needle (SM 29996).

8.7 Medieval c. 850 – 1550

The eastern end of the pipeline route lay largely within the Archbishop of York's estate of Otley, for which a significant amount of pre-Conquest documentation survives. The administrative centre of the estate, within Otley itself, lies well to the south of the pipeline, on the south bank of the River Wharfe; the archbishop's manor, including an eleventh-century chapel, has been excavated. It has been suggested that the estate was based on a minster, with a community of priests providing ecclesiastical services to the archbishop's 'tenant-parishioners'. Ilkley, also to the south of the western end of the pipeline, was part of the Otley estate; Anglo-Scandinavian crosses are displayed in the present parish church, with two Roman tombstones that have been recut as window heads, presumably for the pre-Conquest church. The settlement of Addingham, bordering the southern edge of the pipeline corridor, is the most westerly member of the Otley estate, and the one for which there is the earliest documentation: Archbishop Wulfhere is recorded as living here after fleeing the Viking conquest of York in AD 867, although no remains of his residence have been identified (Sanderson and Wrathmell 2005). Excavation of 55 graves near St. Peter's Church has identified a cemetery in use between the eighth and tenth centuries. There is also part of a late Norse cross in the church, and finds from the site include a Viking bone comb-case and needle (SM 29996).

Despite the ready availability of stone in the area, many domestic buildings of the Middle Ages were timber framed. Nonetheless, the frequent occurrence of quarry remains and of place-names and field-names with the element *delf*, 'pit, quarry', testifies to the widespread extraction of both the grit and sandstone. Limestone has also been quarried, for the manufacture of lime mortar and as a fertiliser. There are references to *Lympittes* in or near the Aire valley in 1421-2 and to *Lymkilnbanks* at Otley in the early fourteenth century.

Iron production in Yorkshire was already an extensive industry by the late thirteenth century. Water-powered ironworking complexes are recorded from the late twelfth century, and had become commonplace by the fourteenth (Moorhouse 2003a). The charcoal blast furnace was introduced into England in the late fifteenth century. A notable concentration of iron bloomery sites has been recorded on the North York Moors, of which the majority are probably medieval; these sites include important evidence for the development of water-powered smelting. There are also important bloomery sites on the South and West Yorkshire coal fields, and scattered along the eastern margin of the Pennines – again, these sites include important early water-powered examples (Cranstone 2003).

Abandonment of medieval villages took place in the medieval and early post-medieval period. The potential for intact DMV remains is greatest where there was early abandonment, and where pastoral landuse has protected the archaeological remains from truncation by ploughing or development. Preservation of surviving ridge-and-furrow earthworks is considered important for future research needs and for educational purposes, as well as providing a landscape of interest to the general public and enhancing the setting of monuments (Hall 1995).

Known sites

A lead coffin and lid, believed to be medieval, were found when the field south of the burial ground at Farnley was being ploughed (MON 51546).

The village of Lawkland (DSMR 24153) is mentioned in Poll Tax Returns for 1379. The village is a linear settlement largely made up of farmsteads and there are indications that the village was once larger (MON 44801). There is a record of ‘distinct’ remains of houses standing beside Lawkland Green, just outside the Giggleswick parish boundary, and a tradition that these buildings were destroyed by a Scottish raiding army in the early fourteenth century. Enclosures and possible house platforms are visible to the north of Lawkland Green, at NGR 37810 46570, but it is possible that they are the result of village shrinkage. Traces of disturbance at 37810 4765940 have been interpreted as the foundations of an old barn, but may be evidence of quarrying.

Complicated, irregular earthworks at Austwick (DSMR 3634) are faintly visible on aerial photographs and probably represent shrinkage of the medieval settlement. Depopulation appears to have occurred over an area of around 3 acres in a fairly sheltered position. Field survey in the late 1970s failed to identify house sites, but six or seven crofts with accompanying roads were traced; the earthworks of an extensive lynchet field system, broken in many places by later surface quarrying and overlain by later enclosures are visible outside the village site (DSMR 3647 and 36401).

Settlements at Embsay and Halton East (DSMR 14879 and 14890, Network Archaeology Ltd 2005a) were established before 1086 and are referred to in the Domesday Book. Halton East is a small nucleated village or hamlet, the major element of which is now Halton Hall. The standing earthworks of an artificial fish pond, associated with Halton Hall and dating to AD 1540, can be seen directly to the east of the plot (NHER 48348).

The remains of the open fields of the deserted village of Scales survive as numerous discrete areas of ridge-and-furrow earthworks in the parish of Askwith (DBA: CRZ); the pipeline route runs close to some of these. On the higher land are a number of worked-out quarries and extraction pits of unknown date (DBA: CQZ and CYB; MON 1369092 and 561301; NHER MNY22238 and MNY22240), while a lime kiln is recorded 200m to the south of Plot 7-18 (MON 560970).

Ridge-and-furrow was recorded in 1976 by the Lune Valley Survey, around the possible prehistoric hut at Old Wennington Farm (LSMR 2665). Ridge-and-furrow was also recorded at Bull Bank Farm in Wennington in association with the possible prehistoric settlement (LSMR 2667) and in the field above an undated group of ‘levelled platforms’ (LSMR 4358).

Hollow-ways are recorded at Halton West (MON 591120) and Halton East (MON 1367120). A hollow-way is typically an unmetalled road, whose surface is below ground level due to traffic and natural erosion, between high banks, often running through open fields. They frequently form part of DMVs and medieval field systems. In the east part of the village of West Halton, earthwork remains of a curving hollow-way flanked by ridge-and-furrow are visible on air photographs taken in 1998 (MON 591120).

At Addingham, bordering the southern edge of the pipeline corridor, the site of the medieval manor house has been eroded by the River Wharfe, but the earthwork remains of its fishponds are visible to the west of the church. Other earthworks around the modern village indicate a shrunken medieval settlement. Addingham was a centre for textile manufacture in the fourteenth century, with a fulling mill on the Wharfe (Bradford MDC 2004). A late medieval ironworking site was excavated at Smithy Hill, Addingham, and proved to be a small water-powered industrial complex, with an extensive water system including header tanks (Moorhouse 2003b).

The pipeline route crosses a deserted medieval farm site (DBA:ZNO) at Ackworth in the parish of Rathmell. Medieval documentary evidence for the surrounding area indicates that it was well populated. The Domesday Book and documents from the early fourteenth century onwards mention assarts (woodland clearances), vaccaries (cattle farms) and lodges (usually a building in wood- or parkland). Additionally, there is documentary evidence of iron mining and smelting, although no evidence has yet been found in the field (Phil Hudson, *pers. comm.*, 2005).

Potentially medieval barns at Austwick (DSMR 24212, DSMR 24197), Clapham (DSMR 24336, DSMR 24337, DSMR 24338, DSMR 24340) and Skipton (DSMR 27241, DSMR 27242, DSMR 27243) have been identified from OS first edition maps.

Loyn Bridge (SM LA 60), which carries the road between Hornby and Gressingham, is possibly 16th century, but there is no certain dating evidence. A ford must have preceded the bridge, for the latter is deflected from the direct line of the Hornby to Gressingham road, and traces of a ford are visible in line with the road.

Castle Stede (SM 13413) is a motte-and-bailey castle overlooking Loyn Bridge. It is of particular importance as one of a group of early post-Conquest mottes established along the Lune Valley. The only recorded medieval find from the vicinity is a coin, found in a field near the castle (LSMR 2648). Portions of the boundary of a medieval deer park in the area may have been associated with Castle Stede or with Hornby Castle Park (DBA: FAB).

An Augustinian priory was founded at Embsay in 1120 but moved to Bolton in 1154-5. A dependent cell continued on the site, though there are now no visible remains (DSMR 4342).

8.8 Post-medieval c.1550 – 1900

The enclosure of the valley fields had been carried on piecemeal since the medieval period. In the late eighteenth century the demand for food created by the growing urban population and the need to supply the mills with wool meant that more marginal land began to be enclosed. The land was enclosed by hedges and dry stone walls, some with banks or ditches. The last enclosures were enacted in the 1880s (Butlin 2004). The pipeline route crosses a large number of extant and former field boundaries, some of which may be of considerable antiquity. Some may form the boundaries of historic parishes.

Lime kilns and limestone quarries of various sizes are recorded from Embsay to Nesfield in the east, and Lawkland to Wennington in the west. Kilns were generally built into the slope of a hill or in freestanding clamps. Smaller freestanding kilns will only survive as rings or heaps of overgrown rubble and could easily have been overlooked by the record. Sandstone quarries are found between Stirton and Nesfield in the east, Lawkland and Austwick at the centre, and Aughton and Melling in the west, while gravel extraction was centred on Clapham and Wrayton. Small quarries may have been backfilled and levelled, and their sites as yet unidentified. The remains of 400 years of coal mining, clay extraction and brick and pottery making sites are known in the parishes of Ingleton and Burton (Phil Hudson, *pers. comm.*, 2005).

Textile manufacture in West Yorkshire developed into a major industry in the eighteenth century, initially using water power. The first worsted spinning mill in Yorkshire was opened in Addingham, to the south of the pipeline route, in 1787; several other mills soon came into operation in the same parish, powered either by the River Wharfe or by local becks (Bradford MDC 2004).

Isolated field barns and small farmhouses are distinctive architectural forms of the northern uplands and Dales (White 2005, 76 and 104). Many are extant, or at least recognisable, but some more isolated structures could be so ruinous as to be little more than an overgrown

foundation and a scatter of stones. Free-standing field barns can occur as frequently as one to a field in the Yorkshire Dales. This occurred where a number of different farmers owned adjoining plots of land. The buildings provided storage for hay in a loft, reducing the need to cart it back to the main farmstead, and housing for cattle below, allowing for manure to be moved easily onto the surrounding fields in the spring.

Known sites

Listed Buildings and those on the SMR list within the pipeline corridor consist mainly of farmsteads, many of which were built in the nineteenth century. There are a few large country houses and smaller private houses included in the listings. The most common building materials are sandstone and slate.

Hathenshaw Farm (LS (I) 331421) lies close to the pipeline route in the parish of Denton. The farmhouse is surrounded by earthworks, including ridge-and-furrow and a possible water management system. Moss House (LS (II) 182533) is a nineteenth century model farm on the Wennington Hall estate; the listing includes a former steam-powered saw mill, smithy and corn mill, while cattle pens on the same estate are listed separately (LS (II) 182534). Dunald Corn Mill, Nether Kellet (LSMR 4788) was a water-powered mill dating from the seventeenth century. Production ceased in the late nineteenth century, but the mill cottage of 1822 is extant (LB (II) 7-123 LSMR 10975). Gressingham Hall (LB (II*) 7-84 LSMR 2851) is a three-storeyed manor house of the late seventeenth century, with eighteenth century additions.

8.9 Modern c. 1900 – present

The study area has remained largely agricultural throughout the modern period.

During the Second World War, ‘Western Command Stop Line No.16’ ran from Lancaster, via the River Lune, to Sedbergh, requiring the fortification of the Loyn Bridge (see above).

Known sites

A concrete type 24 pillbox (LSMR 19413) was constructed just outside the southern ditch of Castle Stede to protect the Loyn Bridge crossing of the River Lune during the Second World War: it is included in the scheduling of the monument.

8.10 Undated sites

Roundhouse

The remains of a possible prehistoric round house are located just to the east of the proposed pipeline route in the parish of Rathmell (DBA: ZNQ). The remains are visible on the ground surface as an arrangement of boulders.

Earthworks

In Halton with Aughton, lengths of ditch, interrupted by the modern Thirlmere Aqueduct at Green Hill, are visible on aerial photographs as a large ‘J’ shaped feature (LSMR 2620), and two lengths of low embankment are visible on aerial photographs at Whinney Hill (LSMR 2985).

Two possible enclosures have been recorded in Cantsfield parish. A possible irregular ditched enclosure (LSMR PRN2641) at Windy Bank has been identified from the lines of old field boundaries, while at High Wood, a sub-rectangular ploughed out enclosure or old field boundary, about 80m by 8m, abuts an existing field boundary (LSMR 3330). An aerial photograph suggests a slight ditch and very indistinct inner bank.

In Wennington, two roughly oval pits about a metre deep can be seen to the south-west of High Barn (LSMR 2664). One is about 14m by 19m in extent; the other has a 5m masonry strip along

the south side. They may be associated with the barn. At Bull Bank, three or four oval 'levelled platforms' are visible on an aerial photograph on the side of a hill (LSMR 4358). They appear to be natural features - rotational landslips - but it is possible that they are manmade. An oval raised feature with what may be a ditch surround and internal detail has also been recorded; it may also be natural, but it is no longer visible.

Two small mounds and a low, curving length of bank have been recorded near Castle Stede in Hornby (LSMR 2967).

The National Mapping Programme has recorded rectilinear enclosures of undetermined date in Austwick parish (DBA: CBY).

Industrial sites

An aerial photograph shows a series of pits at Wegber Plantation, Halton (LSMR 9199). These may be bell pits, since the field centred at 353700 468100 is called 'Coal Pit Lot' on the 1972 OS 1:10,000 map. The pits lie immediately to the north of the remains of an enclosed wood. Nearby there are at least two rectilinear features and an oval mound with a flat top. One linear feature may be a natural drainage channel, but might mark the course of a Roman road (LSMR 549).

Quarried land between Carnforth and Nether Kellet has been identified from an aerial photograph (LSMR 20093). In Embsay, several limestone quarries are known from first edition Ordnance Survey maps (DSMR 14954) and (DSMR 14958).

The place name 'Kiln Meadow' is shown on a nine-year lease of 1812 in Melling (LSMR 2752), which suggests that there was at least one kiln in the locality. It is uncertain what the kiln was used for, though it is likely to have been lime burning or ceramic production.

In Clapham, the place name 'Tenter Hill' is recorded on the first edition Ordnance Survey map (DSMR 24790). This probably denotes the site of a tenter field, where newly woven cloth would be spread out to be bleached by sunlight, indicating textile production in the area.

The remains of a lime kiln of unknown date in Addingham parish comprise a low, oval earthwork mound (WYMCC 1981).

9 RESULTS

9.1 General

The twenty-three main sites identified during the fieldwork (figs. 2a-2e) are described in this chapter. They are presented in order of their location along the pipeline route from Yorkshire to Lancashire, starting at Pannal at the eastern end and working westwards towards Nether Kellet.

Table 4: Summary of Main Sites

Plot ¹	Name of Site	Parish	Period	Description of Remains	Further Analysis Required?
3-5	Farnley Lake	Farnley	Roman/undated	Field system elements/ field kiln (possibly post-medieval)	Yes
6-7	Brick House Farm	Weston	Post-medieval	Brick clamps	Yes
7-18	Scales: Site 1	Askwith	Medieval and post-medieval	Farmhouse with large pottery assemblage	Yes
7-18	Scales: Site 2	Askwith	Undated, probably post-medieval	Field kiln	Yes
8-5	Denton Moor	Denton	Medieval	Bloomery furnace	Yes
11-6	Langbar	Nesfield with Langbar	Undated, probably post-medieval	Ditch	No
12-4 (West Yorks)	Bolton Road	Addingham	Undated, probably post-medieval	Two field kilns	Yes
13-19	Halton	Draughton	Post-medieval	Field barn or dwelling	Yes
14-1	Long Croft Hull	Halton East	Undated, probably post-medieval	Four stone-lined pits	No
15-1	Halton East	Halton East	Undated, probably medieval or post-medieval	Field kiln	Yes
15-8	Embsay: Site 1	Embsay with Eastby	Undated, probably post-medieval	Two field kilns	Yes
15-8	Embsay: Site 2	Embsay with Eastby	Prehistoric	Cup-marked boulder	No
19-1 (YDNP)	Thorlby Springs	Stirton with Thorlby	Bronze Age	Probable structure/ roundhouse	Yes
21-10	Turnbers Hill	Broughton	Bronze Age	Burnt mound	Yes
21-18	Bank Newton	Martons Both	Prehistoric	Ring cairn	Yes
21-18	Bank Newton	Martons Both	Late Iron Age, Romano-British, and possibly early medieval	House platforms, linear features and stone surfaces	Yes
28-1	Rathmell	Rimington	Undated, probably post-medieval	Kiln, linear features and small pits	No
31-2	Wham	Rathmell	Mesolithic	Flint scatter	Yes
31-11	Farther Rome	Giggleswick	Post-medieval	Metalled surface	No

¹ All Plots in this column fall within the curatorial remit of North Yorkshire County Council unless otherwise indicated

Plot¹	Name of Site	Parish	Period	Description of Remains	Further Analysis Required?
34-5	Lawland Green	Lawkland	Post-medieval	Dwelling or field barn	Yes
35-8	Lawland Moss	Lawkland	Post-medieval	Ditches and modern burnt spread	No
36-3	Kettles Beck	Lawkland	Undated, probably medieval or post-medieval	Field kiln	No
50-2 (Lancs)	Backland Wood	Melling with Wrayton	Bronze Age	Burnt mound	Yes
54-2 (Lancs)	Gressingham	Gressingham	Post-medieval	Boundary ditch containing three iron cauldrons	No
56-7 (Lancs)	Whinney Hill	Halton with Aughton	Undated, probably medieval or post-medieval	Field kiln	No

For each site, the results are presented under the following headings:

- EIS plot number and site name (usually the closest significant place-name to the site)
- Locational data including the following:
 - Civil Parish
 - Network Archaeology plot number used in earlier stages of work (e.g. N494 NAL)
 - National Grid Reference (NGR)
 - Figure reference: where the site is illustrated within this assessment report
 - Plates reference: selected images of the site or specific features
- Summary: a brief descriptive and interpretive text
- Location, topography and geology: a summary of site-specific data
- Results from earlier stages: baseline data, to put the site in context
- Site description: a descriptive outline of the results of the fieldwork
- Analysis potential: a brief assessment of potential.

9.2 Plot 3-5: Farnley Lake

Farnley civil parish; N494 Network Archaeology Ltd (NAL); National Grid Reference (NGR) 422360 448180; Figures 2a, 3 and 3a; Plates 1 and 2

Summary

A ditch and a small circular pit with burning, both identified as agricultural features, yielded Roman artefacts. A feature tentatively identified as a large field kiln was also found; it produced a fragment of a Roman glass bangle, though it is possible that this find is residual. A small assemblage of residual worked flint was also recovered from the excavation area, indicating prehistoric activity.

9.2.1 Location, topography and geology

The site was located on a north-facing, well-drained, moderate slope above a river valley carved out by the River Washburn. It was at a height of approximately 90m Above Ordnance Datum (AOD), and overlooked the western end of the Lindley Wood Reservoir. The excavation area was 1.9km north of the River Wharfe and 650m east of Peartree Farm.

The subsoil consisted of a friable, mid-brown, sandy clay loam with well-sorted sub-angular and sub-rounded stone inclusions. The topsoil was typically more humified than the subsoil and was dark brown. The underlying drift geology was less well drained than the upper strata, and was brownish-grey sandy clay with poorly-sorted stone inclusions.

The terracing of the slope suggests recent movement has changed the topography of the earlier Roman and medieval field system. The drainage of the site had been altered at its eastern limit during the nineteenth century. This may have removed archaeological features.

9.2.2 Results from earlier stages

At the commencement of fieldwork, the archaeological potential of the site was unknown, but it overlooks a crossing of the River Washburn that is believed to be historically important. A stone bridge at the crossing point is modern, and listed by English Heritage as Grade II, but Neil Campling, the Historic Environment Team Leader for North Yorkshire at the time, suggested that there may have been an earlier, possibly Roman, structure or ford (*pers. comm.* 2006; fig 3).

Field reconnaissance indicated that the pipeline would cross a remnant ridge-and-furrow field system and an earthen bank, and that the ridge-and-furrow followed the natural contours of the valley side, running approximately east to west (Network Archaeology Ltd 2005b, section 4.4). The related geophysical survey results showed that there were some possible pits and irregular linear and curvilinear anomalies at this location.

This area was selected for evaluation trenching on the basis of the field survey results. Six trenches were opened, primarily to target geophysical anomalies. The initial results provided evidence of grain processing from a small circular feature in Trench 41, and from the same trench an incomplete flint blade of Neolithic or Bronze Age date was found. A sherd of samian-type pottery from Trench 49 suggested Roman activity at the site.

9.2.3 Site description

The topsoil strip revealed several features. A number of these such as features [7002] and [7004] were deemed natural or non-archaeological hollows: boulder sockets or voids caused by machine activity from the topsoil strip. Others, such as feature [7007], were ambiguous, as it was not always clear if they were natural or truncated archaeological features, but several features could confidently be identified as man-made.

A sub-circular pit, [7015], 2.95m by 2.1m across is considered to be the remains of a kiln (fig. 3a). It was excavated in quarter-section, and proved to contain re-deposited natural materials, (7018) and (7019), as well as sandstone cobbles, in a matrix of coarse sand, (7017), and silty clay (7016). No burnt material or possible products of the kiln, such as pottery, metalwork, lime or building materials, were observed. A piece of Roman glass, identified as part of a bangle, was recovered from context (7017). A further feature, [7028], which protruded from pit [7015], has been interpreted as a possible flue (plate 1).

A V-shaped ditch, [7027], running north to south, was located at the western edge of the site. This was excavated by means of a slot 1.5m in length which revealed that the original cut contained two fills, (7026) and (7025), whilst a later re-cut, [7021], contained a single fill, (7020), from which a piece of Roman mortarium was retrieved. The possible southern continuation of this ditch had been encountered during the evaluation trenching, when stony fills, possibly implying a drainage function and further Roman pottery were recorded.

An extant earthwork bank [7008] that extended through the plot had four machine slots excavated through it in order to determine the methods, materials, and date of its construction, as well as its purpose (fig. 3; plate 2). The slots revealed that the bank was of man-made, rather than natural, origin. There was a deposit visible in section, (7030), which was made up of a mix of sand, clay and large sub-angular stones. This is thought to be material originally used as a face for the bank. The other materials used in the construction of the bank were mainly clayey sand. A flint flake and an incomplete flint blade of Neolithic or Bronze Age origin were found in the redeposited clay (7044) that formed the base of the bank. Also at the base of the bank was a linear feature, [7038], that may have been a revetment. The section of the bank also revealed a ceramic field drain probably of Victorian date.

9.2.4 Analysis potential

Later post-medieval farming practices such as terracing and drainage works would appear to have resulted in poor conditions for the preservation of earlier archaeological deposits. This may explain the paucity of the remains present on the site.

The archaeological potential of the possible Roman agricultural features, [7027] and [7021], is limited, and they do not appear to have any relevance to the strategic crossing point of the River Washburn. However, it is recommended that the mortarium fragment from context (1020) should be examined by a specialist to confirm its identification.

The kiln is judged to be the most significant discovery on this site, but as no charcoal was retrieved from the environmental samples it will not be possible to obtain a radiocarbon date. Recent, excavated examples of field kilns in the Yorkshire Dales have provided post-medieval dates for their use (D. Johnson, *pers. comm.*, 2008). This feature was similar to Kiln 2 excavated near Addingham (see section 9.8) as it was filled with small sandstone boulders, and did not initially appear to have been fired, as there was no discoloration on the boulder surfaces. Sandstone would normally crack, and turn black and red when heated to kiln temperatures.

Comparative work on similar excavated examples could determine if there are similarities in the firing process, and perhaps identify the potential product of the kiln. It is unlikely the correct firing temperature for production of lime was ever achieved and it would appear from the initial excavation assessment that the kiln found here at Farnley Lake had another purpose. If the function of the kiln was not to produce lime, then it could possibly pre-date the evidence for nineteenth-century land improvements found in the excavation area. The comparative analysis will concentrate on the plan form, fills and structure of all of the kilns located on the pipeline, and other excavated examples in the region will be used to identify potential function. It is intended that the results of this work should then be published in a journal of industrial archaeology.

9.3 Plot 6-7: Brick House Farm

Weston parish; N468 NAL; NGR 418344 448872; Figures 2a, 4, 4a and 4b; Plates 3 and 4

Summary

During the topsoil strip in Lower Wharfedale, a 200m² area containing brick structures and burnt material remains was exposed. Once the site had been cleaned and the excavation began, it became apparent that the features were part of a series of post-medieval brick clamps. Two clamps were excavated, and the presence of a third, poorly preserved clamp was ascertained. A fragment of tobacco pipe found in the spent fuel surrounding one of the clamps was dated to the late seventeenth century.

9.3.1 Location, topography and geology

The site was located in Lower Wharfedale, 1.25km south-west of Brick House Farm and on the western side of the Moor Plantation at 189m AOD. The immediate landscape was reasonably level with few undulations. The surrounding land on either side of the easement was very marshy, but the ground within the excavation area appeared to be better drained.

The topsoil was a humified friable greyish-brown silty clay loam, 0.2m thick, above moderately drained subsoil consisting of grey clay silt with prominent mottling occurring with a frequency of 20-40%. The mottling varied in colour from dark grey to orangish-brown. The surface of the subsoil appeared to be disturbed, with frequent small inclusions of brick and charcoal. The subsoil did not occur across the entire site, and appeared as a spread along the southern limit of the excavation, up to a depth of 0.5m.

Excavation suggests that the subsoil may have been a fluvial deposit. Although it was homogenised, with no visible indications of sedimentation or varves, there are wells and springs draining into nearby becks, which feed the River Wharfe. Speculatively, the thickness of the subsoil and well-sorted archaeological inclusions could suggest that localised inundation of the site may have occurred fairly frequently or seasonally.

Below the subsoil the drift geology was firm yellowish-grey silty clay. The deposit was slightly stony with a few large, boulder-sized, inclusions of millstone grit.

9.3.2 Results from earlier stages

The field survey conducted by Network Archaeology Ltd recorded an irregular earthwork (FSU: 214). This was a slightly raised area located in the north-east corner of the field. Initial interpretation concluded that it may have been artificially created as a platform for some purpose, but it could equally be a natural variation. It was c. 10m long and c. 8m wide. The pre-construction surveys did not include geophysical survey in this plot.

Mitigation work on the earthwork included a topographic survey of the platform and a ditch (appendix E, fig. 3). During the construction watching brief, the removal of topsoil from the platform was monitored and recorded. None of this work indicated the presence of brick clamps.

9.3.3 Site description

Evidence of brick-making activity was discovered during topsoil stripping. An area of around 200m² was subsequently cleaned, investigated and recorded. The remains of three brick-firing clamps were planned and photographed [12000, 12002 and 12004]. The two best preserved clamps had slots excavated centrally, along their long axes, to determine construction methods and relationships.

The clamps probably date to the post-medieval period; a reasonably accurate date may be obtained by comparison with the dimensions of dated examples and by typological means. A

roughly circular marshy depression adjacent to one of the clamps is considered to be a clay-winning pit from which the raw material was extracted, but no evidence of a drying area or 'hack' for unfired 'green' bricks was noted.

The most northerly clamp, [12002], measured 3m by 2.6m in plan (fig. 4a). The remains of this clamp consisted of a spread of dark material, (12001) and (12003), interpreted as spent fuel, with five rows of fired red bricks laid on edge, aligned east to west (plate 3): both of these contexts were sampled. The supposed spent fuel deposits also filled the spaces between the brick rows. The clamp remains lay in a shallow cut in the natural boulder clay, interpreted as levelling activity prior to clamp construction (fig. 4b). Fine grey silt, (12011), had formed above the exposed natural surface, indicating that the levelled area had been open to the elements before brick stacking had begun. This deposit was also noted at the south end of the site, where it was recorded as (12016). A compacted strip of redeposited clay on the south side of the clamp could represent a path or hard-standing area. Three probable postholes, [grp no. 12005], at the north-east, south-east and south-west corners are considered to relate to scaffolding or support posts to assist clamp construction.

The clamp in the central part of the site, (12004) (fig. 4a) only survived as traces of a c. 2.50 by 2.00m sub-rectangular spread of material interpreted as spent fuel, (12004), c. 2.00m south of [12002]. This had been heavily truncated by the machine and was not excavated.

The southern clamp, [12014] (fig. 4b, plate 4) measured c. 6m by 6m in plan. Remains of this clamp, which lay c. 15m south of clamp [12002], consisted of similar spreads to those encountered at the other clamps, (12006) and (12015), overlain in its central area by several fragmentary rows of green bricks, [12014], aligned north to south. A piece of post-medieval tobacco pipe was found within spread (12015). The heel is decorated with a circular maker's mark stamped into the base and the rim has a single band of milling 2mm below the edge. The maker's mark consists of a simple three-pointed crown over the initials 'FW', enclosed by a single plain band and then a single milled band. All of this indicates a date of approximately 1660 to 1680.

A spread of crushed red brick fragments (12010) on the west side appeared to be contemporary with layer (12015). A sherd of heavily abraded Romano-British pottery was recovered from spread (12010); the sherd was possibly from a mortarium and almost certainly residual. The brick debris deposits could have been derived from an earlier firing using the same site or from another firing event beyond the excavation area. This material was cut by a narrow, shallow, horseshoe-shaped ditch, [12012], which surrounded the clamp on the north, east and west sides and continued southwards outside the excavation limit. Bricks retrieved from fill (12017) of this ditch were of larger dimensions than those *in situ* in the clamp. A sherd of early post-medieval pottery was also recovered from the fill.

9.3.4 Analysis potential

A provisional seventeenth century date for the construction of the clamps is based on the post-medieval pottery and tobacco pipe. The brick clamps were found in an area where the traditional building material was stone. As the clamps pre-date the boom in quarrying associated with the construction of field walls, lime kilns, railways and canals in the nineteenth century, there is a possibility that the product was only for a local market or a small-scale building project, perhaps even the buildings associated with the nearby 'Brick House Farm'. Further work would be required to investigate the potential of brick as a commodity in the regional economy before the eighteenth century.

Fabric analysis of the brick samples removed from the clamps will also aid the investigation of trade in the region, and potentially provide a date if comparable examples can be found from other clay-winning, production, or construction sites in Yorkshire. Identifying the fabric type by thin sectioning of the bricks and comparing with other stratified brick found along the pipeline

may provide a more precise date. As an example, the small brick structure (phase 2) found within the building at Scales also dates from the late seventeenth century and is possibly contemporary with the brick clamps. However, in this case, initial assessment of the fabric suggests that the bricks used in the building are not the same as the bricks manufactured at this production site (Vince, Appendix C).

Current assessment of the technology that was available before the industrial revolution suggests that these brick clamps may have been constructed in an open stack with layers of fuel placed between each layer of bricks. The flues at the base of the stack allowed air to flow beneath the stack and to reach the necessary temperature to fire the bricks. Further analysis may provide more specific information on how the clamps were constructed, and how many bricks could be produced from a single firing. For example, comparison with the dimensions of other sites where layers of pre-fired bricks are known to have been used for temperature control and to strengthen the stack of green bricks to add stability to the clamp could show whether this method was used here. Comparison with other sites may also suggest how the bricks were stacked. The arrangement of the basal layer of bricks in parallel rows may be similar to that in brick clamps with alternative crossing orientations (that is, a north-south oriented layer alternating with an east-west layer) which would suggest that this method was also used here, to maximise airflow through the clamp. The method employed on this site could usefully add to our understanding of early brick manufacturing processes.

Other excavated examples may provide information on the type of bricks produced, and how they may have been distributed from their production centres; whether they were a local building material or as a traded commodity. The proximity of the River Wharfe might have allowed regional export as bricks could be transported a substantial distance along a major waterway. More local consumers of bricks could be suggested: construction of the Leeds to Liverpool canal during the eighteenth century, or reverberatory kilns in upper Wharfedale during the sixteenth and seventeenth centuries. The abraded Romano-British pottery would probably imply that the surrounding marshland formed after the Roman period.

Analysis of the rectangular earthwork (FSU: 214) identified in the field may also be useful. This could be done in conjunction with the topographic survey data potentially clarifying the form and function of the surrounding earthworks and providing information on the environs of the brick clamp, including the clay-winning pit observed adjacent to the excavation area. The chances of success, however, might be low, as observations made during the removal of the earthworks by machine suggested that they might have been drainage-related, and thus of little archaeological significance.

Insufficient material was recovered from the samples for radiocarbon dating. Although the spreads around the clamp bases appeared on site to be rich in carbonised organic material, the sample taken from material associated with the northern brick clamp, <1450> from deposit (12001), proved to be principally composed of pellets of a dark-coloured, densely compacted mineralised silt. Plant macrofossils were very scarce within the assemblage, which otherwise contained only a few small pieces of burnt stone. Charcoal was also scarce within sample <1454> from deposit (12017), although the assemblage did contain a moderate density of small coal fragments. Neither of the assemblages appeared to consist of spent fuel or to be directly related to the functioning of the clamp, and it is assumed that the material present is derived from a low density of scattered debris of uncertain origin. Although it was hoped to gain some evidence of the types of fuel used within the clamp and the management of any local fuel resources, there is insufficient material for any further analysis.

9.4 Plot 7-18: Scales; Site 1

Askwith parish; N443 NAL; NGR 416032 450144; Figures 2a, 5, 5a-c; Plates 5-12.

Summary

Slight traces of a probable rectangular stone-built structure, dating from the late thirteenth to fourteenth century were recorded beneath the more substantial remains of a post-medieval farmhouse. This latter structure, which was occupied from the sixteenth until the eighteenth century, survived as foundations and bases of walls, floor surfaces, robber trenches and spreads of rubble. The shape in plan of the building and the variety of building materials used indicate that the structure was developed and modified over time. The buildings produced an extensive medieval and post-medieval artefact assemblage, and may have been part of the deserted settlement of Scales.

9.4.1 Location, topography and geology

The site was located below a ridge forming the edge of Askwith Moor to the east of Scales Gill, a valley sweeping down to Ilkley and the River Wharfe (fig. 5). The archaeological remains were situated on a well-drained, moderate slope, at a height of 206.5m AOD on the centre line of the pipe-trench, declining to 204.8m AOD at the base of the scarp. An area of 450m² was recorded and investigated.

The topsoil was dark greyish-brown humified silty clay and occurred over the entire site. The subsoil was pale grey silty clay, but this deposit was only found upslope along the northern limits of the excavation, and it may have been a cultivation horizon derived from medieval agriculture. The horizon was possibly truncated and removed to the south by construction activity. At the southern end of the excavation area the post-glacial clay below the subsoil had been redeposited, either as deliberate levelling events or to create surfaces. In the south-west corner of the building it sealed post-medieval rubble. The undisturbed drift geology was firm yellowish-brown silty clay, mottled grey, with few inclusions.

9.4.2 Results from earlier stages of work

Scales House Farm, lying to the south-east of Plot 7-18, and Top Moorside Farm, which appears as 'Scales' on early Ordnance Survey maps and lies to the east of the site, may mark the location of the deserted village of Scales. The remains of the open fields of the village survive as numerous discrete areas of ridge-and-furrow earthworks to the south and south-east of the plot, while one such area occupies its south-eastern corner (DBA: CRZ). At the point where the pipeline route enters the corner of this plot, it crosses a dry stone wall (recorded as B491 in the field survey).

A plot of land labelled 'Scales Green' on a map dated 1781, was probably used for the village's common grazing; it lay 140m to the south of Plot 7-18. On the higher land, to the east of the site, are a number of worked-out quarries and extraction pits (DBA: CQZ and CYB; MON 1369092 and 561301; NHER MNY22238 and MNY22240). The dates of both the quarrying activity and the abandonment of the village to the south are unknown; however, quarrying activity in the Yorkshire Dales was particularly intensive during the eighteenth and nineteenth centuries. At this time, there was a greatly increased demand for stone for agricultural uses, such as liming, salting, barn building and field drainage following the enclosure of common land. A lime kiln is recorded 200m to the south of the site (MON 560970). Extensive quarrying on top of the ridge may have had an effect on water run-off and soil deposition processes down slope.

In the pre-construction geophysical survey the site appeared as a confused mass of strong magnetic anomalies. This was interpreted as evidence of modern ferrous disturbance and the site was not targeted for evaluation trenching.

Six evaluation trenches were excavated in an adjacent field, Plot 7-19, and a shallow ditch was recorded. The results of the evaluation suggest that the ditch was open in the mid-eighteenth century and was backfilled by the mid-nineteenth. This falls within the date range of the abandonment of the building remains in Plot 7-18 described below; pottery types recovered from the evaluation work included Pearl, Cream, and Sunderland wares, a similar range of types to that found in the excavations.

9.4.3 Site description

Initial excavation revealed the remains of a building: foundations and bases of walls, floor surfaces and robber trenches, beneath extensive rubble spreads. There was also evidence of a possible timber building above the rubble deposits. The major part of the building was visible as mass walling and flagged floor surfaces, in a variety of materials: dressed limestone, millstone grit, red sandstone, and flat river cobbles. The local limestones are particularly durable compared to the other stones and this was reflected in their state of preservation, the red sandstone walls, by contrast, being poorly preserved, with eroded surfaces to the masonry blocks.

It appears from the plan form of the building and the variety of building materials used that the structure had been developed and modified over time. The phasing outlined below is provisional and further analysis may allow this phasing to be developed and refined.

Phase 1: Possible medieval features

Near the south-western edge of the excavation area, a shallow linear feature, [13017], with a right-angled return produced 145 sherds of Northern Gritty Ware pottery from its fill, (13016). The lack of other pottery types from this feature may be purely accidental, but could imply that this fill pre-dates the arrival of Humberware on site in the late fourteenth century. This feature was less than 0.10m deep and contained stone fragments and mortar within its fill. It has been tentatively interpreted as a robber trench.

Similar pottery was recovered from a linear feature further to the north, [13102]. This was only seen clearly in its west-facing section, but seems to have been broadly parallel with robber trench [13017]. It was a deeper feature, steep-sided and not completely bottomed during excavation, but could perhaps also be a robber trench. Ditch [13058], to the east, also contained three sherds of Northern Gritty Ware pottery, and may have been a continuation of feature [13102].

Both of these features were cut through a spread layer of olive-green silty clay, (13098), less than 0.15m thick with few inclusions. This layer lacked any stone debris, implying that it pre-dated the earliest stone-built structure on the site. It appears to have been a build-up of well-manured cultivation soil, protected from subsequent erosion by layers of later demolition rubble. This deposit produced 46 sherds of Northern Gritty Ware, together with a single sherd of Humberware and a sherd of post-medieval coarse-ware; both possibly intrusive.

Robber trenches [13017] and [13102] together seemed to define a rectangular structure, the stone and mortar inclusions in their fills suggesting that this may have been a stone-built building.

Phase 2

The post-medieval building (fig. 5b, plate 6)

The surviving foundations and fragments of wall seem to share a similar alignment to the possible medieval structure described above but the lack of early post-medieval finds from the site suggests that its occupation was not continuous.

The plan of the northern side of the building was clearly defined by a 12m-long wall foundation with right-angled southward returns at either end. The north-west corner, wall [13051 = 13070], had been cut off from the rest of the north wall, [13029], by a land-drain; another land-drain had removed the north-eastern corner, similarly severing the surviving part of the eastern wall, [13013]. A shallow feature recorded in this corner, [13048], is likely to have been no more than an area of disturbance arising from the installation of the drain.

These walls consisted of double rows of large, squared facing blocks with rubble infill, giving a width of between 0.7m and 0.8m. The facing blocks were generally in hard, greyish-blue limestone, typically up to 0.45m long, but some, especially the two cornerstones, were much bigger. Two courses of blocks survived for much of the length of the wall, giving a depth of up to 0.36m. At least some of the blocks had been reused, quoin [13031], at the northern end of wall [13013], being a recognisable architectural fragment, a threshold stone, placed upside-down (plate 11).

To the south, the line of wall [13051] continued as a robber trench [13036], the masonry apparently having been lost in antiquity. Rather more survived of the eastern wall, [13013], which could be followed for 7m south of the north-east corner before its line was lost in a complex and disturbed area that marked the south-east corner of the structure. A single sherd of pottery, the rim of a puncheon dating from later seventeenth century at the earliest, was found within the east wall.

The south wall of the building, [13064], was up to 1.16m wide, 7.5m long, and mostly survived as a single course of sandstone blocks. This wall was on the crest of the hillside, the ground beginning to slope away quite markedly; at the eastern end of wall [13064], the remains of a buttress wall formed a lower step to the south. A regular course of blocks, [13021], abutting the eastern wall of the building may have been the remains of a similar buttressing wall, or been related to the drains described below.

Around 4m from the south-eastern corner of the building, wall [13064] had been cut by the same land drain which removed the north-east corner. Beyond this, around 2m of the wall had been lost, though it remained partly traceable as a line of rubble. The western end of the wall was better preserved, and appeared to form a definite terminal, approximately 1.5m short of the extrapolated line of wall [13051], perhaps suggesting that there was a doorway in this corner. Evidence of burning of the stone blocks and underlying clay in the region of the gap in the wall led to the suggestion that there may have been a chimney in the centre of the south wall.

Below the wall foundation a deposit, (13096), of humic loamy clay produced 52 sherds of post-medieval pottery: Nottingham Stoneware, Ryedale ware, Midlands Purple ware, Midlands Yellow ware and a range of Staffordshire-type slipwares dating from the sixteenth or seventeenth centuries but including one small sherd of eighteenth century white salt-glazed stone ware, which may well be intrusive. A stone rubble and soil layer, (13106), to the south of the wall contained similarly dated material.

The western side of the building

Just over 6m west of the wall [13051], a single course of stones survived of another wall, [13088], also in hard greyish-blue limestone, in freestone blocks typically 0.60m by 0.50m by 0.40m, with no visible surface tool marks. This section of wall was 2.50m by 0.60m by 0.15m. A perpendicularly placed block at its northern end hinted at a possible return to the east.

A length of wall, [13084], abutted wall [13051], running for 1.8m to the west. It consisted of a single course of a double row of red sandstone facing blocks, up to 0.40m by 0.30m and 0.15m high, with a rubble core. The western end of this wall had been partially robbed away; it seemed to have originally formed a butt end, but the possibility that it may have extended further to the west cannot be entirely ruled out.

The remains of a clay floor, [13049], survived in the south-east corner and a stone surface, [13089], abutted the western wall. The stone floor was constructed using glacial boulders and cobbles. The clay floor, [13049], probably overlay two small post holes, [13076] and [13078].

Internal features (fig. 5b, plate 6)

In the middle of the north wall, a pair of stone blocks, [13046], each with a socket cut into its upper surface, projected perpendicularly southwards. These stones probably formed the threshold of an internal door, with the two sockets holding the door posts. Behind this doorway, a 1.6m-wide floor surface, [13024], extended eastward for 2.8m. This surface consisted of large, irregular sandstone flags (13024), up to 400mm by 300mm by 60mm in size, laid on a bedding layer of sand, (13043), which was 50mm thick (plate 9). This bedding layer produced twelve sherds of pottery, including mottled ware and a light-bodied wheel-thrown slipware cup, indicating a late seventeenth century or later date. A large shallow irregular pit, [13071], recorded below the bedding layer, was probably a natural feature.

Floor [13024] was bounded on its southern side by a line of kerb stones, [13045], and to the east by a row of bricks, [13030]. The bricks measured 200mm by 100mm by 60mm and, although comparable in size to those found during the excavation of a brick manufacturing site two kilometres to the east, in Plot 6-7, they differed in appearance and fabric, and may not have been of local manufacture (Vince, Appendix C). Between the line of bricks and the corner of the building, the floor surface continued as regularly laid rectangular flagstones, [13032]. The bedding layer for these stones, (13044), was recorded as continuing beneath layer (13943), perhaps the result of floor surface [13024] having been re-laid at some point.

There was no evidence of a stone surface immediately to the west of threshold [13046], where the surviving surface, (13109), consisted of mortar, crushed brick, and clay, (13109). This was bounded to the south by another floor area, [13110], composed of a small number of large, square flags. Although probably set directly onto the natural clay surface, a layer, (13022), containing ash, charcoal and brick and stone rubble, surrounded these stones. The clay surface in this area, (13075), had been heat-reddened, especially to the south-west, where the surviving stone surface formed a re-entrant right angled corner. A brass button inscribed with 'Northamptonshire Militia' (Special Find 350; plate 8) was recovered from the rubble-rich layer.

A very regular rectangular pit lined with vertically placed stones, [13080], seemed to be aligned with surface [13110], and had a fill of black, charcoal- and ash-rich loose clayey material (13081). There was little sign of burning on the sides of pit [13080] suggesting that the fill was not burnt in situ. Sherds of three vessels were present in the fill of this pit: a flanged bowl of Sunderland Coarseware and a Creamware plate and tankard.

A further area of stone flooring, [13040], survived in the north-west corner of the building. These flagstones were roughly rectangular, up to 0.6m long and 0.5m wide, and were regularly laid.

A small linear gully, [13035], ran parallel to, and up to 1m inside, the eastern wall, being lost at its southern end in the confused area around the south-east corner of the building. At its north end, it may have formed a junction with a similar feature, [13090], recorded after the removal of stone floor [13032], but the intersection of these two features had been largely removed by the installation of the land drain which cut through the north-eastern corner of the building. It is possible that these gullies were robbed-out wall trenches from an earlier phase of building, but some form of internal drainage function may be more likely, especially as the western terminal of gully [13090] seems to correspond to the line of bricks separating floors [13024] and [13032]. A small circular posthole, [13066], just to the south-west of this terminal, was an isolated feature.

A number of artefacts were recovered from the surface within the building. These included dress fittings such as buttons and shoe buckles, household utensils such as fragments of pewter spoons, a knife, and a rare example of an early table fork (plate 7). Many of these finds can be dated stylistically to between the sixteenth and eighteenth century.

External features to the north and east

Ditch 13058, immediately beyond the north wall of the building, was up to 1.50m wide and 0.7m deep. The occurrence of three sherds of Humberware pottery in its lowest fill suggests that this ditch might have been open in the late medieval period, perhaps forming an eaves-drip gully for an earlier phase of building. An upper silt layer, (13085), overlying the lower fill and extending as a spread layer to the south of the ditch produced three pottery sherds: Northern Gritty ware, Humberware and a tin-glazed vessel sherd. This layer may have been the same as a dark, greyish brown sandy silt layer, (13065), recorded in section underlying the north-east corner of the building, [13029], which produced several sherds of pottery dating from the seventeenth or eighteenth century.

To the north of ditch [13058], a neatly made dry stone structure [13069] consisted of horizontally and vertically set slabs together with some large squared blocks and may have been a trough, part of a drain or footings for a masonry or timber building. Twenty-two sherds of pottery were recovered from context (13074), the fill overlying structure [13069], including a single sherd of a Staffordshire-type white slipware posset pot. To the east, a compacted stony surface, (13020), was found on the edge of the ditch and extending to the north.

Phase 3 Late post-medieval (fig 5b, plate 12)

In the south-east corner of the excavation area, an area of stone surface (13008), constructed from large flat flagstones lay over the expected position of the corner of the building. A similar area to the south-east, (13006), included several even bigger slabs, to 1.3m long, 0.6m wide and 0.3m thick. Four sherds of pottery, Ryedale ware and wheel-thrown slip-decorated red ware, were recovered from surface (13006). The red ware indicates a late seventeenth century or later date.

This part of the site was criss-crossed by a confusion of stone culverts and drains, either cutting through the stone surfaces or bridged by them. Culvert [13009] was a continuation of gully [13035], perhaps originally carrying it beneath the south wall of the building, and was bridged by the westernmost slabs of surface (13008). On its eastern side, this surface lay over the top of culvert [13004], which, for part of its length, contained a ceramic drain. It was not clear whether the culvert was a pre-existing feature incorporated into the stone surface, or the two were contemporary. This culvert may have been contemporary with the building, draining the eastern side where perhaps the stones of feature [13021] were the silted up remains of its northward continuation. A deposit, (13050), which was thought to be contemporary with culvert [13004], produced twenty-five sherds of pottery of late seventeenth century or later date.

To the south, culvert [13004] formed a junction with culvert [13038], the relationship between them not being determined, before swinging to the west to disappear beneath the edge of site baulk.

Drain [13054] crossed the space between surfaces (13008) and (13006) intersecting as it did so a horse-shoe drain [13019]. To the north, drain [13054] was cut by a shallow feature, [13062]. A ceramic land drain, aligned with three other land drains cutting the north wall of the building and surface (13089), was also recorded as feature [13059]. Drain [13019] produced a number of finds including a cartwheel penny of 1797 and another George III penny dating from to 1770 to 1775, and part of an iron chain link and a buckle.

Downslope of the remains of the south wall of the building, a levelled deposit of stone rubble, (13107) and (13108), extended southwards to a single regular row of stones, [13003]. The two stones at the eastern end of this row were notable: a reused block with a notch removed from one face and a circular slab. The presence of a packed clay layer, (13028), over the rubble layer and interpreted as a floor surface might suggest that there was a structure built against the standing south wall or the building, perhaps an animal shelter. Eight sherds of pottery recovered from clay floor (13028) include a sherd of a white salt-glazed plate, of mid-eighteenth century date. Three small circular patches of degraded timber (13119, 13120 and 13121) within this area might be related to the use of this structure.

Over the rubble deposits near the north-west corner of the building, three heavily degraded timber posts, (13115, 13116 and 13117), formed an regularly spaced alignment. A fourth post of similar appearance was noted 8.5m to the west.

Artefacts from the rubble spreads which covered both structures were recorded by 10m grid square as contexts (13001), (13002), (13007), (13010), (13011) and (13014). In total 1497 sherds, weighing 23.87 kg in total, were recovered from this spread. The rubble deposits included a number of late eighteenth century types, including 64 sherds of Creamware and six sherds of Pearlware, all from one vessel, a bowl for which a complete profile can be reconstructed. The low quantity of Pearlware and the absence of transfer-printed ware suggest an end date before 1800. Residual medieval finds found in the demolition rubble included a buckle and a fragment of a multi-armed candle holder.

9.4.4 Analysis potential

The building foundations as recorded must have been largely of late sixteenth or seventeenth century date, but the artefactual evidence indicates earlier occupation of the site, probably in the late thirteenth to fourteenth century. Activity between these two periods of occupation seems to have been minimal. Some features, such as robber trench [13017] may date from the medieval occupation, although this cannot be unequivocally demonstrated. Variations in the build and materials used in the masonry suggest that the building foundations and floor surfaces are not all of the same age, and some may be the remains of the medieval structure, re-incorporated into the rebuilt post-medieval building. Again, this is difficult to demonstrate from the stratigraphic and artefactual data.

There may be some scope for further refinement of the phasing of the site, but determining the sequence of masonry structures stratigraphically is rarely straightforward; to take an example, the differences between a stone block set in an earlier soil layer, and a soil layer deposited against an existing stone is unlikely to be accurately recorded in every case. Abutting masonry presents similar problems, especially when, as here, no bonding material survives.

In plan, only the north side of the building survived, and then barely higher than the likely ground level at the time it was occupied. The quantity of domestic debris leaves little doubt that the main building had a residential function, presumably as an isolated farmhouse, at least in its later, post-medieval incarnation. The medieval structure may have been a more transient, seasonally occupied building.

It is not clear how the features to the west relate to the main building. Because the medieval finds seemed to be concentrated in this area, it is tempting to think that some of these at least are survivors of the medieval structure, but other interpretations are perhaps more viable. Wall [13088] may have been the western wall of a second cell of the overall building plan but could equally be no more than the wall of a yard area. The construction of surface (13089) certainly appears to be more apt for a yard than for an internal floor.

The internal features of the main building provide some clues to the floor plan but leave many unanswered questions. The survival of floor surfaces in the northern side of the building focus

attention on this area but may be misleading; it could be that this part of the structure had a relatively utilitarian function reflected in a lower floor level. Alternatively, the remains may highlight different preservation conditions caused by the slope, with the uphill elements surviving better than the downhill ones. The more regular squared flags of surface (13110) may be more representative of the original floor surface in the rest of the building. Better quality stone would have been preferentially robbed when the building fell out of use.

The burnt ground between surface (13110) and pit [13080] suggests that there was a fireplace in this area, although it is by no means certain that the burning was contemporary with these features. The stones may have been set into burnt demolition rubble from the earlier phase of occupation, or the burning may have occurred during or after demolition of the structure. If the fireplace was in this area, the flagged surfaces along the north wall could have floored a hearth passage behind the fire, a common feature of early buildings. Pit [13080] is not easy to interpret; if the charcoal-rich fill is related to its function, rather than to its disuse, it would imply that it was a fire site, though it is not clear why it should be so deep. Alternatively, it could have held a large structural timber or had a drainage, or perhaps even a storage, function.

The row of kerb stones defining the edge of surface (13024) implies that this part of the building was partitioned off, although there is no direct evidence for any other internal walls. To span the whole width would require timbers of over 10m; it is unlikely that such timbers could be obtained from local sources, although importation of Baltic pine could have supplied this need. It is perhaps more likely that there were internal load-bearing walls, possibly with shallower foundations than the external walls, which have not survived. A continuation southwards of the line of door threshold [13046] would be an obvious position for such a wall.

A more detailed floor plan of the building, and by extension, a refinement of its interpretation, could be inferred from comparison with other, similarly dated buildings in the locality. Documentary research and consultation with local vernacular building specialists could help to locate suitable comparanda.

The rubble-rich spreads over and around the building may include demolition debris from earlier phases, as well as from the final abandonment of the building, which probably occurred in the eighteenth century. There is some potential for further analysing the distribution of artefacts within these spreads, which might help to refine the interpretation of phasing. Cross-fitting of sherds within the pottery assemblage may also help to establish stratigraphic relationships within these spreads and other deposits. Thin section and chemical analysis of selected sherds of Sunderland coarseware, Upper Heaton and Askwith wares will help to characterise the ceramic assemblage and may contribute towards refining the dating of the site, as well as providing information about the provenance of locally available pottery at the time that the site was occupied.

Overall, the significance of the site lies with the extensive medieval and post-medieval artefact assemblage and the relationship of these artefacts to the domestic structural remains. Further analysis and interpretation of the building remains would enhance this significance.

9.5 Plot 7-18: Scales; Site 2

Askwith parish; 443 NAL; NGR 416032 450144; Figures 2a, 5, 5d; Plate 13.

Summary

A field kiln was excavated, but no datable artefacts were retrieved. Production waste and coal retrieved from an environmental sample provide evidence of metal working. Radiocarbon dating may provide a date for the use of the kiln, and comparisons with the other excavated kilns along the pipeline route may also allow the kiln to be dated.

9.5.1 Location, topography and geology

A field kiln, visible as a roughly circular area of burning 2.7m in diameter, was located 110m to the west of the demolished building described above, on the southern edge of the easement. It was situated on a steep slope at a height of 203.8m AOD, 3.7m lower than the hall site. The topsoil was the same as the topsoil above the demolition rubble from the hall, but no subsoil was observed above the clayey till cut by the kiln pit.

The undisturbed drift geology was firm yellowish-brown silty clay with 20-40% grey mottling and a few small sandstone inclusions.

9.5.2 Results from earlier stages of work

A lime kiln is recorded 200m to the south of the plot at 180.00m AOD (MON 560970). There is also evidence of industrial activity on the higher ground to the east of the site, above the open fields of the deserted medieval village of Scales. This includes quarrying and clay extraction pits (DBA: CQZ and CYB; MON 1369092 and 561301; NHER MNY22238 and MNY22240). It is not known if all of these activities were contemporary.

9.5.3 Site description

The kiln was a steep-sided pit, [13068], cut into natural clay, (13095) (fig. 5d). It was excavated to a depth of 1.05m, but not fully excavated because of flooding. No flue was obvious in plan or during excavation, but one may have lain outside the excavation area. A row of large sandstone ashlar placed centrally in the base of the pit (plate 13). may have been the remains of a 'feather', a structure allowing a free flow of air from a flue into the base of the kiln

The corona of heat-affected natural ground around the edge of the pit was 2.7m in diameter and extended for a thickness of up to 0.25m into the underlying clay (13094) behind a layer of burnt sandstone and limestone lumps (13093), less than 0.09m thick. The temperature required to burn the clay to this depth would indicate a firing temperature of approximately 1000°C (D. Johnson, *pers. comm.*, 2006). The pit was deliberately backfilled with clay (13092), and a small amount of production waste (5g) was retrieved from the environmental sample taken from this fill.

Environmental bulk samples were taken from the fills, but not enough material was present after processing to obtain a radiocarbon date. Initial interpretation suggests that the structure may have been a potash kiln; potash would have been used in the preparation of lime mortar compounds. Its proximity to the house may also be significant, as lime mortar deposits survived along the north wall of the building.

9.5.4 Analysis potential

Further analysis will help to locate the kiln within its industrial landscape context. Many of the nearby sites have an industrial character, with metalworking, quarrying, and brick manufacture all represented, and this may be relevant to the development and use of this kiln site and the nearby building (above).

Investigation of the link between the use of the kiln, the abandonment of the building in Scales site 1, and the decline of the surrounding settlement, undertaken in conjunction with an overview of field kilns in the Yorkshire Dales, may help elucidate their relevance to the local and regional economy. It is recommended that a separate article is written for a regional post-medieval or industrial archaeological publication, and that all the excavated kilns from the pipeline are included in this article.

Lime kilns and limestone quarries within the study corridor of the ADBA are found from Embsay to Nesfield in the east and Lawkland to Wennington in the west. Kilns were generally built into the slope of a hill or in free-standing clamps, and are often adjacent to a limestone quarry. The processed lime was used locally for building materials, and was also used to reduce soil acidity; this would have been very necessary on the newly enclosed moorland of the eighteenth and nineteenth centuries (White 2003).

One hypothesis is that the kiln was used to produce mortar for the second phase of construction of the building in site 1, in the seventeenth century. Mortar samples from the building and burnt limestone from the sample residues taken from the kiln may indicate a similarity. Analysis of the main mineral components of the mortar may be able to show if they were made from the same parent material. A small amount of metalworking residue was also found, which could indicate a multi-functional use of this particular kiln. Production waste and brick fragments have been found in other excavated examples along the route, and suggest an alternative function to producing lime or potash for fertiliser.

It is recommended that the mortar samples are quantified and that research is undertaken in conjunction with the documentary research work proposed for Scales site 1. It is also recommended that the slag residue is analysed by thin section in order to identify the production technique.

The results of the analysis from this site, and other 'field kiln' sites along the pipeline route, will help to inform excavation and research strategy for future excavations of kilns and furnaces in the Yorkshire Dales.

9.6 Plot 8-5: Denton Moor

Denton parish; 428 NAL; NGR 413450 450600; Figures 2a, 6, 6a; Plates 14-16.

Summary

A bloomery furnace was found, with in situ deposits associated with iron production and smithing. Pottery found in the backfill of the furnace and analysis of the slag deposits suggests a date between the fourteenth and sixteenth centuries for its final phase. An earlier ditch was sealed by the production waste from the furnace: this ditch appears to have been backfilled between the twelfth and fourteenth centuries, and may have been part of a field system associated with agriculture.

9.6.1 Location, topography and geology

The site was located on moderately well-drained level ground at a height of 190m AOD, below a ridge forming the edge of the moor and the top of a valley, which sweeps down to Ilkley and the River Wharfe.

The topsoil and underlying subsoil are comparable to the soils found at Scales site 1, which are described above. In the south-east corner of the excavation, the subsoil had become mixed with slag residues. The natural drift deposits consist of firm yellowish-brown silty, slightly stony clay. There was evidence of root disturbance to the clay, but it only appeared infrequently across the site, in small linear clusters or small and very irregular shallow pits that were interpreted as being tree throws.

9.6.2 Results from earlier stages of work

A Grade 1 Listed Building, Hathenshaw Farm (LS331421), is located in the south-west corner of Plot 8-5. Between the building and the pipeline construction areas were coppiced woodland, a pond, and linear earthworks. The extant earthwork features included a water-filled ditch and a bank. These features may have been part of a water management system associated with the farm buildings, and appeared to be linked to a palaeochannel which ran north to south and bounded the eastern limit of the excavation area. Other features recorded in the ADBA include pits, ridge-and-furrow, and a lynchet (Network Archaeology Ltd 2005a).

The results of the geophysical survey indicated several anomalies which were interpreted as being ridge-and-furrow, a pit, and a substantial ferrous anomaly (Pre-Construct Geophysics 2005a).

9.6.3 Site description

Phase 1

The earliest activity identified on this site was a linear feature, variously numbered [11050] and [11035], which was 0.70m wide, and ran straight across the excavation area for 16m, east to west, continuing beyond the excavation limits. In places, the upper fill of the ditch was sealed by a layer of production waste from the furnace. The profile and depth of the feature suggest that it was a boundary ditch. The pottery found in the ditch was Humberware, which dates the backfilling of the feature to the twelfth to fourteenth century onwards. A worked stone was also found in upper ditch fill (11049), and was identified as a small hand rubber of fine, micaceous sandstone measuring 75 by 60 by 32 mm.

A small pit, [11031], excavated below the slag mound (11003), had an irregular profile and was interpreted as a tree throw. Similar features were investigated in the south-western quadrant of the excavation area.

Phase 2

A shallow and ephemeral linear feature, recorded as [11044], [11022] and [11074], ran north to south, cutting across the phase 1 ditch [11035] at a right angle (fig. 6a). At its southern end, the linear feature was filled with metalworking waste, and was less than 0.1m deep. Medieval pottery was found in fill (11030), while at its northern end, the feature was visible as a stripe of burnt material, (11007), containing fragments of burnt clay and small soft reddish lumps, probably roasted iron ore. The feature was interpreted as a redundant hedge line, possibly existing before, or contemporary with, the construction of the furnace.

Both the ditch and putative hedge line were sealed by layer (11056), a deposit of burnt material 0.1m deep. It covered an area 6.8m by 5.5m and consisted of lenses of charcoal, burnt clay and slag. Some of the material, recorded as (11015) and (11021), produced Northern Gritty Ware. A more intense area of burning was visible at the junction of the two linear features, and there may have been a hearth, (11040), perhaps placed in the top of the backfilled phase 1 ditch, after the hedge had been destroyed.

These deposits may have been contemporary with a slag mound, (11003), which could have all been derived from the furnace [11024]. The western edge of the slag mound was partially exposed, and a 1m-wide slot was excavated through this material. The thickest part of the exposed portion of the mound was 0.15m deep, tapering to 0.05m towards its edges. The estimated total volume of slag within the excavation area was approximately 15 m³ spread over an area roughly 16.5m by 6.5m. The total extent of the mound was not determined, but it appeared to continue beyond the eastern limit of the excavation area. Fragments of pottery were recovered from the surface of the mound, but these proved to be from domestic vessels (see post-Roman pottery report, Appendix C).

A roughly rectangular area, 8.4m by 2.5m, consisting of a thin spread of crushed roasted ore and charcoal, (11004), was defined in the north-western quadrant of the excavation area (fig. 6a). This layer was contiguous with a trampled floor of small pebbles, (11002), which lay in the centre of the spread; layer (11004) surrounded the pebble floor, but did not underlie it, suggesting that the two deposits were contemporary. No post or stake holes, which might have suggested a structure, were found. The layer showed evidence of root disturbance.

The furnace [11024] was situated on the northern edge of the slag mound and consisted of a circular bowl-shaped pit 0.9m in diameter, and an oval slag pit, [11023], 2.6m by 1.6m (figs. 6a, 6a i; plates 14-16). The tap arch between the slag pit and the furnace was found to be intact. Pottery was found in the mostly slag and charcoal backfill of the slag pit, (11016).

A smaller pit, [11014], adjacent to and 0.3m to the east of the slag pit, was fully excavated. This pit was kidney-shaped, and measured 1.3m by 0.70m in plan, and 0.48m deep. It had been backfilled with slag and charcoal (11037), and was interpreted as being a quarry pit for the extraction of clay, which may have been used in the construction of the furnace cylinder or dome. Redeposited clay (11036) was found above the collapsed furnace lining (11033) and over the extraction pit itself.

A complex group of small pits and putative hearths were excavated 4.2m to the north of the furnace (figs. 6a, 6a ii). The earliest feature could have been the base of a hearth which was visible as a circular orangish-red area of burnt clay, (11069), 0.40m in diameter. It appeared to have been cut away on its southern edge by a small oblong feature, [11080], which fed into a large shallow pit, [11060]. It is thought that this small feature might indicate the position of a tuyère (a nozzle for a set of bellows), or some other type of furnace furniture. The pit was 1.30m in diameter and 0.14m deep, with two fills, (11058) and (11059), both comprising slag and large charcoal lumps. The environmental sample from the primary fill, (11059), contained hammer-scale, while ferrous globules were retrieved from both fills. Below the pit fills and cut into the base and sides of the pit were several small postholes.

Adjacent to the hearth, and 0.10m to the north, was an identical feature, [11061]. It was probably contemporary with the complex of features described in the previous paragraph, but there was no direct relationship between it and the pit [11069], 0.61m to the south.

Another shallow pit, [11055], was excavated immediately to the south of the earlier pit. It was also filled with charcoal and slag, (11054). The south-west quadrant of this circular pit was cut by a small, straight-sided pit [11020]; this was possibly a posthole, as its fill, (11019), contained stones that might have been post-packing. Slag was also retrieved from this fill.

Surface bulk finds were registered by 5m grid square, and bulk samples of the surface spread were taken from each square to allow micro-residues, such as hammer scale, to be collected.

9.6.4 Analysis potential

The large amount of industrial residues retrieved from this site provides good evidence for bloomery iron smelting. The apparently *in situ* material associated with furnace [11018] suggests that the tapped low-density slag amounts to 20kg, with over 19kg of untapped material still within the furnace. The large size of the slag flows is consistent with a relatively late date for this furnace, probably fourteenth to seventeenth century. All slags identifiable with a reasonable degree of certainty were from iron smelting. No certain smithing residues were identified, although it must be borne in mind that no slag assemblages were analysed from the north-eastern corner of the site, which seems most likely to have been the smithing area.

Currently, the furnace is regarded as potentially important because of its unusually good state of preservation. The furnace slag may shed some light on the production methods of this period, before the transition to brick-lined blast furnaces in the sixteenth century.

Further work on the stratigraphy should be directed at analysing the fills of features, in order to refine the interpretation of the archaeometallurgical residues. In addition, species identification of the charcoal flots will indicate fuel types and wider woodland management practices. Species identification from contexts (11007), (11038), (11058), and (11089) is recommended, as these samples were obtained from sealed contexts.

A radiocarbon date from the charcoal recovered from burnt spread (11056), which stratigraphically pre-dates the excavated bloomery furnace, would provide a *terminus ante quem* date for the furnace construction, while a second radiocarbon determination from the clay lining, (11033), could date its final use. Charcoal from the possible clay extraction pit, context (11037), could also be dated and would show whether this was broadly contemporary with the furnace.

It is also recommended that the medieval pottery from the Phase 1 features is examined in thin section and chemical analysis to try to determine if the vessels were manufactured from a local source.

9.7 Plot 11-6: Langbar

Nesfield with Langbar parish; 405 NAL; NGR 408900 450600; Figure 2b; Plates 17 and 18.

Summary

The working width of the pipeline came very close to a farm track believed locally to be a Roman road. The area of the easement next to the track was stripped and examined for any features of archaeological potential that may be associated with the road. A ditch was discovered during the topsoil strip and a slot was excavated across it. On excavation, the ditch seemed unlikely to be of Roman origin, and was interpreted as a relatively modern field boundary.

9.7.1 Location, topography and geology

The site was located 2.5 km north-east of Addingham, 3 km north-west of Middleton and 750m south of Spring Well Farm. The land here is a moderate slope, downhill from west to east.

The topsoil in Plot 11-6 was a soft dark brown silty loam, overlying the drift geology of firm light grey clay with occasional lenses of friable to loose orange sandy silt.

9.7.2 Results from earlier stages of work

Excavation in Plot 11-6 was recommended as it is in close proximity to a farm track locally thought to overlie the course of a Roman road (Neil Campling, *pers. comm.*, 2006). The desk-based assessment did not find any records of a Roman road in this area. During the pipeline topsoil strip, a ditch that briefly ran parallel with the farm track was observed.

9.7.3 Site description

Following the removal of topsoil and machine disturbance (5122) and (5120), a slot 7.8m long and 1m wide was excavated across the 2.30m wide ditch identified during the topsoil strip and initially interpreted as a drainage ditch associated with the putative Roman road. The ditch cut, [5123], had a shallow profile no deeper than 0.48m, with a gentle break of slope and base, and slightly concave sides. The profile also revealed that it contained a single fill, (5124), which principally consisted of large, flat, sub-angular stones in a loose dark brown clayey silt matrix. A small quantity of slag was recovered from this context. The nature of this deposit indicates that it was deliberate back-fill into the feature. The feature appears to run parallel to other ditches in the field (plates 17 and 18).

9.7.4 Analysis potential

The results from the excavation of this feature indicate that it is unlikely to be associated with a Roman road: the feature respected walls and field boundaries still in use, its profile is not characteristically Roman, and its fill produced no datable material to suggest that it may be Roman. The feature is also too far away from the track to be plausibly associated with it. In the absence of excavation evidence of its relationship with the trackway, the most appropriate interpretation of this feature would be that it is a relatively recent boundary ditch, as it runs parallel to extant field boundaries. No further analysis of this site is proposed.

9.8 Plot 12-4: Bolton Road

Addingham parish (West Yorks); 393-394 NAL; NGR 408111 450522; Figures 2b, 7, 7a; Plate 19.

Summary

Two well-preserved but undated field kilns were identified near Addingham during the watching brief. The smaller pit or kiln may have been a bowl furnace used for metal working, while the larger feature may have been used for lime burning. However, the functions of these two features, and the site as a whole, are not clear.

9.8.1 Location, topography and geology

The site was located to the north-east of Addingham, above the western bank of the River Wharfe. The kilns were located on a well-drained steep slope, and on a sandy gravel terrace above a glacial meltwater channel, near to the Bolton Road, at a height of 91.0m AOD.

The topsoil in Plot 12-4 was a mid-brownish-grey silty loam with moderately frequent small stones, and was up to 0.30m deep, overlying a mid-reddish-brown, slightly sandy, silty clay subsoil, also with moderately frequent small stone inclusions. The natural drift deposits were orangish-brown, firm sandy clay, with a low to moderate occurrence of moderately sorted small pebbles, stones and boulders.

9.8.2 Archaeological and Palaeoenvironmental Background

A sand and gravel terrace was bisected by the route of the pipeline. This feature forms part of a floodplain area with recognised potential for prehistoric occupation (WSMR 538), (NAL 2005b). The field survey recorded a ruined wall in the plot (FSU: 191).

The pipeline crosses the Wharfe just north of Addingham, at a pinch point in the valley where the floodplain is no more than 130m wide (figure 7): 40m on the eastern side and 90m wide on the western side. There is no evidence for channels on the LiDAR survey (Challis 2005); this is because the river has migrated back and forth across the floodplain with insufficient space to create any cut-off channels.

The present river level lies approximately 1.5m below the floodplain, and there is some evidence for ridge-and-furrow on the western floodplain, although this cannot be seen in the LiDAR plot (Rackham 2005).

9.8.3 Site description

Kiln 1

The kiln had been dug into a slope at 91.07m AOD, with a fall of approximately 0.5m to the junction of the kiln flue and pit (fig. 7a).

The feature [4024] consisted of a kiln pit and a flue. The kiln pit was oval in shape, measured 1.72m by 1.56m by 0.80m, and was oriented from south-west to north-east. The kiln flue was located almost due east of the kiln pit and was approximately 1.70m in length, 0.40m wide and 0.30m deep; it was constructed of sandstone blocks, set vertically to support capstones.

The kiln pit was backfilled with brown clayey sand (4034), with some inclusions of burnt limestone, and sandstone rubble (fig. 7a i). Samples from the kiln fill have been processed and the residues were found to include 346g of dense clinker, which may have had a metallurgical origin (see production waste report, Appendix C). The rubble included fragments of worked and shaped sandstone blocks. The backfill (4034) sealed a deposit of heat-affected natural clayey sand, (4035) (plate 19), and a charcoal-rich deposit, (4036).

Kiln 2

This feature was much larger than Kiln 1, and had been dug into the slope next to it, 2.15m to the north (fig. 7a). The uphill edge of the kiln pit occurred at a height of 91.20m AOD, with a fall of nearly 1m to the opposite edge.

The kiln pit, [4025], was slightly elliptical, measuring 3.20m by 3.00m by 1.00m and oriented north to south. The flue, located on the eastern side of the pit and parallel to the flue of kiln 1, measured 3.20m by 0.80m by 0.40m. A stone structure, [4032], ran along the line of the flue and extended 0.65m into the kiln pit. It was constructed with squared sandstone blocks, c. 0.20m by 0.30m by 0.10m in size, set vertically and supporting capstones measuring 0.85m by 0.20m by 0.30m.

The outer western edge of the kiln pit was formed by a layer of burnt, reddish-brown, natural clay, (4027), below a thick deposit of silt and charcoal, (4028). A deposit of fired clay, (4029), above the traces of a previous burning event is thought to represent a secondary firing. The kiln pit was subsequently backfilled with medium-sized sandstone boulders, (4030), and brown silt, (4031), formed over the rubble backfill (fig. 7a ii).

9.8.4 Analysis potential

These two kilns and the other similar examples excavated along the route of the pipeline should be compared to each other and any local comparanda. A small amount of slag and burnt limestone was found in the fill of the smaller kiln, and this should also be compared with the production waste sample from the kiln excavated at Scales Site 2 (Plot 7-18). The smaller feature may have been a furnace used in association with the kiln. Further analysis may help to answer the following questions:

- were Kiln 1 and Kiln 2 contemporary?
- did Kiln 1 and Kiln 2 have the same function?
- how did the production waste become incorporated into the fill of Kiln 1?

It is recommended that the production waste from the environmental samples should be analysed, because the quantity recovered from Kiln 1 suggests a function for this feature other than lime burning.

9.9 Plot 13-19: Halton

Draughton parish; 375 NAL; NGR 405445 452869; Figures 2b, 8 and 8a; Plates 20-23.

Summary

The excavation revealed the foundations and floors of a seventeenth-century stone-built structure, 16m by 4m in size, and divided into two cells. This has been interpreted as a field barn, with a byre and animal stalls, or a possible small longhouse (combined farmhouse and byre). Several drains, probably contemporary with the building, were also recorded, along with an undated clay extraction pit and a lump of glass waste. The building seems to have been deliberately demolished and its stone walls were quarried and removed from the site by the end of the eighteenth century.

The excavation also produced a small residual flint assemblage from the building, suggesting a nearby prehistoric settlement dating from the Neolithic period. Some residual medieval activity, represented by pottery and a re-used architectural fragment, was also recorded, but it is unknown if an earlier building existed close to the site.

9.9.1 Location, topography and geology

The site was situated on a smooth slope to the south of the Embsay and Bolton Abbey steam railway line, near to Bolton Abbey Station and west of Harry Wall Gill, at a height of 190m AOD.

The topsoil was a dark greyish-brown friable silty loam extending over the entire plot, which was under permanent pasture, although the frequent presence of sherds of post-medieval pottery within the topsoil perhaps indicates former arable use. The soil was slightly stony with sub-angular cobble-sized lumps of sandstone. A variable depth of mid-brownish-orange, moderately stony friable clayey silt subsoil was present, thickest near the western limit of the excavation. This was not easy to distinguish from the underlying glacial till, especially as the area has been considerably modified by levelling and extraction. The glacial clay was a pale brownish-yellow, up to 0.40m thick and extremely stony and overlay sandstone bedrock and pockets of very compacted yellowish-brown clayey sand.

9.9.2 Results from earlier stages of work

The immediate area around the site has been heavily quarried and numerous pits and quarry sites are recorded in the HER. As the route of the pipeline in this region passes through the coal-bearing rocks, this may result from mining. However, some of the quarries may also have been used as a source of material for the construction of the railway and station below the excavation site.

A bank, with an associated ditch, was noted during the field survey of the plot. This was undated and was classed as being of minor significance (FSU: 184; Network Archaeology Ltd 2005b). Ditches and earthworks with associated field systems are also recorded and, interestingly, appear to mirror the current land divisions and field boundaries created by the Parliamentary Enclosure in 1768. Initially, it would appear that the excavation area is within a fossilised field system, preserved by accident as the Embsay and Bolton section of the railway cut through the landscape.

9.9.3 Site description

The main elements of the site – the remains of stone walls, foundations and flagstones – were initially exposed by the topsoil stripping (fig. 8a; plate 20). In addition to these building remains, a large pit to the north was partially excavated. This quarry pit, 7m in diameter, had been deliberately backfilled with a mix of rubble and natural clay silt (5026). The material produced several fragments of ceramic building material and a further piece of residual flint.

Having regard to the constraints of the construction timetable, full excavation of this feature was not considered to be a high priority.

Phase 1

Two stone-lined drains, [5037] and [5042], were found underneath demolition layer (5009) and levelling deposit (5032), which produced a single sherd of medieval Northern Gritty Ware pottery. Neither of these drains appears to have been particularly well constructed, and both had been damaged by robbing and ploughing.

Phase 2

Towards the western edge of the site, the remains of sandstone paved floor, (5005), (plates 21 and 22) were exposed. This covered an area of approximately 5m by 1.5m and was oriented north to south, possibly forming a cross passage. Some of the paving stones had small sporadic dimples and indentations, possibly indicating a previous use elsewhere before being re-used in this structure. Fragments of post-medieval pottery were found in close proximity to the paved floor. A single piece of Neolithic flint was discovered close to this feature within the subsoil. On either side of, and in the same alignment as, the paved floor were sandstone walls or kerbing (5004) and (5020) (fig. 8a i).

Directly to the east of floor (5005), four blocks of sandstone, (5022), were set in brownish-orange clayey silt (5032), probably deposited as a levelling material for a floor. The sandstone blocks delimited the sides of a small rectangular cell, perhaps an animal stall, 1.3m north to south, 0.8m east to west. The stones were arranged perpendicularly to the paved floor and kerbing, and may have supported timber or stone sides which were removed when the building was demolished. Each stone had a square beam socket, approximately 120mm by 115mm, cut into the surface. A further stone of similar size, (5031), was found to the south of wall (5022) in alignment with the two easternmost socketed stones (plate 23). This piece of stone had a linear V-shaped indentation carved into it on the underside, indicating that the stone had been re-used from another building. No other socketed stones were found in association with stone (5031).

A small piece of window glass from the plot possibly suggests a domestic role for the building, as do some of the iron objects recovered: a possible handle from a ladle, and a socketed fire-hook, although these, along with the small pottery assemblage (31 sherds), are not sufficient to determine the function of the building. The pottery is predominantly late seventeenth century or later in date.

Phase 3

During the process of subsoil and demolition rubble removal, a very thin layer of yellowish-white friable lime mortar, (5009) and (5012), was observed. This material was distributed throughout the area of archaeological activity. A series of 1m-wide slots ranging from 5.6m to 8.12m long were excavated across the deposit, revealing that most of the material was the fill of robbed-out foundation trenches (5011) and (5018) (fig. 8a ii). The spreading of the material may have been a result of the demolition of the building, or was perhaps a levelling event to reinstate the field for agricultural use after the building had been demolished. In the absence of any outer wall foundations for the structure, the best indicator of the footprint of the building is provided by the outline of these two mortar layers, (5009) and (5012).

Several pieces of post-medieval pottery and two pieces of residual Neolithic flint were found during the removal of the demolition rubble (5024). These pieces of flint may have been part of a larger scatter, somewhere in close proximity, disturbed by plough or bioturbation; the post-medieval pottery is more likely to be associated with the demolition phase of the building.

9.9.4 Analysis potential

It may be possible to better establish the plan form of the building by consideration of the position of the Phase 1 drains in relation to the later structure, and determination of the location of the main gutter.

It is possible that an earlier building existed on the site. This may be confirmed by identifying architectural fragments and floor surfaces which may have been re-used or added during phase 2. It may also be possible to fit the robber trenches to an earlier plan form. Documentary and cartographic study may identify the site, and would provide more social context for the finds, as well as a tighter chronology

Further questions include:

- was the building demolished well before the construction of the railway or as a consequence of its construction?
- can the function of the building be determined from a reconstruction of its ground plan?

9.10 Plot 14-1: Long Croft Hull

Halton East parish; 372 NAL; NGR 404780 453480; Figure 2b; Plates 24 and 25.

Summary

Four shallow, aligned, stone-lined pits were recorded during the topsoil strip. No datable evidence was found in the fill of the pits, and no further work is recommended.

9.10.1 Location, topography and geology

Plot 14-1 is situated some 400m south-east of the hamlet of Halton East, on the north side of the Long Causeway road (A59). The northern boundary of the plot runs approximately along the 180m AOD contour line and the site slopes down to the south towards the Ings Beck, on the south side of the A59: several minor streams rise in the area to flow into the beck, one of which passes through the eastern side of the plot. The plot was under pasture at the time that the ground works took place.

The topsoil in Plot 14-1 was a dark greyish-brown silty loam, up to 0.20m deep, overlying a mid- to light brown, plastic, silty clay subsoil, 0.50m deep, with frequent angular and sub-angular sandstone fragments up to boulder size. The underlying drift geology was a mid-brown sandy, silty clay, with bands of bedded shale and frequent lenses of gravel and loose stone.

9.10.2 Results from earlier stages of work

Ridge-and-furrow earthworks, with associated field boundary traces, were observed in the plot during the field survey (FSU: 179/180, Network Archaeology Ltd 2005b). The plot lies at the eastern end of a band of fields all displaying ridge-and-furrow remains, some now only identifiable by geophysical survey, presumably a remnant of the medieval open-field system of Halton (Pre-Construct Geophysics 2005a).

9.10.3 Site description

Four sub-circular sandstone rubble-lined pits, each measuring approximately 2.85m by 2.75m, were exposed beneath a colluvial subsoil that still remained on the features after the topsoil strip. The structures each consisted of a single course of stones on their northern sides, but several courses on their southern, downhill, sides (plates 24 and 25).

One of the stone structures, half-sectioned to determine its method of construction and to try to retrieve dating material, was 0.61m deep and displayed considerable root action within its fill. No dating evidence was found. A large tree throw was located next to one of the structures. The 1840 tithe award plan of Halton parish shows the area of Plot 14-1 as being subdivided by lines of trees, and it is possible that one such was encountered here.

9.10.4 Analysis potential

The stratigraphic potential of this site is negligible and no further study is recommended.

9.11 Plot 15-1: Halton East

Halton East parish; 365 NAL; NGR 403700 453900; Figures 2b, 9, 9a; Plates 26 and 27.

Summary

Excavation of a field kiln produced iron objects and production waste from the backfill of the kiln pit and several brick fragments from the fired basal fill of the kiln. Although the kiln produced no directly datable pottery or charcoal, it was cut by a furrow, probably post-medieval in origin and associated with a relict field system belonging to the shrunken village of Halton or 'Haletune'.

9.11.1 Location, topography and geology

Plot 15-1 is located 300m to the west of the hamlet of Halton East, on the north side of Holme Lane, a minor road connecting Halton East and Embsay. The land slopes from north to south towards the Lillands Beck; the plot lies between the 190m and 200m AOD contour lines (plate 26).

The topsoil was a dark brown sandy clay loam, overlying light brown sandy clay subsoil with few inclusions of poorly sorted sub-angular and sub-rounded coarse pebbles. Variations in the subsoil occurred in areas where there was glacial till. As a result, in these areas there was no clear horizon between the subsoil and glacial till. The till was visible as an underlying poorly sorted mottled grey and yellowish brown clay deposit with frequent boulder-sized sub-angular inclusions.

A deposit of pale brown, slightly sandy, silty clay was also recorded below the subsoil in places. The relationship of this layer to the glacial till was not seen, but it may have been alluvial in origin, deposited in a post-glacial period below a lake or pond.

9.11.2 Results from earlier stages of work

Settlements at Embsay (DSMR 14879) and Halton East (DSMR 14890) were established before 1086 and are referred to in the Domesday Book. Halton East is a small nucleated village or hamlet, the major element of which is now Halton Hall. Embsay is essentially a small linear village with an outlying mill settlement at Mill Holme, but with extensive twentieth century housing development. The geophysical survey noted traces of ridge-and-furrow in Plot 15-1 and in the two adjacent plots to the west, indicating that the site lay within an open field in the medieval period, while the standing earthworks of an artificial fish pond, associated with Halton Hall and dating to AD 1540, can be seen directly to the east of the plot (NHER 48348). Hollow-ways are recorded at Halton West (MON 591120) and Halton East (MON 1367120).

The DBA recorded lime kilns and limestone quarries in the study corridor from Embsay to Nesfield in the east and Lawkland to Wennington in the west. Kilns were generally built into the slope of a hill or in free-standing clamps. They are often adjacent to a limestone quarry, as at Flambers Hill, Nappa (LSMR 9952). The processed lime was used locally for building materials, and was also used as a fertiliser to reduce the acidity of the newly enclosed moorland in the eighteenth and nineteenth centuries (White 2003).

The smaller lime kilns became redundant in the mid-nineteenth century, when it became more cost-effective to import processed lime by rail from large commercial quarries and kilns such as the Hambleton Rock Limestone Quarry at Halton East (DSMR 14863).

Although the geophysical survey results, which indicated some ferrous anomalies and pits in addition to the ridge-and-furrow, were thought to be of minor significance (Pre-Construct Geophysics 2005a), the site was targeted for trench evaluation because of the proximity of the

pipeline to Halton Hall. Four machine trenches were excavated, and a field kiln was found in Trench 24. Full open area and hand excavation was then conducted to investigate this feature.

9.11.3 Site description

The kiln and associated features

An oval ring of fired natural boulder clay, deposit (8043), measuring 3.1m by 2.6m, was investigated (fig. 9a, plate 27). The ring formed the edges of a pit, [8010], cut into natural boulder clay, (8027). The boulder clay was orangish-brown clay silt, becoming dark red where heat-affected. The boulder clay was consistent across most of the site except in the south, where it became stony and dark greyish-brown (8026).

The backfill, (8022), of the kiln was greyish-brown sandy silt and contained very occasional inclusions of burnt limestone and some lumps of coal. It filled the flue as well as the kiln pit. The matrix of the fill included frequent charcoal flecks and occasional lenses of charcoal. Slag and unidentified fragments of iron found in the kiln pit were recorded as bulk finds.

Linear feature [8040], 1.6m in length and 0.70m wide, on the western edge of the kiln, appeared to have been cut through the heat-affected natural clay (8043) and to be stratigraphically below backfill (8022). This linear feature, which had straight sides and a flat base, and was 0.48m deep (fig. 9a), was interpreted as a flue. A patchy lens of mixed orangish-brown and dark grey clay, (8037), was excavated opposite the mouth of the flue on the north-eastern edge of the kiln pit. It may have been residual material from a previous firing, as it was above the burnt clay and below the backfill of the kiln pit.

A small burnt area of natural clay, (8030), 0.30m in diameter, was excavated 3.5m to the south-east of the kiln. It may have been the base of a hearth, but modern ploughing would have removed any remains of a structure which would have provided more conclusive evidence of the function of this feature.

A hedge line, [8015], pre-dating the ridge-and-furrow, was excavated in the south-east corner of the excavation. No dating evidence was found for this feature. A gully, [8039], also excavated in the north-west corner of the excavation area, was only intermittently visible and no more than 0.05m deep. A small circular feature, [8015], in the south-west area of the excavation area was probably the impression left by a large stone; it was not associated with any other features.

The partially complete skeleton of a calf was found in pit [8011] in the south-west corner of the excavation area; the pit had no stratigraphic relationship with the kiln complex, and the burial appeared to be modern.

Ridge-and-furrow

A furrow, [8042], truncated flue [8040]. It was 1.70m wide and 0.18m deep and filled with orangish-brown sandy clay silt. There were very few inclusions in the fill of the furrow, and no residual finds that could be associated with the kiln or later activity. Five further furrows, roughly 7m apart and running north to south across the excavation area, were also investigated. They varied in width from 1.4m to 2.5m and were up to 0.20m deep. A few fragments of degraded animal bone were found in one furrow, [8023], and some worked flint and chert in another, (8033). Ploughing of the site would have removed all traces of the ridges normally associated with this type of agriculture.

9.11.4 Analysis potential

Unstratified assemblages of pottery, assigned to five different contexts, were recovered from Plot 15-1. They comprise three sherds of medieval pottery; forty-four sherds of post-medieval date, including late sixteenth to mid-seventeenth century types; and three sherds of late eighteenth or nineteenth century date. The pottery probably derives largely from the furrows

crossing the site but because of difficulties in distinguishing fills of the furrows from remnant topsoil, the finds were recorded as unstratified surface finds. It may be possible to refine the dating of the ridge-and-furrow, perhaps by comparative study.

It is recommended that charcoal recovered from the kiln pit should be analysed and radiocarbon dated to aid the site chronology and to provide a date for the final firing of the kiln.

9.12 Plot 15-8: Embsay; Site 1

Embsay with Eastby parish; 358 NAL; NGR 402808 454048; Figures 2b, 10, 10a; Plate 28.

Summary

Two kilns were found in Plot 15-8, north of Embsay. On excavation, it was observed that they were both furnished with intact 'feather' walls and had deposits of burnt limestone, indicating their use as lime kilns. An unusual connecting gully ran between the two features.

9.12.1 Location, topography and geology

Plot 15-8 was located approximately midway between the village of Embsay, to the west of the plot, and the hamlet of Halton East, to the east. The surrounding land slopes generally from north to south, into the valley of the Holywell Beck: the site itself is level, and is at around 185m O.D. A tributary of the Holywell Beck, the Berry Ground Beck, forms the south-eastern edge of the plot; on the far side of the beck lie the Halton East Quarries. The plot was under pasture at the time that the groundworks took place.

The topsoil in Plot 15-8 was loose, dark brown silt with occasional small stones, and up to 0.30m in depth. It overlay a 0.20m depth of soft, mid-yellowish-brown clayey silt subsoil. The underlying natural drift geology was mid-brown, orange-mottled silty clay.

9.12.2 Results from earlier stages of work

The historical background to field kilns and their importance in the Dales has been described elsewhere in this report (Section 9.5.4).

Preliminary investigation of the area between road crossing (RDX) 15 and RDX 16 included a geophysical survey, which indicated some ferrous anomalies, ridge-and-furrow, and pits. These features were interpreted by the surveyor as being of minor significance (Pre-Construct Geophysics 2005a).

9.12.3 Site description

Kiln 1 (figs. 10a, 10a i and 10a ii; plate 28)

The first kiln excavated was located on the eastern side of the site and measured 3m by 2.7m excluding a flue which extended for a further 2m. The excavation strategy for both of the kilns was to excavate them in opposed quadrants. It was felt that this strategy would provide more information about internal structures, such as the construction of feathers, and depositional processes.

On excavation of the north-eastern quadrant of the kiln, it was observed that the kiln had sharp edges, a sharp break of slope and a relatively flat base [grp. no. 5369]. This quadrant exhibited a sandstone wall 2.5m in length, 0.45m in height and 0.24m in width, running east to west. Another wall, very similar in size, ran parallel to it on the south side, and the flue ran between the two walls to the centre of the kiln. The flue tapered gradually from east to west and sharply from north to south. The 'feather' walls would have ensured that a constant draught could permeate the kiln, and prevented the contents of the kiln from collapsing in on themselves. The deposits built up in the kiln mostly contain charcoal and burnt lime from the burning process. The north-eastern part of the kiln had a small gully, 700mm by 180mm, oriented northward from the point at which the flue met the bowl of the kiln. This small gully contained no charcoal or other evidence of industrial use.

The south-western quadrant of the kiln had a more gradual undulating edge and base. The feather wall to the south of the kiln was partially observed in section during the excavation of the quadrant. The wall measured 1.2m meaning that, if both feather walls were the same length,

the complete length of the walls would be approximately 3.7m. Another gully, [5379], was observed adjoining the south-western quadrant. This was more substantial than the gully on the north-east part of the kiln, measuring 1.24m length by 0.40m width by 0.33m depth. This gully did demonstrate evidence of industrial use, as it had a humic black charcoal layer at the base and red burnt clay above that, indicating that burnt material had been passed or raked through the gully.

Kiln 2 (figs. 10a, 10a i and 10a iii)

This kiln, [5361], was considerably smaller than the other, measuring 1.8m by 2.2m and 660mm at maximum depth. It was excavated in quadrants in a similar fashion to Kiln 1. The excavated quadrants revealed that the construction of Kiln 2 was very similar to that of Kiln 1, though at a smaller scale. The feather walls were constructed in the same way as those in Kiln 1, and the sequence of deposits was similar to that of Kiln 1. The major difference was in the flues, that of Kiln 2 extending over 2m eastward and apparently connecting with Kiln 1. The flue was half sectioned, and the profile revealed that it may not have been a continuous channel into the kiln. It appears as if a gully similar to those on the south-western and north-eastern sides of Kiln 1 extended towards the west, and that this gully was later recut and extended to form the flue of Kiln 2. The gully to the west does display signs of industrial use whereas that to the east does not, supporting this interpretation.

9.12.4 Analysis potential

Unfortunately, insufficient charcoal was obtained from the processed samples to provide material suitable for AMS dating but it may be possible to date the two kilns typologically. The potential for further analysis of all the kiln sites collectively has been described elsewhere in the report (Section 9.5.4).

9.13 Plot 15-8: Embsay; Site 2

Embsay with Eastby parish; 358 NAL; NGR 402808 454048; Figures 2b and 10b; Plate 29.

Summary

A boulder with a surface decoration of cup marks, very similar to other examples of prehistoric rock art from the area, was found during topsoil stripping. This was recorded and moved to a place of safety within the same plot.

9.13.1 Location, topography and geology

Plot 15-8 was located approximately midway between the village of Embsay, to the west of the plot, and the hamlet of Halton East, to the east. The surrounding land slopes generally from north to south, into the valley of the Holywell Beck: the locale is relatively flat, with a gentle slope towards the eastern edge, where a depression allows excess groundwater to escape via a subterranean stretch of the Berry Ground Beck, resulting in a well-drained location. The plot was under pasture at the time that the groundworks took place.

The topsoil was dark brown silt with occasional unsorted, sub-rounded, small stones, and the subsoil consisted of mid-yellowish-brown silty clay containing frequent unsorted sub-rounded stones up to 0.20m across. The underlying natural drift geology was mid-brown, orange-mottled silty clay.

9.13.2 Archaeological Background

Cup marks are predominately discovered in Northern England, Scotland and Ireland; they correlate with areas of prehistoric activity and date to the Late Neolithic and Bronze Age periods (2800 to around 500 BC). Around 800 examples of prehistoric rock-art have been recorded in England, but this is unlikely to be a realistic reflection of the number carved in prehistory. Many will have been overgrown, or destroyed in activities such as quarrying. Prehistoric rock art sites exhibiting significant groups of designs are considered to be of national importance and likely to be scheduled.

British rock art does not exhibit the intricacy of continental examples, where the imagery leans towards anthropomorphic and zoological representations. British petroglyphs tend to be non-figurative, and vary from simple hollows, ranging in size from about 12mm or less to quite large basins 150mm wide and described as cup marks, to more complex designs involving rings encircling the depressions. Single pecked lines extending from the cup through the rings may also exist, providing the design with a 'tail'. Other shapes and patterns also occur, but are less frequent. Carvings may occur singly, in small groups, or may cover extensive areas of rock surface.

The meaning of the designs is unknown; perhaps abstract motifs were chosen because their meanings were never meant to be disclosed to the casual observer. It has been suggested that the more rudimentary motifs are primarily associated with free-standing boulders situated on low-lying land, which might only pertain to and be observed by an elite social group, whereas the more intricate designs are depicted on elevated outcrops intended for public display (Bradley 1995).

9.13.3 Site description

The boulder was positioned directly in front of the gateway connecting Plots 15-8 and 15-7, and was alongside another boulder that did not display any carvings. It was held firmly in position by the topsoil and did not appear to have sustained any recent damage from ploughing or other farming activities.

The boulder was examined by Keith Boughey, a regional specialist in prehistoric rock art, who stated that although the markings were somewhat ambiguous, it was '70-80% probable' that the indentations were man-made cup marks (*pers. comm.*).

The boulder is roughly oval in plan, with a domed top; it measures 1.26m by 0.70m, and was oriented approximately north-south as originally found. It bears four simple cup marks (circular depressions), all on its southern side and end (plate 29). Three of the cup marks are grouped together on the upper surface of the boulder. The largest cup mark of these three, nearest to the centre of the boulder, measures 125mm by 116mm, and is situated 130mm north-eastwards of the second, which spans 98mm by 89mm; the third, nearest to the southern edge, is 40mm to the south of the second cup mark and measures 116mm by 106mm. The largest cup mark, measuring 137mm by 125mm, is positioned separately from the others, on the vertical southern face of the boulder.

The cup marks are comparable to those discovered on a variety of examples on nearby Rombalds Moor, Ilkley, particularly the Hardwick Stone and the Anvil Stone (Cope 2000), which demonstrate distinctively similar indentations.

9.13.4 Analysis potential

Although preservation *in situ* was not practicable, as the cup-marked boulder was at risk of damage from construction traffic, it was preserved as close to its original site as possible by relocating it to the north-eastern corner of the plot. There is no further stratigraphic potential, but a description of the stone will be included in the publication.

9.14 Plot 19-1: Thorlby Springs

Stirton with Thorlby (YDNP); 325 NAL; NGR 397521 453734; Figures 2b, 11, 11a; Plates 30-32.

Summary

A horseshoe-shaped curvilinear feature 9m in diameter, two pits, and several post holes representing the remains of a timber-built structure were excavated. Sherds of Collared Urn, fragments of hazelnut shell, and some pieces of struck chert were found in the horseshoe-shaped gully.

9.14.1 Location, topography and geology

The site was located 2.2km to the north-west of Skipton, between Thorlby Springs, a wooded area where at least six springs rise, and Tarn House Farm, on a flat ridge to the south of Flasby Fell, at a height of 205.60m AOD. To the south-west are large drumlin fields resulting from glacial activity, and to the north of the site the land falls away into a valley, above which fells rise to a height of 500m above the Grassington road. A natural spring line runs across the top of the ridge towards Thorlby Springs, and passes the southern edge of the site; as well as the rising springs, many small streams and becks sink and issue in the area.

Geologically, the Skipton area lies close to the boundary between the calcareous shales of the Bowland series and hard sandstones of the Millstone Grit series. On the site, orangish-brown boulder clay with pinkish or grey sandstone boulders overlay shale and mudstone beds, which were seen, during the excavation of the pipe trench, to extend to a depth of at least 5m. Occasional lumps of stone conglomerate were also found in the boulder clay; this is typical of the Millstone Grit series in the region.

The topsoil was a dark brown silty clay with occasional small lumps of degraded limestone inclusions, to a thickness of less than 0.20m. Patches of gritty greyish-brown silty clay subsoil occurred on the moderate slope to the north of the site. The subsoil may have been originally formed as wind-blown loess (NCHRG 2006). No subsoil was present in the occupation area or on the most exposed part of the site.

9.14.2 Results from earlier stages of work

Evidence of early human activity close to Stirton and Thorlby is provided by stray finds, including a Neolithic stone axe found to the north of Stirton (DSMR 27186) and two bronze swords found close to Thorlby Springs (Robert White, *pers. comm.*, 2006) and now in the British Museum. In the medieval period, a dispersed settlement developed around a crossroads. Elements of the field systems associated with this settlement were recorded, in the excavated test pits or by the topographic surveys within the pipeline corridor. The site was found during the watching brief on topsoil stripping (plate 30).

9.14.3 Site description

A shallow horseshoe-shaped gully 9m across and up to 0.12m deep was interpreted as the remains of a structure (plates 31 and 32). This feature was totally excavated in segments, and three separate context numbers were allocated to its terminals and main body: [5194], [5192], and [5163]. In profile the feature had a flat base with gently sloping sides (fig. 11a iii).

The north-western terminal, [5163], was very well-defined with a steeper profile and a narrow base, and was 0.20m deep and 0.46m wide. Pottery sherds from two Collared Urns, including one decorated sherd, were found in the lower fill (5162) of this terminal, along with degraded fired clay, and a flint flake. The pottery vessels may have been made in a local tradition or imported; one can be dated to the early Bronze Age, while the sherds of the other vessel are less diagnostic and can only be ascribed broadly to the Bronze Age.

The opposite, south-eastern, terminal was more difficult to define, because of machine damage and erosion probably caused by modern ploughing. It had a flat base, and in places was up to 0.70m wide and 0.10m deep. Further to the north, several shallow scoops were excavated: [5171], [5181] and [5179]. It is thought that the scoops could be from the remains of the terminal of an additional segment of the horseshoe gully, but these features proved to be very insubstantial and exceptionally difficult to excavate accurately in the dry conditions prevailing at the time of the excavation.

Hazelnut shell fragments were present within samples <564>, <565> and <566> all of which came from slot [5192], at the back of the structure. This area was behind two burnt areas: a roughly oval area of fired natural clay, (5195), 0.30m by 0.25m, and a larger oval, (5165), 0.41m by 0.28m. These burnt areas were situated, perhaps significantly, towards the centre and rear of the enclosure, a position where a central hearth might be expected to be. Both of these heat-affected areas had been disturbed by ploughing and animal burrowing.

There were several other internal features. To the north of the burnt areas, there was group of postholes and stakeholes defining a roughly square area 1m across. Three double post- or stakeholes, [5204] and [5177], [5221] and [5219], [5212] and [5214], formed the corners of this square, along with stakehole [5187]. Stakehole [5234] and posthole [5206] lay to the south. A fragment of a heavily used saddle quern made of medium-grained feldspathic millstone grit, showing traces of heat or burning (SF 580), was found in posthole [5212].

The postholes were heavily truncated but may have defined an internal structure, lying between the burnt area and the terminals of the gully. Posthole [5179] produced a sherd of Bronze Age pottery but this was not associated with the central cluster of postholes.

Two pits were excavated at the mouth of the horseshoe. The more easterly pit, [5131], may have held a post (fig. 11a ii), as a possible post pipe was excavated in its upper fill. The pit may have had an alternative function: clay slumping along its edges suggested that the feature may have been left open before a post was inserted into its centre. However, the clay deposit may have been used to pack around the post, collapsing after the post had been removed.

A shallow scoop, [5156], with a charcoal-rich fill, was excavated close to the southern edge of the pit, but the relationship between the two features had been obliterated by a modern drain.

The western pit had been recut (cut nos. [5136] and [5201]), and may have held a post (post-pipe [5197]), as there were large flat fragments of millstone grit, (5198), in the backfill of the pit, possibly used as post-packing (fig. 11a iv). The lower fills of the pit consisted of clay silt (5200) and a charcoal-rich silt (5199): the latter produced sherds of undated prehistoric pottery. Hazelnut shell fragments were recovered from the fills of the pit.

There was evidence of an earlier, shallower pit on the southern edge of the main pit, and, beyond that, an irregular-sided linear feature, [5184], probably a row of stakeholes disturbed by roots growing horizontally in the upper part of the boulder clay between the fills of the closely spaced features. The severely disturbed lower fill and the edges of stakeholes exposed in the base and sides of the linear feature were excavated. A large sherd of a prehistoric ceramic vessel, possibly the base of a Neolithic pygmy cup, and sherds of Bronze Age pottery were found within lower fill (5160).

One member of a group of small pits excavated to the north of the line of stakeholes, an oblong cut with steep sides and a narrow base, [5228], was initially thought to be a cremation pit but there was no evidence of burnt bone either in its fill, the processed environmental sample or in the surrounding area. This feature was adjacent to posthole [5203] and it is perhaps more likely to have been one of a pair of postholes, similar to the pairs in the interior of the horseshoe enclosure. Pottery from feature [5228] came from fill (5227), probably deposited after the

removal of the post. The top of the feature and a ceramic field drain were both truncated by a plough-mark [5170], which had a sherd of Collared Urn in its fill, (5169).

To the west of this group was a small crescent-shaped linear feature, [5216], caused by ploughing. Before excavation, a posthole was visible in the southern terminal of the crescent, but on excavation this became less clear. A wide-topped groove, [5233], formed the northern sides of the crescent: the groove was straight and continued several metres beyond the limit of excavation, parallel to other plough marks.

Subsoils had developed in hollows within the boulder clay, and over more extensive areas on the downslope side of the site; they were recorded as layer (5231) in the north-west of the excavation area and layer (5236) on the western edge of the enclosure and were generally greyish-brown in colour. Modern pottery found in subsoil contexts probably resulted from bioturbation and plough disturbance.

During the watching brief, a linear feature, [5245], was investigated 22.50m to the west of the excavation. A 1m-wide slot excavated through the linear feature on the centre line of the pipe trench (fig. 11a i) showed it to be 2.8m across and 1.6m deep. The cut had a gently sloping profile on both sides, and a flat base except on the eastern edge, where there was a well-defined 0.24m-high step in the bottom of the ditch. There was a considerable dump of redeposited clay on the eastern edge above the primary silting layers, (5249) and (5248), which may indicate that there was a bank on this side. The ditch was recut after the earlier ditch had silted up. The later cut, [5247], was smaller; 2.15m across and 0.4m deep, and appeared to continue on the same alignment.

A ditch, with associated bank on its western side, was also recorded during the watching brief, 20m to the east of the curvilinear feature and adjacent to Bog Lane. The earthwork was 1.8m across and the bank stood to a height of 0.90m. No dating evidence was obtained from the feature.

9.14.4 Analysis potential

Further analysis may allow pit [5197], which may have held a post, to be better understood, but a degree of interpretation will be needed in order to reconstruct the stratigraphy, as the depositional sequence is not at all clear. Otherwise, the overall stratigraphic potential of the site is limited. There was a general lack of multiple fills and layers, and erosion and weathering caused by modern agricultural practices on the fairly light soil have caused degradation of the site. The patterns of finds deposition in relation to the erosional state of the features in which they occur may have potential to throw light on the soil formation processes at work on this site. The development of wind-blown soil horizons in prehistoric highland areas of the Dales is rarely considered (NCHRG 2006) and may be relevant to the deposition processes on this particular site.

Fifty-one samples were taken, of which only nine contain plant macrofossils other than charcoal or charred wood fragments. These nine assemblages are mostly very small (<0.1 litres in volume) and plant remains are exceedingly scarce, rarely occurring as more than one specimen per assemblage. Possible barley and wheat grains are present, although preservation is very poor, with most specimens being both very fragmented and severely puffed or distorted as a result of high temperature combustion (Fryer Appendix C). The data recovered is not sufficient to contribute much to the reconstruction of the local environment. The environmental remains from the Bronze Age phase of the site at Bank Newton, along with the results from research excavations undertaken by the Yorkshire Dales, could be used as comparative sources.

Initial interpretation of the site suggested that it may have been a funerary monument, but no skeletal material was recovered from the excavation. The gully and internal features, although poorly preserved, are more likely to be the remains of a domestic structure, the gully

representing either the wall line or a drainage gully surrounding the wall. Comparison with other examples of early Bronze Age houses may aid the interpretation of the function of the site. The food residues recovered from the environmental samples, particularly hazelnut shells, would be consistent with an interpretation as a domestic dwelling. Other food residues that might have been expected, particularly animal bone, are unlikely to have survived in the acidic upland soil.

Radiocarbon dating should provide a reliable date for the structure. The hazelnut shells from the fills of the gully, together with fragments of charcoal greater than 2mm across from the primary fill of the large posthole, [5136], an internal stakehole, and one of the external features less damaged by ploughing, should provide adequate material for AMS dating. Key deposits are the primary fills of the two pits within the mouth of the horseshoe enclosure, as these may be contemporary with the construction phase. The primary deposit in these features accumulated before the insertion of a secondary feature, probably a post, and before the entrance of the gully was blocked by the placement of the pits in front of the structure. The artefactual evidence for the early Bronze Age was chiefly found in secondary deposits or deposits that may only be contemporary with the disuse of the horseshoe enclosure.

9.15 Plot 21-10: Turnbers Hill

Broughton parish; 292 NAL; NGR 391800 451850; Figures 2c, 12, 12a; Plates 33 and 34.

Summary

During the topsoil removal on Plot 21-10, a large spread of burnt material and charcoal was observed. On investigation, this feature proved to be typical of a burnt mound. The mound contained a trough with timber lining and produced a few pieces of Bronze Age pottery. As recorded burnt mounds are scarce in the area, this site is potentially of regional significance.

9.15.1 Location, topography and geology

The site was located close to the Pennine watershed, on an extensive drumlin field between the valleys of the Aire and the Ribble. The site lay near to the base of a steep southern slope of a drumlin, Turnbers Hill. Subsequent investigations of the geological morphology in Plot 21-18, and investigation of deposits on the western side of the Leeds to Liverpool Canal, indicate that the drumlins overlay earlier lakebed deposits. The varied natural deposits found during the excavation, which appeared to be yellowish-grey boulder clay, changing to bluish-grey at the northern limit of the site, may therefore be lacustrine in origin.

The site was found after the removal of topsoil (plate 33). The excavation began with the removal of greyish-brown silty loam subsoil, (5263), which still partially obscured the true extents of the features and the burnt stone mound. The subsoil had a few small gritstone inclusions and was up to 0.20m thick, but was very patchy, and in places was less than 0.05m thick. This layer, which is likely to have been colluvium accumulated at the base of the hill slope, had helped to preserve the archaeological features below. During the watching brief on the pipe trench, the subsoil was observed to be stiff brown silty clay with few inclusions. Subsoil was also recorded during the topsoil strip and removal of an earthen bank toward the eastern limit of the field (FSU: 125, Network Archaeology Ltd 2005b). At this location it was noted that the soil was poorly drained and that frequent patches of peaty soil occurred below the topsoil. The topsoil was recorded as a mid-grey silty clay.

9.15.2 Results from earlier stages of work

In the field reconnaissance, ridge-and-furrow (FSU: 122, Network Archaeology Ltd 2005b), and an earthen bank (FSU: 123) were observed in the plot but both were undated. A modern track (FSU: 24), a former field boundary (FSU: 126), and a possible hollow-way (FSU: 127), consisting of a track flanked by banks, were also noted. All of these features were graded as being of low significance, and of minor importance in the field survey report. The intense concentration of earthwork features in this field suggests multiple phases of activity, but the site itself was not apparently visible as a mound, and it may have been levelled in antiquity.

An earthen bank, (4101), was recorded on the eastern boundary of the plot during the topsoil strip. A dry stone wall followed a similar alignment to the bank between Plots 21-9 and 21-10. The bank had been recorded during field reconnaissance as a sinuous earthwork (FSU: 125) around 1.3m wide and 0.1m high, which ran on a north-east to south-west alignment parallel with the present-day eastern field boundary through the eastern portion of the field. It was judged to be of minor significance. The bank was truncated near the northern limit of the field by a deep modern drainage ditch. It is possible that the drainage ditch had also removed the northern extent of the burnt mound, but this area was obscured by spoil generated during construction. Before its removal, it was observed that the bank material consisted of a brown, weak, sandy clay loam 1.9m wide and no higher than 0.45m, but appeared to be eroded as it extended to the south. An earthen bank following a similar alignment was also recorded in the adjacent western field (FSU: 121, Plot 21-11).

9.15.3 Site description

Once the patches of subsoil were removed, a series of features including the basal spread of a burnt mound and other sub-circular features was revealed (fig. 12a).

A 0.6m by 16.25m trench was excavated across the 13.45m width of the dark peaty silty clay, (5259), of the burnt mound. The peaty silty clay material produced two pieces of prehistoric pottery, the larger, decorated, sherd being early Bronze Age Beaker. Two flint flakes and a retouched flint blade were also recovered from this context.

The profile through deposit (5259) revealed that the make-up of the mound consisted almost exclusively of this context. The thickness of the material ranged from 0.07m on the periphery of the burnt stone to 0.59m in the deeper parts of the mound. The slot revealed a rectangular pit, [5255], with steep to vertical sloping sides and a flat base, oriented north to south. The upper fill, (5271), had charcoal inclusions with heat-cracked stone. The lower fill, (5278), included unburnt stone and a density of charcoal similar to the upper fill.

This pit contained what appeared to be radially split oak timber planks and oak roundwood, preserved in the waterlogged deposits (plate 34). The timbers on the base of the pit, (5284) and (5256), were in relatively good condition: the grain of the wood was clear and any tool marks present would have been visible. Timber (5256) measured 300mm by 660mm and was partly overlapping timber (5284), which measured 700mm by 370mm. As the timbers almost covered the entire base of the pit, and other examples of burnt mounds display the same feature, it can be assumed that the timbers were lining the pit to form a trough and were *in situ* (fig. 12a i). Pieces of roundwood were lining the sides of the pit. These were too degraded to be fully excavated, but samples were retrieved for species identification and possible carbon dating. The base planks were fully excavated for analysis.

A second pit, [5273], with similar size and attributes to feature [5255], also contained timber. This pit was located adjacent to [5255] and on the same orientation (fig. 12 ii). The timbers in this pit, (5277), were very badly degraded, in some cases only recognisable as soil stains. In parts of the pit where the timbers were in better condition, samples were taken.

The profile of the excavated slot revealed that a possible ditch, [5258], was associated with the pits. Upon further excavation, the putative ditch was revealed to be a natural feature, caused by bioturbation.

Context (5259) also concealed other features cut into the natural. Two of these features were circular pits, [5279] and [5281]. Pit [5279] was filled by deposit (5280), which was identical to context (5259). Although no finds were recovered from this feature, it is probably Bronze Age in date, as the material that the feature cut into contained pieces of Bronze Age pottery. Feature [5281] was a circular pit, very similar to pit [5279]. The fill of this feature was also the same as the material that made up the burnt mound. The similar fills in each of these features indicate that they were open either at the same time as, or immediately after, the burnt mound was in use. These features have been interpreted as being postholes or stakeholes, and it is unlikely that they were isolated: there were probably several counterparts that have been lost to later truncation.

A shallow gully, [5272], was cut into the natural boulder clay. This feature did not contain any finds, and it is unclear if it is associated with the burnt mound. The gully was filled by the mound material, here recorded as fill (5257), so it may have been an earlier feature that became filled while the mound was being constructed. However, it may have been an integral part of the construction of the mound, providing a channel for the movement of water.

One other feature, [5289/5252], was excavated on the site, 7.5m west of the burnt mound. This was a sub-oval pit, measuring 1.7m by 1.45m in plan, and was half-sectioned. No lithic or

ceramic material was recovered, but because it was also filled with the burnt material associated with the mound, it is assumed that the feature is contemporary with the mound and other features. The fill of the pit (5253) contained lumps of charcoal greater than 5mm.

9.15.4 Analysis potential

The landscape context of the site could be important, as a later field system appears to have been imposed on an earlier field pattern. Lack of dating evidence may impede interpretation, but it is possible that the burnt mound was enclosed by a bank on either side (FSU: 123 and 125, Network Archaeology Ltd 2005b). A similar interpretation could be proposed for the early Bronze Age site and enclosure at Thorlby Springs, Plot 19-1, but again interpretation is hampered by a lack of datable evidence.

A small flint assemblage was recovered from the site and may have been associated with the use of the burnt mound. But based upon the condition of the pieces, it is likely that they have been disturbed and redeposited. The small size of the assemblage would suggest that activities associated with domestic tasks are not represented at this site. None of the pieces collected from this plot are diagnostic in terms of dating. However, a Bronze Age date is suggested (Wilson 2006).

A single sherd from a Beaker vessel was found in good condition in context (5259), the basal spread of the burnt mound. Beaker pottery is known in burials throughout Britain (Clarke 1970). However, this sherd is decorated with paired fingernail impressions and this type is more likely to be associated with a domestic settlement site (Gibson 1982). Pottery of this type is usually dated to a period between 2600 and 1800 BC (Kinnes et al. 1991). However, local comparisons need to be found for this pot, and recent work on Beaker pottery needs to be considered (Needham 2005).

It is hoped that comparisons may be made with the Bank Newton and Thorlby Springs sites, both of which produced pottery from this period.

The significance of the finds is increased by their being found within the mound. It is thought that increased rainfall associated with climate change in the late second millennium BC caused the spread of blanket bog on the summits of the North York Moors and the Pennines, 350m above sea level. Simultaneously, the wetter climate contributed to the increase of lowland wetlands (Manby 2003). The patchy peat subsoil deposits sealing the mound may have been part of this process, and could help to establish a provisional chronology for the site formation processes, and a disuse date for the site.

Traditional chronologies for burnt mounds often place them in the middle Bronze Age, but the Beaker pottery from below the mound may suggest an earlier date, which would be significant. Examples of early burnt mounds have been excavated recently in North Wales at Llandygai (J Kenny, *pers. comm.*, 2006) but this may be the first early Bronze Age or Neolithic example excavated in Yorkshire.

The wood lining of the trough was not in a suitable condition for conservation but it is proposed that further comparative work is undertaken to establish the function, and possible ritual deposition, of the timber planks.

It is recommended that three radiocarbon dates are obtained. This should include the charcoal from the upper and lower fills of the trough, and the charcoal obtained from (5253), the fill of pit [5252], which cut the mound material containing the sherd of Beaker ware. Together, these dates would provide dating brackets for the deposition of the mound.

9.16 Plot 21-18: Bank Newton

Martons Both parish; 286 NAL; NGR 390000 452100; Figures 2c, 13, 13b-13h; Plates 35-52.

Summary

A ring cairn thought to date from the Bronze Age was excavated in the western part of the plot, whilst at the opposite end of the plot, the remains of a Romano-British farmstead were investigated. The ring cairn was 23m long by 18m wide, and its long axis was aligned north-east to south-west. The farmstead comprised a succession of ditched enclosures, linear ditches, stone platforms and the remains of three structures. Evidence of occupation seemed predominantly combined to the late second to early fourth century.

9.16.1 Location, topography and geology

The site was located 1.5km to the south-west of Bank Newton, close to the Pennine watershed and on an extensive drumlin field between the valleys of the Aire and the Ribble. The site occupied the base of a small valley surrounded by drumlins. Enclosed by the local topography, the location is fairly protected and sheltered. Plot 21-18 lies at a height of around 150m above sea level.

In the post-glacial period, the drumlin fields themselves would not initially appear to have been suitable for agriculture, as demonstrated within the excavation and geoarchaeological report (S. Lancaster 2006). The soft glacial till of the drumlins surrounding the site would have been susceptible to erosion and slope failure and there was evidence in the excavation results (see below) that failure of the slope occurred in the Roman period. This may have been caused by agricultural activity on the unstable hills above the site, changing climate leading to the development of wetland areas, seasonal flooding from becks flowing around the bases of the drumlins, or even earthquakes along the nearby Craven Fault.

The drift geology on site consisted of fluvioglacial and glacial lacustrine clays, silts, and gravels. This contrasts with the dominant drift geology in the Skipton area: glacial till and alluvium (Butlin 2003). The ring cairn was situated on the bed of a meltwater river, represented by gravel, occasional patches of sandy gravel, cobbles and boulders. The main palaeochannel was located towards the northern limit of the excavation area, and consisted of loose, rounded boulders of a varied size, poorly sorted with small interstices. Although excavated to a depth of around 2m, the base of the main post-glacial channel deposit was not reached. The abundance of loose stone was possibly a resource which attracted the builders of the cairn. The deeper drift geology was recorded during the excavation of the pipe trench and varied from glacial till to gravel. A brownish-orange clay till was recorded below a layer of lacustrine greyish-blue clay in the eastern section of the trench. The upper part of the gravel in the western end of the field produced frequent fragments of animal bone. A few of these appeared to be either water-worn or partially fossilised, and may be immediately post-glacial in date.

The settlement site was interleaved with a complex soil slope sequence. The drumlins are predominately heavy clays, usually drift-covered. Post-glacial erosion of the upper deposits on the hill slopes would have added to the complexity of the hill slope sequence and even possibly the build-up of buried soils within or below archaeological deposits. A LiDAR survey commissioned by National Grid (Challis 2005) shows the direction of the ice flow from the last glaciation and possibly the earlier underlying geology of the Carboniferous period and previous glacial events. The characteristic 'whale-backed' drumlins are easily recognised as separate features superimposed on an earlier land form.

9.16.2 Results from earlier stages of work

Desk-based Assessment

The ADBA noted the presence of a post-medieval rectangular enclosure (MON 593718), a field system of undetermined date (NHER MNY 15184) and a lynchet field system, also of undetermined date (MNY 15040).

Field survey results

Various earthwork features were noted in the northern and north-western parts of the field, an area of about 300m east to west by 100m north to south (Network Archaeology Ltd 2005b). A D-shaped bank, 7m across, and an adjacent linear bank (FSU: 116) were identified as a possible enclosure. This subsequently proved to be the site of the ring cairn. To the east of this enclosure, two parallel linear earthworks, 30m apart, (FSU: 115, 117) ran for around 100m along the base of the northern slope of the hill. Towards the eastern boundary of the field a series of parallel banks with ditches, about 50m long and running north-west to south-east (FSU: 118), were thought to be the remnants of former field divisions.

The results of the geophysical survey indicated ditches and pits at the western end of the field. The earthwork remains of the ring cairn (FSU: 116) were partially recorded by the survey as a curvilinear anomaly. A zone of potentially significant magnetic variation was recorded in the middle part of the field. This appeared to mark the site of concentrated activity, despite a lack of enhanced topsoil magnetic susceptibility. A series of parallel curvilinear anomalies apparent in the eastern half of the field probably relate to ridge-and-furrow ploughing. The strongest linear anomaly corresponded to the shallow earthwork ditches (FSU: 115, 117).

Topographic survey

A contour survey of the standing earthworks in the field was carried out. The survey showed that the ring cairn was next to, or above, a slight rectilinear platform. The platform may possibly be a gravel terrace forming a high point on the flat post-glacial deposits below the subsoil.

In addition to the two parallel linear earthworks (FSU: 115, 117), the survey also showed an irregular linear feature to their east, which appeared to stop below the hill slope, next to a triangular-shaped earthwork at the base of the slope. These earthworks may be distorted because of slope failure, or could reflect two separate phases of field division.

Evaluation

Six evaluation trenches were opened. The last of the six to be opened, Trench 37, was positioned to investigate the ring cairn earthwork at the western end of the field. This revealed a bank of stone cobbles, [307], 3.75m wide at the south-western end and 2.75m wide at the north-eastern end (fig. 13). Within the area encompassed by the stone bank, a firm dark deposit, (15070), was located: it contained a moderate amount of animal bone and frequent small stone inclusions. The presence of animal bone and what appears to have been a trampled layer would indicate this being occupation debris post-dating the construction of the stone bank. Initial interpretations were of an Iron Age hut or possible animal shelter; although excavation shows its form more resembles that of a ring cairn. The excavated trench measured 2m by 23m; it was aligned centrally within the feature and traversed the south-western and north-eastern edges.

A band of stones was also visible in Trench 32, just to the east, though its significance was not fully appreciated until Trench 37 had been opened. Trench 33 was positioned to test an apparently blank area on the geophysics plot, which proved to be devoid of significant archaeological features.

Trenches 34, 35 and 36 were oriented at right angles to the earthwork bank at the base of the hill, Trench 34 being extended northward to investigate the significant area of magnetic variation in this part of the site. A ditch containing prehistoric pottery was recorded in this trench. A ditch recorded in Trench 36 may have been a continuation of the feature, but no dating

evidence was found in this trench. No significant archaeological deposits were recorded in Trench 35, midway between Trenches 34 and 36.

Historical background

The geological depression known as the Aire Gap cuts across the Pennines west of Skipton and was utilised in the Bronze Age as a communication route (Pearson 1973). The early Bronze Age site at Thorlby Springs, located on the edge of the moors and foothills, and the burnt mound at Turnbers Hill may be contemporary with early activity at Bank Newton. These sites should not only be considered individually, but also as part of a larger prehistoric settlement pattern around Skipton. In the Roman period, Bank Newton was situated approximately midway between the Roman settlement and villa at Gargrave and the fort at Elslack, and close to the junction formed where the road between Ilkley and Ribchester met the road between Ilkley and Over Burrow (Margary 72a and 722).

The presence of this contemporary road network would have encouraged settlement along its course and in the vicinity. Good communications enabled rural sites such as this to transport agricultural surplus to market and receive Romanised material culture in return.

In the post-medieval period, the site was used for agriculture, but very much less intensively and probably only for sheep farming. As the industrial economy expanded many rural settlements may have been abandoned. Evidence of this change of use may be found in the abandonment of the field systems, although the site at Bank Newton was probably not occupied after the Romano-British period, and the deterioration of the climate could have been a factor in its reversion to rough grazing.

9.16.3 Site description: The Ring Cairn

Summary

A stone ring was initially visible as a standing earthwork with a hollow in the middle (fig. 13a). The stone walls survived to a height of around 0.50m. The rubble above appeared to spread out from the walls but the centre of the structure had remained clear of debris. Originally thought to be the remains of a building, the structure on closer investigation was re-interpreted as possibly being a well-preserved ring cairn. However, a regional specialist, Roger Martlew of Leeds University, considered that there were some important stylistic differences from known examples of ring cairns.

Phase 1: Natural deposits

Phase 1 represents the uppermost natural geological strata present on site, a layer of moderately sorted sub-rounded to rounded stones, mostly 4-8 cm in size. The stones are surrounded with clays and silts which appear to have infilled from above. The stone layer is interpreted as stream bed of late glacial origin, overlying earlier fluvioglacial deposits.

Phase 2: Feature below ring cairn

Phase 2 is represented by a single feature, [10377], found beneath the ring cairn. This feature was 1.1m wide and at least 0.18m deep, and was found to contain fragments of wood. This feature would appear to be a small cut of unknown function, possibly natural, which potentially immediately preceded the construction of the ring cairn. There is therefore the chance that a radiocarbon date from the wood from feature [10377] may provide a close *terminus post quem* for the construction of the ring cairn. A radiocarbon determination may also test the surprising relationship recorded in the field that this feature was sealed by the deposits of Phases 3 and 4.

Phases 3 and 4: Buried soil/Late Glacial colluvium

Physically overlying the glacial stream bed of Phase 1, a fine silt/clay layer was observed. This could be divided into two horizons. The lower (Phase 3) horizon was grey. This was overlain by a horizon varying in colour from a very dark grey to dark yellowish brown. This layer is interpreted as a buried soil, with the upper horizon being the more organic A horizon (Phase 4),

and the lower being the B horizon that showed evidence of the effects of surface water gleying. The probable origin of the clayey silt from which this soil developed is hill wash in the late glacial period prior to the stabilisation of the nearby hill slopes by vegetation. The lower stones of the ring cairn, through their weight, and possibly also via bioturbation, became intermingled with upper portion of the Phase 4 horizon.

The ring cairn served to preserve this material from later ground erosion: It was best preserved under rubble related to the ring cairn walls and within the area the ring cairn enclosed. The buried soil A horizon was not found beyond the area protected by the ring cairn.

Phase 5: Construction of ring cairn

The construction of the ring cairn forms the commencement of the definite human archaeological record on the site. The monument was 23m long by 18m wide, and its long axis was aligned north-east to south-west. The in-situ walls were between 2m and 3m wide, and enclosed an area measuring approximately 13m by 8m. The wall of the cairn was constructed from large water-worn cobbles and boulders probably obtained from the channel of the nearby river. Half of the building material was limestone with sandstone (c.40%), with gritstone comprising the remainder. No coherent cut for the structure was observed, nor were any earthfast stones recorded.

Larger boulders or kerb stones probably delineated the base of the monument, with rubble infill placed between the 'kerbs'. However, this kerb was not well preserved, and only an 8m -wide section of it survived, on the inner face of the cairn. This was constructed using medium-sized sandstone blocks and a smaller quantity of limestone boulders. From this it is presumed that a complete inner and outer kerb originally existed. A fragment of saddle quern was found in the make up of the wall (10215).

An outlying wall (10109) was present, to the north east of the main structure, with a second example possibly present on the opposite side of the monument. Wall (10109) had no direct stratigraphic links with the main ring cairn, and is assumed to be contemporary with it. These walls may represent free standing 'outliers', or they be all that remains of a once complete enclosure wall or kerb circle (e.g. Lynch 1972, Fig. 1)

Phase 6: Additional features

At some time following the construction of the ring cairn one, or possibly two features appear to have been built against it. Feature (10338) seemed to form a small wall abutting the western outer wall of the ring cairn. It survived as a rather diffuse feature, uncoursed and not more than 0.24m high. It was 3.2m in length by 0.9m wide and ran north-west to south-east, that is perpendicular to the primary orientation of the ring cairn itself.

Feature (10389) was a flattish irregular arrangement of cobbles covering an area of about 7 square metres adjacent to the northern edge of the ring cairn. This context may represent the remains of a surface that once served the ring cairn. Platforms or surfaces have been found adjacent to ring cairns elsewhere, for instance Oddendale, Cumbria (Turnbull 1997, 22). Equally, it may represent tumble similar to that of Phase 7 (below) but which has, in this case, worked its way into the underlying ground surface, possibly during wetter periods. The stones of feature (10389) were similar in size and material to the rest of the tumble, which rather strengthens the latter interpretation.

Feature [10256] was a circular cut feature, 0.48m in diameter and 0.38m deep. It was found cutting the natural deposits of Phase 1 and was sealed by the tumble of Phase 7 (see below). As such, it is not possible to know exactly which of the intervening phases it dates to. This feature, which was located 1.5m beyond the ring cairn on its north western side, contained loose, dark organic-rich fills sealed by a more sterile sand layer, (10257), that contained a struck flint flake/blade of possible late Neolithic date. Pits containing 'dark earth' or deliberately deposited

artefacts have been recorded at many other ring cairn sites throughout Britain (Lynch 1979). It is therefore assumed that this feature relates to the use-period of the ring cairn itself and has thus been placed in Phase 6.

Also possibly dating from this phase are several silting deposits (10368, 10369, 10200, 10410, 10407). These were fluvially deposited, and relate to the inundation of the structure before the accumulation of the stone rubble above the cairn wall and kerb.

Phase 7: Tumble

Phase 7 marks the disuse of the ring cairn, during which period its walls collapsed and became spread about. The surviving in situ walls of the cairn were found buried below the resultant spread of tumbled cobbles. The bulk of the stone was limestone, with the inclusion of some sandstone and gritstone. The stone size did not vary from the size of material used in the construction of the cairn wall.

A quantity of animal bone was recovered from the stone rubble above the cairn wall including a bone ring (SF 466) and a fragment of the lower part of a boat shaped saddle quern (SF 478).

Phase 8: Colluvium

During Phase 8, a thick deposit of till-derived homogenised soil (10115) developed inside the cairn over the stone tumble and the earlier phases. The soil was interpreted as a product of hill wash that probably developed as a result of deforestation or ploughing on the hillside above the monument. Once this accumulation of material had ended, the cairn would have been far less visible in the landscape.

The finds excavated from the colluvium contain a high percentage of horse bone. The overall bone assemblage included smaller numbers of sheep or goat and cattle. The horse bone is of some intrinsic interest, as it includes examples from unusually small and slender animals. These have been tentatively identified as donkey or mule, but it is possible that they may just be from a small breed of pony. Donkey and mule are not commonly identified within archaeological assemblages from the area.

Phase 9: Modern agriculture

Phase 9 is the final phase of activity recorded in the excavation of the ring cairn area: modern agriculture as evinced by the topsoil that sealed the excavation area when fieldwork commenced. During this period, two field drains were dug across the monument, and it is likely that ploughing also accelerated the deterioration of the monument during this period. When excavation of the ring cairn commenced, the landuse of the plot was short pasture, given over to sheep grazing.

Discussion

The structure was first interpreted as a ring cairn on the basis of its form. The absence of features often associated with ring cairns, such as a spreads of burnt material and consistent kerbing, and the fact that it was apparently not used for the disposal of human remains, perhaps illustrates the degree of variation possible within this monument type. Alternatively, it may imply that this structure belongs to a different type of monument. Its elliptical form is certainly very unusual. This structure does not appear to match any of the current typological classifications of ring cairn. Many of the ring cairns that have been excavated in North Yorkshire have been complex ring cairns and have displayed structural similarities with Welsh varieties (Lynch 1979, 7). This structure, however, appears to be an anomaly.

The ring cairn was not particularly well preserved, and appears to have suffered much disturbance since it was originally built. There is a possibility that parts of the structure that would be more typically associated with a ring cairn have been removed. The stone ring may have once housed internments that have been subsequently removed; the chamber walls may

have collapsed and therefore would not display any evidence of use. This could have easily been the case as a result of the high level of activity on the site over many periods, or through the flooding that it is known occurred on site. It may be that the structure was semi-permanently waterlogged and therefore unusable for part of each year.

The general paucity of artefacts and ancillary features associated with this monument makes it difficult to know how it was used by the community that built and lived alongside it. However, a few finds of a somewhat exotic nature were recovered from the ring cairn, including a bone ring, worked stone blade and fragments of quernstone. It is generally accepted that such finds, and quernstones in particular, had a role in rites and ceremonies linked to votive deposition in the prehistoric period (Brück 2001, Pryor 2001, 322-329).

The other area of archaeological significance in Plot 21-18, towards the eastern of the plot, generated artefacts dating from the Bronze Age through to the Roman period, and possibly later. However, the ring cairn and the area adjacent to it apparently remained free of further features. It therefore seems likely that not only did the monument play a role in the ritual life of the population that built it, but it also continued as a point of significance in subsequent periods.

9.16.4 Site description: The Settlement

The complex archaeology of the settlement site in the eastern part of Plot 21-18 merits a full and detailed description by Group and Phase. This is presented below, preceded by a site summary.

Summary

The settlement site contained remains of human activity dating from the prehistoric period to the present day. The earliest remains comprise only a few artefacts of pre-Roman pottery, the great majority of which was found as residual artefacts in later features. No archaeological features securely identified as prehistoric in origin and use can be discerned. The third century AD apparently marked the most concentrated period of activity on the site.

The earliest feature identified on the site is a collection of ditches forming a probable enclosure, in the north western part of the site. This area was intensively reworked over a relatively short period of time, with frequent boundary redefinition and reorientation. Thus, the earliest enclosure was later supplanted by a series of larger enclosures, as well as a driveway or double-ditched boundary. In its final occupied phase, the settlement or farmstead in Plot 21-18 (for this is what the remains represent by this stage, and probably before) consisted of a stone platform supporting a building either partially or wholly built in stone, further enclosures or paddocks, and curvilinear ditch features, probably representing a small hut or a byre, and shelters or windbreaks. Stone platforms were found in various places across the site, these were unusual in that fragments of quernstone, and in one case, a large millstone, had been incorporated within them.

At some point during or after the fourth century AD, colluvium accumulated across the site, probably fairly rapidly. This material originated from the steep slope that overlooked the site to the south, and served to partially bury and preserve the farmstead. This event or process marked the end of occupation activity.

The archaeological record preserves little indication of the use of the plot following the Romano-British period. A series of land drains was inserted into the plot from the post-medieval period onwards. The plot contained short pasture used for sheep grazing when excavation commenced.

The archaeological excavation of the Romano-British remains on Plot 21-18 commenced in late June 2006, and continued for four weeks, and so coincided with the drought and heatwave of July 2006: the subsequent dryness of the soil presented difficulties in determining the full extent of deposits, and in discerning relationships between them.

A possible phasing of the settlement site is offered below. There is no correlation between the phase numbering for the ring cairn and that used for the settlement site, as the two were not stratigraphically related.

	Approximate Date
PHASE 10: Modern pasture	Modern
PHASE 9: Land drains and modern features	Post medieval-modern
PHASE 8: Colluvium	C4th AD, onwards
PHASE 7: Unphased features	Romano-British
PHASE 6: The Final Farmstead	C3rd to early C4th AD
PHASE 5: Group 10456	C3rd AD
PHASE 4: Group 10460 and double ditches	Late C2nd to mid-C3rd AD
PHASE 3: Earliest enclosure	Prehistoric to late C2nd AD
PHASE 2: Buried soil	Post glacial to Romano British
PHASE 1: Basal geological natural	Post glacial

Phasing Summary of Plot 21-18

Phase 1

Phase 1 represents the earliest events recorded in the excavation area; the formation of the underlying natural deposits.

The basal geology of the site consisted of a 0.1-0.15m thick layer of stones in a clay and silt matrix. This has been interpreted as a streambed of late glacial origin, overlying earlier fluvioglacial deposits (Lancaster, 2006). It is possible that this streambed was used as a source for pebbles and cobbles, and may have encouraged later settlement on the site.

Phase 2

Phase 2 is represented by Group 10450, a dark clayish palaeosol found on the site. The soil probably developed from hill wash in the late glacial period, prior to the stabilisation of the nearby hill slopes by vegetation.

The Phase 2 palaeosol formed the ground surface contemporary with prehistoric and early Roman occupation activity. The majority of the archaeological features on the site overlay or were cut from this horizon. Physically, it was sealed beneath the colluvium of Phase 8, and overlay the basal natural of Phase 1.

As a palaeosol, its formation predated the human settlement of the site, but as the old ground surface, it was open throughout the site's occupational history, and received artefactual material throughout the full period of occupation.

In places, this buried soil appeared to have been trampled and disturbed, and contained relatively large amounts of artefactual material. These areas have been interpreted as midden deposits, and artefactual evidence suggests that they were present for most of the occupation period of the site.

Phase 3

Phase 3 represents those features and deposits that mark the earliest remains of human activity recorded on the site:

- Group 10423: a north east to south west aligned ditch
- Group 10447: an angular ditch
- Group 10448: an east to west aligned ditch
- Group 10461: an east to west aligned ditch
- Cut 10319: an east to west aligned ditch
- Cut 10324: an east to west aligned ditch
- Cut 10394: an east to west aligned ditch

Group 10423

Description

Group 10423 was a north east to south west orientated ditch observed in the extreme north western corner of the site. Approximately 50 per cent of its 7m visible length was excavated; the feature extended beyond the northern limit of excavation. Group 10423 was 1.2m wide and attained a maximum depth of 0.43m. It was filled with an orangey brown silty clay, which contained animal bone and a single sherd of pottery. A shallow post hole was recorded in the terminal of this feature.

Dating

The single find of pottery was datable only to the prehistoric period. The presence of this material, with no other later pottery, may suggest a relatively early date for Group 10423. Group 10423 was cut by a shallow pit, 10284/10295 from a later phase, which contained pottery dated to the late second to third century.

Group 10447

Description

Group 10447 was a north to south aligned ditch, located in the central northern part of the excavation area. It ran from the northern limit of excavation in a southerly direction, before turning to run to the east for at least 2m. Its continuation or terminus could not be discerned, but it may have been truncated by Group 10460. Group 10447 was approximately 0.4m wide and 0.3m deep and filled with grey clay, which contained a large amount of animal bone.

Dating

Group 10447 did not contain any dateable material. It was recorded as having been sealed by 10064, an activity surface containing pottery dated from 170 to the mid third century AD, although this relationship is unverifiable.

Group 10448*Description*

Group 10448 was an east to west aligned ditch located in the north western part of the site. The ditch measured 0.63m wide, 0.12m deep, and a 4.5m length of it was observed: it is truncated to the east by Group 10183. Two interventions recorded that the fill of the ditch was a dark brownish grey silty clay; these were found to contain a small amount of pottery and animal bone.

Dating

Pottery dated from the late second to early third century was recovered from one of the two interventions dug into Group 10448. The phasing of this feature is not certain. It certainly predates Phase 6, as it is cut by a feature from that phase (Group 10183). Group 10447 does not cut any earlier features. Because of this, and because it possibly forms part of a more extensive feature whose other elements belong to Phase 3, it has therefore been tentatively allocated to Phase 3, that of the earliest features.

Group 10461*Description*

Group 10461 was an east to west aligned ditch located in the central and northern part of the excavation area. It measured approximately 6m in length and had a bowl-shaped, flat-bottomed profile. This feature measured approximately 0.8m wide and 0.3m deep, and had a dark grey sandy clay fill, which was very stony in places. No finds apart from animal bone fragments were recovered.

Dating

No dating material was recovered from this feature, nor was it recorded cutting any earlier features. It was cut by Group 10460, which was found to contain pottery in use between the second and the mid third to mid fourth centuries. Group 10461 has been placed in Phase 3, because of its relationship with later features, its possible spatial association with other Phase 3 features, and the absence of dating evidence to suggest an alternative phasing.

Phase 3 Discussion

The groups described above, along with a number of ungrouped cuts, appear to have formed the remains of the southern part of a rectangular ditched enclosure; the full extent of this enclosure is lost beyond the northern edge of the pipeline easement. This enclosure, the first of a sequence of several on the site, measured 16m east to west and at least 10m north to south. It appeared to have an entrance in its south western corner, and a further funnel-shaped entrance on its eastern

side. The animal bone assemblage from the site records the predominance of cattle, followed by sheep/goat, and it may be surmised that this enclosure, and other similar examples that followed it, were used in the husbandry of these animals.

Phase 4

During Phase 4, the Phase 3 enclosure appears to have been replaced by a larger enclosure. To its south, areas of stone surfacing and a double-ditched feature, representing either a driveway or a boundary were located. Phase 4 features comprise:

- Group 10459: a north east to south west aligned ditch
- Group 10460: a rectilinear enclosure ditch, with spurs projecting to the east and south
- Group 10462: a north east to south west aligned ditch
- Cut 10044: a posthole
- Cut 10158: a north west to south east aligned ditch
- Cut 10271: a north west to south east aligned ditch
- Cut 10367: a north east to south west aligned ditch
- Layer 10188: a metallised surface

Groups 10459 and 10462

Description

Group 10459 was a north east to south west aligned linear ditch in the extreme south east of the excavation area. It measured at least 19m in length and was 1.1m across at its widest, and attained a maximum depth of 0.5m. Neither terminal of the ditch was identified during the excavation. The fill of the ditch was a mixed brown and grey silty clay, which contained only a single fragment of animal bone.

Group 10462 was a north east to south west aligned ditch located 3m to the north of Group 10459; the two features form a parallel-aligned pair. Group 10462 was at least 15m in length and was found to be 0.6m wide and up to 0.45m deep. The fill was a greyish brown clayish silt. The north eastern terminal was identified; the south western was not, suggesting that Group 10462 may have extended further in that direction.

Discussion

Groups 10459 and 10462 may define a double ditched boundary or a 3m wide driveway. Given the increase in the gradient of the hillslope south of this point (the features lies at the base of the slope), these two Groups may represent the southern boundary of the site. Cut 10271, to the west of the stone spread associated with Structure 3, may form a perpendicular continuation of Group 10462, possibly indicating a rectilinear arrangement to the field boundaries in this part of the site, in contrast to the more curvilinear forms noted elsewhere.

Dating

No dating evidence was recovered from either feature, other than a bone gouge from Group 10459, which may be late Iron Age or early Roman in date. Groups 10459 and 10462 would appear to have continued under the stone spread to the south of Structure 3, suggesting that they predate Phase 6, the final arrangement of the farmstead, when Structure 3 existed. Additionally, Group 10462 was cut by Group 10086, the curvilinear ditch forming Structure 1, which is one of the features associated with Phase 6, the final arrangement of the farmstead.

Group 10460*Description*

Group 10460 defined the east and south sides of a large rectilinear enclosure in the central and northern part of the excavation area. It had a projecting east to west aligned ditch on its eastern side, and a second 'spur' ditch running north to south on its southern side: these features are thought to be contemporary. The enclosure measured 22m east to west and at least 10.6m north to south, and was the largest enclosure recorded on the site. The northern side of the enclosure lies beyond the limit of excavation. The enclosure would appear to have stood open, or at least unditched, on its western side.

The main enclosure ditch had a maximum width of 1.24m, and was up to 0.37m deep, with a concave bowl- or dish-shaped profile in section. Fills were typically a dark or mid-grey sandy clay; this contained CBM, pottery, heat affected stone and 43 fragments of animal bone.

Group 10460 represents the second, and largest, of the sequence of enclosures or paddocks in the northern part of the site.

Surviving remnants of stone surfacing (layer 10188) were abutting Group 10460 to the south. This was cut by a post hole (10044), which is assumed to be functionally related.

Dating

Pottery was recovered from three of the five interventions dug across this Group. This dated to between the second and the mid third to mid fourth centuries. Group 10460 has been placed in Phase 4 that relating to an early arrangement of the farmstead in Plot 21-18. Group 10460 presumably postdates Phase 3, that of the earliest features, as it cuts one of the elements of that Phase. Group 10460 is presumed to have fallen out of use by Phase 5, as it is cut by a Phase 5 feature (Group 10456).

Phase 4 Discussion

During Phase 4, the farmstead took on a reasonably developed form, with a single large enclosure, and a droveway or double-ditched boundary feature to the south. Areas of metallurgy reflect an investment in time devoted to improving the working environment of the site. The site may have been occupied at this time, or it may have been merely an area of animal pens, where animals were processed, but where their owners did not permanently live. The relatively low levels of artefacts from this phase of the site may suggest the latter, but regionally, occupation sites often record a low level of material culture during this period (White 1988, 212).

Phase 5

During Phase 5 Group 10460, the large enclosure, that partially defined Phase 4, was supplanted by a long curvilinear ditch and an adjacent ditched feature: these are Groups 10456 and 10454.

Group 10456*Description*

Group 10456 formed an open U-shaped enclosure in plan. The original extent of the ditch is not known, as it extended beyond the northern limit of the excavation.

Group 10456 measured some 30m in length. Where excavated, it achieved a maximum depth of 0.43m, and its width varied between 0.35m and 1.02m, with around 0.7m being most typical. The ditch profile was variable, sharply V-shaped in places, more shallow and dish-shaped in others. The six interventions dug into this ditch all recorded the fills as variable brownish grey silty clays, containing no finds save for animal bone fragments.

Dating

No dating material was recovered from the fills of this ditch, but relationships with other, dated, features would suggest a second to third century date. The fills of Group 10456 appear to have been sealed by stone surfaces associated with Phase 6.

Group 10454*Description*

Group 10454 formed an L-shaped ditch in plan, possibly representing the south eastern corner of a square or rectangular enclosure, the majority of which lies beyond the northern limit of the area of excavation. The enclosure had a maximum visible north west to south east 'length' of 8.6m, and extended 4.8m to the north. Three interventions into this feature recorded that it was 0.59m wide and up to 0.26m deep, and contained a grey sandy clay fill. The cut was generally shallow and dish-shaped in profile. This Group contained worked stone, animal bone and a lead object. Although the full extent of this feature did not survive, it presumably formed one element in a sequence of small enclosures or paddocks that once stood in the northern part of the site.

Dating

Group 10454 did not contain any dating material other than a small lead disc, which may have been a spindle whorl, possibly of Roman date. It cut a Phase 4 feature, ditch 10158, which itself contained pottery dated from the second to early to mid- third century AD, setting a terminus post quem for Group 10454.

Phase 5 Discussion

Group 10456 forms the principle Group of Phase 5, which marked the end of Phase 4 by cutting and supplanting the presumably disused enclosure of Group 10460. However, there is nothing to indicate that the parallel ditches that are thought to have been contemporary with enclosure Group 10460 (Groups 10459 and 10462) need also to have fallen out of use by this time. With no evidence to the contrary, it is assumed that these features persisted into Phase 5.

Phase 5 represents a continuation of the process by which the enclosure boundaries in the northern part of the site were subject to frequent rearrangement and renewal.

Phase 6

During Phase 6, the Romano-British occupation reached its final phase and the farmstead attained its fullest and most developed form. The principal features of Phase 6 are:

- Structure 1
- Structure 2
- Structure 3
- Group 10440
- Group 10452
- Group 10453
- Group 10455

Structure 1*Description*

Structure 1 (Group 10086) was a curvilinear ditch located in the south eastern part of the site. It appears to represent half of a circular ditch that opened to the north east. Structure 1 had a diameter of 6.8m and a surviving circumference of 12.1m. The ditch was 0.54m wide and 0.46m deep. The profile of the ditch was typically recorded as being deep and U-shaped with flared sides and a flat or concave base. Fills consisted of a greyish brown silty clay. The eastern terminus of the ditch was found to be well-defined, whereas the opposite western terminus was not identified, as it had been truncated away by a modern land drain.

Structure 1 may represent the remains of a small round house, outhouse, or animal shelter. No structural remains were found associated with this feature. A feature within the area enclosed by the ring ditch was interpreted as a natural disturbance.

Dating

Excavation of this feature produced no dating evidence, and no finds other than animal bone fragments. It was not recorded as having been sealed by any particular deposit. It appears to cut Group 10462, a linear feature that also contained no dating evidence, but appeared to predate the stone spread associated with Structure 3. Its contemporaneity with Groups 10453 and 10455 (which have also been placed in Phase 6) is suggested by the mutual spatial respect between the three groups: these features seem to abut, rather than impinge on, each other.

Structure 2*Description*

Structure 2 was an irregular curvilinear ditch made up of Groups 10444, 10457 and 10458. These ditches were up to 0.65m wide, 0.42m deep and filled with a grey sandy silty clay.

Together they formed a C-shaped enclosure that opened broadly to the south east. This alignment, as well as the presence of an internal stone floor (context 10352) and an internal posthole (10287, a shallow and artefactually sterile feature), strengthens the interpretation of this as a roundhouse. The enclosed area measured 4.3m north to south by 5.7m east to west.

The western side of Structure 2 appears to have been re-defined at some point in its history, with the wall on that side being extended to the west slightly, to judge by the sequence of the cuts. Alternatively, as the westernmost arm of the structure is much shallower (0.1m) than the rest of it, this may represent the partial remains of a drip gully.

Structure 2 is a rather small and untidy feature. It may represent the remains of a crude dwelling, or it may have been merely an outhouse or animal shelter.

Dating

Save for a piece of presumably intrusive post-medieval pottery from the uppermost fill of the ditch, Structure 1 contained only a single sherd of pottery: this was only broadly dateable to the Iron Age to Romano-British period.

Structure 3

Description

Structure 3 (Group 10445) was marked by an arc of gritstone rubble, distinct from context 10248 – the surrounding limestone surface that it was set within. The arc was 1.7m wide, and had a maximum diameter of approximately 6.2m with an enclosed area of 4.5 sq m. The arc was not complete and a broad gap was visible on its southern edge, which may have marked an entrance.

Structure 3 has been interpreted as the collapsed remains of a small building either partially or wholly constructed from stone. A large millstone (10245), 0.95m in diameter, marked the southern terminal of the gritstone rubble arc; this may have been reused to form a post pad (its central socket had been “plugged” by a stone). A number of large flat boulders of limestone inside the entrance possibly formed an internal floor. The gritstone may represent the remains of a collapsed solid stone wall or a cob wall of clay and stone, from which the clay component has been washed out.

Stone surfaces consisting chiefly of small rounded cobbles and large flat stones, probably obtained from the nearby riverbed, were located to the north and south of Group 10445. Fragments of saddle and rotary querns were found incorporated into the stone surface.

The siting of Structure 3 within the corner formed by the possible intersection of Group 10462 and Cut 10271 may indicate that the double-ditched boundary represented by Groups 10459 and 10462 persisted from Phase 4 until the early part of Phase 6.

Dating

Pottery dating from the second to early third century, and from the mid to late third century was retrieved from the stone spreads adjacent to Structure 3. These dates are consistent with the fact that stone layer 10244 sealed a pit, 10375, which contained pottery dating from the Iron Age to the mid first to second century AD.

The stone spreads to the south of Structure 3 and presumably associated with it appear to overlie the parallel ditches that form the possible droveway attributed to Phases 3 and 4.

Group 10440

Description

Group 10440 was a curvilinear ditch feature located in the north western part of the excavation area. As revealed in plan, it measured approximately 12.4m in length. Four slots were excavated through it. These found the feature to be 0.2m wide, and 0.2m deep.

This feature opens to the east, and may have formed a windbreak or shelter against prevailing westerly winds, possibly for the use of stock. Alternatively, the line of the northern limit of this feature may be discerned continuing towards the north east by the enclosure represented by Group 10452. The two features may have formed part of a contemporary stock handling system featuring ditched boundaries and paddocks. Although, not fully discerned in plan, this feature may have continued further to the south east, where it may have been linked to Structure 2. With its shallow curve and opening to the east, this features resembles a similar curvilinear feature, Group 10453, located some 15m away to the east.

Dating

No secure dating material was recovered from this feature. However, stratigraphic relationships and spatial arrangements suggest this feature forms part of Phase 6:

- Group 10440 cuts Group 10456 from Phase 5
- Group 10440 does not appear to be cut by any later features
- Group 10440 may have extended to form part of Group 10452 and Structure 2 (to the north east and south east respectively)

Group 10452

Description

Group 10452 was a ditch, seemingly forming three sides of a rectangular enclosure, located at the north edge of the excavation area, beyond which it extended. In plan, the enclosure measured 7m east to west and, had a visible north to south “width” of 2m, but presumably extended further to the north. Group 10452 was investigated via two interventions, which found the ditch to be 1.25m across at its widest point, and to attain a maximum depth of 0.26m. The ditch had a shallow bowl-shaped profile, and was filled with a dark grey silt clay; this contained pottery, production waste and animal bone. Group 10452 appeared to form the final element in a sequence of small enclosures or paddocks that once stood in the northern part of the site.

Dating

A sherd of a vessel with a narrow neck (such as a Roman flagon or a bottle) in a wheel-thrown redware was recovered from one of the interventions dug into Group 10452. This redware is not recognised as being typically Roman, but may be late Roman in date, although an Anglo-

Scandinavian date has also been posited. Group 10452 appears to represent the replacement for Group 10454, which it cut.

Group 10453

Description

Group 10453 was a C-shaped curvilinear ditch located towards the eastern end of the site. It measured approximately 16m in length, was aligned north to south, and its concave side faced east. Its terminals were well defined when excavated, so it seemingly did not originally extend further. The ditch was 0.8m across at its widest, and it was 0.45m deep, with a fill of brownish grey sandy clay. A recut was recorded at the southern terminal. The ditch generally had a blunt V-shaped profile in section. This Group contained heat affected stone, quernstone fragments and animal bone.

Group 10453 may represent the partial remains of an enclosure, or was possibly an animal shelter: its plan form would have formed a wind break against prevailing westerly winds.

Dating

This feature yielded fragments from the base stone of a saddle quern and a broken handstone from a saddle quern. No other material for dating was recorded from this feature, nor did it have any direct stratigraphic relationships with any of the other features on the site, other than being cut by a probable post-medieval land drain. The saddle quern would suggest an earlier prehistoric date, but it is not known if this was residual, or if the artefacts had been 'curated' into a later feature. Indeed, the apparent contemporaneity of Group 10453 with Structure 1 and Group 10455 (which have been placed in Phase 6), as suggested by their mutual spatial tolerance, would suggest that Group 10453 is rather later in date than these finds would suggest.

Group 10455

Discussion

Group 10455 was a lightly curvilinear ditch observed in the north eastern corner of the excavation area. It ran for approximately 21m on a north west to south east alignment. The northern limit lay beyond the limit of excavation. At its southern limit, the feature turned to run on a more north to south alignment. The ditch was found to have a maximum depth of 0.66m, the width varied between one and two metres, approximately. Fills were recorded as brown to grey clay silt mixes, containing CBM, pottery, and animal bone. A recut was recorded at the southern terminal, where a short 'spur' section of ditch, 2.4m in length and running north east to south west was also noted.

This was one of the most substantial ditches present on the site. Given this, and given the apparent lack of archaeological features to the east of it, in contrast to the intensity of activity on the opposite side, it is possible that this feature represents the easternmost main boundary ditch of a small enclosed settlement.

Dating

A fragment of airbrick and a field drain were recovered from the primary fill of the feature, although it is not known if this is due to the disturbance from modern land drains, or because it is a genuinely modern feature. The uppermost fill of one portion of the ditch was found to

contain pottery dated to the third or fourth century AD; elsewhere a brooch dateable only to the Iron Age or Romano-British period was recovered from it. The mutual spatial tolerance, suggesting contemporaneity, between Groups 10455 and 10453, and Structure 1, has already been noted. This feature would appear to cut Group 10460, the principle feature of Phase 4. It is not cut by any feature save for a modern land drain.

Phase 6 Discussion

Pottery dates indicate that the farmstead reached its final form at some point during or after the late third or early fourth century. By this period the site consisted of perhaps three structures, at least one of which was stone-built, and associated metallised surfaces. The series of enclosures that had stood in the northern area reached its final stage, with the last enclosure being perhaps less defined than its predecessors.

The sense of permanence to the farmstead at this stage is perhaps supported by the find of the large millstone. This was probably mechanically driven, and presumably had been in use somewhere on the site.

During its final occupied phase, the farmstead would appear to have been involved in mixed agriculture, with an increased emphasis on the processing of cereal products. The relatively large amounts of Romanized material goods recovered from the site would suggest that the occupants of this site participated in the wider regional economy, and traded their agricultural produce with goods produced elsewhere, including the current forms of pottery, and coinage. Two coins were recovered from the site, one illegible but of an early form, the other dated to between the late second to early third century.

Artefactual evidence does not extend beyond the fourth century AD, perhaps indicating the end of occupation on the site occurred at this time.

Phase 7

Phase 7 represents those features that appear to be Romano-British, but could not be assigned to any particular phase. This was usually because they did not contain any dating evidence, have any stratigraphic relationships or form a coherent spatial arrangement with any other features,. The majority of these features were located in the most intensively used part of the site: the northern area where a sequence of enclosures or paddocks was excavated. They were probably functionally associated with this activity, but the archaeology does not allow us to know precisely when.

Phase 8

Description

Phase 8 is represented by Group 10451. This was a brown grey sand silt clay with rust coloured mottles. This material was found below the topsoil and sealed the archaeological remains in southern part of the site; its depth diminished away from the slope to the south. Correspondingly, this material has been interpreted as colluvium.

The deposition of this material on a well-developed buried soil points to a significant change in the local depositional regime. For the till-derived soil to move after a period of stability, during which the buried soil had developed, implies considerable disruption of the soils on the

hillsides. The most likely causes would be deforestation or ploughing on the hillsides. (Lancaster, 2006). Both these activities may have been carried out by the occupants of the site.

Group 10451 may have accumulated gradually through soil creep, or suddenly via sudden landslip, or a combination of both. Its formation is thought to have been at least reasonably rapid, as its interface with the underlying buried soil (Group 10450, Phase 2) was clearly defined.

Dating

The majority of the colluvial deposit seems to have accumulated after the site was no longer occupied, although exactly when this occurred, and over what period of time, is not known. It is tempting to assume that the site was abandoned following its burial by a landslide, but this cannot be proven. However, the site was apparently abandoned fairly abruptly: there is a marked absence of fourth century material. Dating material from the colluvium ranges from a coin dated to AD 193-211, pottery of the late second to late third to fourth centuries to a post medieval halfpenny. Because this material has been translocated from upslope, there is a likelihood that much of the earlier material within it is likely to be residual.

Phase 9

Following the colluviation, the site was apparently never again occupied. Phase 9 records the next significant activity on the site: the digging of land drains from the post-medieval period onwards. Following machine-removal of topsoil, the site was found to be raked by a number of land drains. Some of these were reasonably modern with ceramic pipes; others seemed older and had been filled only with stones. The majority of these drains were aligned north east to south west, and presumably reflect the drainage fall of the site away to the north east.

It is assumed that much of this drainage was inserted into the plot as part of a package of land improvement measures associated with Enclosure in the eighteenth, or more probably, nineteenth century.

Phase 10

Phase 10 is the final phase of activity recorded in the excavation area: modern agriculture as evinced by the topsoil that sealed the excavation area when fieldwork commenced in June 2006. The topsoil, context 10000, was a dark greyish brown silty loam. Plot 21-18 was used as short pasture for sheep grazing when the archaeological work began. Twenty three sherds of pottery, dating from the post-medieval to the early modern period, were recovered from the topsoil. This assemblage may suggest that the plot was manured during this period and it may therefore have previously been used for arable agriculture.

Overall Discussion

The remains in Plot 21-18 are a regionally rare example of a Romano-British settlement that has been subjected to modern excavation. The site is especially unusual as it is upland sites in the Dales that are more typically investigated hereabouts (e.g. Maude 1999). The site therefore has some potential to examine the activities that occurred in the immediate hinterland of the Roman military system.

Sherds of prehistoric pottery, as well as the ring cairn, in Plot 21-18 suggest that the immediate area was an enduring focus of activity in the prehistoric period. Pre-Roman activity is often difficult to identify, due to a comparative lack of artefactual evidence, but at 21-18 there is evidence of a prehistoric presence. Although the sherds of prehistoric pottery were few in

number, and mostly found in residual contexts, there is enough evidence to suggest that the Romano-British settlement was not founded on empty ground. There is no convincing structural evidence of an Iron Age settlement, but this may have been erased by subsequent activity, especially if the remains were slight.

Earlier occupation may therefore have been light, and transient, and was possibly both. The ditched enclosures recorded on the site were rather slight features, would quickly have become backfilled, and it is unlikely that they formed substantial barriers. These appear to have been temporary features. Perhaps the site was at first utilised as a livestock station, for the temporary sorting and corralling of beasts, possibly during an annual routine of transhumance, the ring cairn being selected as a marker or 'stop' on the journey. This is merely a theory, but would explain the recutting of the transient enclosure features and the lack of substantial occupation structures from the earlier phases of the site.

The infrastructure of Roman civil and military administration that came to be installed in the surrounding landscape may provide the context for understanding later activity in Plot 21-18. The fort at Elslack was located approximately three miles to the south east, whilst Gargrave villa lay two miles to the north east. The junction formed where the road between Ilkley and Ribchester met the road between Ilkley and Over Burrow (Margary 72a and 722) lay around three miles to the east; a second fort, at Long Preston may possibly have been situated on the latter road (White 1988, 203), about seven miles to the north west of Plot 21-18. The road system may have provided access to major forts and civilian markets further afield at places such as Ribchester and Ilkley. It would therefore appear that a market for agricultural produce and rural craft items existed in the near vicinity of the site, and the presence of a relative abundance of Roman pottery, as well as coinage, on the site would indicate that its occupants exploited the opportunities offered.

Permanent garrisons would have required a reliable supply of grain, and at 150m above sea level, the site was well within the altitudinal tolerance zone of arable agriculture: from about 150 BC onwards, the limit for cereal cultivation lay at between 200m and 250m (Nevell 1999, 17). The many quern stones recovered indicate that grain was at least being processed on this site, and the large millstone in particular indicates that this was being done on a scale that exceeded subsistence. These particular artefacts were recovered from deposits associated with the latter phases of the site's occupation in the third century, and may indicate an increasing specialization on the part of its occupants. Increasing arable utilization of the surrounding hillsides may even have been the source of the colluvium that eventually partially buried the site.

The animal bone assemblage from the site, which records the predominance of cattle, followed by sheep/goat, and the possible spindle whorl may indicate other resources and products that the site traded with its neighbours.

Most of the datable material culture on the site derives from the second to early fourth century, and it is assumed that this period marks the height of its occupation (although it is acknowledged that activity extending into the less archaeologically visible adjacent periods is a possibility). The period of datable occupation of the settlement site at 21-18 therefore seems to closely mirror that of the villa at Gargrave, and also the activity indicated by the metalwork recovered from caves (White 1988, 204-206). On these sites, the adoption of Roman material culture began quite soon after the Roman occupation of the area (which commenced in the last quarter of the first century AD), and also seems to have ended relatively early, perhaps a century before the final collapse of formal Roman administration. The evidence would support the assumption that it was the presence of the Roman military, and not independent traders, that led to the introduction and use of Roman goods into the area, but the premature cessation of this requires further investigation.

As stated above, few Romano-British sites have been excavated in the area, and those that have been have generally proved to be artefactually poorer than the site described here, but some parallels may be identified. At Arncliffe (16 miles to the north of Bank Newton) an oval enclosure close to the valley bottom contained a number of smaller features including three probable huts, one of which was partially excavated and produced several pieces of Roman pottery, a coin, a knife and four fragments of rotary quern. (Leak and Leak 1970, cited by White 1988, 210-211). A site surveyed and partially excavated at Eller Beck, Lunesdale (approximately 25 miles to the north west of Bank Newton) also provides many parallels. This was also situated at around 150m on a valley floor and consisted of enclosures, fields, cobbled areas and terraced platforms. Like Bank Newton, Eller Beck was also located close to a Roman road and fort (at Burrow, which lay about 2.5 miles to the south west). Although the scale of excavation was limited, pottery evidence suggested a third century period of occupation, which possibly extended into the fourth (Lowndes 1963).

During the course of a 1988 resource review of the Roman archaeology of the Pennines, White drew attention to the discrepancy between the fact that *'the Roman military occupation will have placed considerable demands on the native economy of the Dales'* yet *'excavation evidence seems to point to a subsistence level economy with relatively few material possessions'* (212). The Bank Newton farmstead may prove to be one of the hitherto missing sites capable of resolving this anomaly, as it is relatively artefactually rich and located close to the Roman military presence. Moreover, it may suggest that others may yet exist, perhaps buried under colluvium, in valley bottom locations in close proximity to Roman roads and forts. A differentiation in native material culture seems to have been present in the Pennines in the Romano-British period. This may have been at least partly due to proximity to Roman installations, and the level of trade undertaken with those installations.

9.16.5 Analysis potential

The Neolithic or Bronze Age activity at Bank Newton might be contemporary with the rock art found at Embsay; the early Bronze Age site at Thorlby Springs located on the edge of the moors and foothills; and the burnt mounds at Turnbers Hill, Lawkland Moss, and Backland Wood. These sites should not only be considered individually, but also as part of a wider regional prehistoric settlement pattern. Comparative study of the prehistoric sites found along the pipeline route could allow a broad approach, including forms of interaction and communication, resource exploitation and technological change over a long period of time, to be implemented.

The earliest phases of the ringcairn are not securely dated and a series of radiocarbon assays will be undertaken. A small pit, [10376], excavated below the stone wall of the cairn, produced fragments of wood. Dating of the finds from the stone rubble of the structure, deposits (10219) and (10226), could possibly confirm a period of use. The horse bone from the buried soil, (10115), in the centre of the monument may represent the burial of an individual animal. The bone is in a good condition and it should be possible to extract collagen for radiocarbon dating. This may reveal an extended period of use of the monument by later communities.

Finds from the area of the cairn were spatially located during excavation and it might be possible to analyse the distribution of these within the monument. For instance, if the horse bones, including those retrieved during the evaluation trenching, can be ascribed to individual animals, it might help in determining which deposits were broadly contemporary. The unusually gracile equid bones would benefit from further comparison from similar assemblages and modern reference material to try and further establish species.

Plot 21-18 that produced the most extensive remains of Romano-British activity from the entire pipeline. The site contained a well-dated, pottery assemblage, of rather higher status than normal for rural settlements in the region. It includes traded wares which have a well-

established date range, and can thus be used to establish the date range of some of the South Yorkshire types also found on the site. The remains excavated offer the chance to consider the character and date of the structural elements and finds assemblages present, the agriculture, diet and landuse throughout the period and the timing and extent of the adoption of Romanised material culture

The phasing scheme outlined above is provisional and relies heavily on pottery spot dates. Prehistoric pottery was found in the upper fills of some later linear features. Although the pottery must be residual, it might not have moved far from its original deposition site, particularly if an earlier linear feature was truncated or recut. Some of the later Roman ditches could possibly reflect the alignment and realignment of the earlier prehistoric ditches. Radiocarbon dates of secure contexts may help to bolster the pottery dating, and also establish whether or not the site was occupied in less archaeologically visible periods.

There is ceramic evidence of occupation during the fourth century AD, but no definite evidence of occupation extending beyond this time. Pottery which could be of Anglo-Scandinavian or Anglo-Saxon date has been recovered from features of the latest phase, highlighting the possibility of the later Roman deposits being reworked during the early medieval period. If it can be shown that the unidentified pottery is Anglo-Scandinavian, it would add greatly to the significance of the host features and the site in general.

The site has been referred to here as a 'farmstead', but the possibility of a more extensive settlement situated to the north of the construction limits cannot be ruled out.

9.17 Plot 28-1: Rathmell

Rimington parish; 231 NAL; NGR 380400 458100; Figures 2d, 14, 14a; Plates 53-55.

Summary

The site was first detected during the geophysical survey. Subsequent evaluation investigated several features, including a kiln. A stone-lined structure of uncertain function was uncovered during excavation. Several other features were also excavated: these contained burnt material. The interpretation of the site is uncertain, as there were no clear indications of the processes which produced the burnt materials and no finds were recovered from any of the features on the site.

Well-preserved earthworks stood either side of the construction area. A walkover survey of the earthworks suggested intense industrial activity, as the area had apparently been subdivided into a number of plots, each containing a sunken feature. These were interpreted by the regional specialist as field kilns, and it is possible that the excavated remains relate to ancillary activities.

9.17.1 Location, topography and geology

The site was located on well-drained, moderately sloping ground and was under pasture when investigated. After removal of the topsoil, the underlying layer appeared to be a moderately undulating surface with frequent clusters of stone rubble within a silty clay horizon (plate 53).

The topsoil in Plot 28-1 was loose, dark brown silty loam up to 0.20m deep, with moderate sub-rounded stones, occasionally up to boulder size. This overlay a compact, mid-greyish-brown sandy clay subsoil, varying in depth from 0.25m to 0.45m, with occasional sub-angular stones and boulders. The natural drift geology was an orangish-grey sandy clay, containing large stones and boulders that protruded into the overlying layers; the pipe-trench watching brief showed this deposit to overlie mottled blue clayey silt and a layer of poorly sorted orange gravel, which in turn overlay blue silty clay with moderate large angular stones.

Plot 28-1 extended to the boundary wall of Hallstack Farm, a stone-built house on the southern edge of the construction area. The boundary wall enclosing Hallstack Farm contained re-used stone and millstones.

Hallstack Farm was located close to an irregular curvilinear earthwork, which may have been a palaeochannel. It appeared from other earthworks in the field that this had been engineered with ditches that led into it and towards the farm, creating subdivisions and irregular parcels of raised land. One of the ditches was fairly substantial and this may have acted as a canal from the palaeochannel before both of them filled with silt.

Between the subdivisions of the field were numerous circular hollows or pits, which in several examples appeared to have small gullies leading into the centre of the pit. These features were interpreted as field kilns by David Johnson, a regional specialist in such remains, who undertook a walkover survey of the field during the course of the excavation.

9.17.2 Results from earlier stages of work

The field reconnaissance noted a natural hollow in the survey area (FSU: 86, Network Archaeology Ltd 2005b). A field kiln, [800], was found during evaluation of the plot (Trench 38; fig 14a). The kiln was possibly used for lime production (D. Johnson, *pers. comm.*). The kiln pit was oval in plan, with a flue at its western end. The fill of the flue, (812), was charcoal-rich, but was not sampled, because it was initially interpreted by the excavator as a naturally filled hollow. The lower part of the kiln pit contained a ledge or step around its sides, possible

evidence of an internal structure, but the top of the feature had been severely truncated by ploughing. The pit contained a single stony fill, (801).

A linear feature, [806], was excavated to the north of the kiln. It was less than 0.1m deep with irregular sides and an uneven base. It was initially interpreted as a redundant field boundary ditch, running north-west to south-east across the evaluation trench. However, a variation in the boulder clay, formed as a result of periglacial silting, may be a more likely interpretation.

During the topsoil strip watching brief, ridge-and-furrow earthworks were noted in the adjacent field, Plot 28-2.

9.17.3 Site description

Cleaning of the site revealed a series of pits, ditches and drains; a stone-lined tank, [9023], and several poorly defined areas of slightly darker soil (plate 54).

Several features containing ash and charcoal deposits were excavated. The deposits in pits [9008] and [9018], and linear feature [9001], had not been burnt *in situ*, but had been dumped within the cuts. The varying dumped materials included charcoal, grey ash and burnt clay. The burnt material was different in the two pits; other excavated pits, such as [9054] and [9083], contained no burnt material. The pits differed in shape and size, and there appears to be no pattern to their distribution.

Features [9038], [9070] and [9073] initially appeared to be irregular pits containing burnt deposits. Features of this kind were widely distributed across the site and a sample of them were excavated and recorded. Whilst these features did not reveal anything of archaeological significance, they did highlight that a lot of the darker areas observed on the plot were a result of tree growth and bioturbation. Some tree stumps may have been removed by *in-situ* burning, but most of these features did not contain burnt material.

A stone-lined structure, [9028], located in the centre of the site, was excavated: it measured 1.4m by 1.3m and was oriented east to west. The stone used in the structure was mainly thin, rectangular slabs of millstone grit with smooth sides and edges. The structure appeared to have been cut into the natural boulder clay and would have had a boulder clay base. The structure had two drains running into it: [9026] and [9023]. The relationship between the structure and the drains is not known so it could not be established whether or not they were contemporary. The structure was initially interpreted by the excavator as a cist but, as no cultural material was associated with the structure, this interpretation seems improbable.

A series of parallel field drains was oriented north-north-east to south-south-west: two of these drains were sampled and were recorded as [9060] and [9062]. Two further drains were excavated that were found with stone rubble, [9023] and [9026]; these run on the same orientation as the other drains and are therefore probably all contemporary.

A sub-circular pit, [9043], measuring 1.1m by 0.99m and situated towards the south of the site, was excavated (fig. 14a). The material filling the pit was mainly variations of ground lime and black or grey silt lime. The purpose of this pit seems unclear but, judging from the concentration of lime in the feature, it may be related to the kiln that was excavated during the evaluation.

A stone spread to the north-east of the site, (9012), had two slots excavated through it to establish its archaeological potential (plate 55). The context appeared to be a spread of irregularly-sized stones embedded in a layer of redeposited natural, probable levelling to fill a natural hollow.

9.17.4 Analysis potential

No stratigraphic relationships between features or deposits were recognised during the course of the excavation, and no finds were recovered. The site is therefore considered to have no potential for further analysis.

9.18 Plot 31-2: Wham

Rathmell parish; 208 NAL; NGR 378951 461195; Figure 2d; Plate 56.

Summary

During pipe trenching, 34 Mesolithic struck flint artefacts were collected from the surface left after the stripping of the topsoil in this plot. A prolonged period of rain following the topsoil stripping had made the presence of the scatter more prominent.

9.18.1 Location, topography and geology

Plot 31-2 was located within the parish of Rathmell, on a hill (220m OD and above) known as Swainstead Knot, 2km south-east of Wham. The site was at a height of around 223.90m OD.

The topsoil in Plot 31-2 had already been stripped when the flint assemblage was observed. The exposed subsoil was an orangish-brown sandy silty clay, up to 1.0m deep. The underlying drift geology was chiefly boulder clay, the colour of which varied from reddish-brown through mid-brown to bluish-grey as the trench crossed Swainstead Knot hill-top; at the northern edge of the plot, the boulder clay deposit became thinner, and was seen to overlie stone-brash and gravel (plate 56).

9.18.2 Results from earlier stages of work

The desk-based assessment noted the presence of ridge-and-furrow earthworks in the northernmost corner of the plot (DBA: CDI, Network Archaeology Ltd 2005a), while two post-medieval field boundaries were recorded at the southern edge of the field (DBA: ZGU and ZGW): these two former field boundaries were seen during the watching brief on the pipe-trench. Aerial photographs indicated the presence of palaeochannels to the east of the pipeline route (DBA: DDK).

The Knot Plantation, within Plot 31-2, was the site of a post-medieval quarry (DBA: AAJ, Network Archaeology Ltd 2005a).

9.18.3 Site description

The flint scatter was collected during pipe trenching from the topsoil spoil heaped on the western side of the working width, on the crown of the hill. The assemblage consisted of 34 pieces of struck flint, located close to one another. The scatter was not seen during the topsoil stripping, but heavy rain during the pipe trenching provided good conditions for showing up flint artefacts. After the discovery of this scatter, a closer examination of adjacent plots was undertaken to locate any further artefact scatters; however, this assemblage appears to have been an isolated group.

The assemblage was characteristically Mesolithic. Of the thirty-four items, half are blades, the rest being eleven flakes; two retouched and two utilised pieces; an irregular waste piece; and a single core. Twenty-one pieces are incomplete, three exhibit edge damage, and four of the pieces have been slightly burnt. The majority of the pieces are debitage, of which one flake (SF 913) appears to be an axe-sharpening flake. The core (SF 916) is keeled and has had several blade removals from it. The retouched pieces are a microlith (Special Find Number 925) and a truncated blade (SF 901); the utilised pieces, one of which is blade-like (SF 923), have possible utilisation damage along their left-hand sides. A range of raw materials is represented within this assemblage: black, grey and grey-brown coloured flint, with the grey flint occurring in both opaque and semi-translucent forms (see Wilson, app. C, this report).

9.18.4 Analysis potential

The apparent positioning of the flint scatter suggests that the hilltop had been chosen as a focus of activity, although the absence of sub-surface archaeology or other flint scatters in the immediate area suggests that the activity in question was transient. In the central Pennine uplands of Lancashire and Yorkshire, the later Mesolithic period (between c. 6000 and 3500 BC) is represented by small spreads of flint and charcoal with occasional patterns of stones that could have been hearths or the foundations of windbreaks. Both relatively extensive scatters with a variety of flint tools and smaller concentrations with only one or two types of microlith are known. The former are normally interpreted as sites where a band of hunter-gatherers have carried out diverse activities and the latter as 'hunting camps' where a small group has prepared weapons. This assemblage would appear to represent the latter type of site.

As Mesolithic material is very rare in the pipeline study corridor the assemblage is considered to be of potentially regional significance. Further study of the assemblage, with publication, is recommended.

9.19 Plot 31-11: Farther Rome

Giggleswick parish; 200 NAL; NGR 379179 462488; Figures 2d, 15.

Summary

The remains of a metalled surface were identified during the watching brief on topsoil stripping on the north-west side of the construction easement in Plot 31-11. The surface was situated on the slope of a hill below Farther Rome Farm. A sample was excavated in order to determine construction method and to ascertain if any earlier phases of surface survived below. This revealed only modern pottery and underlying subsoil. It would therefore appear that this is an agricultural access track of recent date and little historical significance.

9.19.1 Location, topography and geology

Plot 31-11 was located approximately 200m south-east of the farmstead of Farther Rome, near the foot of Rome Crag to the west, at a height of around 177.50m AOD.

The topsoil in Plot 31-11 was soft, dark brown silty clay, no more than 0.10m deep, overlying a thin layer of mid-brown clayey silt subsoil, which in places merged into the upper horizon of an intermittent lower subsoil deposit of light grey clayey silt. At the base of the excavated area was the natural drift geology, a yellow boulder clay.

9.19.2 Results from earlier stages of work

There is anecdotal evidence of a Roman settlement to the north of the site, on the far side of Storth Gill Lane, possibly related in some way to the names of the two farmsteads: Rome and Farther Rome. Between Storth Gill Lane and the northern boundary of the plot, ridge-and-furrow, some extant, some ploughed-out, and earthwork boundaries and enclosures were identified by field survey and geophysical survey, but none extended into Plot 31-11. The desk-based assessment noted post-medieval historic field boundaries on the northern, western and southern sides of the plot (DBA: ZGL, ZGM, ZGO, Network Archaeology Ltd 2005a).

9.19.3 Site description

Machine removal of topsoil, (19000), exposed a rough, metalled surface, (19001). The surface measured more than 11m in length, and was approximately 2m wide. It had a north-west to south-east alignment. On its eastern side, surface (19001) had been cut by a 0.6m-wide linear feature, [19002], which shared the alignment of the metalled surface (fig. 15).

A 1.00m-wide slot excavated by hand across these features revealed that layer (19001) consisted of buff sandstone fragments of random size and shape, roughly laid in a matrix of dark grey silty clay. The deposit was up to 0.18m thick. Linear feature [19002] was roughly U-shaped in profile, sloping steeply on the south side and gradually on the north, with a flat base at 0.28m depth. It was filled by a firm dark grey silty clay, (19003). Ditch [19002] cut, and therefore post-dated, surface (19001). Below the metalled surface was subsoil deposit (19005), a firm mid-brown clayey silt, which contained a number of sherds of Pearlware and Transfer-Printed ware of late eighteenth to mid-nineteenth century date. In places this deposit overlay a further subsoil deposit of light grey clay silt (19006) up to 0.32m deep. Mid-yellow boulder clay, (19004), underlay the site.

Metalled surface (19001) appeared to be aligned on the current buildings of Farther Rome farm, and ran parallel to a current field boundary. It would therefore appear that this is an agricultural access track that once served the farm.

9.19.4 Analysis potential

The stratigraphic potential of this site is negligible: no further work is recommended.

9.20 Plot 34-5: Lawkland Green

Lawkland parish; 178a NAL; NGR 378130 466017; Figures 2d, 16, 16a; Plates 57-60.

Summary

The remains of a stone-built structure on the west side of the easement in Plot 34-5 were identified during the topsoil stripping watching brief. To the south and east, the foundations of the building had been heavily truncated; however much of the rest of the building was visible in plan as cobbled surfaces, walls and spreads of mortar. The layout suggests that this was a field barn or longhouse.

9.20.1 Location, topography and geology

The site was located on level ground 0.3km north of Lawkland Green and 0.5km east of Lawkland Hall, at a height of approximately 170m AOD.

The topsoil was a humified, friable, dark greyish-brown silty loam at 0.05m deep with a few poorly sorted angular and sub-angular stone inclusions. This lay on top of a compact, dark grey silty loam subsoil layer with frequent black patches and very poorly sorted sub-angular stones. This probable levelling deposit, post-dating the building, contained a considerable quantity of archaeological inclusions. Sandstone bedrock and patches of boulder clay underlay the entire site. The outcropping sandstone provided an ideal base for the construction of the stone walls of the building.

9.20.2 Results from earlier stages of work

Enclosures and possible house platforms are visible to the north of Lawkland Green, at NGR 37810 46570, but it is possible that they are the result of village shrinkage. Traces of disturbance at this location have been interpreted as the foundations of an old barn, but may be evidence of quarrying. Documentary sources, particularly early editions of Ordnance Survey maps, reveal the locations of a number of animal enclosures within the study corridor. The place name 'Scale Hill', in Lawkland, is thought to derive from the term 'shieling', which denotes a intermittently occupied shepherd's hut, and more occasionally, summer pasture (DSMR 24187).

9.20.3 Site description

Phase 1: Construction (plate 57)

Pipeline timetable constraints substantially reduced the time available for the excavation and recording of deposits pre-dating Phase 2.

The stone structure appeared to be constructed directly on top of natural layers of very firmly packed yellow boulder clay, (16009), and an outcrop of sandstone, (16003).

The sandstone wall, [16000], oriented north-north-west to south-south-east, abutted sandstone wall [16005] at its northern limit, running to the east-north-east (figs. 16a, 16a i). These perpendicular linear remains enclosed an area 50m² of partially robbed sandstone cobbles, [16004]. Other architectural features included a sandstone threshold, [16030], with sub-square notches at each end (fig. 16a ii), a possible doorway located centrally within wall [16000].

To the west, and abutting the wall, were cobbled surfaces [16002] and [16008], between which was set a stone-lined trough, [16007], filled with mixed rubble dating the demolition to the late eighteenth century (plate 58). Situated to the south of these features, a 3.4m by 1.7m flagstone floor surface, [16001], was excavated, although its location south of all other structural elements does not allow for a stratigraphical connection to be made to the rest of the site.

To the north and located contiguously with wall [16005], a linear flagstone surface, [16012], 2.8m wide, was revealed (plate 59), with an adjacent remnant of another flagged surface, [16013]. North of this, and parallel to wall [16005], was a line, 3.75m by 0.75m of lime mortar, (16014).

All deposits north of the linear mortar spread (16014) were stratigraphically distinct from those to the south, although all were set into boulder clay, (16009).

The most northerly feature was a sandstone wall, [16026], oriented parallel to wall [16005], which was abutted to the south by a cobbled surface, [16025], and flagstone floor surface [16027]. Hand cleaning of the flagstone floor revealed a number of phases demonstrated by the presence of an earlier sandstone floor surface, [16031], and a later slate surface [16029].

A heavily truncated 1.3m by 0.9m section of wall, [16024, was located north of wall [16000] and west of flagstone flooring [16031].

Several small wall footings, [16017], [16018] and [16019], enclose a small (1.6m by 0.8m) cobbled surface to the north of the mortar spread (16014) (plate 60). Adjacent, and to the east, was an area of irregularly shaped sandstone rubble, (16023), on top of a further cobbled surface, [16021].

Phase 2: Seventeenth to eighteenth centuries

The topsoil strip revealed a large quantity of post-medieval pottery and a number of structural remains below a 0.05m deep deposit of overburden, (16016), covering the whole site. This deposit was hand-cleaned across the 18.5m (north to south) by 7.5m (east to west) area, to reveal all masonry features in plan. Some 435 sherds of post-medieval pottery were recovered, with 55 sherds of late eighteenth century wares from this overburden deposit.

There was no evidence of any demolition rubble deposit from the building itself. The only finds recorded from this site were from within the topsoil (16015) and overburden (16016) layers. It is likely that the site was occupied from at least the mid-seventeenth century to the end of the eighteenth. The great quantity of pottery recovered (approaching 650 sherds) may suggest that the building may have been a domestic residence. Alternatively, a derelict barn may have been used as a convenient midden site for material from nearby occupation. Lawkland Green Farm stands approximately 300m from the excavation site. Its earlier use may have been contemporary with the building described here, and possibly was the source of this domestic material.

9.20.4 Analysis potential

The landscape is ideally suited to the rearing of livestock, and with place names such as ‘Scale Hill’ (DSMR 24187) and ‘Shepherd’s Gate’ denoting such activity, it is likely that this site served some agricultural function. Documentary and cartographic study may identify the site, and would provide more social context for the finds, as well as a tighter chronology

The close proximity of the site to Lawkland, and its position within the landscape in relation to the current arrangement of farmhouses and agricultural buildings, raises interesting questions regarding the evolution of landscape use. The present-day form of the settlement may have resulted from its multifocal origins in a series of isolated farmhouses spread out along the road. This site may represent one element in the evolving rural landscape in and around Lawkland village.

The material from contexts relating to Phase 2 provides a date for the disuse of the whole structure. Comparison of the plan form of the building with other existing or excavated examples may also help to date the structure and confirm its function.

It is recommended that this site is included in an article for publication in a suitable journal, such as the Journal of the Yorkshire Vernacular Buildings Study Group, describing and comparing all the buildings excavated along the pipeline route.

9.21 Plot 35-8: Lawkland Moss

Lawkland parish; 164 NAL; NGR 376547 466995; Figures 2d, 17; Plates 61 and 62.

Summary

Three linear cut features were exposed below a large spread of burnt material during the watching brief on topsoil stripping. These were subsequently recorded and a percentage of each of them was excavated, to establish depth, nature and stratigraphic relationships. The spread of material was initially thought to be the remains of a prehistoric burnt mound, but the small amount of datable material retrieved from it indicates a more recent provenance.

9.21.1 Location, topography and geology

The site was located on level ground 1km north-west of Lawkland and 200m north of Lawkland Moss, at a height of approximately 130m AOD, at the south-eastern extremity of the plot.

The topsoil was a humified greyish-brown silty loam 0.28m thick, with moderately drained, silty, slightly stony subsoil with fine pebbles. Below the subsoil was a firm yellowish-brown clay loam with distinct areas of greyish-yellow sandy mottling. This drift deposit was moderately to extremely stony with very poorly sorted, common, sub-angular to sub-rounded pebbles and stones.

9.21.2 Results from earlier stages of work

Ancient and post-medieval woodlands are found to the north-east of Wennington, along the River Greta, near Lawkland. Lowland moss and grassland are located to the west.

A rock shelter known as 'Sewell's Cave', in Common Scar, Lawkland, was excavated in the 1930s (DSMR 3637). The surface soil produced evidence of Roman activity, but at a lower level disturbed human remains were discovered, along with animal bone, flints, sherds of Peterborough Ware and two fragments of Beaker pottery. These burials indicate that there was a community living nearby in the late Neolithic or early Bronze Age. The potential for further prehistoric activity in the vicinity of the cave is therefore relatively high. In addition, several Neolithic stone axes have been found in the area, including one found at Crow Nest Farm in Lawkland, 1.5km to the east of the site (DSMR 3641).

The village of Lawkland (DSMR 24153) is mentioned in the Poll Tax Returns for 1379. The village is a linear settlement largely made up of farmsteads and there are indications that the village was once larger (MON 44801). There is a record of 'distinct' remains of houses standing beside Lawkland Green, just outside the Giggleswick parish boundary, and a tradition that these buildings were destroyed by a Scottish raiding army in the early fourteenth century (Network Archaeology Ltd 2005a).

The site of a possible building of an undetermined date, identified from an aerial photograph during the ADBA, was located at the southern limit of the current plot (DBA: DAM).

9.21.3 Site description

An area 35m north to south by 49m east to west was set out in 10m grid squares, and features within this area were then cleaned, photographed and planned prior to investigation.

Phase 1

A linear feature, [grp. no. 17017], measuring 45m in length and 2m wide, was aligned east to west. A 10% sample of this feature was investigated by hand excavation of four slots. These revealed a shallow profile with irregular, gently sloping sides and a flattish irregular base with a maximum depth of 0.23m.

Phase 2

This linear feature was cut by two modern mole drains, [17014] and [17018], which were aligned north-east to south-west.

Unphased

A 1m-wide slot aligned east to west was hand excavated through the central area of stone spread (17000), which measured 12m long by 11m wide, and up to 0.2m thick. The deposit consisted of limestone and sandstone fragments of random size and shape in a matrix of dark grey friable silt (plates 61 and 62). Fifteen to twenty percent of these stone fragments bore signs of having been subjected to heat. Layer (17000) contained slight traces of charcoal, cinder, unburnt coal and abraded red brick fragments; the only find retrieved from it was a large horseshoe. Below this layer, subsoil deposit (17008) was a dark brown to black silt with a slight peat content, up to 0.3m thick, which filled hollows in the boulder clay substrate (17007) and sealed the earlier features.

9.21.4 Analysis potential

No dating evidence was recovered from linear feature [17017]: no further work is envisaged.

Burnt deposit (17000) was initially thought to have been the remains of a burnt mound similar to that excavated in Plot 21-10, but its stratigraphic position, overlying a subsoil containing brick fragments and a large iron horseshoe, indicate that it was simply a post-medieval or modern levelling deposit: a cartload of stones tipped into a hollow or poorly drained patch in a field. There is also a possibility that it represents a demolition deposit from the putative building located during the ADBA.

The extremely limited excavation results present no potential for further analysis.

9.22 Plot 36-3: Kettles Beck

Lawkland parish; 156 NAL; NGR 374921 467253; Figures 2e, 18, 18a; Plates 63 and 64.

Summary

A small kiln was exposed in one of three evaluation trenches close to a bank and ditch that were still visible as a surface earthwork. The bank and ditch post-dated the subsoil, and were interpreted as part of a post-medieval field boundary; the kiln was sealed by the subsoil, but could not be further dated.

9.22.1 Location, topography and geology

The site was located near the confluence of the Kettles and Austwick Becks; the Kettles Beck forms its south-western boundary, while it is bounded to the south-east by Fummerber Lane. The DBA recorded oxbow lakes, relict meanders of the Kettles Beck, along the site boundary (DBA: DCZ, Network Archaeology Ltd 2005a). The land slopes gently south and west towards the becks from a high point of 136m AOD on its north-eastern edge.

The topsoil in Plot 36-3 was a light to mid-greyish-brown silty loam, varying in depth from 0.05m to 0.36m. The depth of the orange sandy silt subsoil also varied greatly, ranging from 0.03m to 0.41m. The underlying natural drift geology was stony dark grey boulder clay.

9.22.2 Results from earlier stages of work

The desk-based assessment recorded rectilinear enclosures (DBA: CBY) of undetermined date, plotted by the National Mapping Programme; the field reconnaissance noted earthen banks interpreted as redundant field boundaries (FSU: 044) and ridge-and-furrow earthworks (FSU: 045), both in poor condition. These earthworks were also noted by the watching brief maintained during the topsoil strip.

9.22.3 Site description

Three evaluation trenches (nos. 95-97) were excavated; Trench 95 had to be repositioned, as live services were encountered. Archaeological features were recorded in Trench 96; the other two trenches were archaeologically sterile.

Phase 1

The natural boulder clay was cut by feature [2007], a circular pit 3.0m in diameter and 0.45m deep, with a tapering extension, 0.45m wide, running 5.3m from its north-western side to form an overall teardrop shape (fig. 18a). The feature was interpreted as being a kiln, with the extension forming a flue. This was 0.73m deep, 0.28m deeper than the central part of the feature (plate 63). The full extent of the feature was exposed.

At the base of feature [2007] was a thin layer of mid-brown silt, (2012). This was sealed by fill (2011), a mixture of charcoal and heat-affected clay with fragments of heat-affected limestone. Above this fill was a small deposit of compact blue and yellow clay, (2010); this was in turn sealed by a second, thinner layer of burnt material, (2009). The closing fill, (2008), was a sandy, yellowish-orange deposit 0.30m deep, with abundant charcoal and fragments of sandstone. A number of large, unworked limestone blocks were scattered throughout the kiln feature, chiefly within upper fill (2008). The blocks were at a variety of angles, flat, slanting and upright, indicating that they had been tipped in as a load or had fallen from a demolished structure (plate 64). The kiln feature was sealed by subsoil (2002).

Phase 2

Directly to the south-east of the kiln was a linear feature comprising a north-east to south-west aligned bank and ditch (fig. 18). The bank, which was recorded in the section of the excavated trench, was up to 0.46m high, and was made up of compacted orange silt and fine sand (2003),

overlying a small deposit of light grey silt and coarse-sand, (2006). The bank material overlay subsoil (2002), and could be seen on the surface as a slight earthwork. Ditch [2004] ran along the south-eastern side of the bank, cutting subsoil 2002; it was 3.40m wide, but survived to a depth of no more than 0.25m, and could also be seen as a shallow earthwork. Its fill, (2005), was heavily disturbed by the cut of a modern field drain.

9.22.4 Analysis potential

No stratified finds were retrieved from Site 36-3; unstratified finds included three worked flints, for which only a general Neolithic to Bronze Age date range could be given, and single sherds of medieval and post-medieval pottery.

The stratigraphic position of bank and ditch, (2003) and [2004], suggests that they were post-medieval features, probably part of a field boundary laid out during the process of enclosure in the late eighteenth or the nineteenth century. The small kiln, [2007], could not be dated, nor could its function be ascertained. The potential for further analysis of this site is very limited.

9.23 Plot 50-2: Backland Wood

Melling with Wrayton parish; 59 NAL; NGR 361464 471109; Figures 2e, 19, 19a; Plates 65 and 66.

Summary

A spread of burnt stones containing a prehistoric flint knife was identified adjacent to the beck in this plot, during the watching brief on topsoil stripping. The feature was provisionally identified as a prehistoric burnt mound, and subjected to recording and sample excavation to determine nature and depth of deposits.

9.23.1 Location, topography and geology

Plot 50-2 was located in the hilly land between the Rivers Greta and Wenning, both tributaries of the River Lune, 1.7km east of Melling and 1km north of Wennington. The site lies sunken in the landscape, at a height of approximately 70m AOD, with marginally higher ground surrounding it. The site was located on moderately drained level ground, adjacent to a small stream.

The topsoil was a humified, friable, greyish-brown silty loam with common poorly sorted angular and sub-angular sandstone inclusions. The underlying drift geology was a firm, light brownish-orange clay loam with common angular and sub-angular pebbles and stones.

9.23.2 Results from earlier stages of work

Ancient and post-medieval woodlands are found north-east of Wennington, along the River Greta. Chance finds of tools and weapons of the Neolithic and Bronze Age are recorded. In the western section of the study corridor, a stone axe-hammer was found at High Moor Close near Hornby Park in Melling during ploughing, in or around 1821 (LSMR 1189).

A depression adjacent to the Roman Road at Old Wennington Farm is thought to represent a prehistoric hut (LSMR 2665), and there is a possible prehistoric settlement at Bull Bank Farm, Wennington (LSMR 2667), with evidence of three possible huts, two of which are extremely large.

9.23.3 Site description

A spread of burnt stones, extending over an area measuring 10m north to south and 6.5m east to west, continued beyond the available excavation area to the south-west, so was not fully exposed in plan (plate 65). The excavation area was divided into 5m grid squares, cleaned, photographed and planned, prior to sample excavation by two hand-excavated slots (fig. 19a; plate 66). The first of these was 6m in length and 1m wide, aligned north-east to south-west.

This slot revealed the spread of burnt stones, (18001), to be a deposit of randomly sized and shaped sandstone fragments within a matrix of charcoal-rich soft silt, filling natural hollows in a boulder clay substrate, (18002). Layer (18001) increased in thickness from 0.05m at the north-east to 0.35m at the south-west, where it filled a sub-circular feature, [18009]. This had sloping sides, steepest on the east side, and a fairly flat base.

A second slot, aligned north-west to south-east and measuring 3.8m long by 0.50m wide, was then excavated at a 90 degree angle to the first. Again, this showed the burnt stone layer, (18001), filling natural hollows. The burnt layer was revealed to be 0.42m thick in this slot, and had been cut by two intersecting land drains, [18003] and [18008]. The primary mound material also produced a scaled flint knife, suggestive of a late Neolithic or Bronze Age date for the mound.

9.23.4 Analysis potential

The burnt spread, consisting of heat-affected stones within a charcoal rich silty matrix, exhibited the characteristics of a burnt mound. A typically late Neolithic or Bronze Age flint knife was recovered from the mound material. The date of this artefact begs comparison with the date of the Beaker pottery recovered from the basal spread of the burnt mound at Turnbers Hill (see above). It remains to be established whether both sites pre-date the middle Bronze Age. Charcoal samples recovered from the base of the burnt spread may date its initial period of use, although the charcoal in them was comminuted, and so not in an ideal state for returning a reliable date.

The position of modern boundaries puts this site 2km within the county of Lancashire, where few burnt mounds have been recorded (Peter Iles *pers. comm.* and Hodgson and Brennand 2006, 44). However, its topographic location may allow it to be seen as an outlier of the more numerous Pennine examples, although it is rare enough for these to be excavated (Laurie 2003, 246). It has been suggested that burnt mounds may be a relatively common feature-type, but because they were typically overlooked and left un-dug until recently, archaeologists have been slow to appreciate this (Maise Taylor, *pers. comm.*). A forthcoming survey of burnt mound sites by University of Leicester Archaeological Services will inform a new understanding of their prevalence (ULAS in prep.).

Due to its location and the fact that it has been excavated, this site may be considered of regional importance, especially if it proves to be of early Bronze Age date.

The sub-circular pit below the centre of the spread showed no sign of silting or accumulation of earlier deposits in its base, and its fill was indistinguishable from the overlying spread. Assuming that this pit was a deliberately dug feature, it would represent a single event or multiple uses close together, with the burnt material probably having been dumped on top of the pit soon afterwards. Alternatively, the irregularity of the pit feature where it could be seen within the excavation area suggests that it may be no more than a natural hollow.

The landscape nearby is typical of those associated with other excavated burnt mounds, with a watercourse and ancient woodland close by. Species identification of the charcoal from the mound may shed some light on the type of fuel resources being used and woodland management practices. Further evidence from radiocarbon dating is required to determine if the two burnt mounds found on the pipeline are contemporary.

9.24 Plot 54-2: Gressingham

Gressingham parish; 32 NAL; NGR 357006 469646; Figures 2f, 20; Plate 67.

Summary

A boundary ditch containing three large iron cauldrons was found in Plot 54-2. These vessels may have had an agricultural or industrial use, judging from their location within a former field boundary and the artefacts and industrial residues found with them.

9.24.1 Location, topography and geology

Plot 54-2 was located directly to the south of the village of Gressingham, on high ground, at c. 40m AOD, above the north side of the valley of the River Lune. The plot is bounded to east and west by historic hedgerows, recorded as B34 and B36 in the field reconnaissance survey.

The topsoil in Plot 54-2 was shallow, no more than 0.12m deep, and was a mid-brown sandy silt. There was no distinct subsoil layer in this plot. The natural drift geology was sandy silt.

9.24.2 Results from earlier stages of work

The Anglo-Saxon origins of Gressingham are suggested by fragments of a pre-Norman cross, found in the churchyard or within the masonry of the present church (LSMR 571). The church itself has a twelfth-century doorway, but is otherwise post-medieval (LSMR 569).

Neither the desk-based assessment nor the field surveys located any known or potential sites within or bordering on Plot 54-2. The closest known site is Loyn Bridge (SM LA 60), believed to be of sixteenth century origin, which carries the Hornby-Gressingham road over the River Lune. On the far side of the river are the earthworks of an early post-Conquest motte and bailey castle, Castle Stede (SM 13413).

9.24.3 Site description

The site was identified during the watching brief on the topsoil stripping. The boundary ditch was noted, and a number of ferrous objects were observed; subsequent hand-cleaning revealed one of these to be a large iron cauldron. Further excavation uncovered a further two cauldrons, a beer bottle and wooden plank within the vicinity.

A linear feature, [21005], measuring 7m in length and 2.8m in width was revealed during topsoil stripping, emerging from the southern edge of the easement (fig. 20). Investigation of this feature found that it was cut into the natural drift geology, (21009), and was filled with a brown silty deposit, (21008), with early twentieth century pottery and glass inclusions, and a large cauldron (SF 21000).

A 0.7m wide slot, positioned so that the cauldron could to be recorded in section, was excavated through the ditch. In doing so, another cauldron (SF 21001), of similar proportions (0.35m by 0.35m by 0.3m) and heavily rusted state of preservation, was found immediately to the south of the first. Traces of black pitch were found fixed within the cauldrons. Below this, within the same ditch fill, was a glass bottle (SF 21002) (plate 67).

Against the southern edge of the easement, the boundary ditch appeared to have been heavily truncated by the placement of a sheep trough. This was embedded within a widespread concrete layer, which was laid on a hardcore layer, located just outside the easement.

A third cauldron was observed to the south of the two described above; however, this was very poorly preserved.

The alignment of the linear feature [21005] is continued by a line of trees to the south of the easement, indicating that it was once part of a longer field boundary.

9.24.4 Analysis potential

The finds from the ditch indicate that it was backfilled in the early to mid-twentieth century; it is unlikely that the cauldrons were deposited much earlier than this. The residues within the cauldrons provide an indication of their use before they were deposited: pitch is primarily used to render wood waterproof, for any number of purposes. The cauldrons were found just 200m south of the edge of the village of Gressingham, with other buildings and farms in close proximity, and it was in this local agricultural context that they were probably used.

The presence of three cauldrons adjacent to each other within a boundary ditch may have a prosaic functional interpretation, or may be evidence of a local agricultural tradition or superstition. Iron Age parallels are known for three cauldrons being found together (Winterburn 2009) and the motif had significance in the early medieval period, as well as to modern occultists (Laurie 1996). Although there might be an interesting story behind the deposition of these vessels, the modern date of the field boundary ditch means that any further analysis could not be justified, and the cauldrons were discarded following assessment.

9.25 Plot 56-7: Whinney Hill

Halton with Aughton parish; 14 NAL; NGR 354534 467904; Figures 2f, 21, 21a; Plates 68-70.

Summary

A field kiln was excavated in Plot 56-7. No datable material was retrieved during the excavation. Information provided by relevant specialists may indicate the precise use of such a kiln.

9.25.1 Location, topography and geology

Plot 56-7 was located midway between Gressingham and Nether Kellet, above the north side of the valley of the River Lune. It is within the catchment of the Lune and, because of the nature of the Carboniferous Limestone, a number of streams and becks in the immediate area run underground for parts of their courses; an above-ground stretch of the Whinney Beck forms the south-eastern boundary of the plot.

The mid-brown silty topsoil in Plot 56-7 was up to 0.23m deep, and directly overlay the natural drift geology, yellowish-brown silty clay with sandy lenses and laminations of grey shale.

9.25.2 Results from earlier stages of work

The desk-based assessment noted standing ridge-and-furrow earthworks on the site, identified from aerial photographs (DBA: DCC). The presence of the ridge-and-furrow, which extends westwards into Plots 56-8 and 56-9, was confirmed by the field survey (FSU: 002). No sites or findspots were recorded in the area, and no evaluation took place in this plot.

9.25.3 Site description

The site was identified during the topsoil strip. One field kiln was noted, and a thorough clean of an 8m by 8m excavation area around the feature revealed a flue (plate 68). The kiln was partially excavated and the flue was fully excavated (fig. 21a).

The cut of the kiln pit, [20001], was marked by a sub-circular ring of fired natural boulder clay, (20025), measuring 4m in diameter. The heat-affected silty boulder clay was yellowish-brown, changing to a dark red below the topsoil and becoming successively crumbly and orange, and greyish-black towards the base of the cut.

The initial excavation strategy for the kiln was to remove opposite quadrants, but this was modified when the presence of a field drain became apparent, and a decision was then made to excavate the south-western half of the kiln (plate 69). The cut for the kiln was quite steep sided to a depth of 0.5m. It then had a shoulder and, below that, a more gradual slope, before returning to a steeper profile. The feature had a flat base and was 1.35m deep.

A linear feature, [20005], 1.2m in length and 0.9m wide, was located on the south-eastern edge of the kiln, cut into the natural boulder clay (fig. 21a; plate 70). On excavation, this feature was shown to have very steeply sloping sides and a flat base, at a depth of 1.1m, and to be contemporary with the kiln. This linear feature was interpreted as a flue.

The primary fill of the kiln, (20023), was a 0.18m thick, dark brown, spongy organic deposit. A mixed deposit of bluish-grey sticky silty clay, (20021), and greyish-brown sticky silt (20024), lay over this. These deposits were then sealed by a soapy yellow silt, (20003). This sequence of events has been interpreted as a backfill of organic fuel, together with residual deposits associated with the kiln use, becoming sealed by silting deposits (fig. 21a i).

A similar stratigraphic sequence was observed during the excavation of the flue. Fibrous peat, (20016), formed the primary fill, on which a number of backfills were sealed by a soapy orange silt (20010) (fig. 21a ii).

No finds were recorded from either the kiln or the flue. Samples of the organic primary fill of the kiln and heat-affected boulder clay were taken, in the hope that material recovered may be used to date the kiln and indicate the function.

9.25.4 Analysis potential

Very little evidence regarding the use of the kiln remained within the kiln itself. However, with such a high proportion of the earlier fills being organic, it has been suggested by a regional specialist that it may have been used for the production of potash (D. Johnson, *pers. comm.*, 2007).

No finds were found in association with the kiln or flue, and relevant samples taken from the fills have provided insufficient material with which to date it.

Shortcomings exist in the current understanding of the distribution, form and use of kilns on a regional basis. One other possible potash kiln was excavated near Otley (see section 9.5), in association with a large medieval and post-medieval stone building. Potash may have been produced locally for use as a fertiliser.

10 ASSESSMENT OF POTENTIAL AND UPDATED PROJECT DESIGN

10.1 Introduction

The main sites identified during the investigations and described in detail in the previous section, can be summarised as follows:

- a Mesolithic flint scatter: although this consists of no more than 34 unstratified pieces, sites of the period are regionally rare, so this site is considered to be of greater than local significance;
- a Neolithic or Bronze Age ring cairn, considered to be of at least regional significance;
- two prehistoric burnt mounds, potentially of regional significance;
- the remains of a Bronze Age structure, possibly a timber building, considered to be of regional significance;
- a probable example of prehistoric rock art, of greater than local significance;
- a Romano-British settlement site consisting of activity platforms and round houses, with possible evidence late Iron Age activity: this is of regional significance, especially so if evidence of early medieval occupation is confirmed;
- a portion of Romano-British field system, of at least local significance;
- a medieval ironworking site of greater than local significance;
- evidence of medieval occupation on the site of a post-medieval stone-built farmhouse, considered to be of greater than local significance;
- seven field kiln sites, mostly undated but probably post-medieval: individually of local significance but their importance may be enhanced by considering them as a group;
- the sites of two post-medieval buildings, probably field barns or longhouses; of local significance;
- a post-medieval brick clamp site, of local significance.

This section considers, by period, the potential for further analysis and study of the sites by assessing the quantity and quality of the data in relation to local research themes. Specific recommendations necessary for the pursuit of these themes are also presented.

10.2 Updated research aims and objectives

The wide-ranging desk-based and field investigations carried out during the project were designed, as far as possible, to address relevant research priorities and to identify analysis potential. The results of one stage of work were used to inform strategies for subsequent stages.

The pipeline traversed a mainly upland rural area that has been relatively untouched by the ‘boom’ of developer-funded archaeology that has occurred elsewhere in the country. The remains uncovered are therefore generally significant in terms of the rarity of excavated evidence in the region, and in their group value, as they span a range of periods and represent a variety of topographic settings. Linear projects generate a quantity of chronologically and spatially disparate data that, through its breadth and variety, contributes to an overview of regional change across time periods.

However, much of the value of the excavated data lies in its potential to contribute to *particular* period-based research issues. The purpose of this chapter is to state these issues, and to evaluate the quality of the archaeological data in relation to them.

The original research aims of the project were very broad. Following completion of fieldwork they have been updated following a consideration of the sites excavated, a review of published research agenda and relevant period-based discussions, as well as recommendations following specialist analysis.

The following written sources were consulted:

- Brennand, M. (ed) 2007. Research and Archaeology in North West England: An Archaeological Framework for North West England. Volume 2: Research Agenda and Strategy. Archaeology North West Volume 9/19²
- English Heritage Archaeology Division. 1997. Research Agenda (Draft 8th April 1997)
- Gomersall, H. 2005. Research Agenda: Industrial Archaeology. Research Agenda produced in conjunction with the West Yorkshire Archaeology Advisory Service. Issue 1
- Haselgrove, C. et al 1999. Understanding the British Iron Age: an agenda for action
- James, S. and Millet M. 2001. Britons and Romans: advancing an archaeological agenda, York: Council for British Archaeology (Research Report 125)
- Perring D, 2002, Town and Country in England: frameworks for archaeological research, York: Council for British Archaeology (Research Report 134)
- Sanderson, I. and Wrathmell, S. 2005. Archaeology from the end of the Roman period to the Norman Conquest. Research Agenda produced in conjunction with the West Yorkshire Archaeology Advisory Service. Issue 1
- Vyner, B. 2008. The Neolithic, Bronze Age and Iron Age in West Yorkshire. Research Agenda produced in conjunction with the West Yorkshire Archaeology Advisory Service. Issue 1.

10.3 Mesolithic: c. 8000 BC-4000 BC

A collection of 34 struck flint artefacts was recovered from the topsoil heap during the watching brief in Plot 31-2, Wham (Rathmell parish). Mesolithic artefacts are rarely encountered, and multiple finds are rarer still. The locations of the foci of hunter-gatherer activity in the region are poorly understood, and this assemblage will contribute to understanding the distribution of such sites, particularly when considered in relation to the surrounding topography. Technological aspects of the assemblage will contribute to the emerging understanding of the characteristics of Mesolithic flintworking in the region.

10.3.1 Recommendations

- The importance of the flint assemblage from Plot 31-2 should be assessed further in relation to other known sites and its general topographical situation. Consultation of the

² Consulted following initial formulation of recommendations

results of the results of the Yorkshire Dales Hunter-Gatherer Research Project may establish comparisons in flint forms and dispersal.

- A short note on the Plot 31-2 flint assemblage should include illustrations of four of the artefacts.

10.4 The second and third millennia BC

A wide variety of remains currently dated to the late Neolithic to mid Bronze Age were encountered on the pipeline. These consist of:

- a boulder with a decoration of cup marks (Plot 15-8, Embsay, Embsay with Eastby parish)
- a horseshoe-shaped feature, probably structural, with associated stratified environmental remains, ten fragments of Collared Urn pottery and an associated assemblage of 22 pieces of worked flint and chert (Plot 19-1, Thorlby Springs, Stirton with Thorlby parish)
- a burnt mound with two wood-lined pits, the timbers of one being in relatively good condition, and pieces early Bronze Age Beaker pottery (Plot 21-10, Turnbers Hill, Broughton parish)
- a possible ring cairn (Plot 21-18, Bank Newton, Martons Both parish). The cairn and its immediate environs produced a large corpus of animal bone and small assemblages of pottery, worked stone and struck flint.
- a burnt mound containing a prehistoric flint knife (Plot 50-2, Backland Wood, Melling with Wrayton parish). Environmental samples were taken from the burnt mound, but did not reveal anything worthy of further analysis.

The further analysis of these remains will inform the emerging understanding of:

- the spatial and temporal variability of the various prehistoric activities represented
- the differential exploitation of the various landscape zones represented
- the locations and regional manifestation of prehistoric monumentality
- the technological and social developments that occurred during the period
- resource availability and trade connections that existed within the region, and how these may have contributed to interaction between, and development of, different communities
- the prehistoric diet, particularly the relative importance of farmed and wild resources, and the broader implications of the palaeoenvironmental evidence for our understanding of the ancient landscape

10.4.1 Recommendations

Pottery

- The prehistoric pottery corpus from the PNK pipeline comprises a small assemblage of twelve vessels from three different sites. The publication of the pots and discussion of their associated finds will add to the knowledge of Beaker pottery and particularly of Collared Urns in the region.

- Comparative material should be sought in the locality and in the region, in order to further understand the assemblages and place them within their local and regional contexts. Dating for comparative pottery should be sought in order to better understand the pottery from these sites.
- The fabrics of the pottery should be investigated by thin section analysis, and it is recommended that three thin sections and a summary report would be required. This will clarify the type of shell and other inclusions used for tempering, and will assist understanding of the technology and potting traditions on this site, and may indicate trading connections.
- The fabrics should be quantified and qualified, as this would add considerably to the ongoing study of pottery fabrics of all these periods in this area. It should be possible to determine whether different fabrics relate to different vessel styles, and whether the pottery fits within a regional pattern, or is part of a less familiar tradition.
- Twelve vessels, each represented by only a few sherds, should be illustrated from this assemblage.

Flint

- Further analysis would not increase our understanding of the flint finds from Plots 13-9, 19-1, 21-18 and 50-2. It is recommended that a brief description of the assemblage is included from Plot 19-1. A short note on the flint assemblage from Plot 13-19 could be supplemented by an illustration of the flint core, and that from Plot 21-18 with illustrations of three pieces. The flint knife from Plot 50-2 should also be illustrated.

Stone

- Publication of stone artefacts from Plot 21-18; three finds should be illustrated for publication: modified natural ovoid pebbles SF 477 and SF 491, and sandstone disc SF 512.

Environmental

- Separation of charcoal fragments >2mm from 6 samples from the site on Plot 19-1, for species identification and analysis, is recommended. This may pinpoint a higher density of material suitable for dating purposes, as the macrofossil assemblages potentially suitable for AMS dating were very small.
- Separation of charcoal fragments >2mm from three samples from the burnt mounds in Plot 21-10 and 50-2 is also recommended. This should aid species identification and analysis, with a view to potential dating.

Dating

- AMS dating of the cereals, grains and nutshell fragments from seven contexts from the Bronze Age site on Plot 19-1 should be carried out, and the comminuted charcoal from Plot 50-2.

10.5 The Iron Age and Roman period: c. 1000 BC-AD 410

The multi-period site in Plot 21-18 is currently believed to have contained a late Iron Age phase. The importance of these remains lies in the general regional rarity of excavated sites from this period, and the opportunity to investigate relationships with preceding and later archaeological phases.

Slight Roman remains consisting of a ditch, a small circular pit with burning and a residual glass bangle in a later feature were recovered from the eastern end of the pipeline, at Plot 3-5 (Farnley Lake, Farnley parish). It was, however, Plot 21-18 that produced the most extensive remains of Romano-British activity. Circular structures, linear features, stone platforms and quantities of quernstones were excavated. These finds ranged from simple saddle querns,

common during the prehistoric period, to more sophisticated rotary querns and millstones of the Romano-British period. The site produced a well-dated, late second-mid-third century pottery assemblage, of rather higher status than normal for rural settlements in the region. This group is unusual for a rural pottery corpus in having a relatively narrow date range. It also includes traded wares which have a well-established date range, and can thus be used to establish the date range of some of the South Yorkshire types also found on the site. Whilst sites with Romano-British material culture are quite well-represented in the material record, especially in comparison with the prehistoric and sub-Roman periods, few well-stratified sites in the region have been excavated using modern techniques. The remains excavated therefore offer the chance to consider:

- the character and date of the structural elements and finds assemblages present
- the agriculture, diet and landuse throughout the period
- whether the site was an open or enclosed settlement, and how it may have related to any nearby relict field systems
- how the site related to the pre-existing ring cairn, and determine the degree and nature of continuity with the Romano-British settlement
- the timing and extent of the adoption of Romanised material culture
- trade and exchange, particularly through detailed examination and sourcing of the pottery assemblage
- whether the querns indicate that this was an arable “production site” generating a surplus for use in the Roman monetarised economy
- how the developmental trajectory of this rural settlement differed from those located closer to forts, towns, villas and roads
- the resolution of the typological form and chronology of artefacts, especially the pottery.

10.6 Early medieval: c. AD 410-850

Pottery from Plot 21-18 has been tentatively interpreted as Anglo-Saxon or Anglo-Scandinavian (although the majority of this was recovered from contexts that also contained Romano-British material). Should the suggested dating of this material be correct, then this would be a significant discovery that would be able to inform the emerging understanding of the spatial and temporal variability in post Roman or early medieval occupation, the nature of such activity, and the degree to which this was influenced by preceding settlement foci. There would possibly also be an interesting opportunity to investigate the enduring use of Romanised material culture in the post Roman period.

10.6.1 Recommendations

- Absolute dating of material associated with the putative early medieval pottery
- Thin section analysis of the pottery irrespective of its date

10.7 Medieval: c. 850 - 1550

Excavated remains from this period consist of:

- the possible remains of a fourteenth-century building from Plot 7-18 (Scales, Askwith parish)
- an ironworking site dated to the fourteenth to sixteenth centuries with a bloomery and a forge from Plot 8-5 (Denton Moor, Denton parish). Some 115kg of slag were retrieved from this site. The residues are dominated by materials produced during iron smelting in a large slag-tapping bloomery furnace.

Two kilns, of possible medieval date, were also excavated in Plot 15-1 (Halton East parish) and Plot 36-3 (Kettles Beck, Lawkland parish). In addition to these sites, various medieval earthwork features were also recorded along the course of the pipeline, including ridge-and – furrow and field boundaries, both relict and extant. Further analysis will therefore be undertaken in order to contribute to the emerging understanding of:

- rural settlement patterns and village morphology with particular regard to contraction and desertion
- the development of open-field agricultural systems, the character and spatial distribution of medieval boundaries, and changes over time to pastoral and arable regimes
- architectural development from the medieval into the post-medieval period, with particular regard to two-cell rectilinear structures
- the regional development and distribution of metalworking, and changes in industrial techniques and infrastructure over time.

10.7.1 Recommendations

Pottery

- Further study of the medieval pottery from Plot 7-18 is necessary, including a search for fragments of the same vessels scattered among different fills or features, and illustration and analysis of significant vessels, in consultation with a local specialist.
- Thin section and chemical analysis of forty-eight samples of the medieval pottery from Plot 7-18, to investigate the sources of the Upper Heaton and Askwith vessels.

Industrial residues

- The survival of a large quantity of slag within the remains of the furnace in Plot 8-5 provides an excellent opportunity to examine the chemical reactions taking place in such a furnace. This site has a high potential for producing important additional information on the smelting technology and materials employed, and this requires further study.

Stone

- Preparation of a publication report for the stone objects from Plot 7-18.

Dating

- Further analysis and dating of sample <1374> from kiln pit fill (11059) from Plot 8-5.
- AMS dating of charcoal retrieved from samples <204> and <206> from kiln pit fill (8010), from Plot 15-1.

10.8 Post-medieval to modern: c. 1550 onwards

The most significant of the excavated remains from this period consist of:

- three brick clamps, containing both fired and unfired bricks, from Plot 6-7 (Brick House Farm, Weston parish)
- a large stone-built farm from Plot 7-18 (Scales, Askwith parish), occupied from the sixteenth to the eighteenth centuries, with a large and significant assemblage of pottery and other artefacts
- a seventeenth-century field barn or longhouse from Plot 13-19 (Halton, Draughton parish)
- a seventeenth to eighteenth-century field barn or longhouse from Plot 34-5 (Lawkland Green, Lawkland parish).

In addition to these sites, many earthwork features, including ridge-and-furrow and field boundaries, were recorded along the length of the pipeline. Boundaries dated from the period of Parliamentary enclosure, often including stone walls, were particularly numerous. The sum assemblage of remains from this period offers the chance to investigate:

- how and why the landscape developed as it did during the post-medieval period
- the development of vernacular architecture
- expressions of status through material culture and diet in the region, particularly with regard to changes generated by the Industrial Revolution
- the character and date of forms of industrial remains in a rural, as opposed to urban, setting
- the changing scale of industrial activity, and the changing market for these products, e.g. domestic to commercial
- the relationships between rural industries, consumers, the improving transport network and the wider world, especially the expanding towns of West Yorkshire
- the relationship between changes in agriculture and the presence of rural and urban industries.

Further analysis of the artefact assemblages and the by-products of industrial processes will be undertaken not only to elucidate site-specific aspects, but also to contribute to the corpus of materials useful for future reference and analysis.

10.8.1 Recommendations

Pottery

- Further study of the post-medieval pottery from Plot 7-18 is recommended, including a search for fragments of the same vessels scattered among different fills or features, and illustration and analysis of significant vessels, in consultation with a local specialist.
- Thin section and chemical analysis of seventy-two samples of the post-medieval pottery from Plot 7-18 should be carried out, to examine the possibility that the supposed Sunderland Coarseware and Staffordshire-type slipware may have had a more local source.
- Re-examination of the eighteenth-century pottery from Plot 34-5, in order to ascertain the possibilities for further study, followed by reconstruction and illustration of a significant proportion of the vessels

- The pottery corpus from Plot 34-5 also includes eight distinct redware groups, based on method of glazing or decoration. To establish how many centres these were made at would require thin section and chemical analysis of a total of 48 samples.

Ceramic Building Material

- As brick manufacture is known to have taken place in the area, it is important to ascertain, via thin section and chemical analysis, whether brick or tile specimens found in Plot 6-7 are local or imported products
- Characterisation and comparison with the fabric of the bricks found in Plot 7-18 is also recommended to this end, as is characterisation of the remaining fabrics in the fabric series already established.

Special Finds

- Three iron objects from Plot 7-18 and one from Plot 13-9 should be illustrated.

Dating

- Radiocarbon dating should be carried out on sampled residues from the kiln in Plot 7-18.

11 DETAILED SUMMARY OF RECOMMENDATIONS

The purpose of this section is to present a detailed breakdown of the recommendations listed in the previous section. Recommendations have not been organised by period (as previously) but by the type of work that will be undertaken. The specialists and organisations that will carry out the work are identified in the sub-headings.

11.1 Dating (SUERC)

Up to 30 samples will be submitted for radiocarbon dating:

Table 5: Radiocarbon dating

Plot	Number	Possible samples	Purpose
8-5	5	1357, 1380, 1362, 1371	Date for bloomery furnace
15-1	2	204, 206	Date of field kiln
19-1	5	553, 560, 565	Dating of possible Bronze Age building
21-18	17	303, 322, 314, 309, 324, 330, 336, 340, 341, 342, 348	Dates for ring cairn, possible Anglo-Scandinavian pottery, horse bones
50-2	1	807	Date for burnt mound

11.2 Species identification (Palaeoecology Research Services)

A total of thirteen charcoal samples will be submitted for species identification:

- three samples from Plot 8-5
- six samples from Plot 19-1
- three samples from Plot 21-10
- one sample from Plot 50-2.

Table 6: Species identification

Plot	Context	Sample	Material
8-5	11007	1351	Charcoal
8-5	11038	1363	Charcoal
8-5	11058	1373	Charcoal
19-1	5142	554	Charcoal
19-1	5144	555	Charcoal
19-1	5151	556	Charcoal
19-1	5154	558	Charcoal
19-1	5138	561	Charcoal
19-1	5185	601	Charcoal
21-10	5259	622	Charcoal
21-10	5271	623	Charcoal
21-10	5278	625	Charcoal

11.3 Illustration (in house)

There are at least 39 artefacts to be illustrated, including:

- seven worked flints
- eleven Bronze Age vessels, of which three are decorated
- one Iron Age sherd of pottery
- three worked stone finds from Plot 21-18
- three worked bone finds from Plot 21-18
- five quern stones
- two iron objects from Plot 7-18
- one iron object from Plot 13-19
- a number of medieval vessels from Plot 7-18 (material to be selected and confirmed by the specialist, to be revised in the light of the success of joining sherds)
- a number of pottery sherds from Plot 8-5 (material to be selected and confirmed by the specialist)
- one composite iron and bone object from Plot 7-18
- one copper alloy object from Plot 21-18
- one glass object from Plot 3-5
- the key Romano-British vessels from Plot 21-18 (material to be selected and confirmed by the specialist).

Table 7: Artefacts to be illustrated

Plot	Context	Small Find	Material
13-19	5002	557	Worked Flint
21-18	10116	460	Worked Flint
31-2	23011	901	Worked Flint
31-2	23011	916	Worked Flint
50-2	18001	1605	Worked Flint
51-3	6110194		Worked Flint
56-9	23020		Worked Flint
19-1	5130 (1)		Prehistoric Pottery
19-1	5130 (2)		Prehistoric Pottery
19-1	5130 (3)		Prehistoric Pottery
19-1	5130 (4)		Prehistoric Pottery
19-1	5130 (5)		Prehistoric Pottery
19-1	5153		Prehistoric Pottery
19-1	5162	565	Prehistoric Pottery
19-1	5169 (1)		Prehistoric Pottery

Plot	Context	Small Find	Material
19-1	5169 (2)		Prehistoric Pottery
19-1	5169	567	Prehistoric Pottery
21-10	5259	601	Prehistoric Pottery
21-18	10049		Prehistoric Pottery
21-18	10226	477	Worked Stone
21-18	10215	491	Worked Stone
21-18	10441	512	Worked Stone
21-18	10219	466	Worked Bone
21-18	10054	457	Worked Bone
21-18	10029	510	Worked Bone
21-18	10099	503	Quern stone
21-18	10126	465	Quern stone
21-18	10424	504	Quern stone
21-18	10008	464	Quern stone
21-18	10248	473	Quern stone
21-18	10248	479	Quern stone
7-18	13001		Iron
7-18	13007		Iron
13-19	5001		Iron
7-18	tbc	tbc	Medieval Pottery
8-5	tbc	tbc	Medieval Pottery
7-18	13001		Composite
21-18	10219	453	Copper Alloy
3-5	7017	200	Glass
21-18	tbc	tbc	Romano-British Pottery

11.4 Samian analysis (Margaret Ward)

- Further analysis of the samian ware from Plot 3-5 (contexts 1011 and 7020) and Plot 21-18 (10049, 10051, 10106, 10126, 10304, 10375, 10424, 15068).

11.5 Mortarium analysis (Kay Hartley)

- Further analysis of the mortaria sherds from Plot 3-5 (context 7020) and Plot 21-18 (contexts 10049, 10051, 10064, 10106, 10120, 10126, 10252, 10248, 10424, 10439).

11.6 Cross-context medieval vessel joining (Jane Young)

- Cross-context search for joining sherds of medieval vessels from Plot 7-18 (contexts 13000, 13001, 13002, 13006, 13007, 13010, 13011, 13013, 13014, 13015, 13016, 13028, 13033, 13043, 13047, 13050, 13063, 13065, 13074, 13081, 13085, 13086, 13087, 13096, 13097, 13098, 13103, 13111).

11.7 Thin section and chemical analysis (TBC)

- Thin section and chemical analysis of the bricks from Plot 6-7
- Characterisation of the fabric of the bricks from Plot 7-18

- Thin section and chemical analysis of the medieval pottery (Northern Gritty and Humber ware) from Plot 8-5
- Thin section and chemical analysis of the potentially Anglo-Scandinavian sherds from Plot 21-18
- Thin section and chemical analysis of the pottery from Plot 7-18 appearing to be Sunderland coarseware
- Thin section and chemical analysis of Upper Heaton sherds from Plot 7-18 (material to be selected and confirmed by the specialist)
- Thin section and chemical analysis of Askwith sherds from Plot 7-18 (material to be selected and confirmed by the specialist)
- Compilation of extended reports on the medieval and post-medieval pottery from Plot 7-18
- Thin section and chemical analysis of Bronze Age pottery (material to be selected and confirmed by the specialist)
- Qualification of Bronze Age pottery fabrics, and the production of an extended report.

Table 8: Ceramic material recommended for Thin Section Analysis

Plot	Context	Small Find	Material
6-7	12002	451J	CBM
6-7	12002	451E	CBM
6-7	12002	451I	CBM
6-7	12007	452A	CBM
6-7	12007	452G	CBM
6-7	12007	452F	CBM
6-7	12007	452D	CBM
6-7	12010		CBM
6-7	12014	453C	CBM
6-7	12014	453A	CBM
6-7	12014	453D	CBM
6-7	12020		CBM
7-18	13002		CBM
7-18	13010		CBM
7-18	13030	450	CBM
7-18	13007		CBM
7-18	13043		CBM
7-18	13081		CBM
7-18	13111		CBM
8-5	11003		Medieval Pottery
8-5	11004		Medieval Pottery
8-5	11015		Medieval Pottery
8-5	11016		Medieval Pottery
8-5	11021		Medieval Pottery
8-5	11030		Medieval Pottery

Plot	Context	Small Find	Material
21-18	10049		Anglo-Scandinavian Pottery
21-18	10042		Anglo-Scandinavian Pottery
21-18	10008		Anglo-Scandinavian Pottery
21-18	10021		Anglo-Scandinavian Pottery
21-18	10058		Anglo-Scandinavian Pottery
21-18	10060		Anglo-Scandinavian Pottery
21-18	10034		Anglo-Scandinavian Pottery
7-18	13000		Sunderland Coarseware Pottery
7-18	13001		Sunderland Coarseware Pottery
7-18	13002		Sunderland Coarseware Pottery
7-18	13007		Sunderland Coarseware Pottery
7-18	13011		Sunderland Coarseware Pottery
7-18	13015		Sunderland Coarseware Pottery
7-18	13081		Sunderland Coarseware Pottery
7-18	13111		Sunderland Coarseware Pottery
7-18	tbc		Upper Heaton Ware Pottery
7-18	tbc		Askwith Ware Pottery
19-1	tbc		Prehistoric Pottery
21-10	tbc		Prehistoric Pottery
21-18	tbc		Prehistoric Pottery

11.8 Cleaning (Lincoln Conservation Lab)

Cleaning and identification of the currently unidentified Roman coin from Plot 21-18 (SF 487, context 10126)

11.9 Special finds: further research (Hilary Major/TBC)

Further research and reporting on the special finds from Plot 3-5 and 21-18 will occur, and a summary of all of the special finds from Plot 21-18 will be produced. These finds are detailed in the table below. In addition, compilation of a more detailed quern stone catalogue will be undertaken.

Table 9: Special Finds for further research

Plot	Context	Small	Material
3-5	7017	200	Glass
21-18	10219	453	Copper Alloy
21-18	10029	510	Worked Bone
21-18	10054	457	Worked Bone
21-18	10219	466	Worked Bone

11.10 Further analysis of wood (Maisie Taylor)

- Further study of the waterlogged wood from the burnt mound on Plot 21-10, with species identification and analysis of depositional elements (contexts 5256 and 5284).

11.11 Romano-British pottery analysis (Ruth Leary)

- Detailed analysis of Romano-British pottery from Plot 21-18 (contexts 10022, 10022, 10032, 10042, 10049, 10064, 10071, 10074, 10076, 10106, 10121, 10126, 10132, 10138, 10143, 10158, 10162, 10184, 10187, 10212, 10218, 10244, 10247, 10248, 10248, 10248, 10252, 10298, 10303, 10320, 10424, 10426, 10442).
- Comparison with other Romano-British ceramic assemblages in South and West Yorkshire
- Compilation of an extended, publication-standard report on the Romano-British pottery from Plot 21-18.

11.12 Analysis of fired clay (TBC)

- Characterisation of the possible local fired clay from Roman contexts on Plot 8-5 (context 11015)
- Analysis of fired clay in samples residues from Plot 19-1 (context 5193, SF 573)
- Analysis of fired clay in samples residues from Plot 21-10 (context 5259, SF 602)
- Characterisation of the white-firing clay from Roman contexts on Plot 21-18 (context 10321).

11.13 Identification and thin section of slag (Rod Mackenzie)

- Identification and thin section (if appropriate) of slag from the field kiln on Plot 7-18 (context 13092)
- Identification and thin section of slag (if appropriate) from the field kiln on Plot 12-4 (context 4034)
- In-depth analysis of the most significant material on Plot 8-5 and the kiln sites (material to be selected and confirmed by the specialist).

11.14 Further analysis of animal bone (Jennifer Wood)

- Calculations of minimum numbers of individuals from the assemblages should take place, to calculate accurate abundances of each species and remove bias caused by the presence of partial/complete skeletons
- Specific study of the equid remains from Plot 21-18, to identify the presence of horse or a possibly unknown species of pony
- Analysis should be carried out of materials with finalised phasing data, to check patterns across phases within the site and across the scheme, where possible
- Tooth wear and epiphyseal aging data should be analysed, to assess potential husbandry strategies
- Analysis of deposits and spatial arrangements should take place, to suggest any sequence or method to deposition, or location of activity areas

- Further identification of the unidentified fish and bird remains should be carried out to gain a full understanding of the complete range of consumed and utilised animals on site
- Animal bone materials from the environmental samples should be incorporated into the assemblage, to provide as full a picture of animal utilisation as possible
- Comparisons should be made with other similar assemblages both regionally and nationally, where data is available
- The archive record data should be reworked, to provide a suitable report for the smaller assemblages
- Further work on the animal bone from Plot 21-18 is required, to identify the assemblage of large mammal bone and the potential for the exploitation of the post-glacial gravels and 'bone beds'
- Reworking of the 2007 assessment report and incorporation of the archive with the previous year's work is recommended.

12 METHODOLOGIES

This section outlines the methodologies that will be used to further study the archive during the analysis stage.

12.1 Landscape methodology

In order to further examine the landscape and topographic setting of the excavated sites, data from the following sources will be considered:

- Ordnance Survey maps
- geological and soil maps
- the desk-based assessment
- relevant local studies and comparanda sites
- survey-stage data including geophysical survey, LiDAR, fieldwalking results and topographic survey
- NYCC Historic Landscape Characterisation data.

12.2 Stratigraphic methodology

Stratigraphic relationships contained in the drawn and written records have been checked and used, together with artefact dates, to generate preliminary phased matrices. For all of those sites for which further Stratigraphic analysis is planned, the following methodology will apply:

- matrices will be updated to take account of the results of the various specialist analyses
- the form and spatial patterning of dated and undated features will be compared, in order to attempt to provisionally phase any undated features
- functions of features and structures will be inferred through a consideration of the nature of associated artefacts and ecofacts, as well as comparisons with similar remains from elsewhere
- site and feature descriptions, and dating produced for the assessment, will be revised, taking the results of the analyses into account. Where needed to provide clarification of the text, detailed illustrations will be produced.

12.3 Artefactual methodology

Wherever possible, further analysis of the artefactual assemblages will be carried out by those specialists who carried out the initial post-excavation assessment. The specialists to be used are listed in the previous section.

12.3.1 Pottery and ceramic building materials

Further quantification of pottery, and recording methods, will be to the standards issued by the Prehistoric Ceramic Research Group (1997) or the Guidelines of the Study Group for Romano-British Pottery (Darling 2004), as appropriate.

Thin section and chemical analysis of artefacts will be undertaken according to standard techniques by the appropriate specialists. Local specialists may be invited to comment on certain assemblages, as some finds-types are not commonly encountered and are poorly understood.

Illustration of those artefacts recommended for such will be undertaken in-house. Illustration staff will work to the standards supported by the Association of Archaeological Illustrators and Surveyors, and will refer to reports for the artefacts in question. The relevant specialists will check the drawings before publication: any reasonable recommended revisions will be made.

The Roman pottery assemblage will be re-assessed, taking into account phasing and context data. Further detailed study of the assemblages from Site 21-18 will be undertaken: the samian ware and mortarium sherds will be further examined and categorised by appropriate specialists, while the pottery corpus as a whole will be compared with the ceramic assemblages recently retrieved from other rural settlements in West and South Yorkshire, including quantified groups from the Doncaster fort and vicus.

A large assemblage of medieval and post-medieval pottery was retrieved from Plot 7-18. A search for fragments of the same vessels scattered among different fills or features will be undertaken in order to refine the understanding of the date of the site, and the use of the pottery.

Several aspects of the heat-affected clay and ceramic building material collection have potential for further analysis. Characterisation of the white-firing clay found in Roman contexts in Plot 21-18 is will utilise thin section and chemical analysis, to ascertain whether it was imported as a specialised raw material or is of local origin.

As brick manufacture is known to have taken place in the area, it is important to ascertain, via thin section and chemical analysis, whether brick and tile specimens found in Plot 6-7 are local or imported products. Characterisation and comparison with the fabric of the bricks found in Plot 7-18 is also recommended to this end, as is characterisation of the remaining fabrics in the fabric series already established.

12.3.2 Worked Flint

A short note, with illustrations, will be published on the flint assemblages from Plots 13-9 and 31-2, and the flint knife from Plot 50-2.

12.3.3 Worked Stone

A more detailed catalogue of the quern stones will be drawn up, with particular reference to the better-preserved rotary querns, and a selection of the more distinctive material will be illustrated.

12.3.4 Animal Bone

Further analysis of the assemblage will be undertaken according to standard procedures, and with continued access to a reference collection and published guides. The minimum number of individuals from the assemblages will be calculated, and the material will be reassessed taking account of phasing and context data, to check patterns across phases and to identify any activity areas or possible placed or special deposits. Tooth wear and epiphyseal ageing data, where available, will be analysed to assess potential husbandry strategies. Collagen dating will be used on the unusually small equid bones identified on Plot 21-18, which will undergo further study to ascertain whether they represent a previously unknown horse type, or come from a mule or donkey. Comparisons may be sought with other similar assemblages, regionally and nationally, where data is available.

12.3.5 Worked Stone, Copper Alloy, Iron and Lead Objects, Glass

A number of objects have been selected for further work, consisting of researching parallels, preparing text and illustrations. All of the coins will be examined and identified by a specialist. The Roman glass bracelet from Plot 3-5 will be analysed further, as will the copper alloy objects from Plot 21-18 and the metal working residues from Plot 8-5, while the iron objects from Plot 7-18 and one object from 13-19 will be drawn for publication. In addition, thin sections of worked stone from Plots 19-1 and 21-18 will be undertaken. The results will be incorporated into report text, and illustrated.

12.4 Conservation

All metalwork will be repackaged into Stewart boxes and fresh silica gel will be used; further objects retrieved from environmental samples will be conserved where necessary.

12.5 Radiocarbon dating

It is proposed to use the SUERC to carry out Accelerator-Mass Spectrometer (AMS) dating on single-entity samples. Bayesian analysis of stratified sequences of dates will be carried out, if sufficient dates are obtained, using the OxCal programme.

12.6 Archive management

The project archive will be managed and prepared in accordance with the following guidelines:

- Guidelines for Finds Work (IFA 1999)
- Standard and Guidance for Finds and Ecofact Studies and Curation (IFA 1999)
- Guidelines for the preparation of excavation archives for long-term storage (United Kingdom Institute for Conservation 1990)
- Standards in the Museum Care of Archaeological Collections (Museums and Galleries Commission 1996)
- Selection, Retention and Dispersal of Archaeological Collections Guidelines (Society of Museum Archaeologists 1993)
- Guidelines for the Curation of Waterlogged Macroscopic Plant and Invertebrate Remains (Robinson 2008).

Craven and Harrogate Museums will receive the relevant integrated finds and documents archive in line with their requirements, which have yet to be agreed. Lancaster City Museum will, however, be provided with an archive list cataloguing the material from Lancashire which has been deposited in Yorkshire, as well as a copy of the client report.

An appropriate discard policy will be agreed with Craven and Harrogate museums, and implemented prior to deposition.

Network Archaeology Ltd will be responsible for arranging the signing of consent forms by landowners and for the transfer of title of artefacts to Craven and Harrogate museums.

The archive will include copies of electromagnetically stored or processed data, supplied on compact disc.

A client report based on the contents of this document supplemented by the full content of the specialist reports (see below) will be deposited with each of the four curatorial authorities that the pipeline passes through, as well as with the Craven, Harrogate and Lancaster museums.

Completed forms for each site will be submitted for inclusion in the Online Access to the Index of Archaeological Investigations (OASIS) (<http://oasis.ac.uk/>).

12.7 Reporting, publication and presentation

12.7.1 Client report and academic publication

It is proposed that the results are produced as a client report consisting of a draft of the formal publication text, together with the full content of the forthcoming specialist analysis reports. The client report will contain the full content of the specialist reports, which will enable the complete results of specialist analysis to be publicly available at the county Historic Environment Records. The client report will form the basis for the formal academic publication, the draft of which will be submitted to the publishing body for peer review and subsequent editing.

12.7.2 Report Structure

It is proposed that the publications include broadly the following chapters:

Foreword

Acknowledgements

Summary

Introduction

The Circumstances of the Project

The Contexts of the Pipeline Route

Geology and Topography

Historical and Archaeological Background

Prehistory

Mesolithic flint scatter: Plot 31-2, Wham

Ring cairn: Plot 21-18, Bank Newton

Two burnt mounds: Plot 21-10, Turnbers Hill; Plot 50-2, Backland Wood

Bronze Age structure: Plot 19-1, Thorlby Springs

Cup-marked boulder: Plot 15-8, Embsay

Roman Sites

The farm by the cairn: Plot 21-18, Bank Newton

Fragments of field system: Plot 3-5, Farnley Lake

Farm Houses and Field Barns

Plot 7-18, Scales: Site 1

Plot 13-19, Halton

Plot 34-5, Lawkland Green

Industry

Kilns

Plot 7-18, Scales: Site 2

Plot 12-4, Bolton Road

Plot 15-1, Halton East

Plot 15-8, Embsay

Plot 28-1, Rathmell

Plot 36-3, Kettles Beck

Plot 56-7, Whiney Hill

Brick clamp

Plot 6-7: Brick House Farm

Bloomery furnace

Plot 8-5, Denton Moor

Site descriptions will include excerpts from relevant specialist reports, to inform the results and enable the presentation of the most important data. However, it is not anticipated that all or even any of the specialist reports will be replicated in full in the final academic publication.

Figures, plates and tables will appear throughout the text.

Discussion

This chapter will aim to remedy the spatial and chronological disassociation of the sites by presenting a series of thematic discussions. Possible headings include:

Living Off The Land

Farming and landuse over time, wild resources, pastoral and arable agriculture

Mineral Resources

Kilns, clamps etc, their distribution, uses and lifespans. The inter-dependence of industry and forestry (fuel) and agriculture

Quarrying, from quern stones to quoins; limestone, gritstone and sandstone, their sources and uses

Rivers, Roads and Rail

Links to the outside world, imports and exports of produce, people and ideas

Life on the Aire

It may be possible, using the varied sites of this area (from Plot 15-1 to Plot 21-18) to present a brief tour of the valley through time and describe the changing experience of living there, investigating inter-relationships between alterations to the landscape and how it was used and viewed.

The changing use to which stone was put over time, from materials for monuments (rock carvings and ring cairns) and querns, for buildings and boundary walls, to limeburning, may offer an access to discuss these broader issues.

Bibliography

Appendices

In the client report, the appendices will include full and updated specialist reports. In the academic publication, abridged versions of the specialist reports for only the most significant finds groups (e.g. the pottery) will appear, along with any tables and catalogues etc too large to incorporate into the text.

It is currently intended that the academic report will be published by the Yorkshire Archaeological Society, possibly as a monograph within the Society's *Yorkshire Archaeological Reports* series. Specific findings on industrial and buildings may be produced within articles in the *National Industrial Archaeology Journal* and the journal of the Yorkshire Vernacular Buildings Study Group, should the results merit such treatment.

13 RESOURCES AND PROGRAMMING

13.1 Staffing

It is proposed that the following personnel be used during the analysis and reporting stages of work:

Network Archaeology personnel:

- Chris Taylor Senior manager
- Mike Wood Project management
- Patrick Daniel Post-excavation project officer; report writing
- Chris Casswell Post-excavation supervisor; report writing
- Richard Moore Report editing
- David Watt Report illustrations
- Susan Friend Archiving
- Adam Holman IT support

External specialists:

- Chris Cumberpatch Prehistoric pottery
- Ruth Leary Roman pottery
- Jen Kitch Animal bone
- Hilary Major: Prehistoric to Romano-British special finds
- Jane Young CBM, post-medieval pottery, medieval to post-medieval special finds
- Tania Holmes Flint
- Rod Mackenzie Production waste and coal
- Valerie Fryer Palaeo-environmental remains
- TBC Ceramic thin sections and analyses
- Andy Richmond Glass
- Margaret Ward Samian ware
- SUERC Radiocarbon dating
- Stephen Moorhouse Local historic/archaeological archives

- Phil Hudson Local historic/archaeological archives
- Roger Martlew Local historic/archaeological archives
- Tim Taylor Consultee to the YDNP
- David Johnson Industrial archaeology in Yorkshire

13.2 Programme

Presented below is a task list and schedule for the post excavation programme. It comprises four main activities: project management; analysis, academic publication; and archiving.

13.3 Task list

Table 10: Task list

Task	Staff Grade	Time/Days
PROJECT PLANNING		
Establish programme and schedule	PM	2
Produce costing	PM	1
Verify programme and schedule	SPM	0.5
SPECIALIST LIAISON		
Specialist liaison	PO (Finds)	5
Specialist liaison	PO	5
Update finds database from analysis reports	PO (Finds)	3
Residue analysis (to be submitted in recommendations for further specialist analysis table)	SPECIALIST	0
Additional prehistoric analysis and reporting (to be submitted in recommendations for further specialist analysis table)	SPECIALIST	0
Additional Roman analysis and reporting (to be submitted in recommendations for further specialist analysis table)	SPECIALIST	0
Additional medieval analysis and reporting (to be submitted in recommendations for further specialist analysis table)	SPECIALIST	0
Additional post-medieval analysis and reporting (to be submitted in recommendations for further specialist analysis table)	SPECIALIST	0
Radio carbon dating (to be submitted in recommendations for further specialist analysis table)	SPECIALIST	0
Consultation with regional specialists	PO	5
Regional specialists consultation fees (to be submitted in recommendations for further specialist analysis table)	SPECIALIST	0
Finds co-ordination	PO (Finds)	2
Finds logistics	PS	3
Specialists analysis co-ordination and monitoring	PM	3
Specialists analysis co-ordination and monitoring	SPM	0.5
UPDATE RESEARCH ARCHIVE		
Update context database	PO	2
Edit digital matrices as a result of specialist analysis reports	PO	5
Edit phased plans as a result of specialist analysis reports	PO	3
Update feature phasing of specialist analysis reports	PO	5
Update phased text of specialist analysis reports	PO	6

Task	Staff Grade	Time/Days
Assessment update co-ordination and monitoring	PM	1
Assessment update co-ordination and monitoring	SPM	0.5
ILLUSTRATIONS		
Prepare, discuss and revise illustrations brief	PO	5
Digitise relevant sections	PO (Illustrator)	20
Editing sections	PO	5
Matrices layouts and presentation	PO (Illustrator)	5
Produce location maps	PO (GIS)	4
Produce distribution maps of surveys, sites, finds, palaeoenvironmental, evaluations & excavations	PO (GIS)	15
Site plans layouts and presentation	PO (Illustrator)	9
Phased plan layouts and presentation	PO (GIS)	19
Section layouts and presentation	PO (Illustrator)	3
Re-constructions e.g. sites, buildings, artefacts and kilns	PO (GIS)	18
Finds illustrations	PO (Illustrator)	20
Plates	PO (Illustrator)	6
Illustrations co-ordination	PO	8
Illustrations monitoring	PM	4
Illustrations monitoring	SPM	1
PUBLICATION REPORTS		
REGIONAL PUBLICATION		
Publication planning	PM	5
Documentary research (Libraries, museum's SMR/HER's, record offices, archaeological/historical societies)	PO	20
Edit/reformat specialist analysis reports	PO	7
Revise introduction and project background text	PO	5
Synthesise phased site descriptions from updated assessment text	PO	11
Integrate specialist analysis information into site specific discussion sections	PO	14
Integrate documentary research and regional specialist information into site specific discussion sections	PO	7
Draft Mesolithic, Neolithic, early to late Bronze Age period chapter	PO	5
Draft Iron Age, Romano-British and early medieval period chapter	PO	7
Draft Late-med and post-medieval period chapter	PO	7
Draft conclusions sections	PO	3
Revise bibliography, acknowledgements and appendices sections	PO	2
Edit publication text draft 1	PO (Reports)	10
Respond to edits of draft 1	PO	5
Edit publication text draft 2	PO (Reports)	3
Respond to edits of draft 2	PO	2
Internal review process	PO	1
Internal review process	PM	1
Internal review process	SPM	1
Respond to internal review comments and produce publication text draft 3	PO	2
Edit of publication text draft 3	PO (Reports)	1
Respond to edits of draft 3	PO	1

Task	Staff Grade	Time/Days
Review of publication text draft 3 by Project Manager	PM	3
Approval of publication text draft 3 by Senior Project Manager	SPM	1
Print and submit publication for external review	PO	2
External review	Consultant/Curators	90
Respond to external review comments on publication	PO	7
DTP of publication text and figures	PO (Reports)	8
Submit draft publication to publishers	PO	1
Editorial review	EDITOR	90
Respond to editorial review of publication	PO	7
Re-submit final publication to publishers	PO	1
Modify publication text to produce and submit client report	PO	4
Report and reprographic materials	PO	1
Documentary research visits travel expenses	PO	18
Publications co-ordination and monitoring	PM	5
Publications co-ordination and monitoring	SPM	2
NATIONAL PUBLICATIONS		
Synthesise aspects of report text to articles' house-style	PO	12
Edit of articles	PO (Reports)	4
Respond to edits	PO	2
External review	Consultant/Curator's	30
Respond to comments from external review	PO	2
Edit of articles	PO (Reports)	1
Respond to edits	PO	1
Review of articles text by Project Manager	PM	2
Approval of articles text by Senior Project Manager	SPM	1
Submit publications	PO	1
PUBLISHERS' FEES		
Regional publication		1
National article		1
ARCHIVING		
Landowner liaison	PO (Archive)	11
Oasis forms	PO (Archive)	6
Agree dispersal policy and disperse non-retained material	PO (Archive)	1
Preparation of paper archive	PO (Archive)	19
Preparation of finds archive	PO (Archive)	18
Preparation of photographic archive	PO (Archive)	5
Package final archive	PO (Archive)	3
Deliver archive to museums	PO (Archive)	2
Archive submission costs	PO (Archive)	1
Archive materials	PO (Archive)	1
Archiving co-ordination and monitoring	PM	2
Archiving co-ordination and monitoring	SPM	0.5

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- David Watt Final report illustrations
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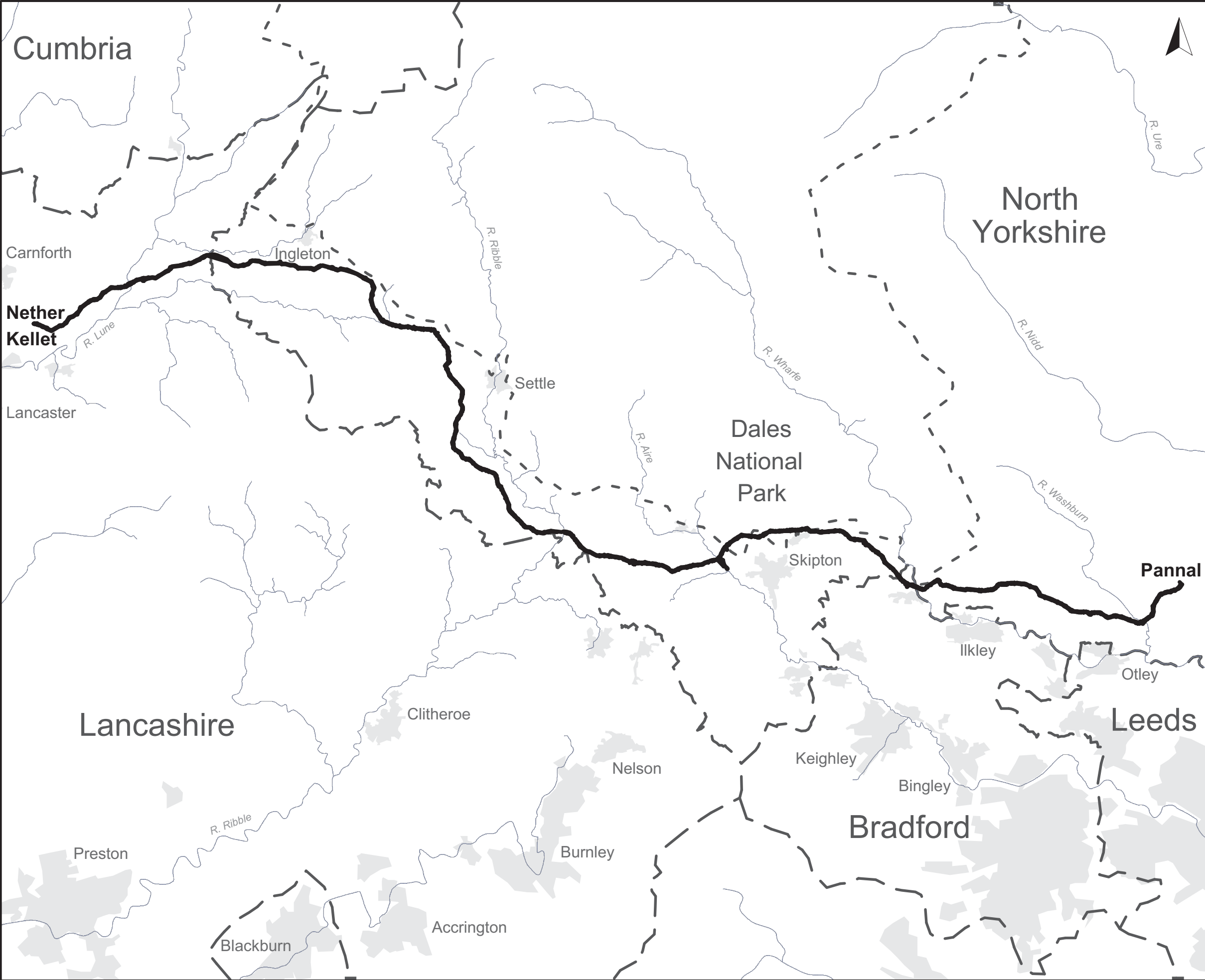
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FIGURES



Key

- Pipeline route
- County boundary
- Dales National Park boundary

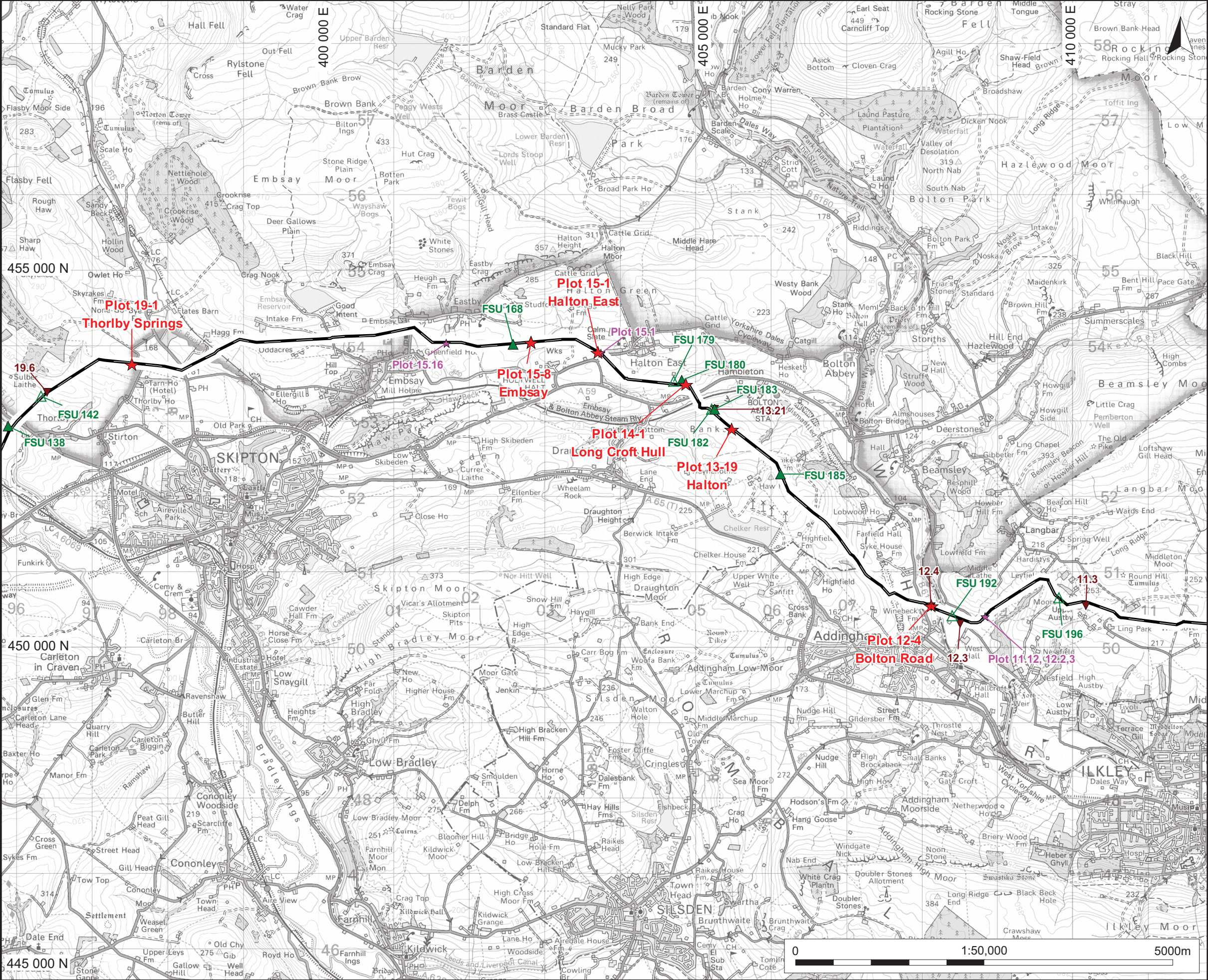
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3.0	16/12/08	Location map	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 1:General location of pipeline.



- Key**
- Pipeline route
 - Excavation site
 - Evaluation site
 - Topographic survey
 - Other earthwork site
 - Recorded palaeochannel

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3.0	16/12/08	General location b	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

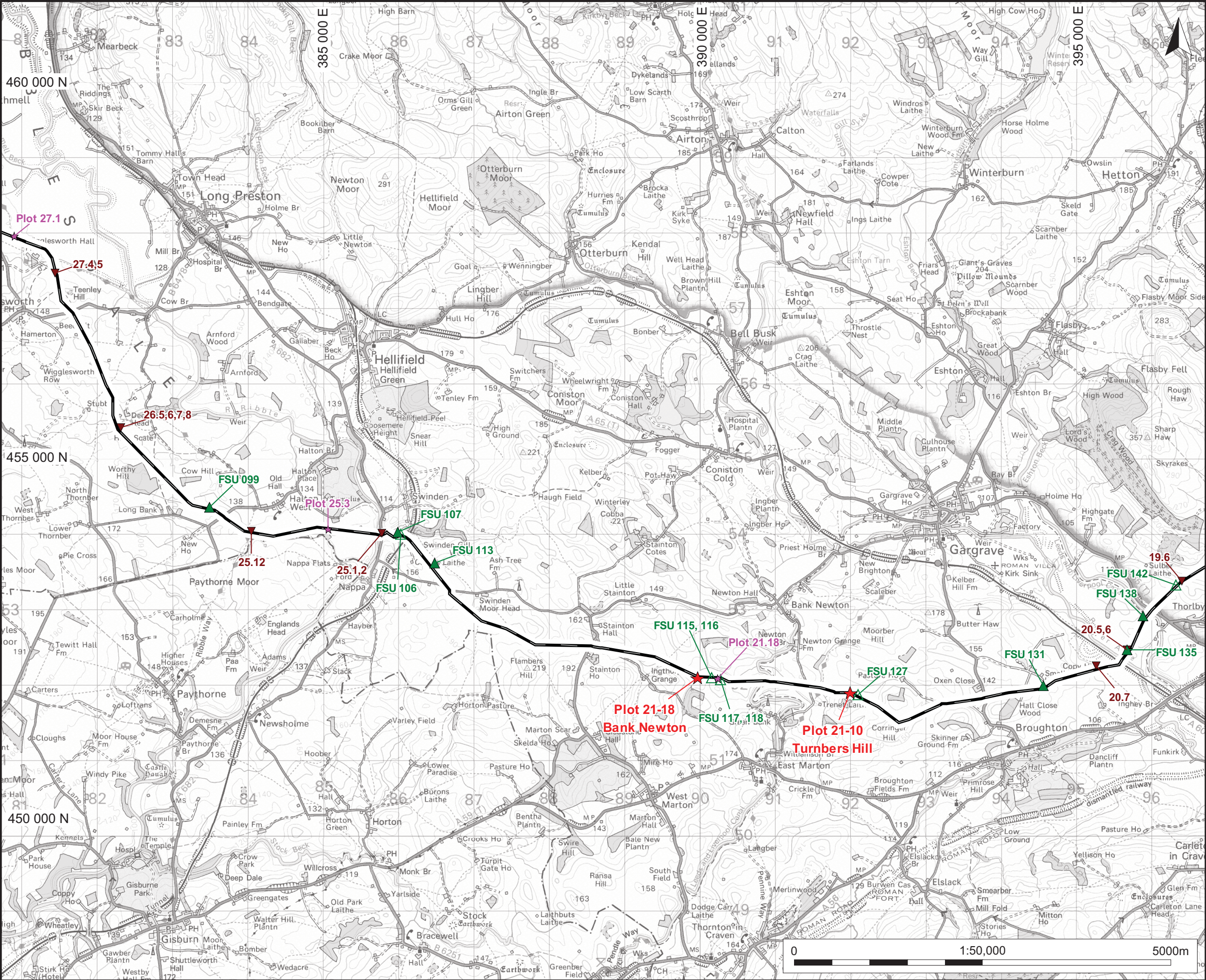


Pannal to Nether Kellet Gas Pipeline

Figure 2b: General location of sites, Plots 11-3 to 19-6.

Scale 1:50,000





- Key**
- Pipeline route
 - Excavation site
 - Evaluation site
 - Topographic survey
 - Other earthwork site
 - Recorded palaeochannel

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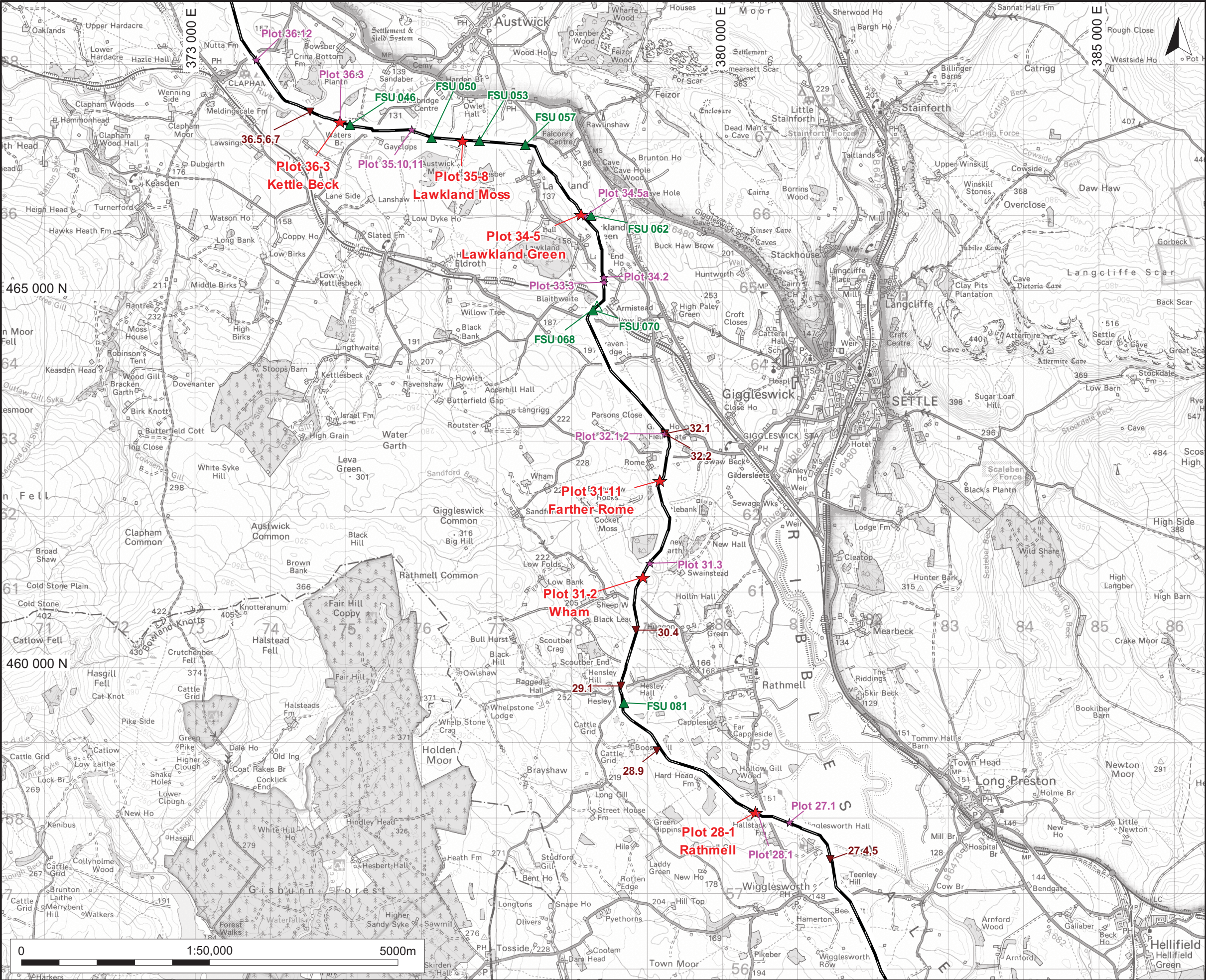
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Pannal to Nether Kellet Gas Pipeline

Figure 2c: General location of sites, Plots 19-6 to 27-1.

Scale 1:50,000



Key

Pipeline route

Excavation site

Evaluation site

Topographic survey

Other earthwork site

Recorded palaeochannel

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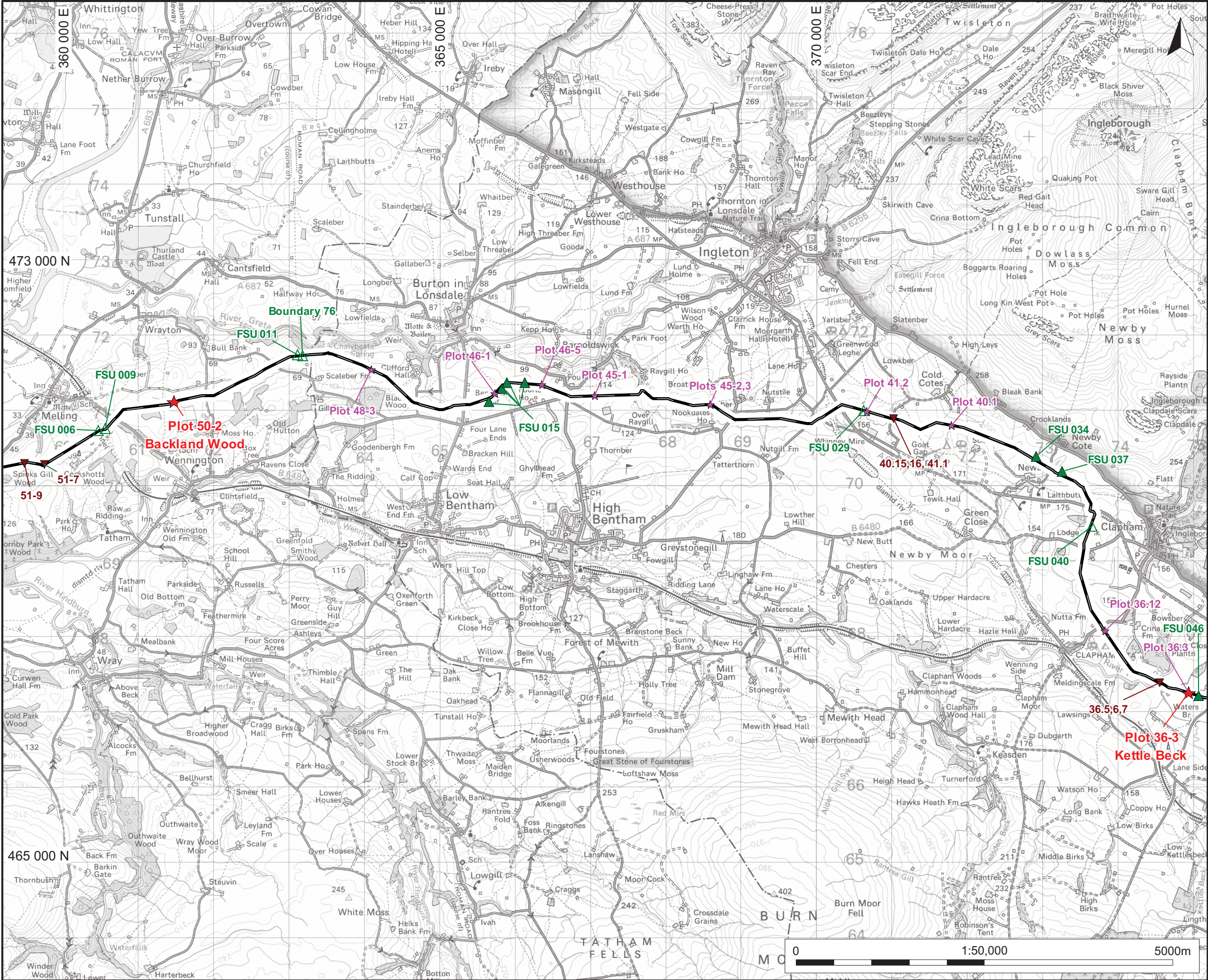
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Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 2d: General location of sites, Plots 27-4 to 36-12.

Scale 1:50,000



- Key**
- Pipeline route
 - Excavation site
 - Evaluation site
 - Topographic survey
 - Other earthwork site
 - Recorded palaeochannel

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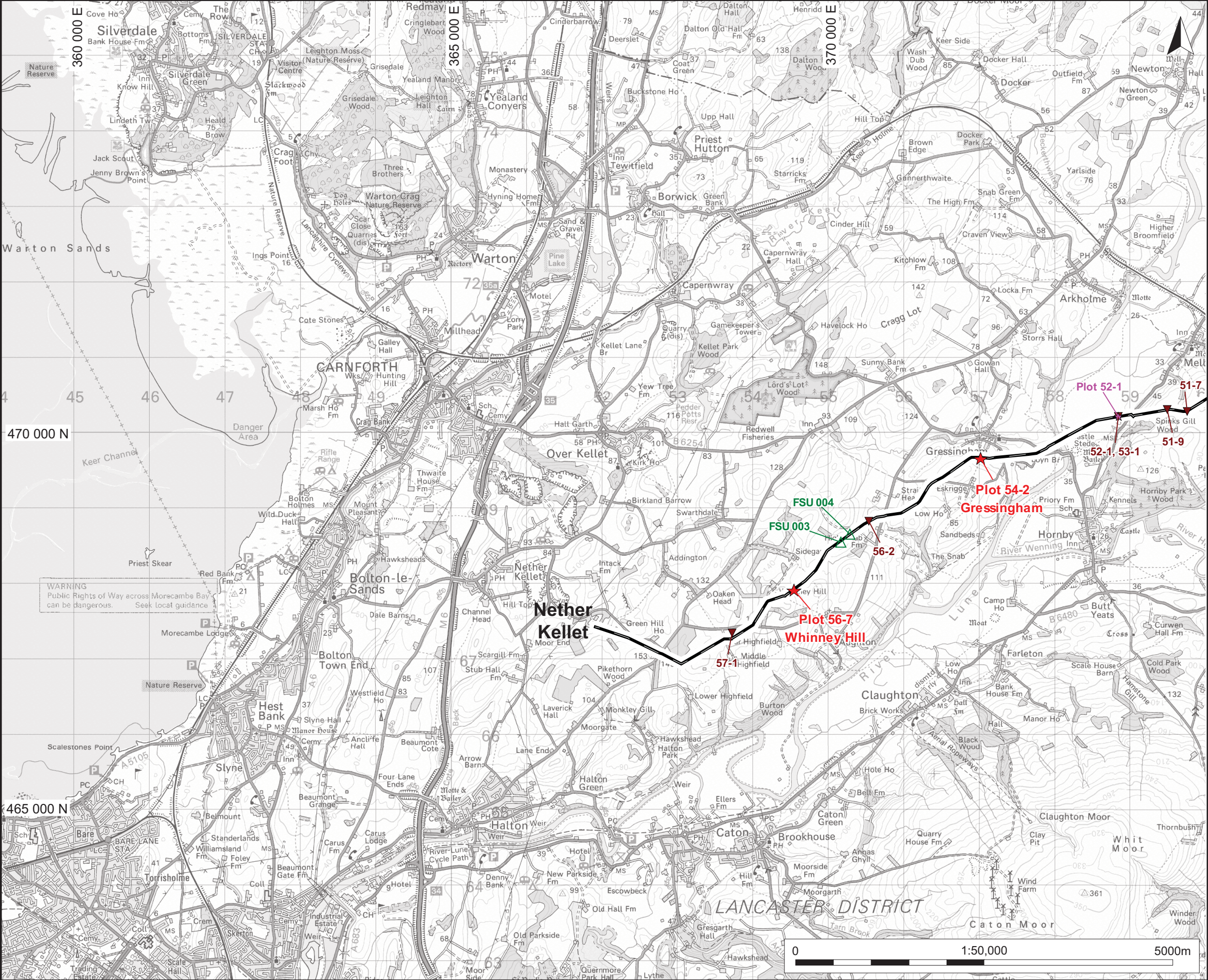
3.0	16/12/08	General location e	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 2e: General location of sites, Plots 36-3 to 51-9.

Scale 1:50,000



Key

Pipeline route

Excavation site

Evaluation site

Topographic survey

Other earthwork site

Recorded palaeochannel

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Ver	Date	Description	DM	Chk	App

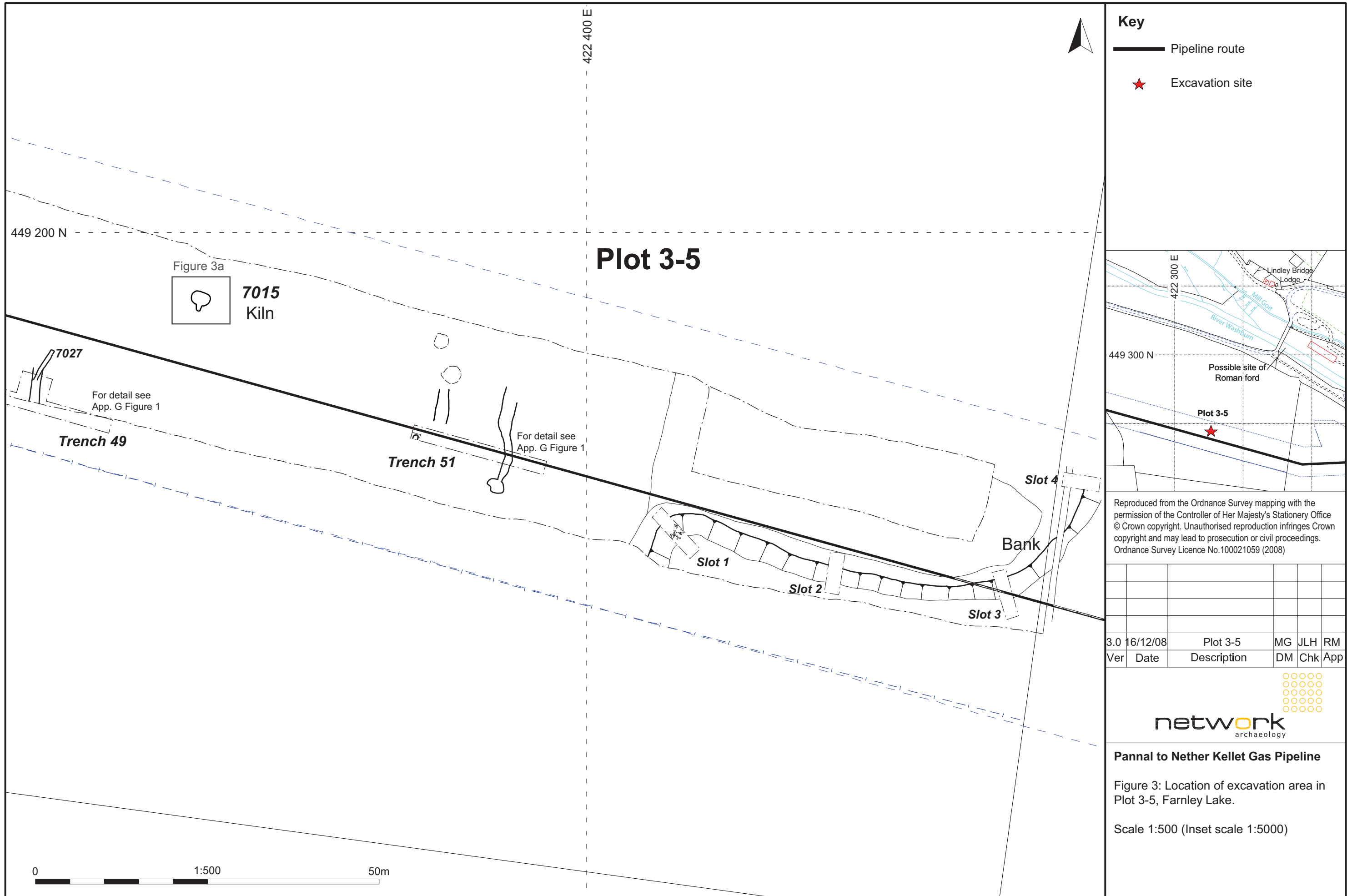
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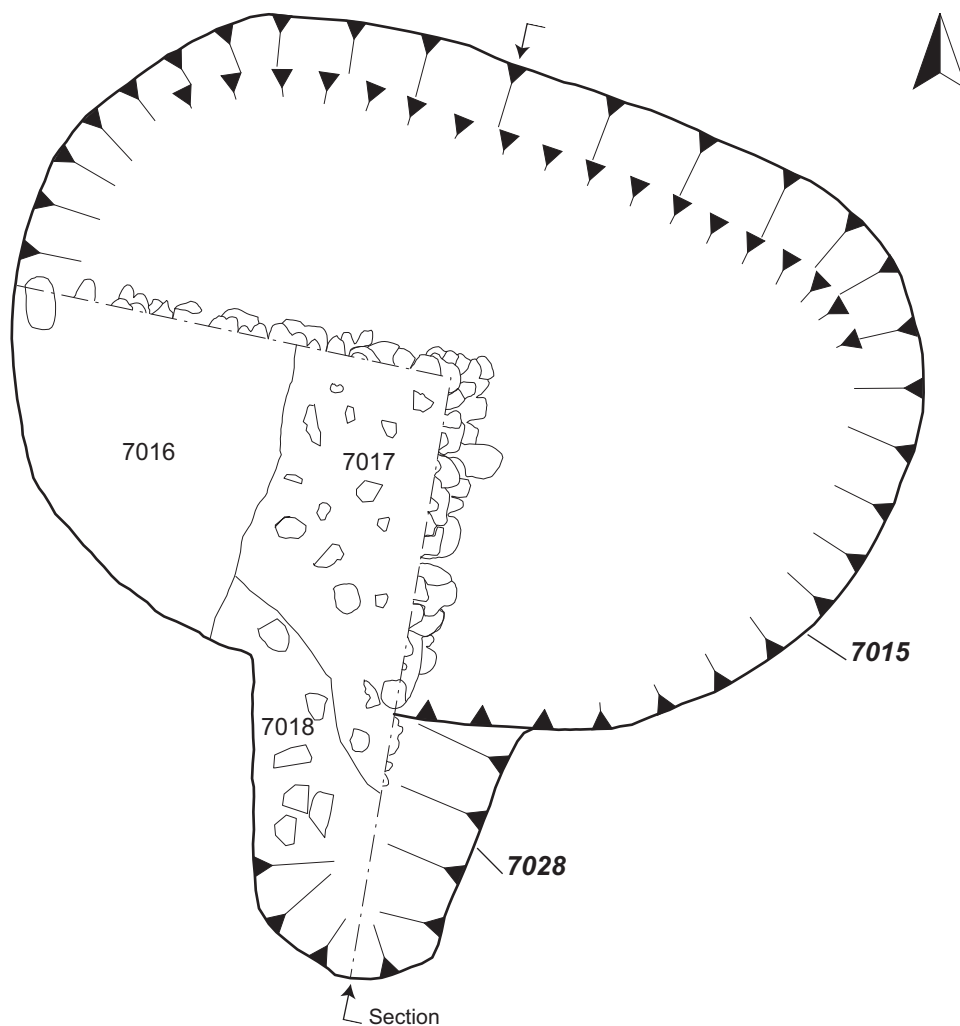
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Pannal to Nether Kellet Gas Pipeline

Figure 2f: General location of sites, Plots 51-7 to 57-1.

Scale 1:50,000





Section

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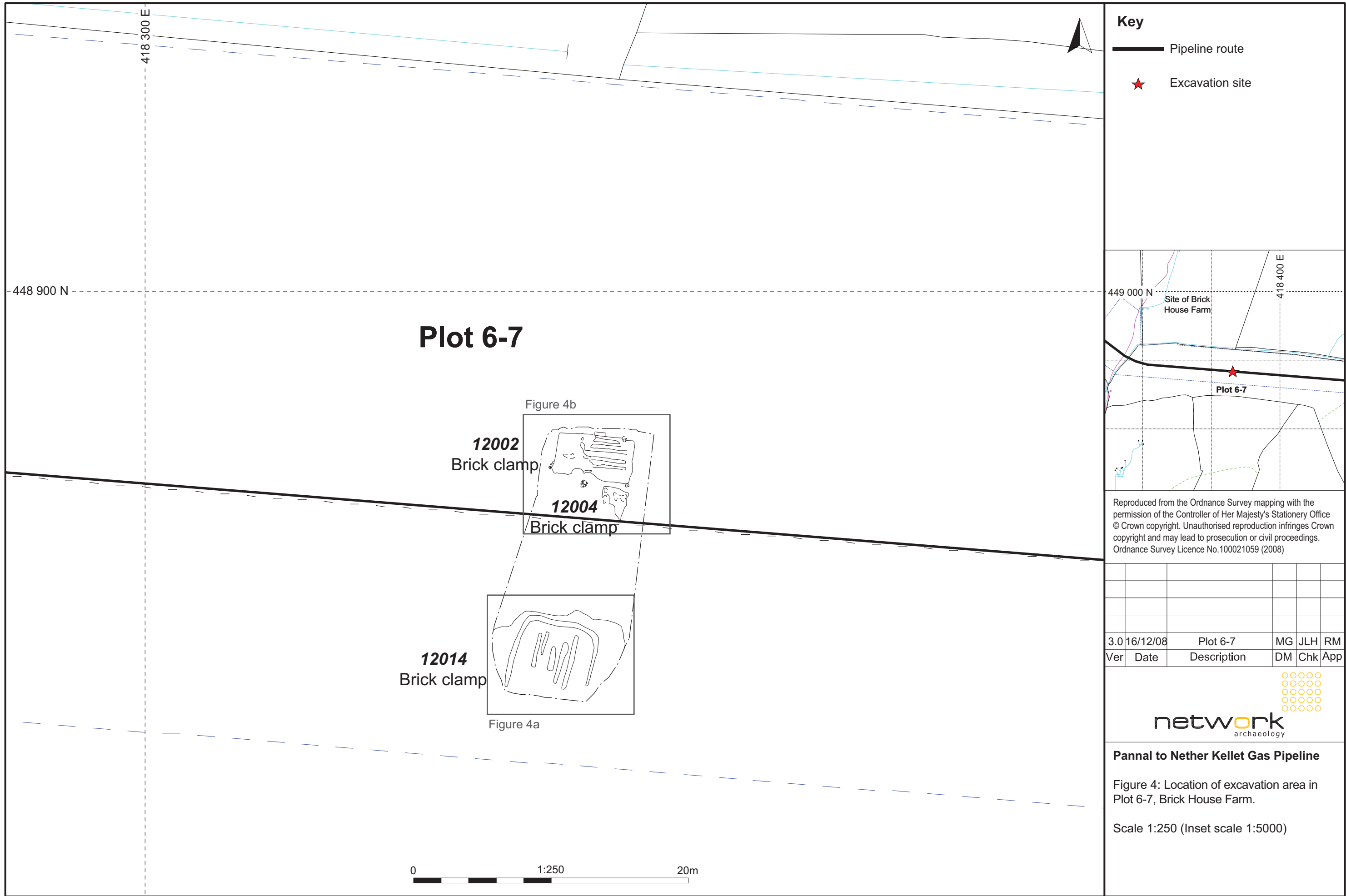
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Key

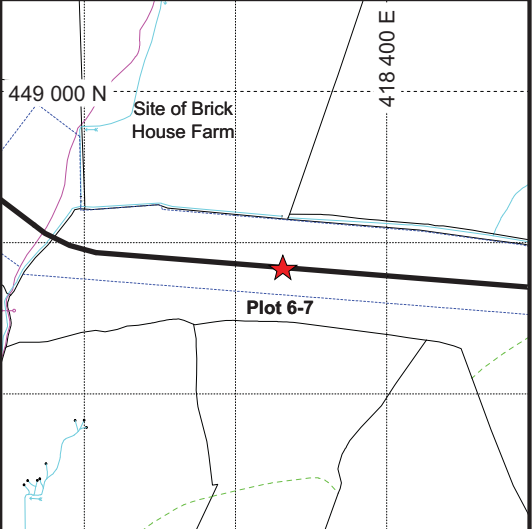
3.0	16/12/08	Plot 3-5 Kiln	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

Pannal to Nether Kellet Gas Pipeline
Figure 3a: Plot 3-5, Farnley Lake, plan and section of excavated kiln [7015].
Scale 1:25



Key

-  Pipeline route
-  Excavation site



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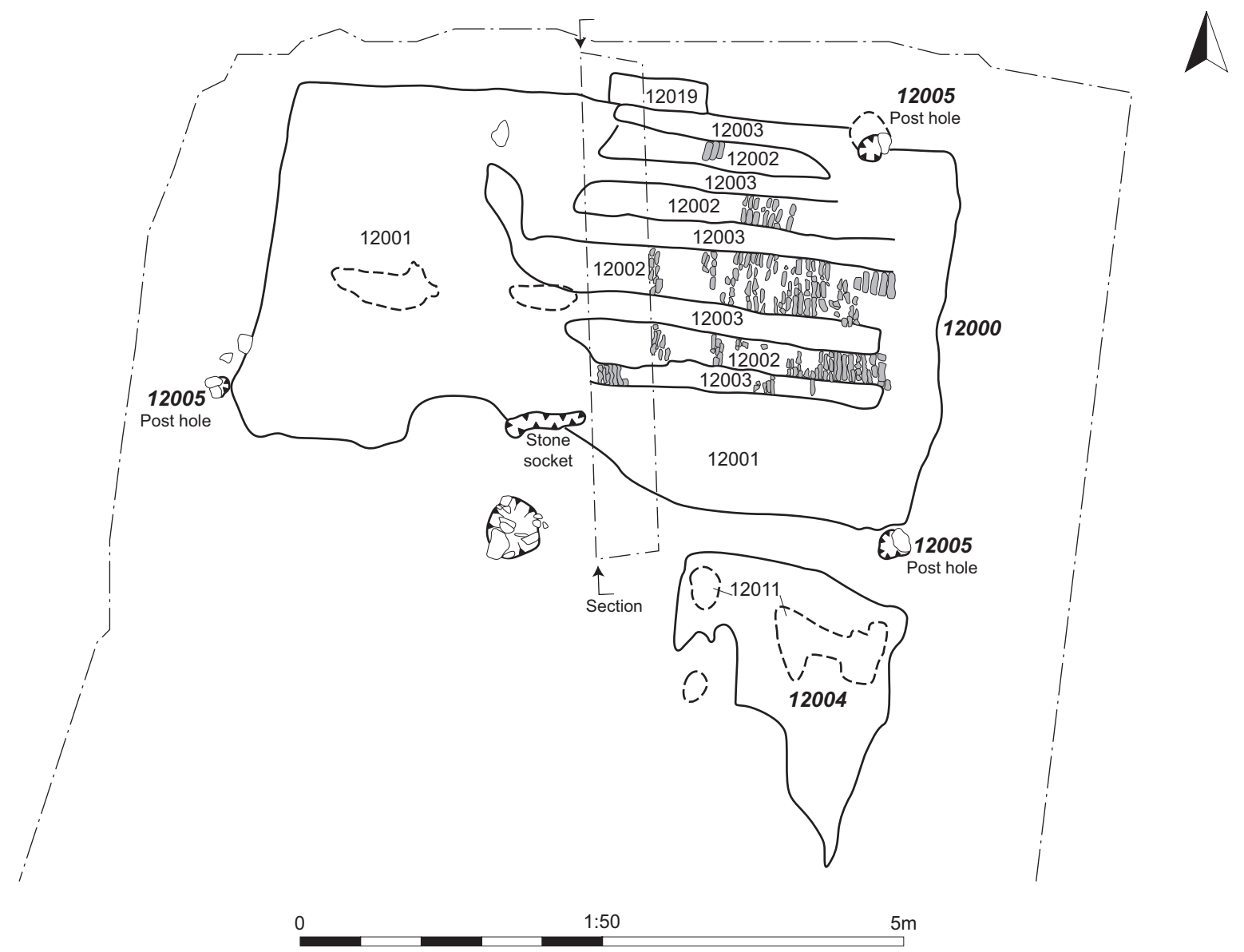
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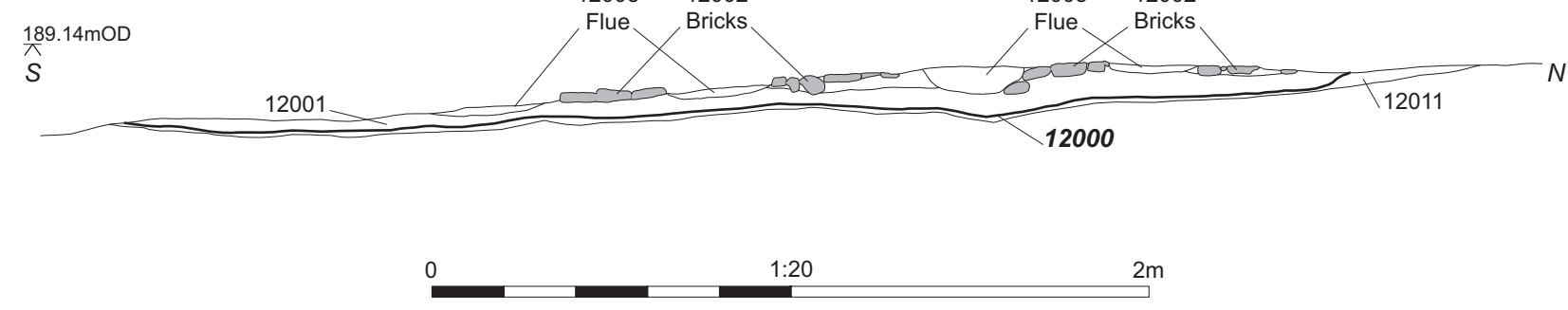
Pannal to Nether Kellet Gas Pipeline

Figure 4: Location of excavation area in Plot 6-7, Brick House Farm.

Scale 1:250 (Inset scale 1:5000)



Section



Key

Bricks

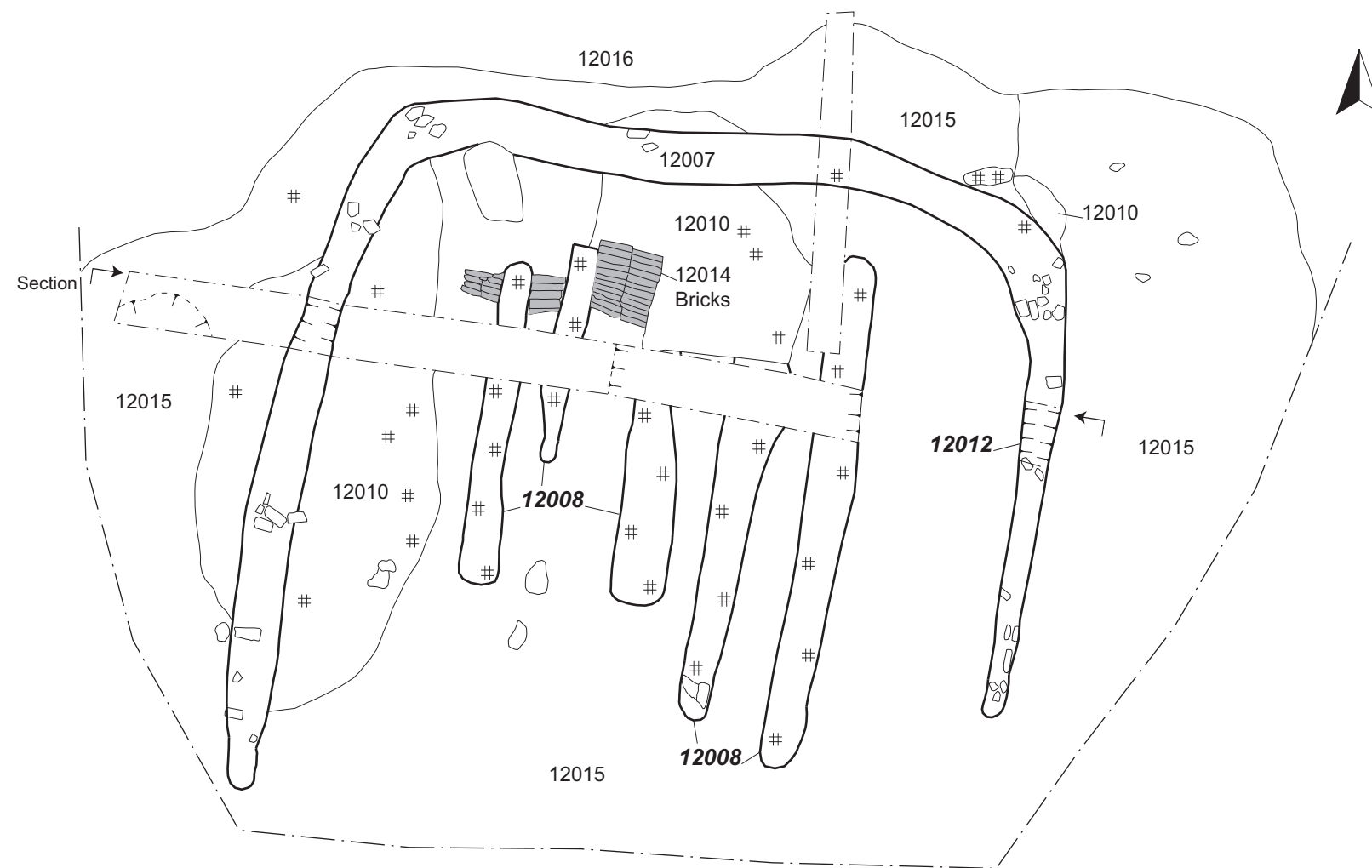
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Ver	Date	Description	DM	Chk	App



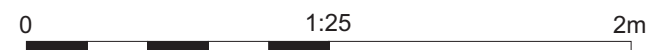
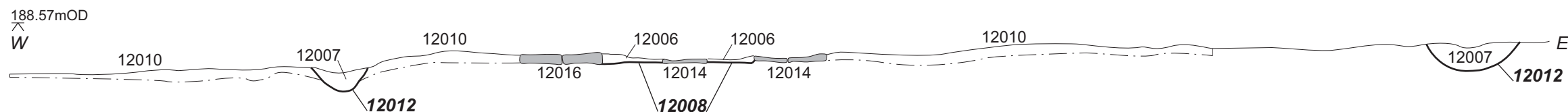
Pannal to Nether Kellet Gas Pipeline

Figure 4a: Plot 6-7, Brick House Farm, plan and section of brick clamp [12000] and plan of brick clamp [12004].

Scale 1:50 and 1:20



Section



Key

Bricks

3.0	16/12/08	Plot 6-7 Brick clamp	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 4b: Plot 6-7, Brick House Farm, plan and section of brick clamp [12014]

Scale 1:50 and 1:25



Plot 7-18

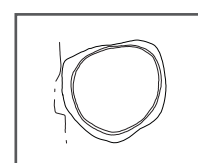
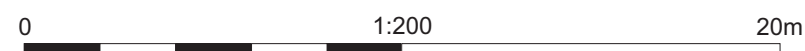


Figure 5d

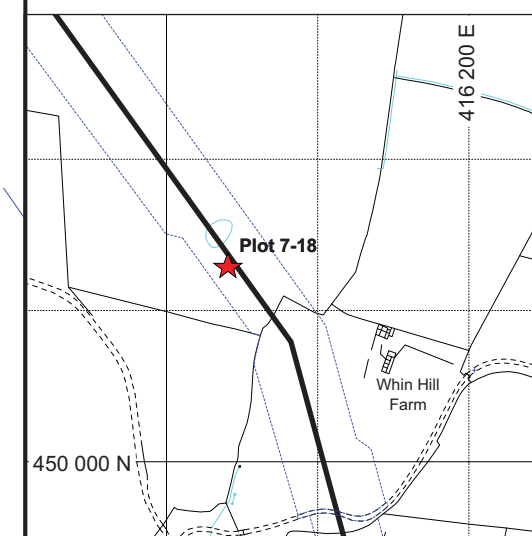
13068
Lime kiln



Key

— Pipeline route

★ Excavation site



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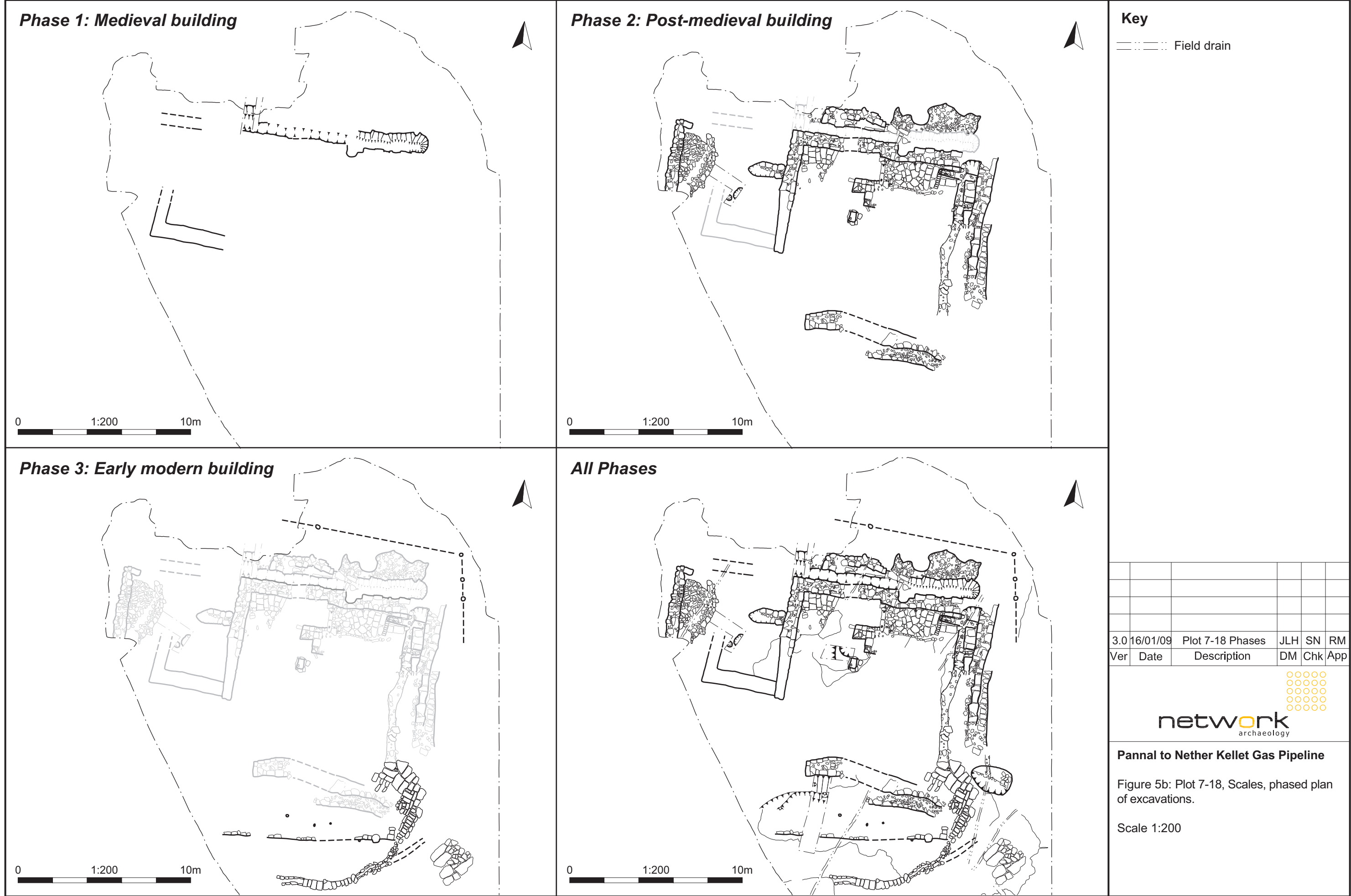
3.0	16/12/08	Plot 7-18	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



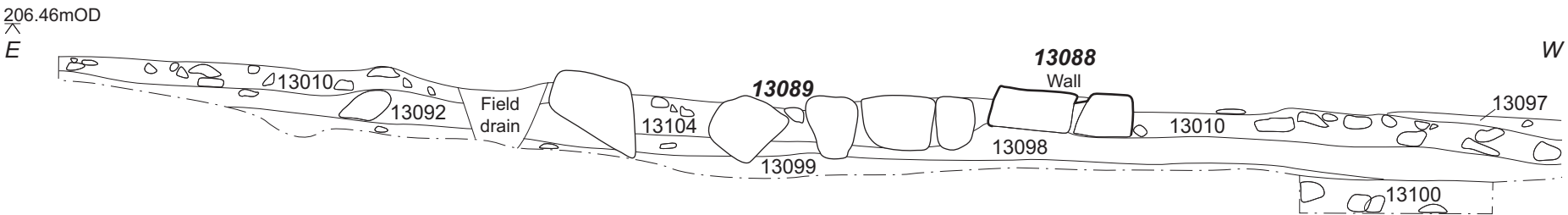
Pannal to Nether Kellet Gas Pipeline

Figure 5: Location of excavation areas in Plot 7-18, Scales.

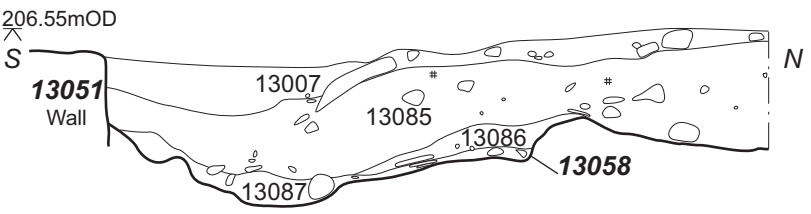
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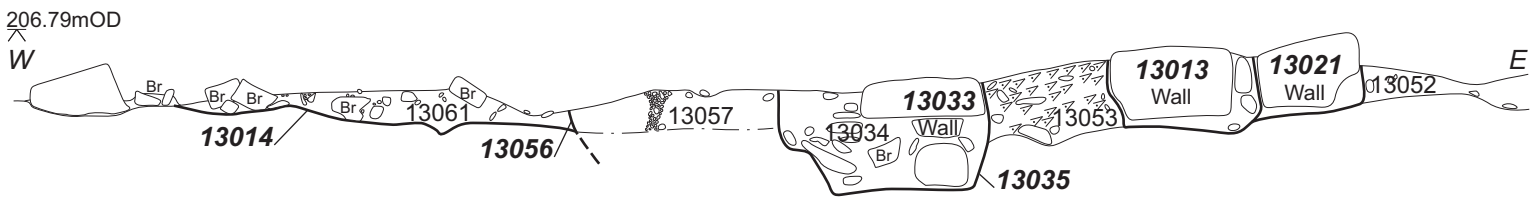
Section i



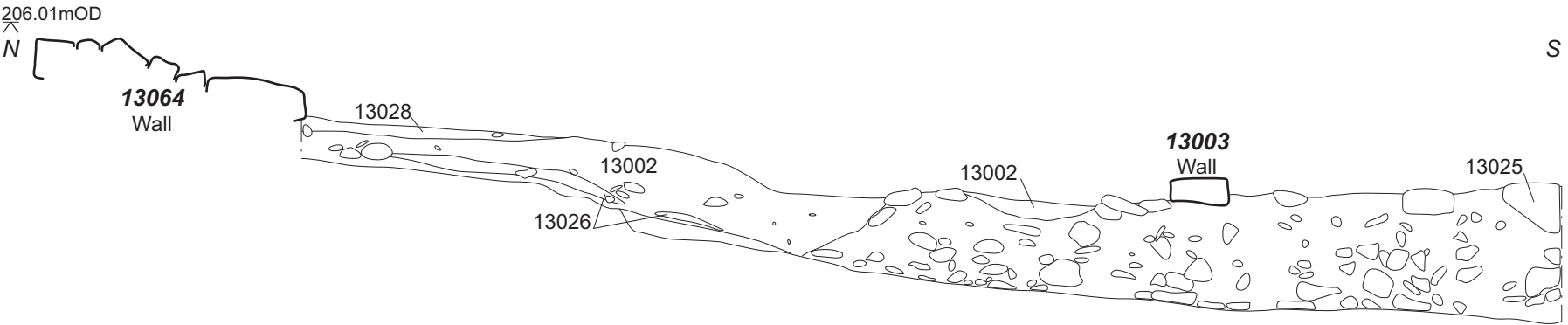
Section ii



Section iii



Section iv



Key

- # Charcoal
- ∇ Lime mortar
- Br Brick

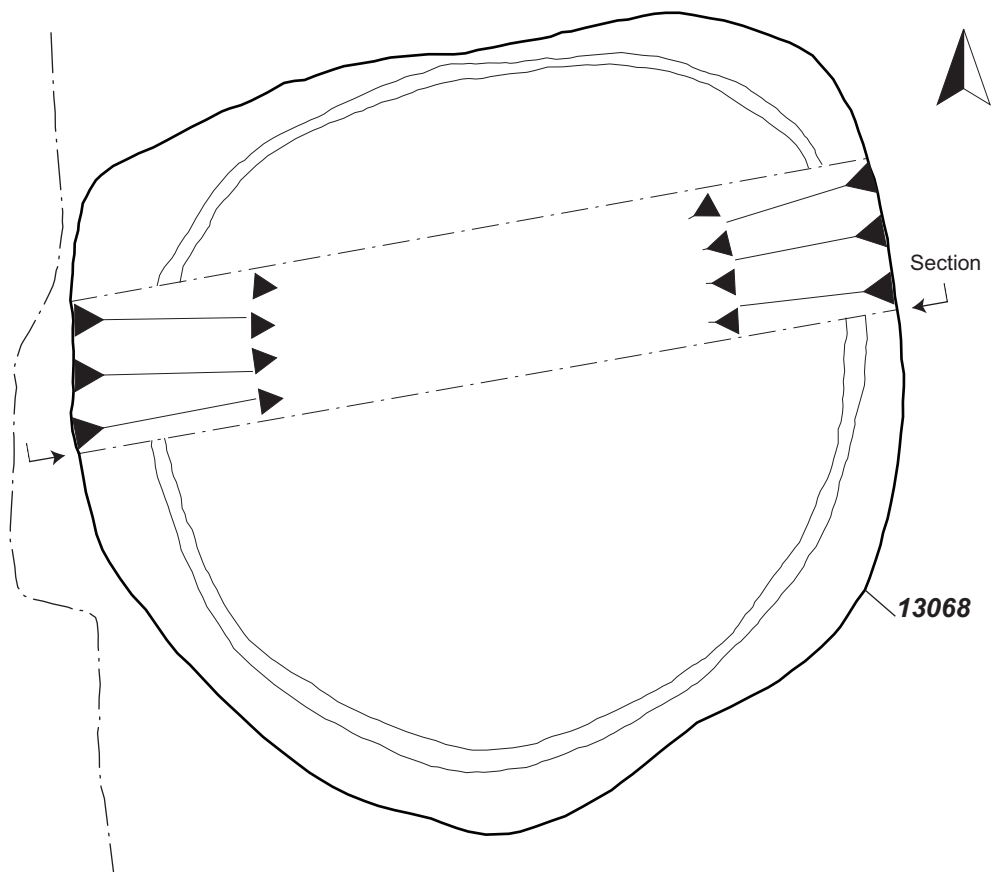
3.0	16/12/08	Plot 7-18 sections	JLH	SN	RM
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Pannal to Nether Kellet Gas Pipeline

Figure 5c: Plot 7-18, Scales, sections of walls [13088], [13033], [13013], [13064] and ditch [13058].

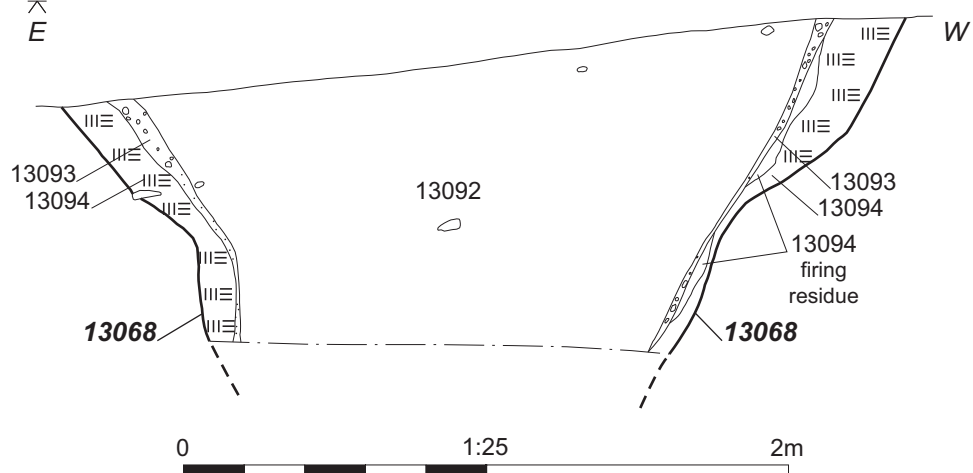
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Section

202.72mOD

E



Key

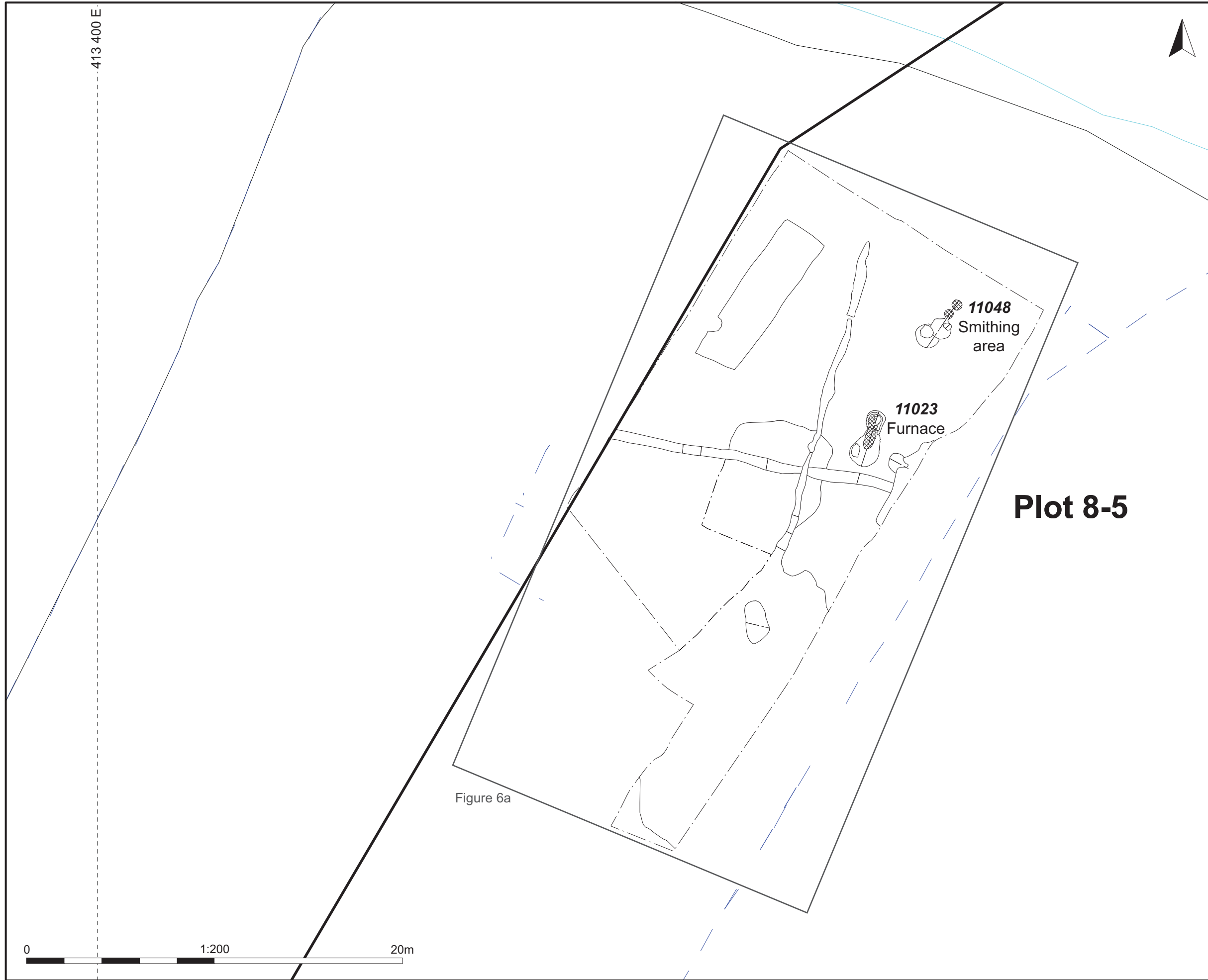
III≡ Burnt clay

3.0	16/12/08	Plot 7-18 Kiln	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

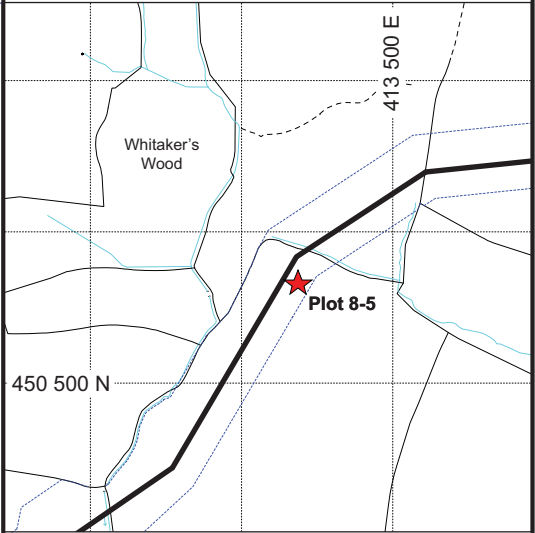
Figure 5d: Plot 7-18, Scales, plan and section of lime kiln [13068].

Scale 1:25



Key

-  Pipeline route
-  Excavation site



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3.0	16/12/08	Plot 8-5	MG	JLH	RM
Ver	Date	Description	DM	Chk	App





Pannal to Nether Kellet Gas Pipeline

Figure 6: Location of excavation area in Plot 8-5, Denton Moor.

Scale 1:200 (Inset scale 1:5000)

Key

-  Slag fragments
-  Area of burning

3.0	16/12/08	Plot 8-5 Excavation	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

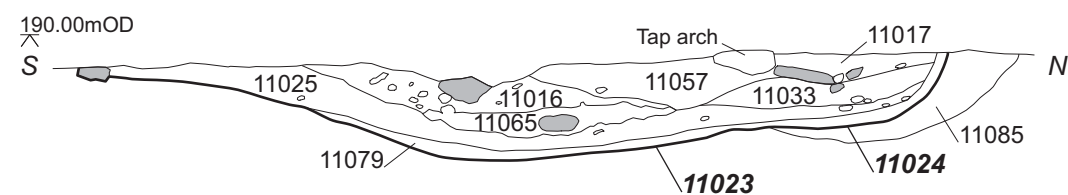


Pannal to Nether Kellet Gas Pipeline

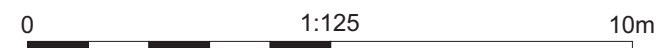
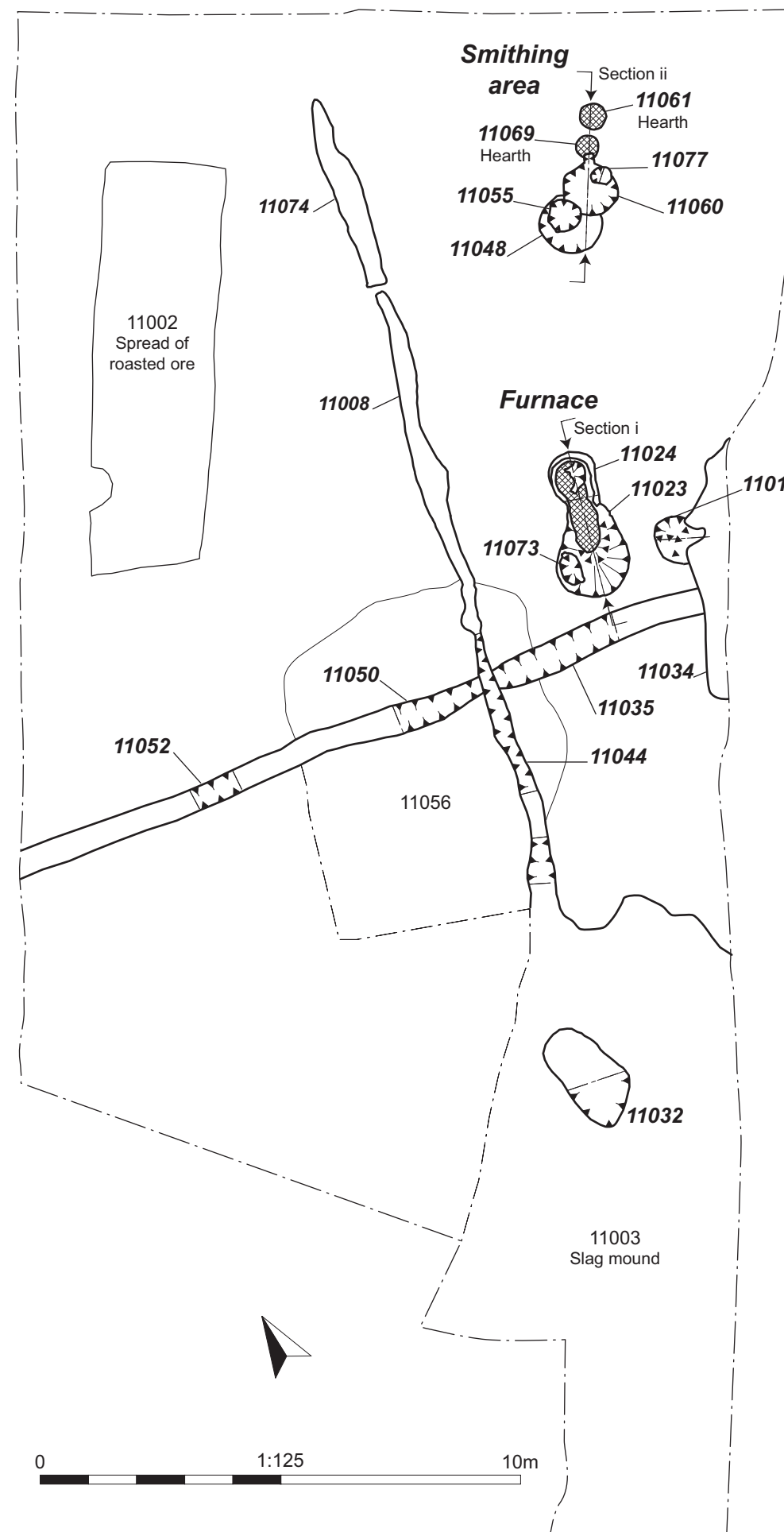
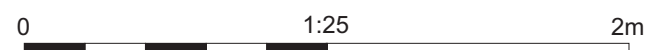
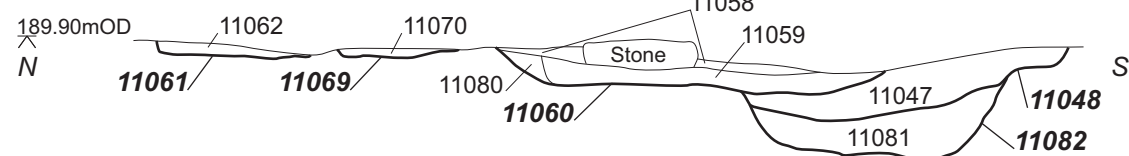
Figure 6a: Plot 8-5, Denton Moor, plan of excavation area and sections through furnaces [11023] and [11048].

Plan scale 1:125, section scale 1:25

Section i



Section ii



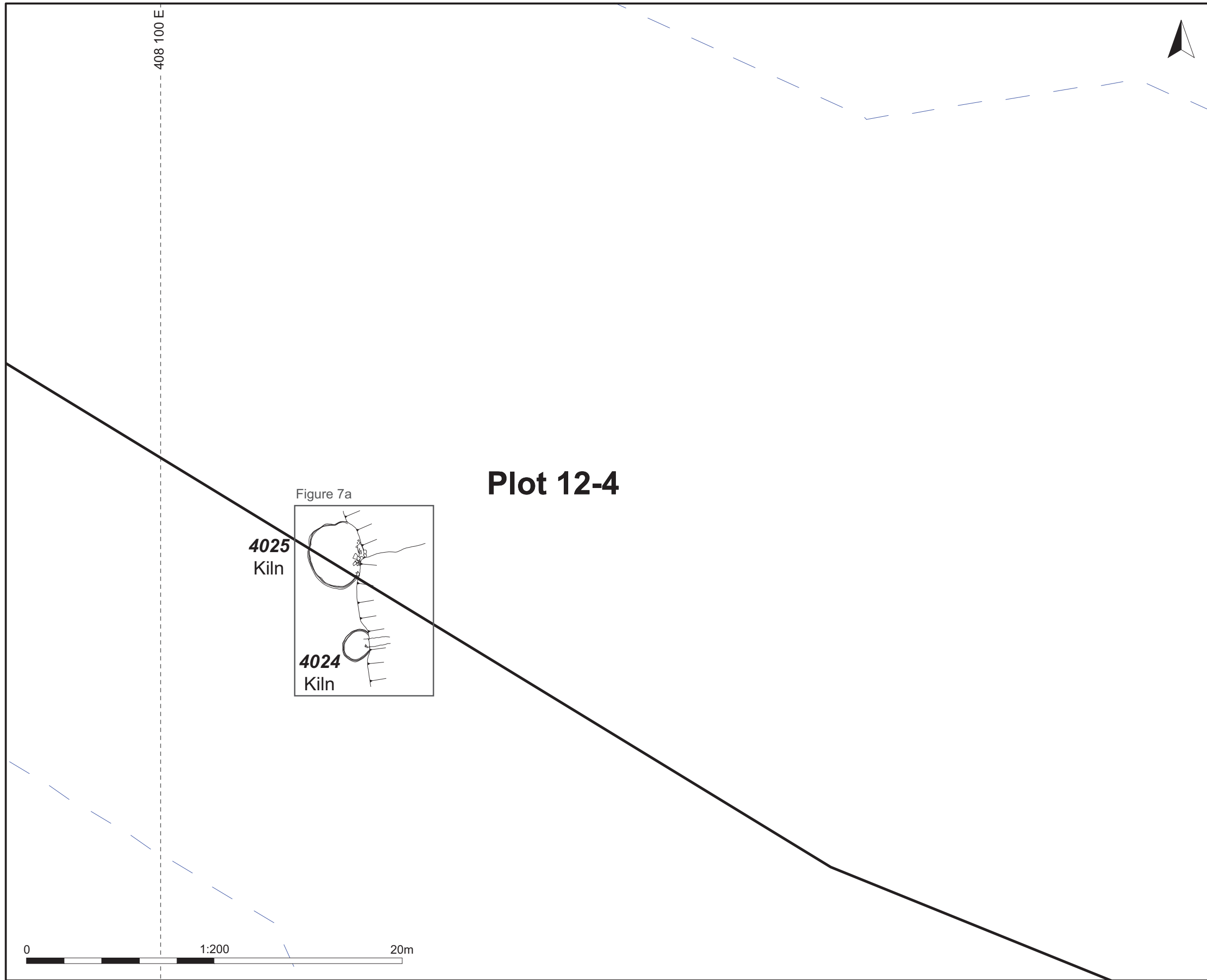


Figure 7a

4025
Kiln

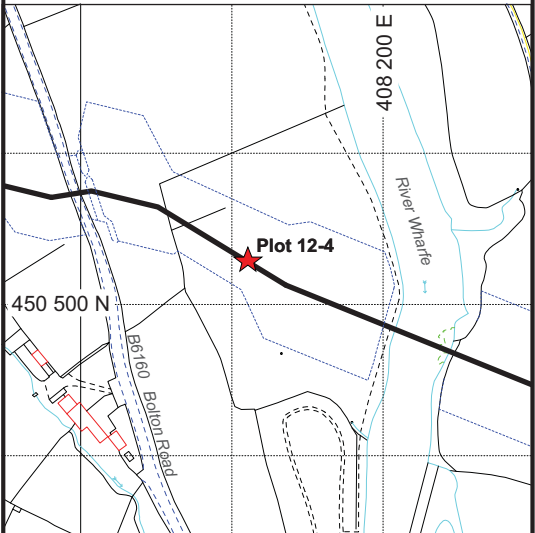
4024
Kiln

Plot 12-4

Key

— Pipeline route

★ Excavation site



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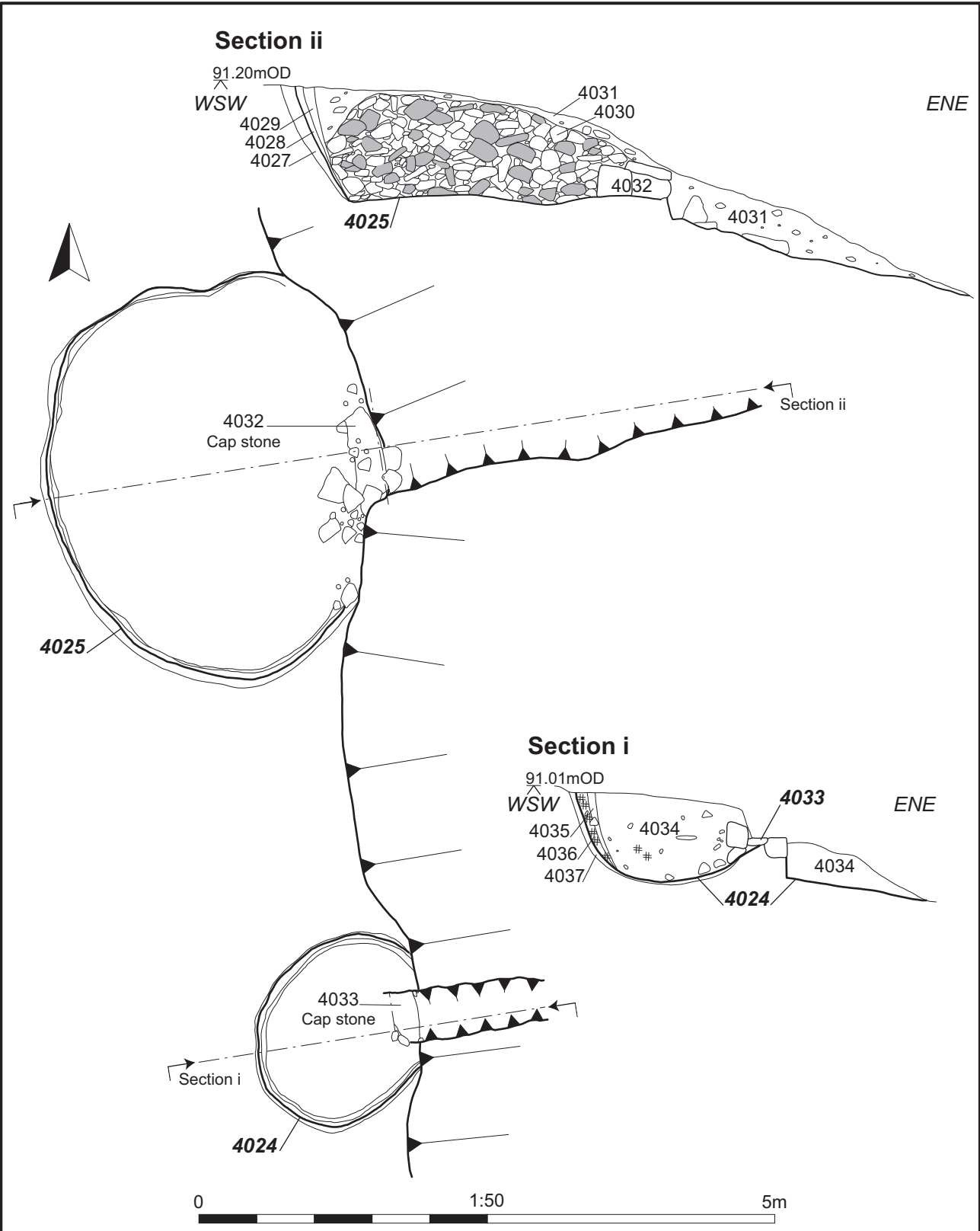
3.0	16/12/08	Plot 12-4	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 7: Location of excavation area in Plot 12-4, Bolton Road.

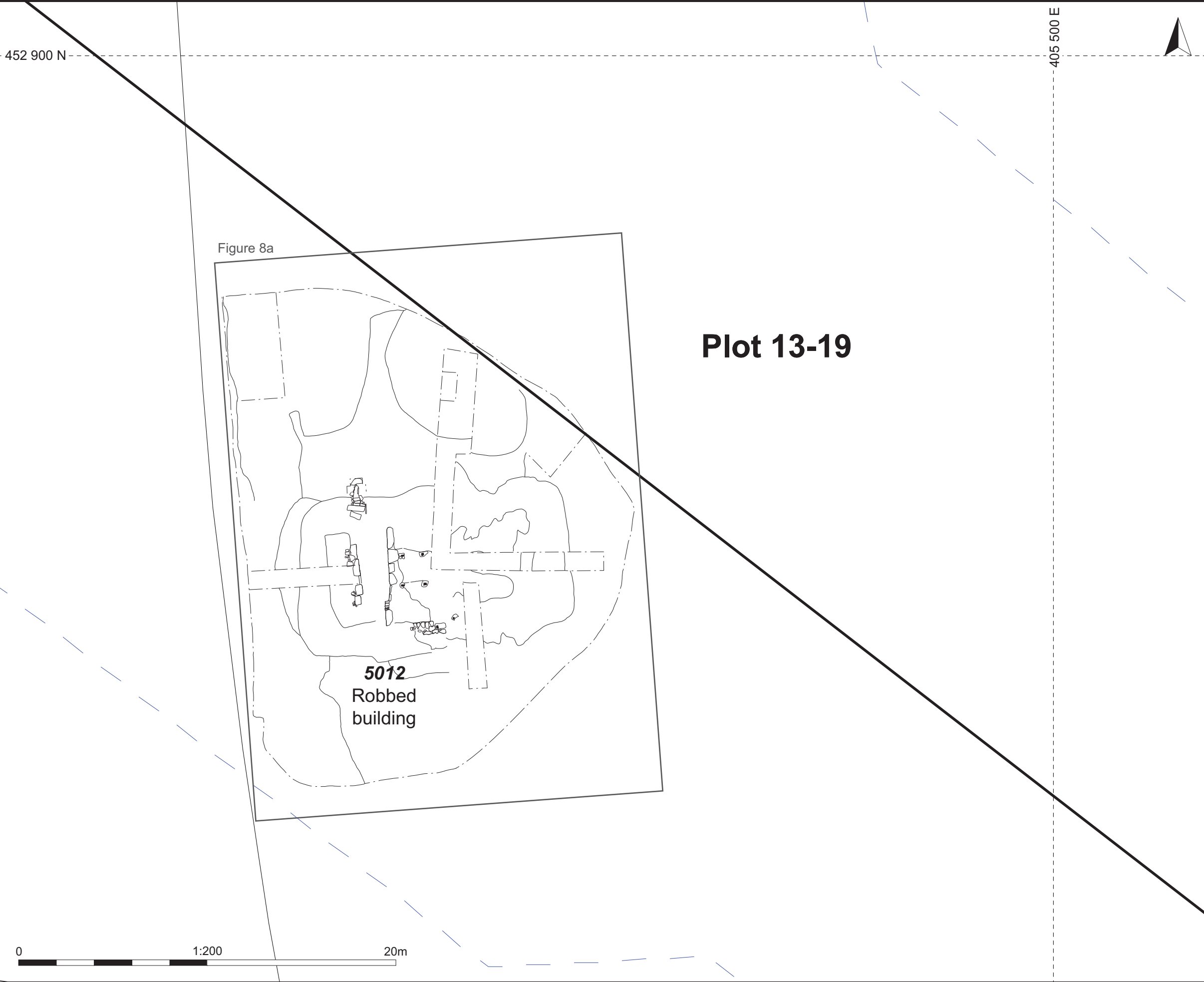
Scale 1:200 (Inset scale 1:5000)



- Key
- # Charcoal
 - Burnt stone

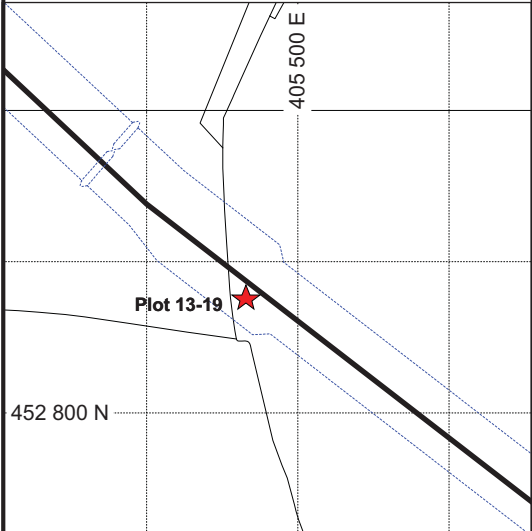
3.0	16/12/08	Plot 12-4 Kilns	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

Pannal to Nether Kellet Gas Pipeline
 Figure 7a: Plot 12-4, Bolton Road, plan and sections of kilns [4024] and [4025].
 Scale 1:50



Key

- Pipeline route
- ★ Excavation site



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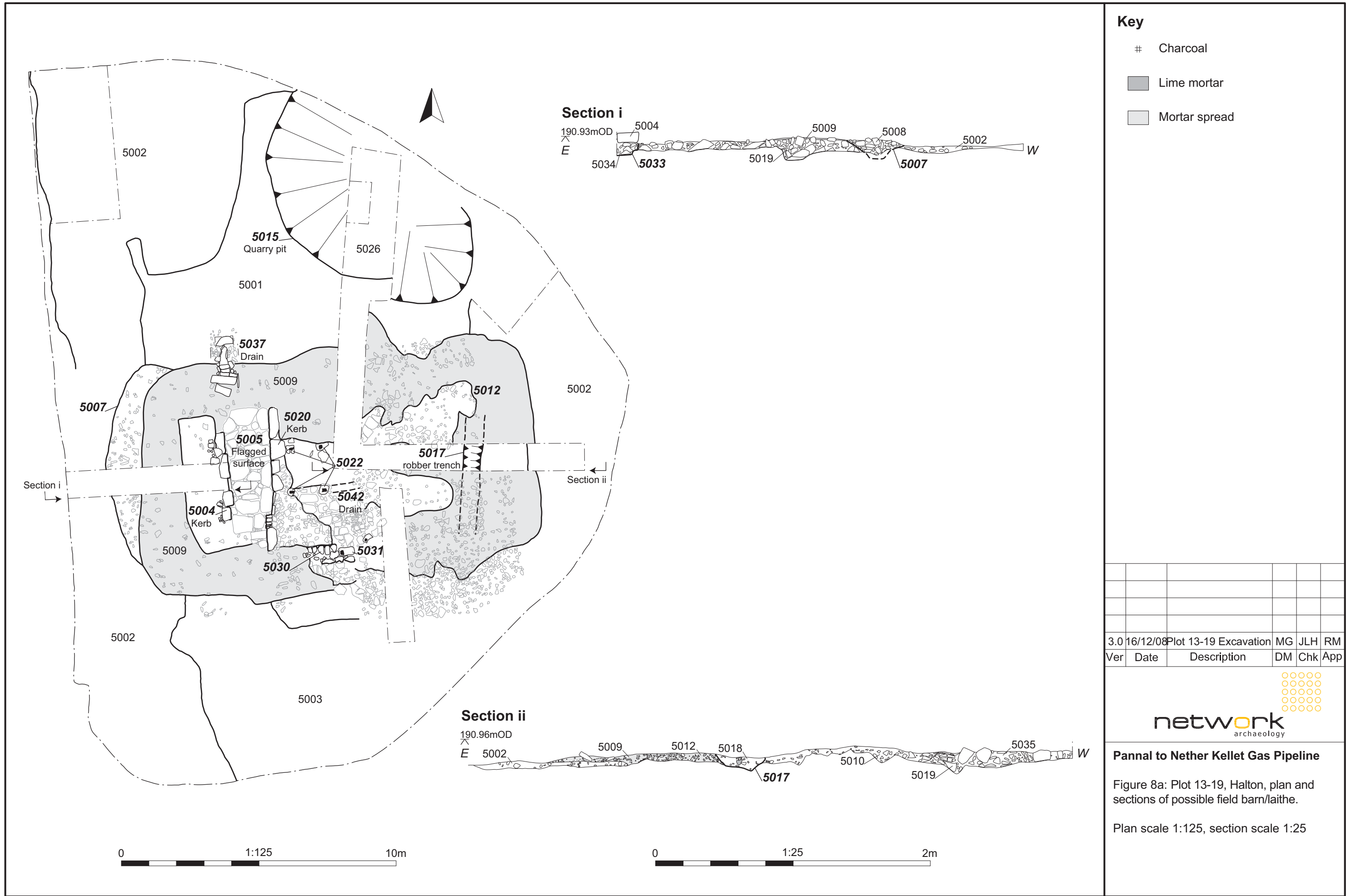
3.0	16/12/08	Plot 13-19	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

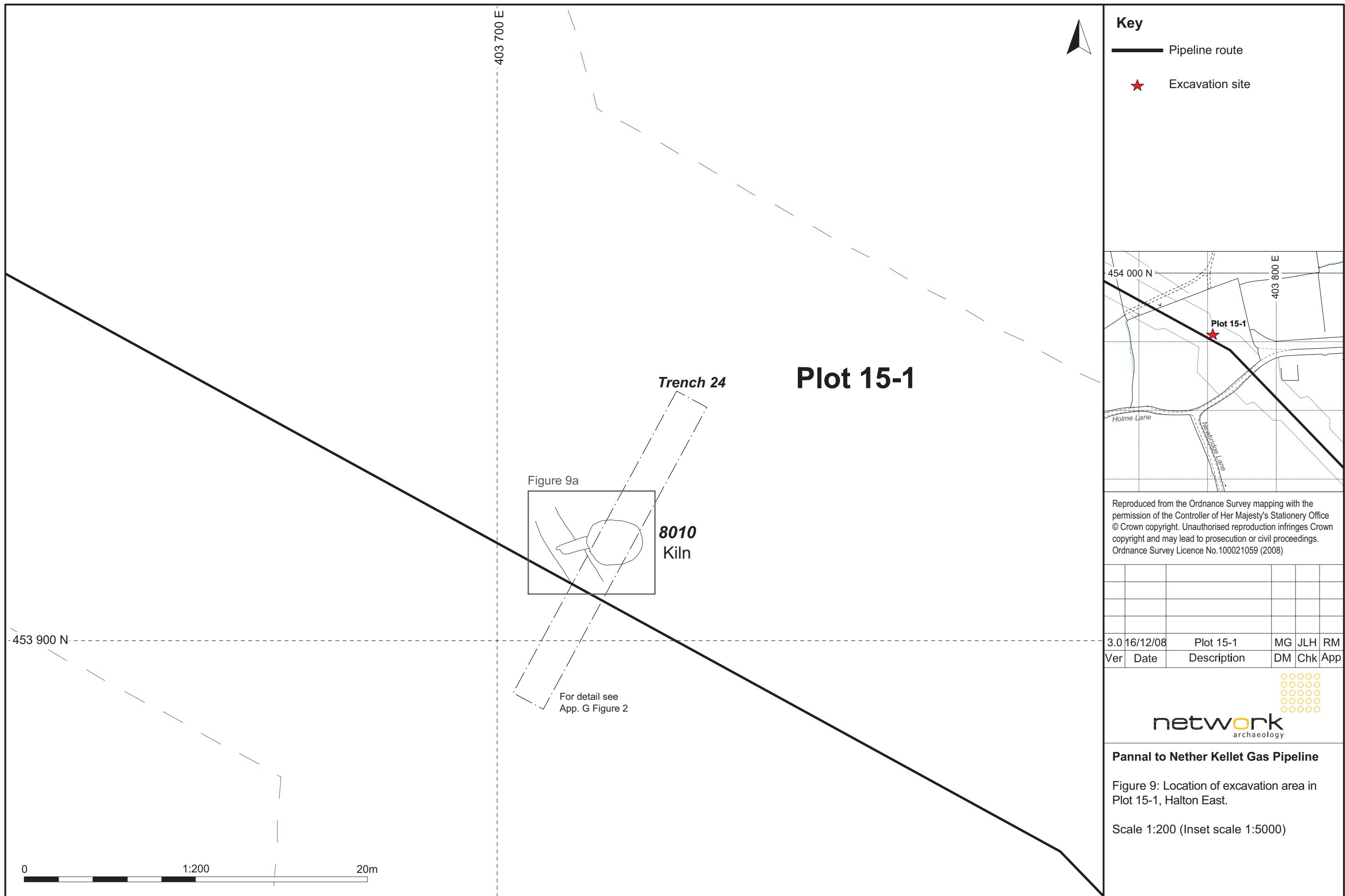


Pannal to Nether Kellet Gas Pipeline

Figure 8: Location of excavation area in Plot 13-19, Halton.

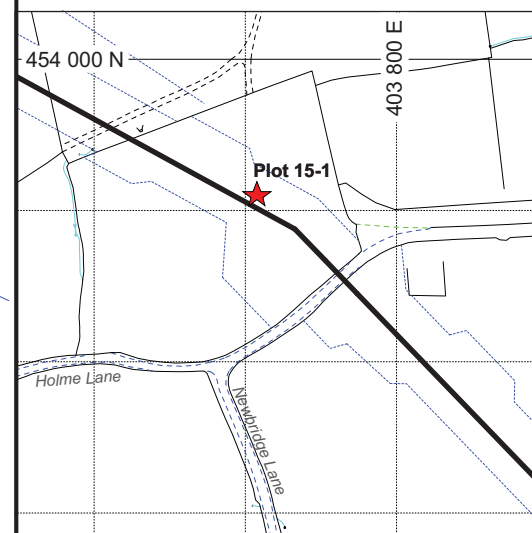
Scale 1:200 (Inset scale 1:5000)





Key

- Pipeline route
- ★ Excavation site



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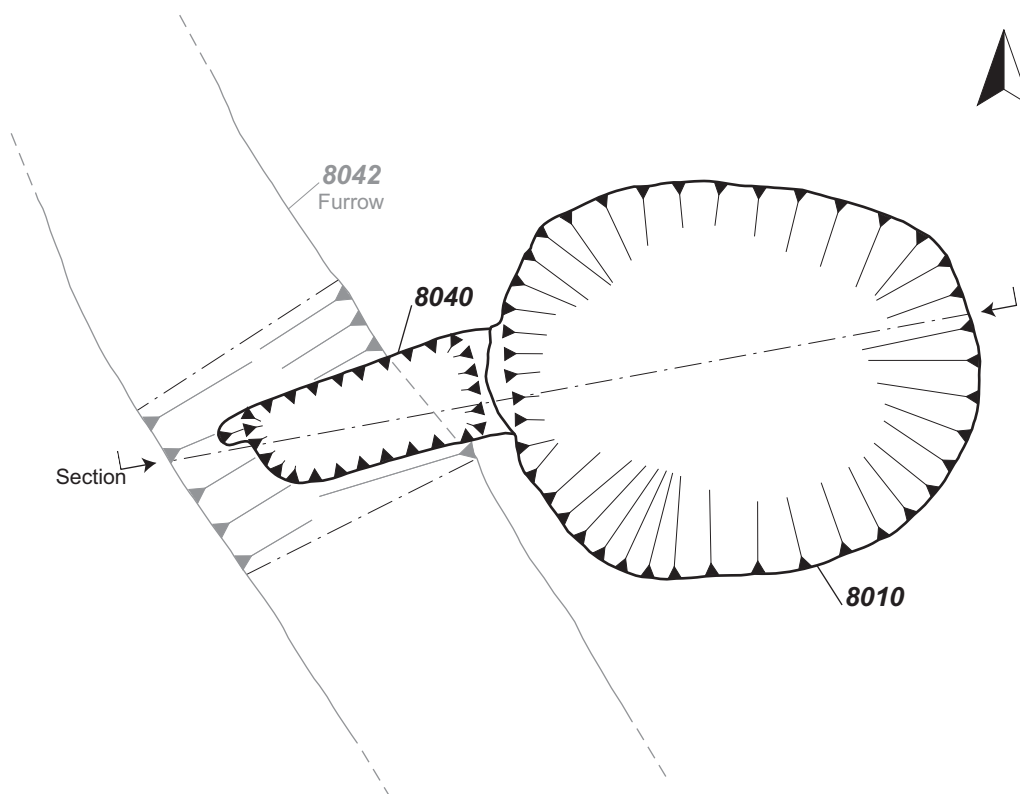
3.0	16/12/08	Plot 15-1	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 9: Location of excavation area in Plot 15-1, Halton East.

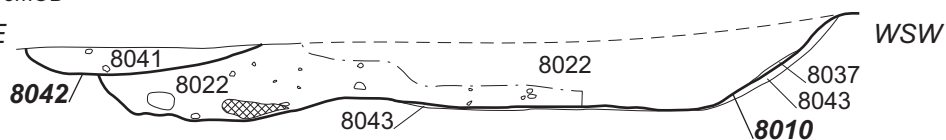
Scale 1:200 (Inset scale 1:5000)



Section


196.93mOD

ENE



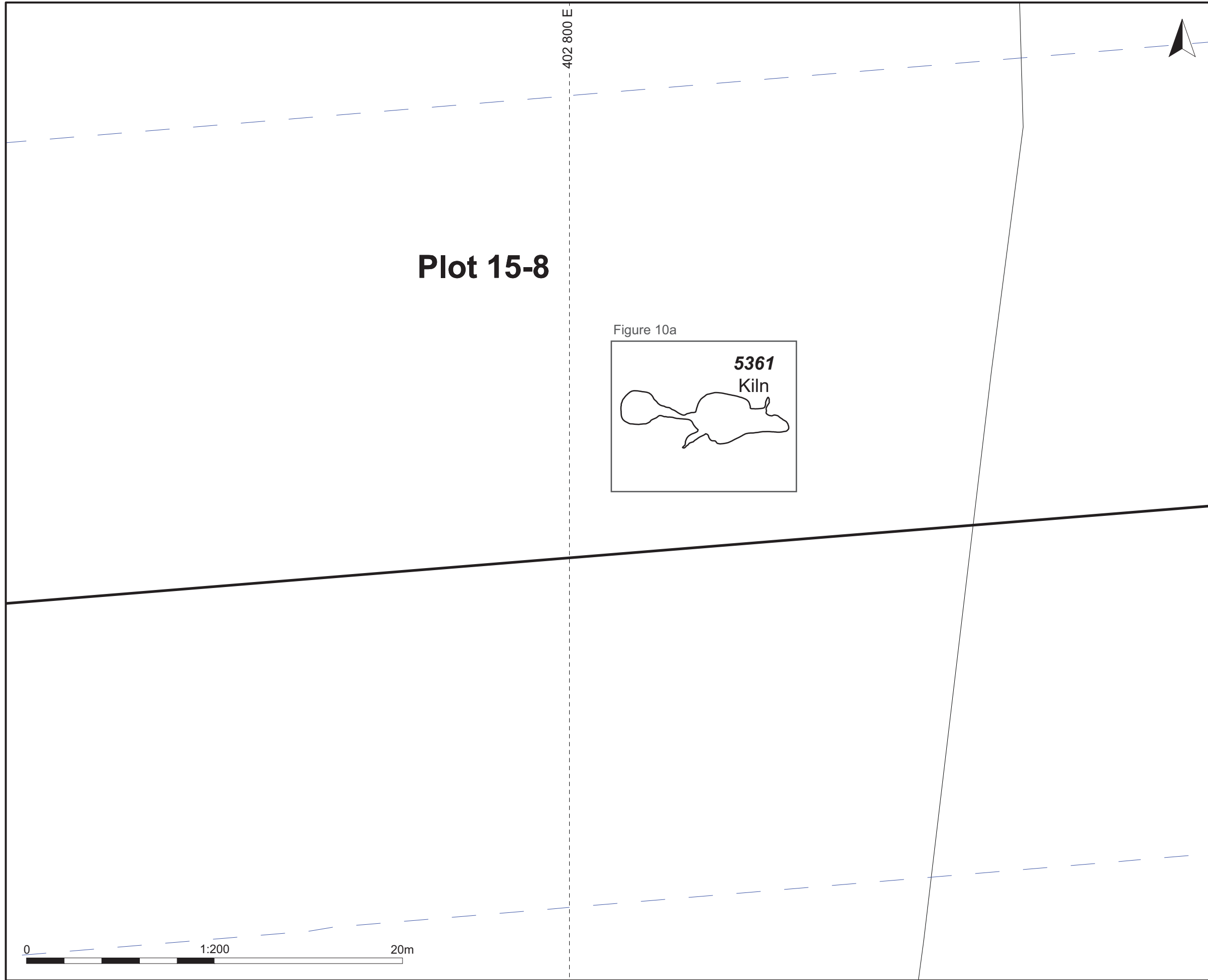
0 1:50 5m

Key

 Area of burning

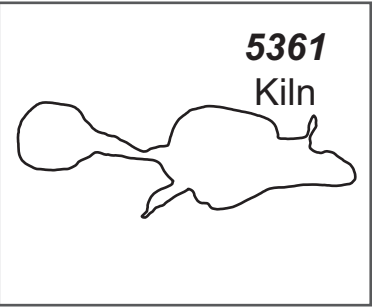
3.0	16/12/08	Plot 15-1 Kiln [8010]	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

Pannal to Nether Kellet Gas Pipeline
Figure 9a: Plot 15-1, Halton East, plan and section of kiln [8010].
Plan scale 1:50, section scale 1:25



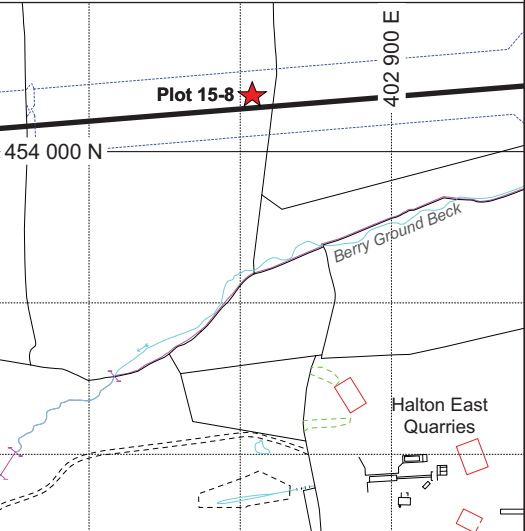
Plot 15-8

Figure 10a



Key

- Pipeline route
- Excavation site



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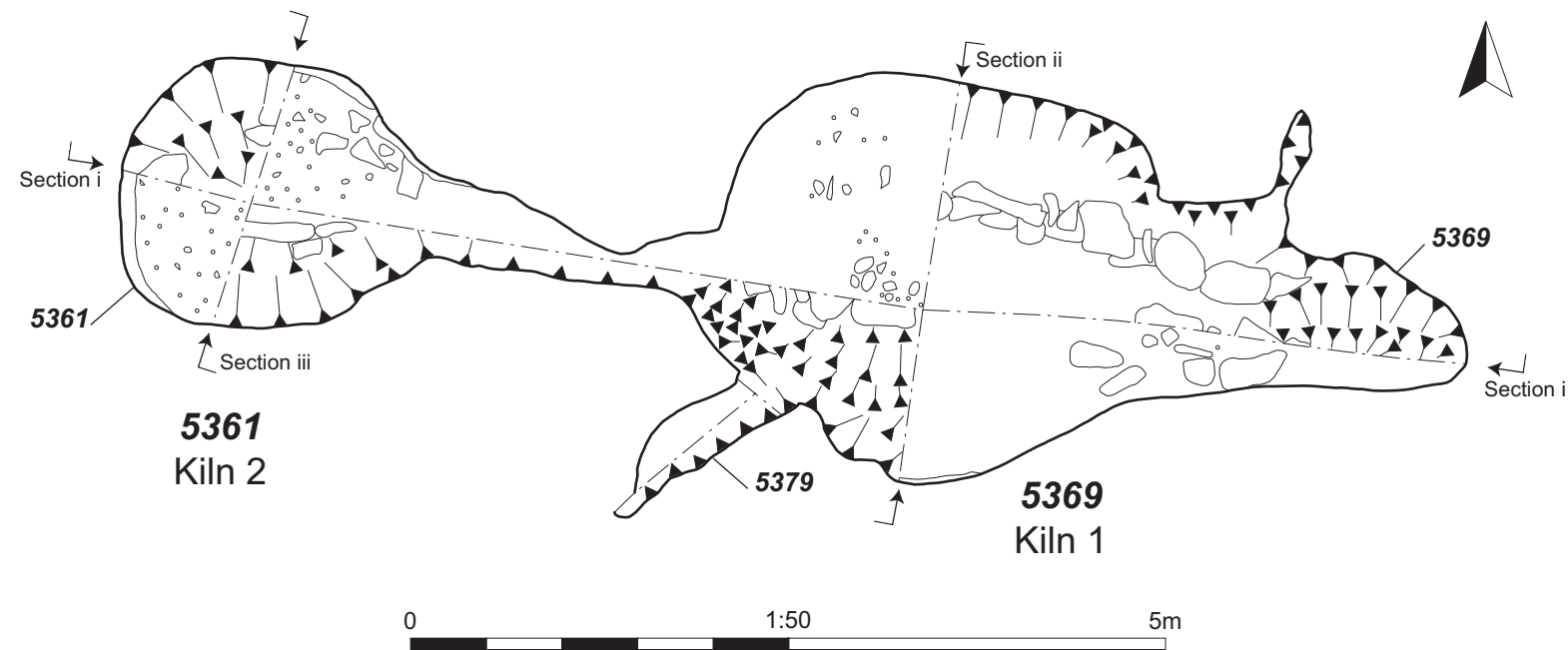
3.0	16/12/08	Plot 15-8	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



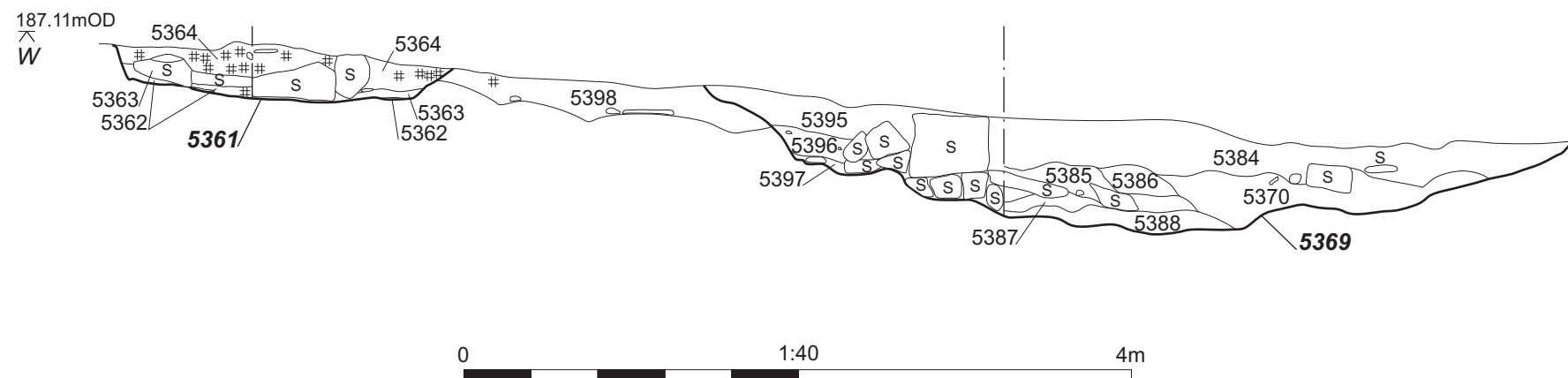
Pannal to Nether Kellet Gas Pipeline

Figure 10: Location of excavation area in Plot 15-8, Embsay.

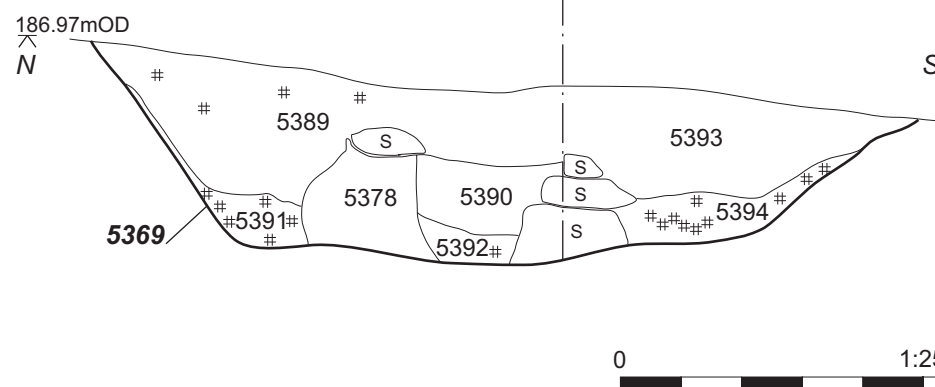
Scale 1:200 (Inset scale 1:5000)



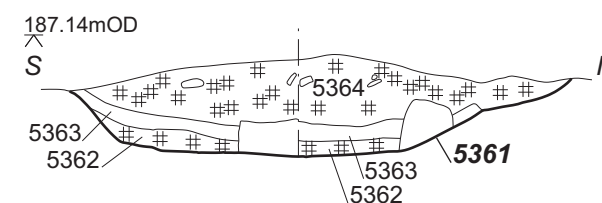
Section i



Section ii



Section iii



Key

- # Charcoal
- s Sandstone

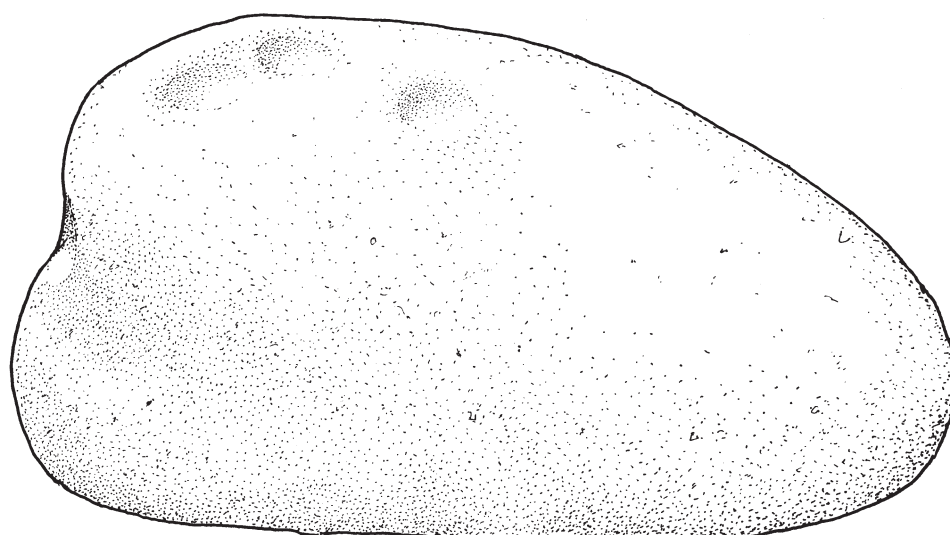
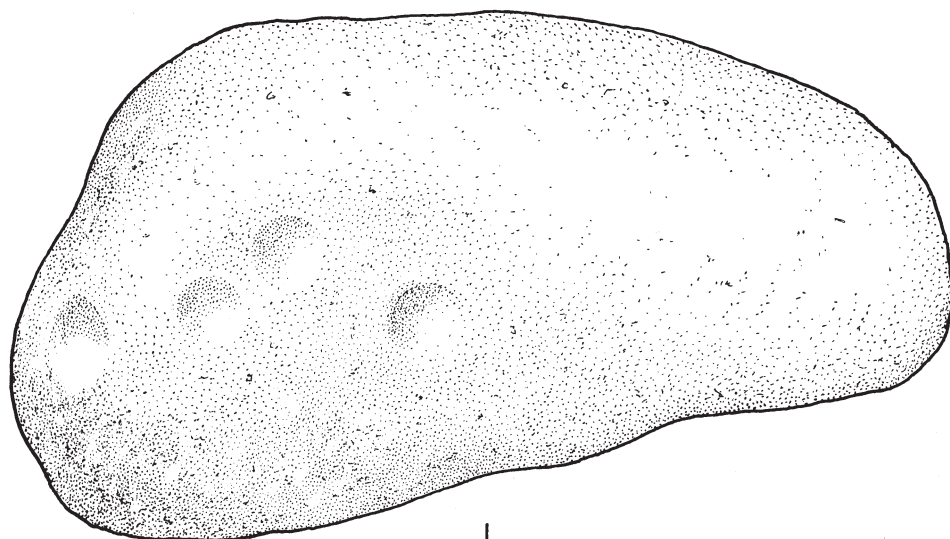
3.0	16/12/08	Plot 15-8 Kilns	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 10a: Plot 15-8, Embsay, plan and sections of Kilns [5361] and [5369].

Plan scale 1:50, section scale 1:25 and 1:40

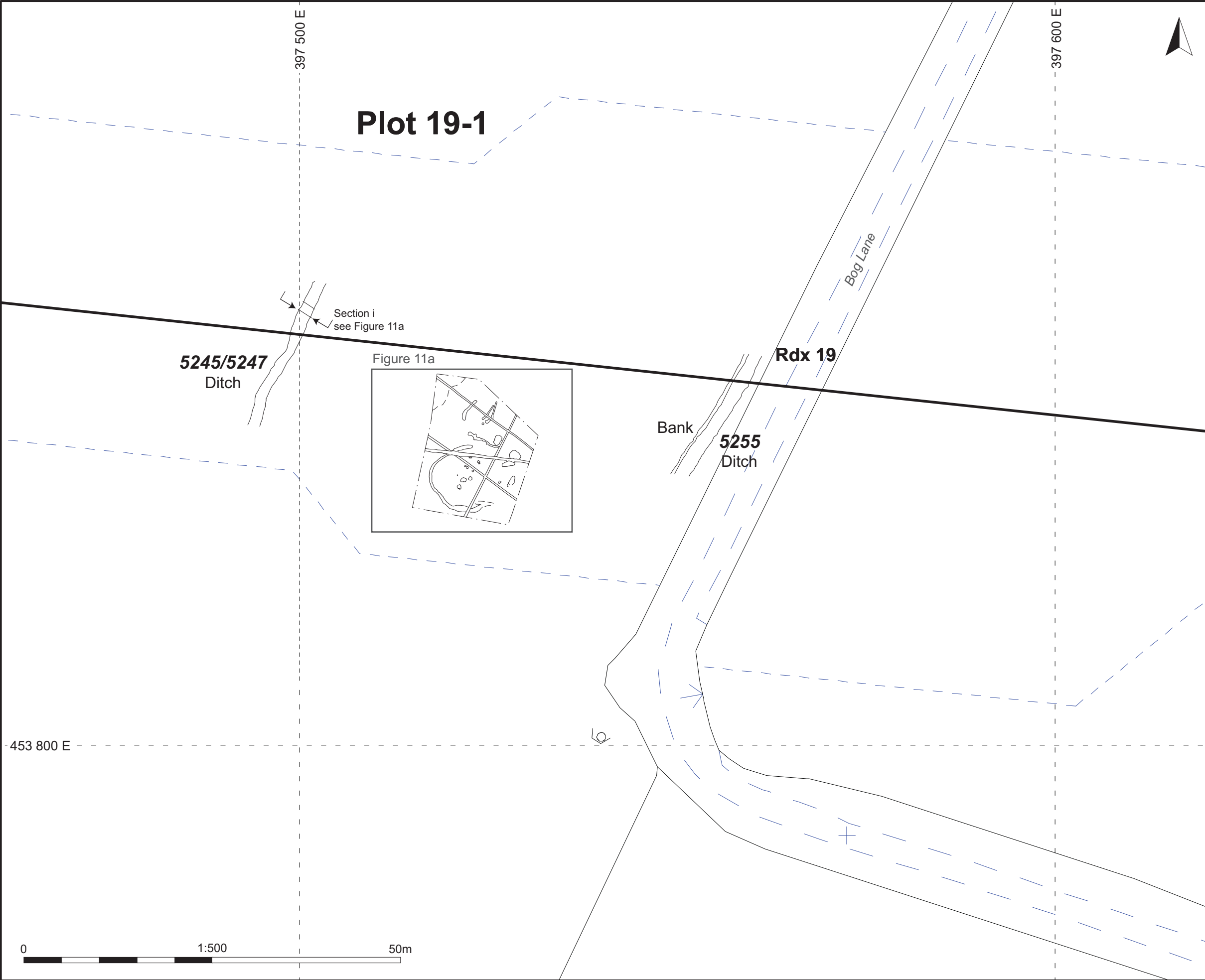


0 1:10 1 metre

Key

1.0	19/01/09	Plot 15-8	DW	PD	RM
Ver	Date	Description	DM	Chk	App

Pannal to Nether Kellet Gas Pipeline
Figure 10b: Sketch of cup-marked boulder
in plot 15-8



Key

— Pipeline route

★ Excavation site

Plot 19-1

High Barn

Tarn House Hotel

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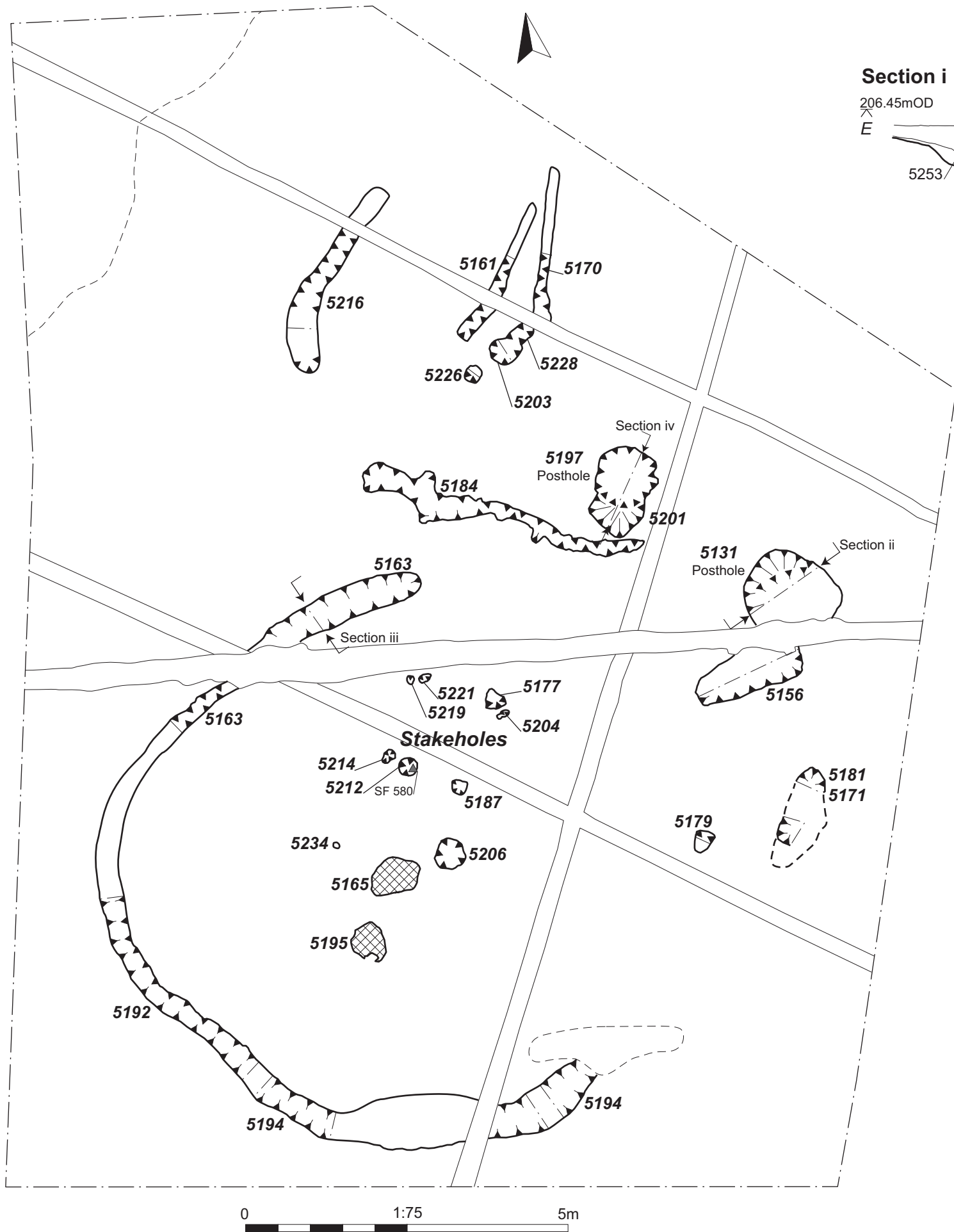
3.0	16/12/08	Plot 19-1	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

network
archaeology

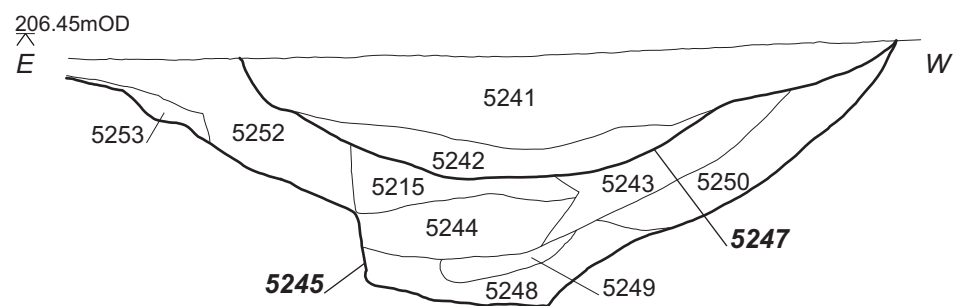
Pannal to Nether Kellet Gas Pipeline

Figure 11: Location of excavation area in Plot 19-1, Thorlby Springs.

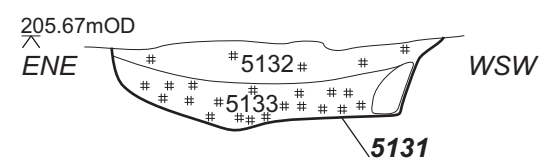
Scale 1:500 (Inset scale 1:5000)



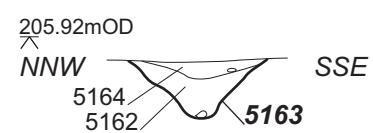
Section i



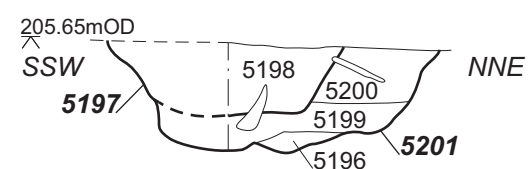
Section ii



Section iii



Section iv



Key

- Area of burning
- Charcoal
- Special finds

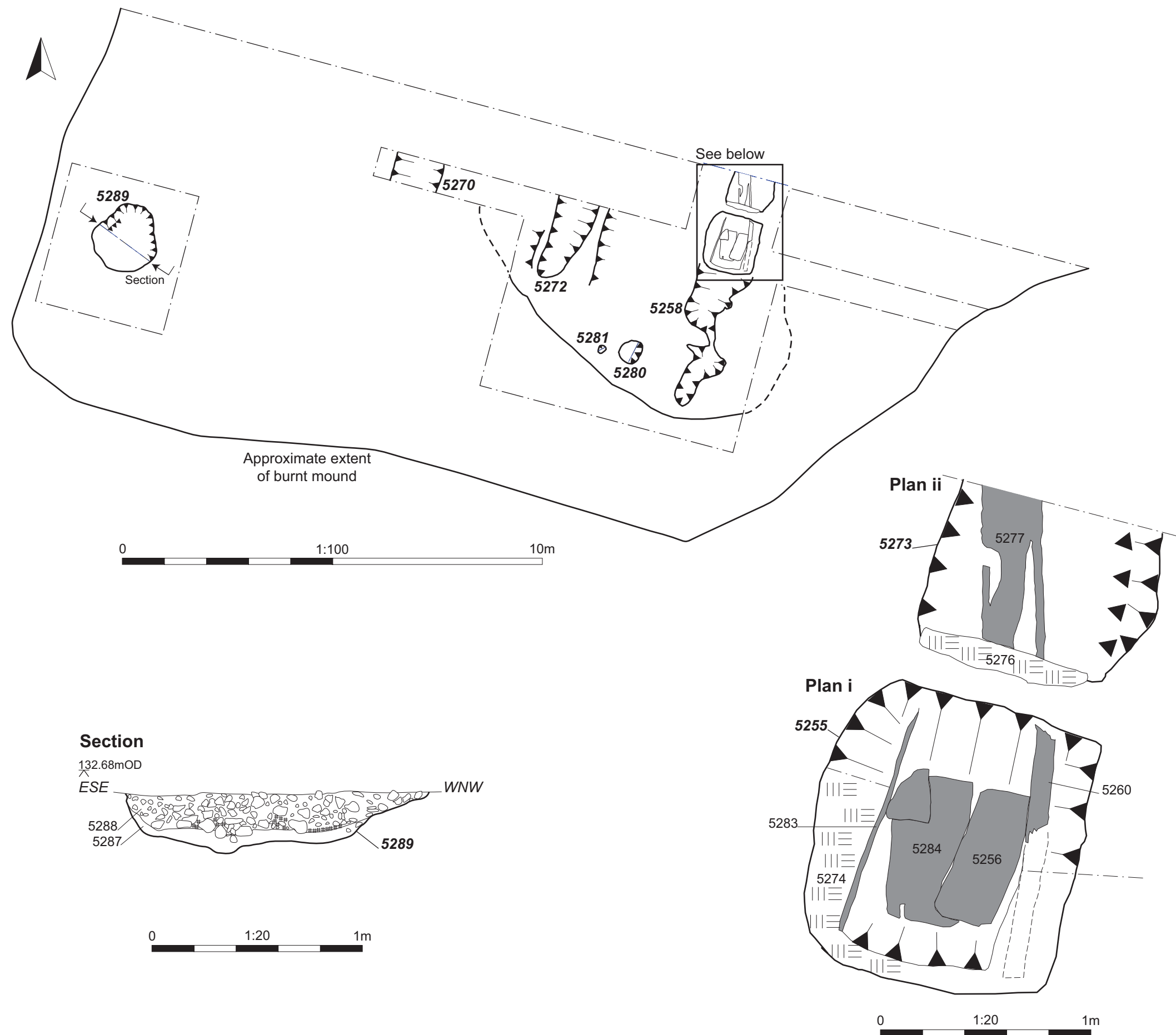
3.0	16/12/08	Plot 19-1 Excavation	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 11a: Plot 19-1, Thorlby Springs, plan of excavation and sections through features {5245}, [5131], [5163] and [5201].

Plan scale 1:75, section scale 1:25



Key

- Wood
- # Charcoal

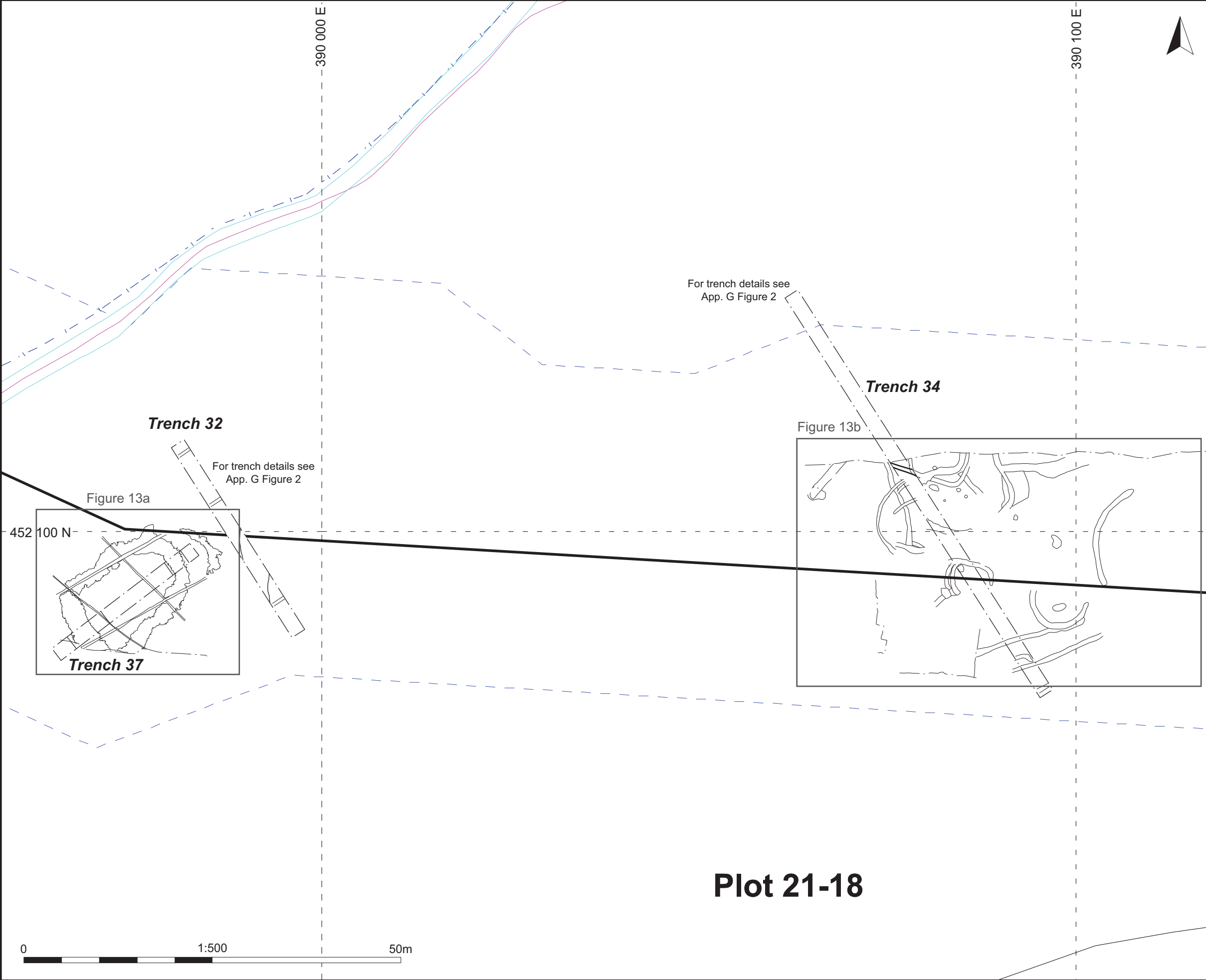
3.0	16/12/08	Plot 21-10 Pits	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

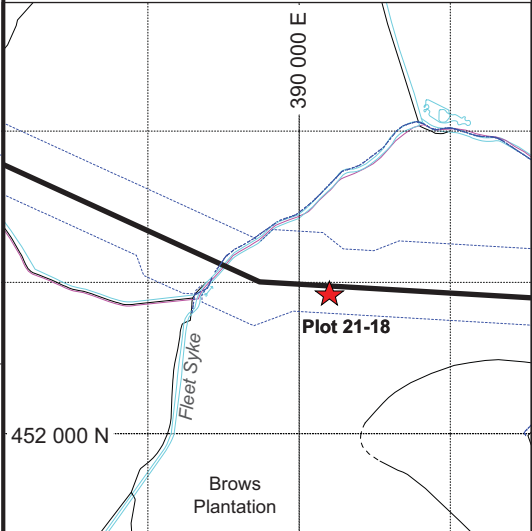
Figure 12a: Plot 21-10, Turnbers Hill, plan of excavation with wood-lined pits [5255] and [5273].

Scale 1:100



Key

- Pipeline route
- ★ Excavation site



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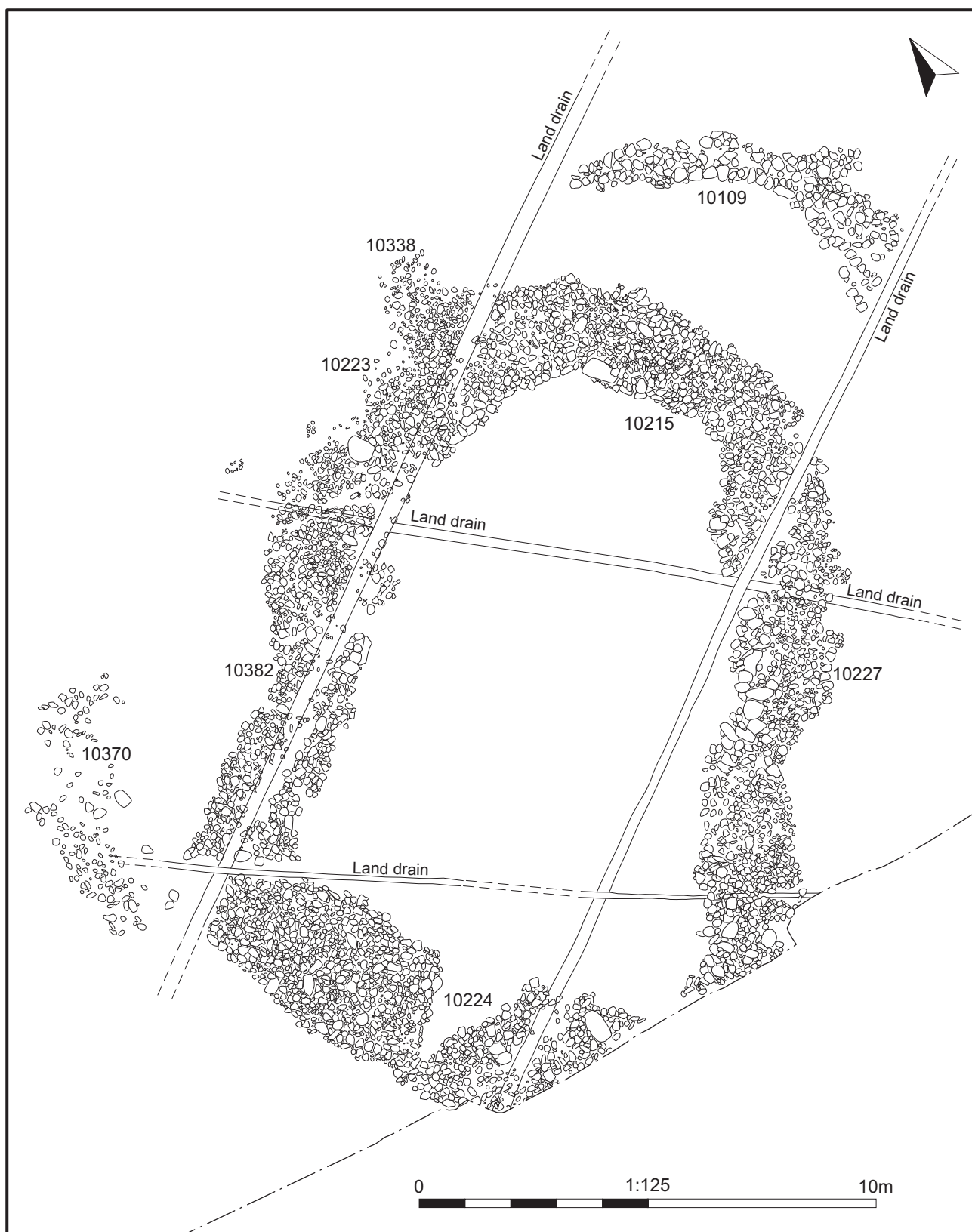
3.0	16/12/08	Plot 21-18	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 13: Location of excavation area in Plot 21-18, Bank Newton.

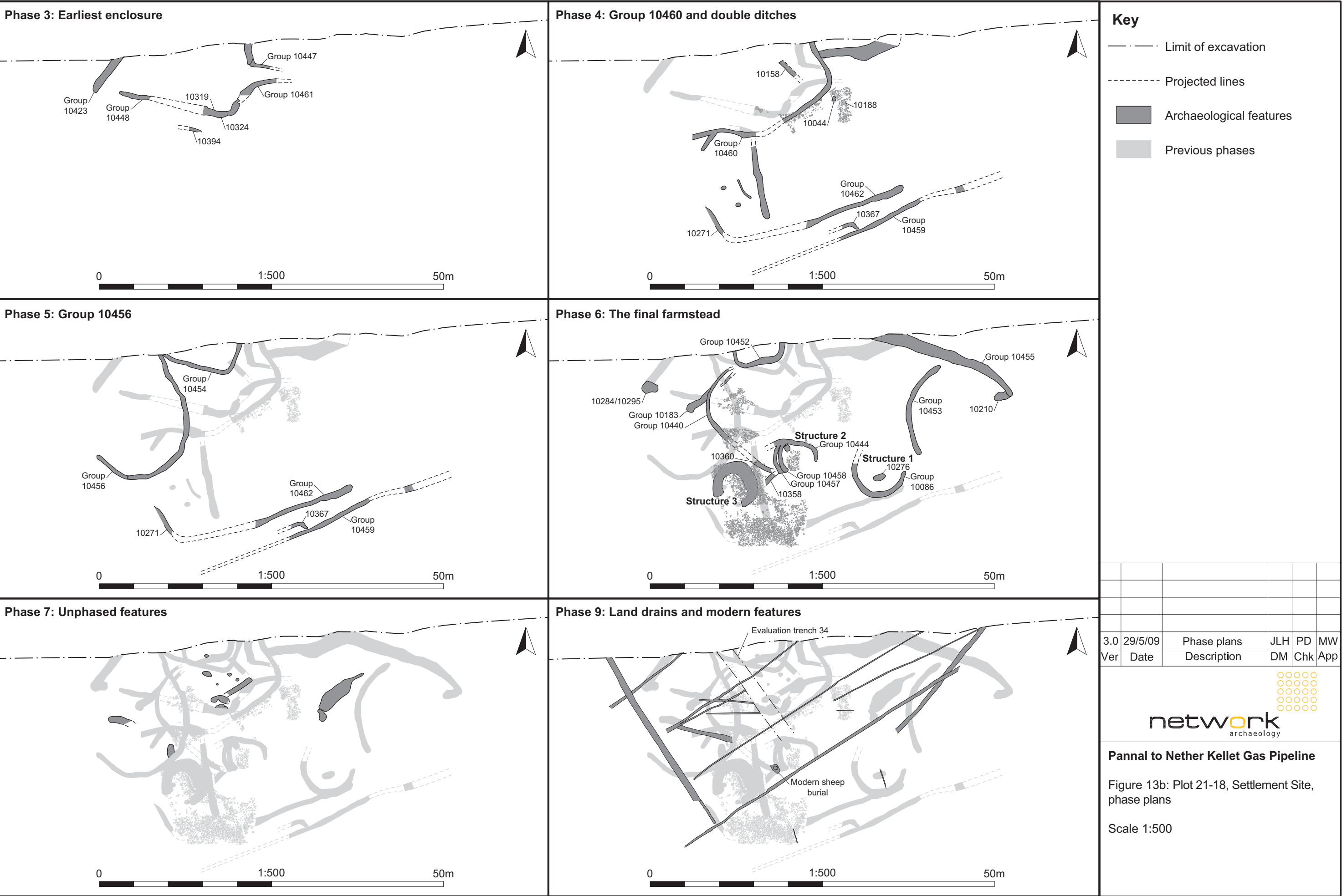
Scale 1:500 (Inset scale 1:5000)

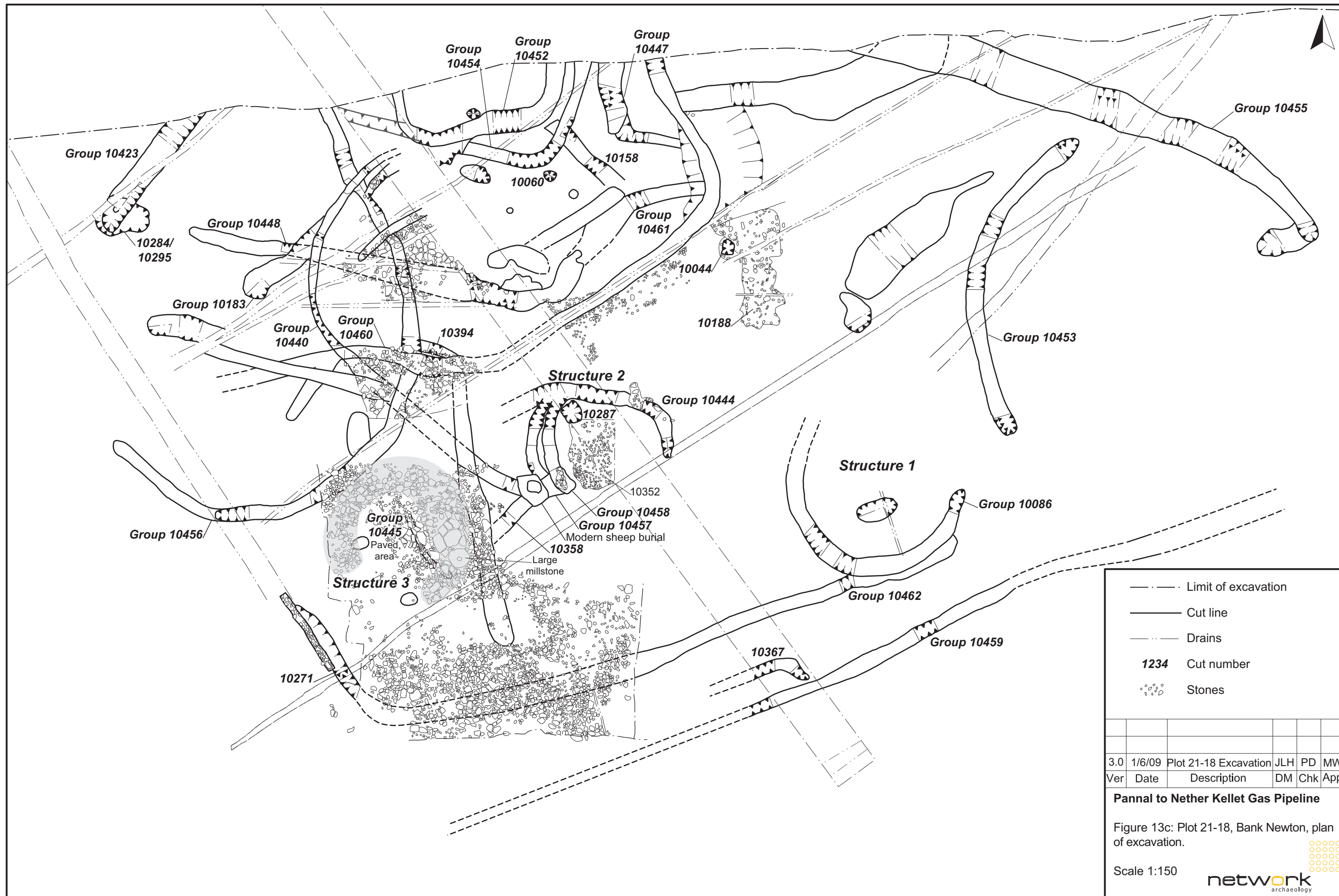


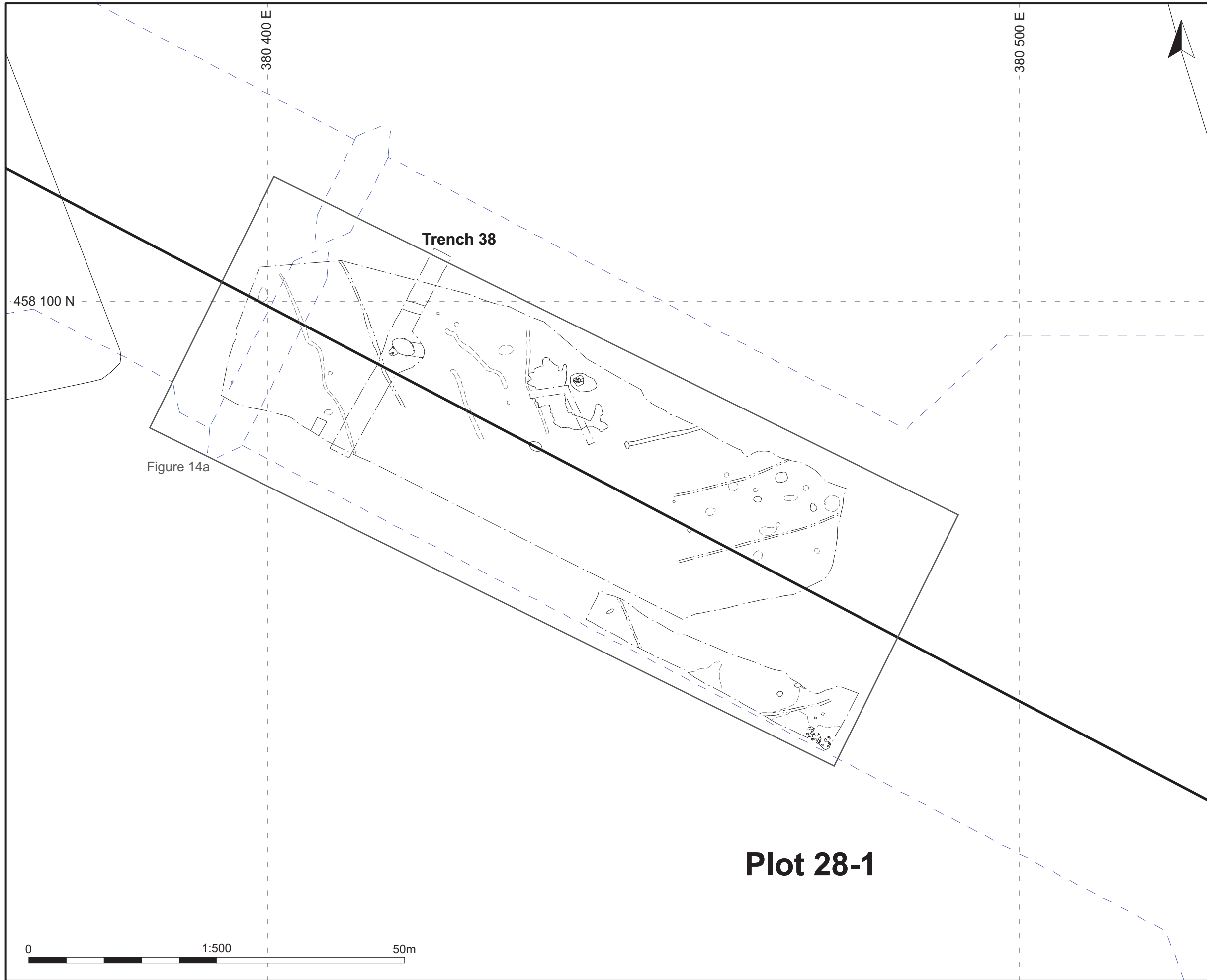
Key

3.0	19/01/09	Plot 21-18 Cairn	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

Pannal to Nether Kellet Gas Pipeline
 Figure 13a: Plot 21-18, Bank Newton, plan
 of possible ring cairn.
 Scale 1:125







Key
 Pipeline route
 Excavation site

Cockley Bank

Hollow Gill Brow

Plot 28-1

Rdx 28

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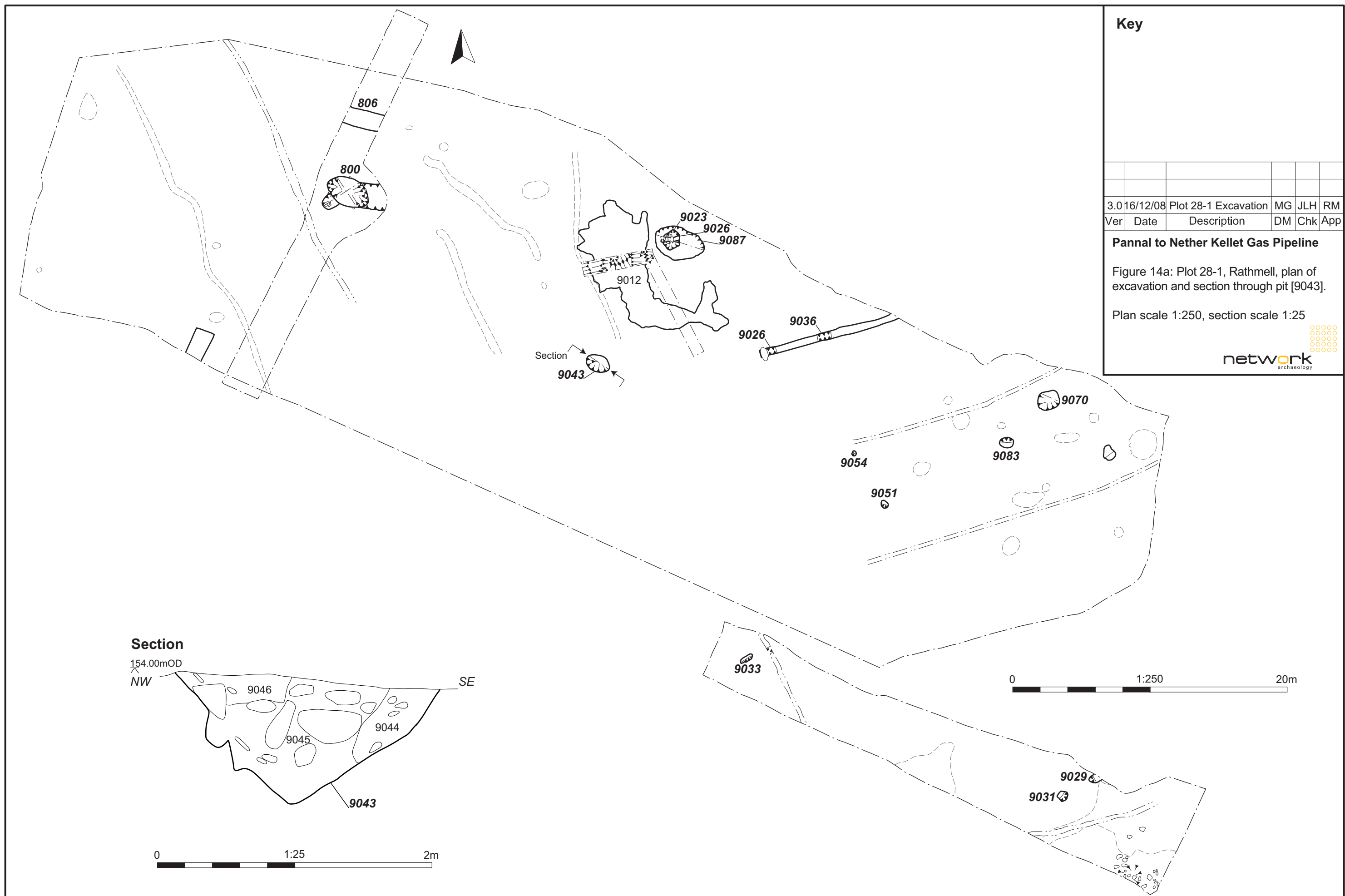
3.0	16/12/08	Plot 28-1	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

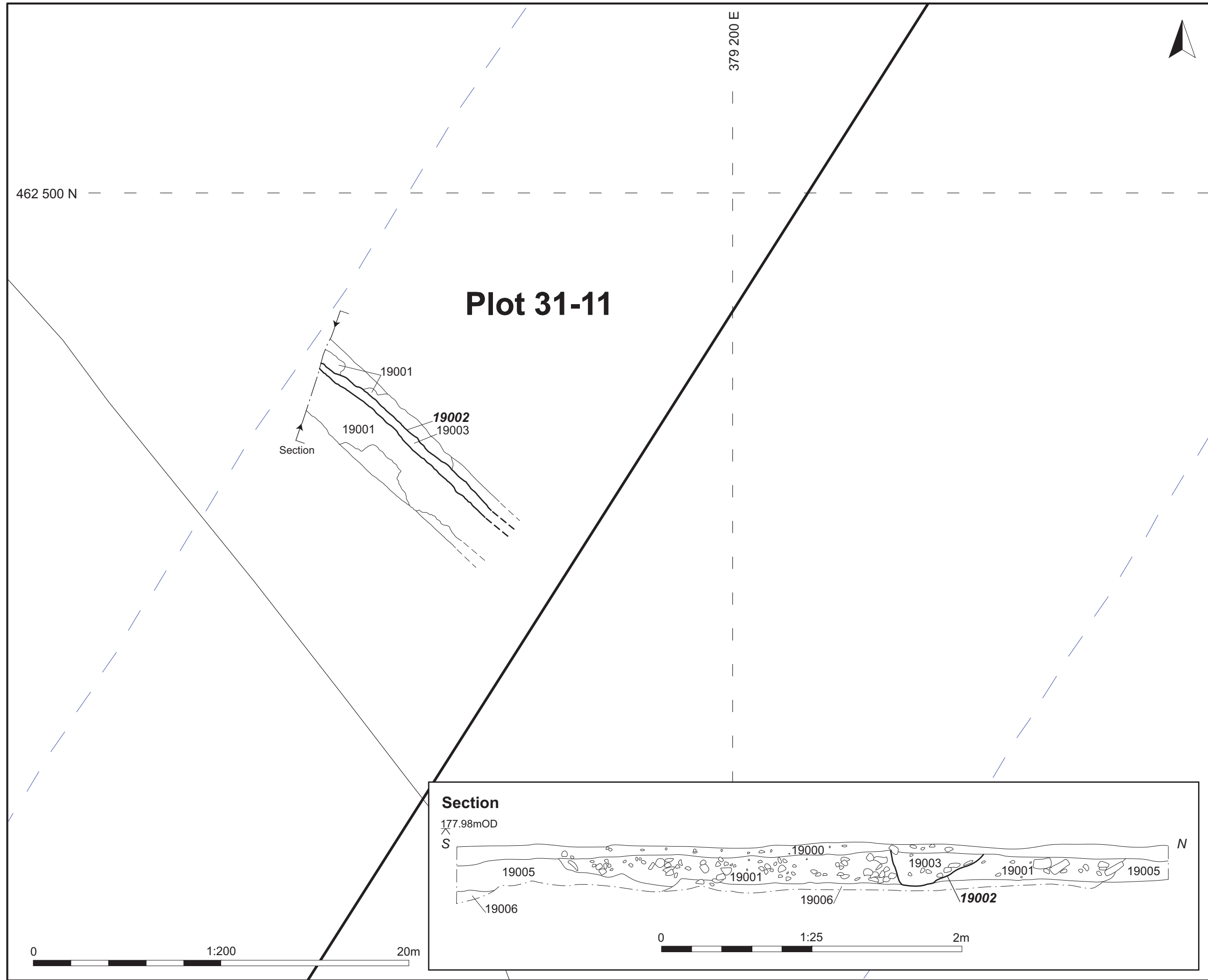
network
archaeology

Pannal to Nether Kellet Gas Pipeline

Figure 14: Location of excavation area in Plot 28-1, Rathmell.

Scale 1:500 (Inset scale 1:5000)

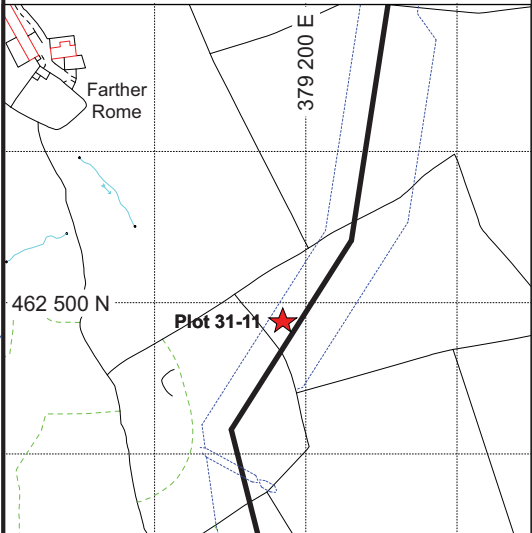




Key

— Pipeline route

★ Excavation site



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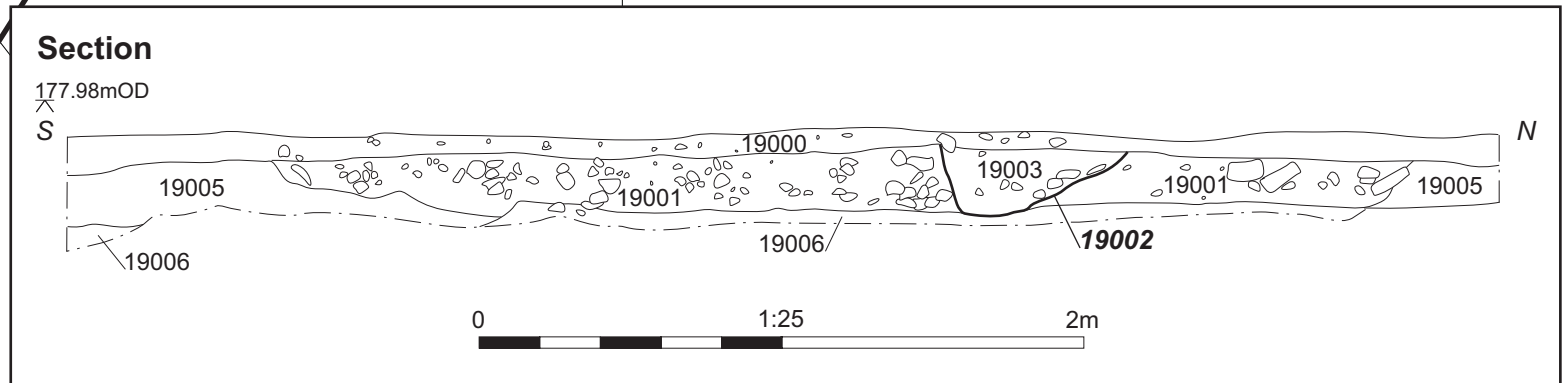
3.0	16/12/08	Plot 31-11	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

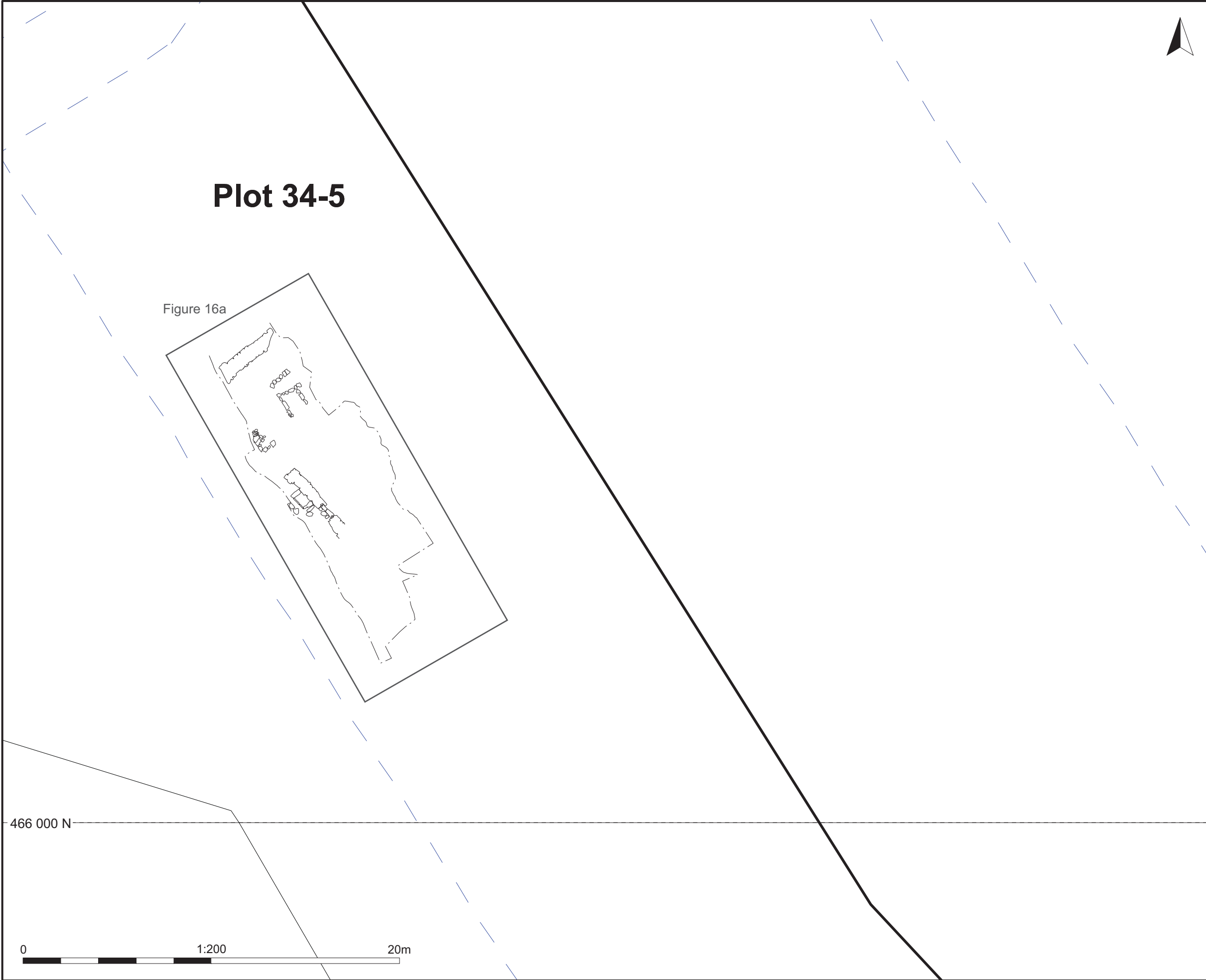


Pannal to Nether Kellet Gas Pipeline

Figure 15: Location of excavation area in Plot 31-11, Farther Rome and section through ditch [19002].

Scale 1:200 (Inset scale 1:5000)

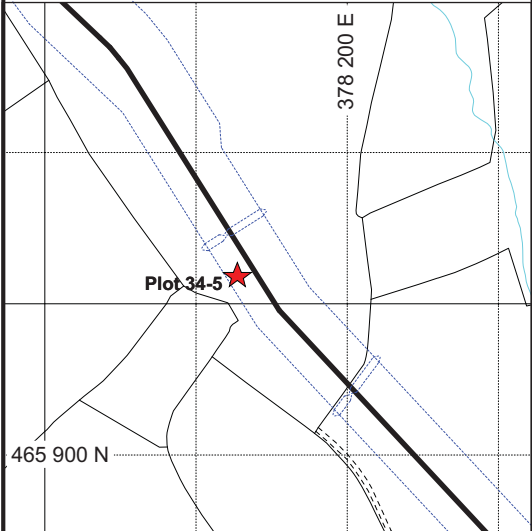




Key

— Pipeline route

★ Excavation site



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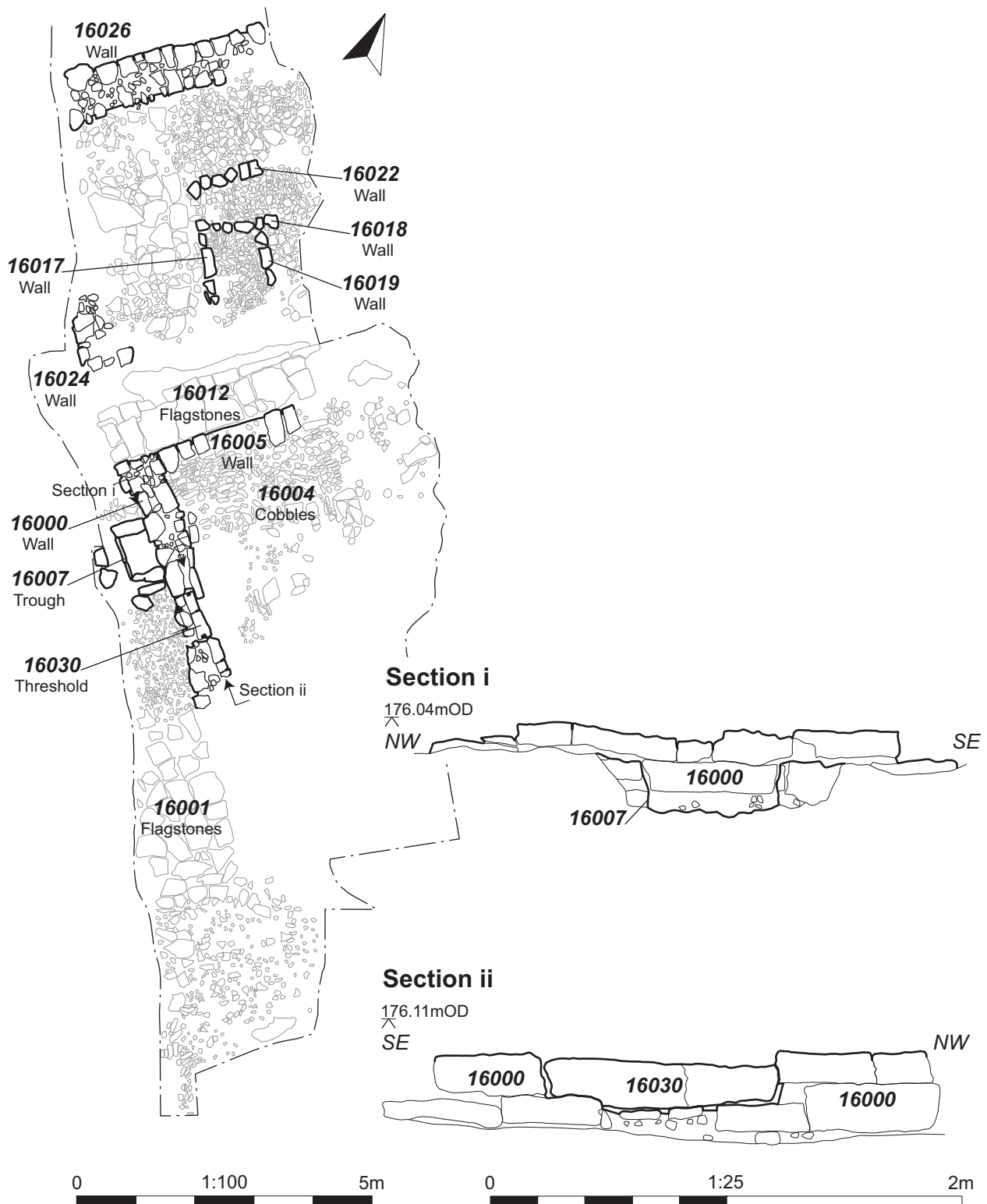
3.0	16/12/08	Plot 34-5	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 16: Location of excavation area in Plot 34-5, Lawkland Green.

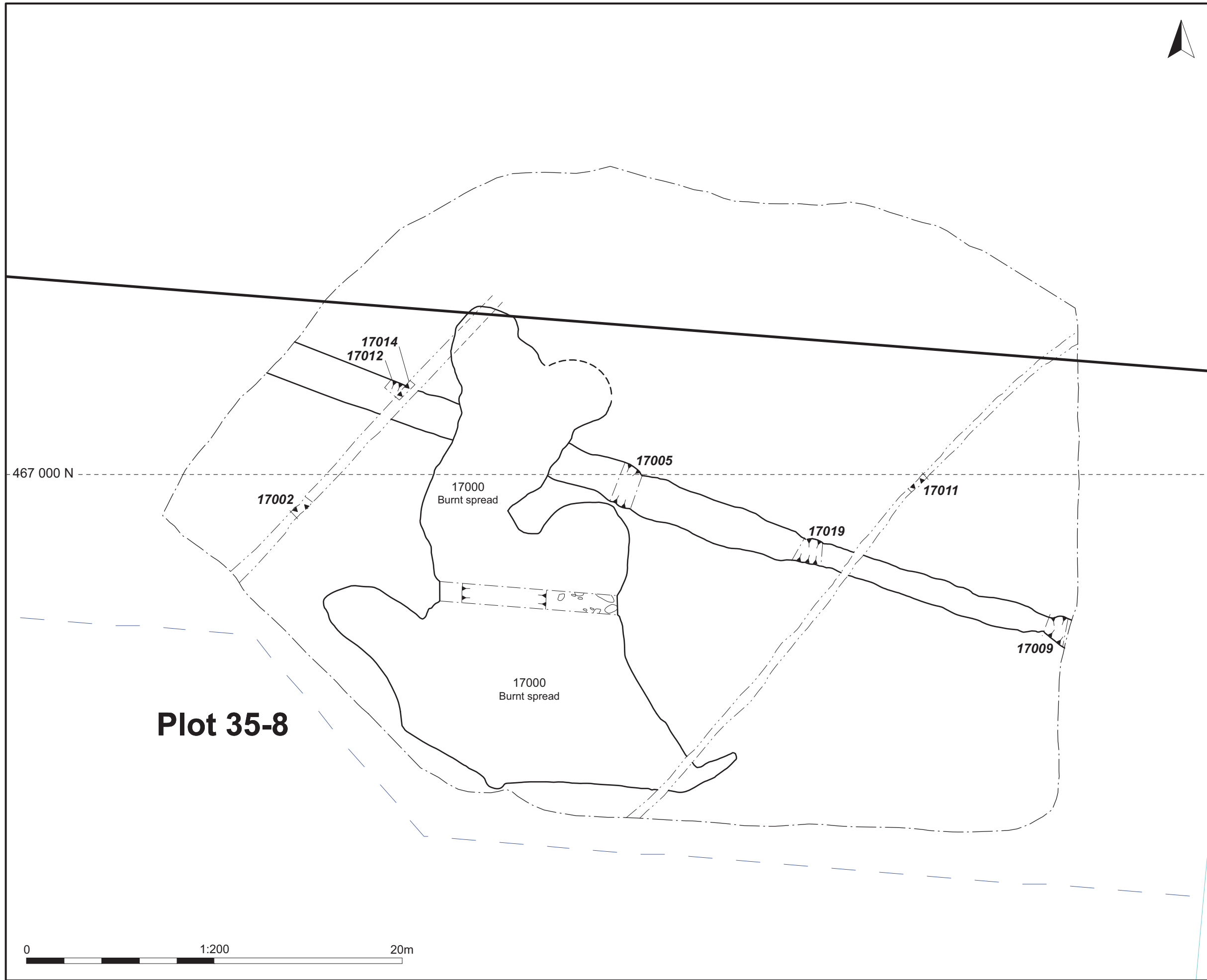
Scale 1:200 (Inset scale 1:5000)



Key

3.0	16/12/08	Plot 34-5 walls	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

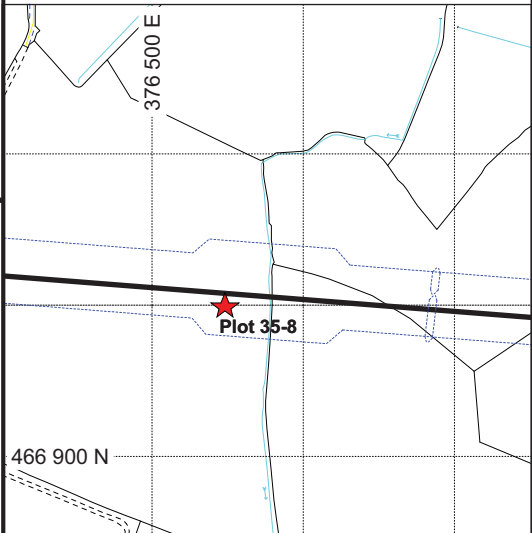
Pannal to Nether Kellet Gas Pipeline
Figure 16a: Plot 34-5, Lawkland Green,
plan of excavation and sections of wall
[16000].
Plan scale 1:100, Section scale 1:25



Key

— Pipeline route

★ Excavation site



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3.0	16/12/08	Plot 35-8	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 17: Location of excavation area in Plot 35-8, Lawkland Moss.

Scale 1:200 (Inset scale 1:5000)

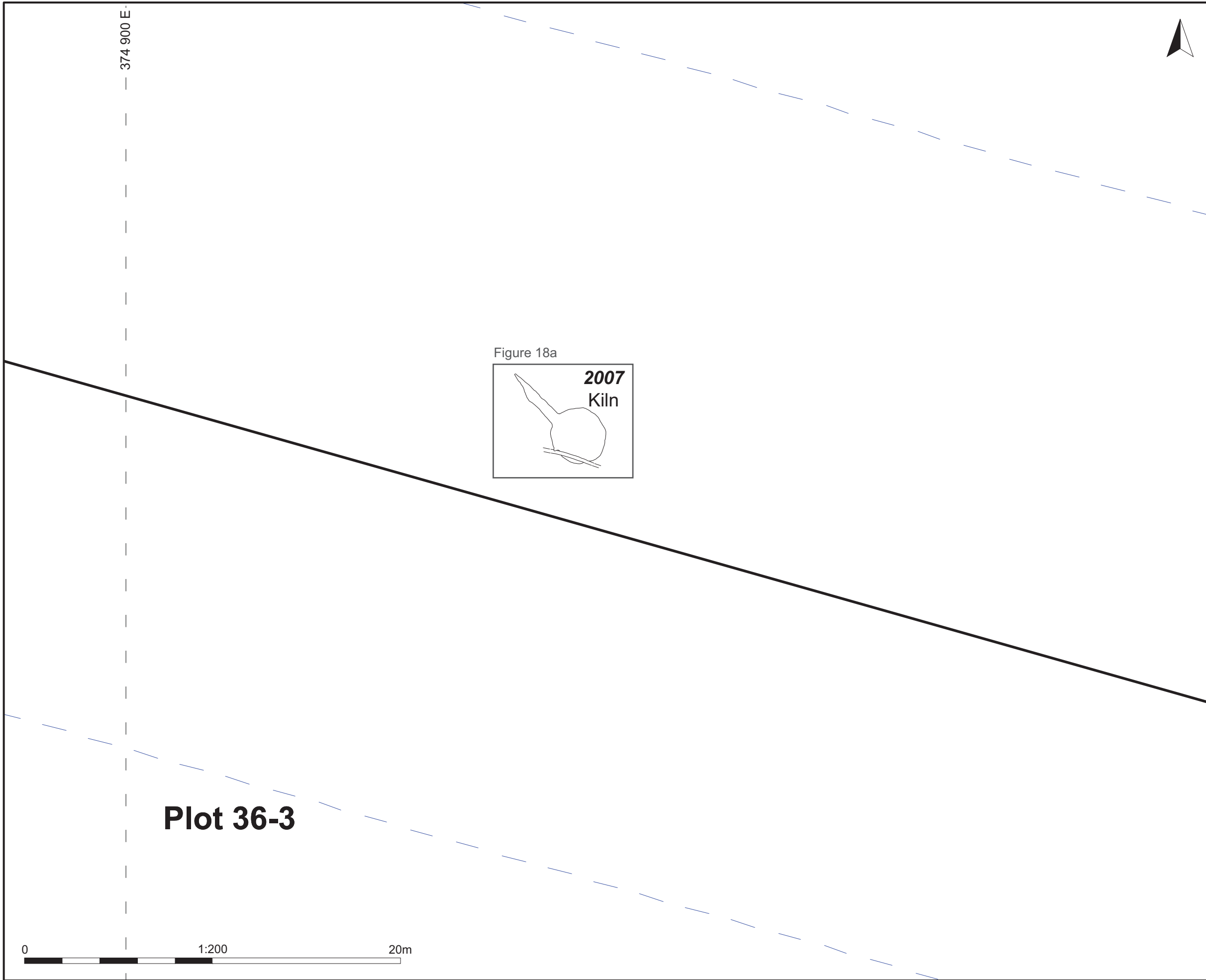
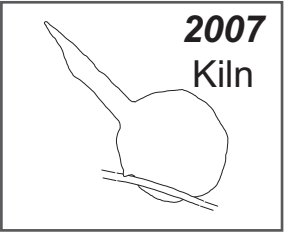


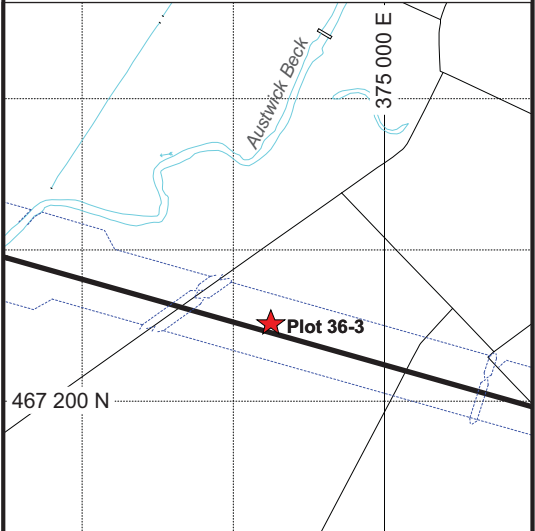
Figure 18a



Key

— Pipeline route

★ Excavation site



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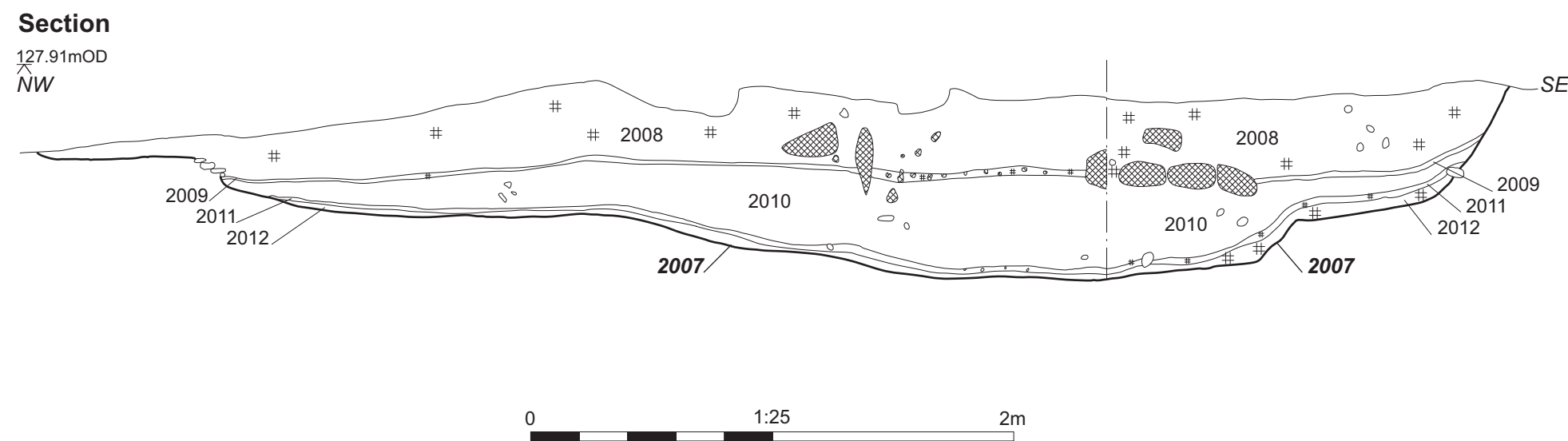
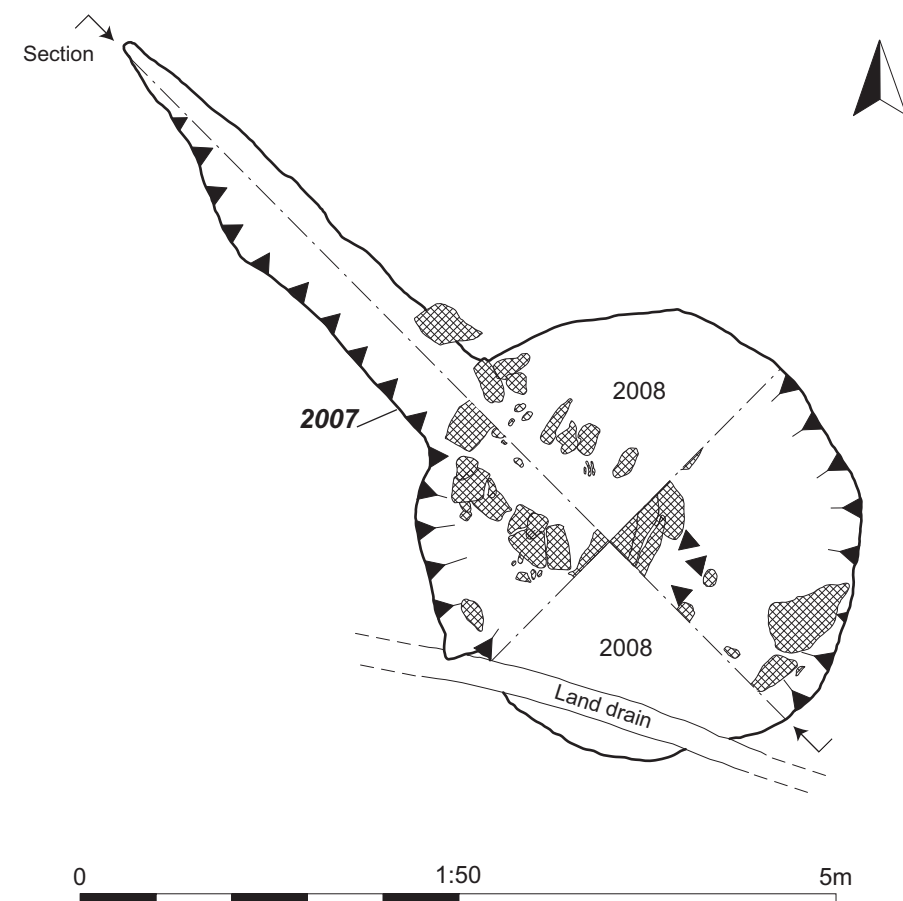
3.0	16/12/08	Plot 36-3	MG	JLH	RM
Ver	Date	Description	DM	Chk	App




Pannal to Nether Kellet Gas Pipeline

Figure 18: Location of excavation area in Plot 36-3, Kettle Beck.

Scale 1:200 (Inset scale 1:5000)



Key

 Burnt stone

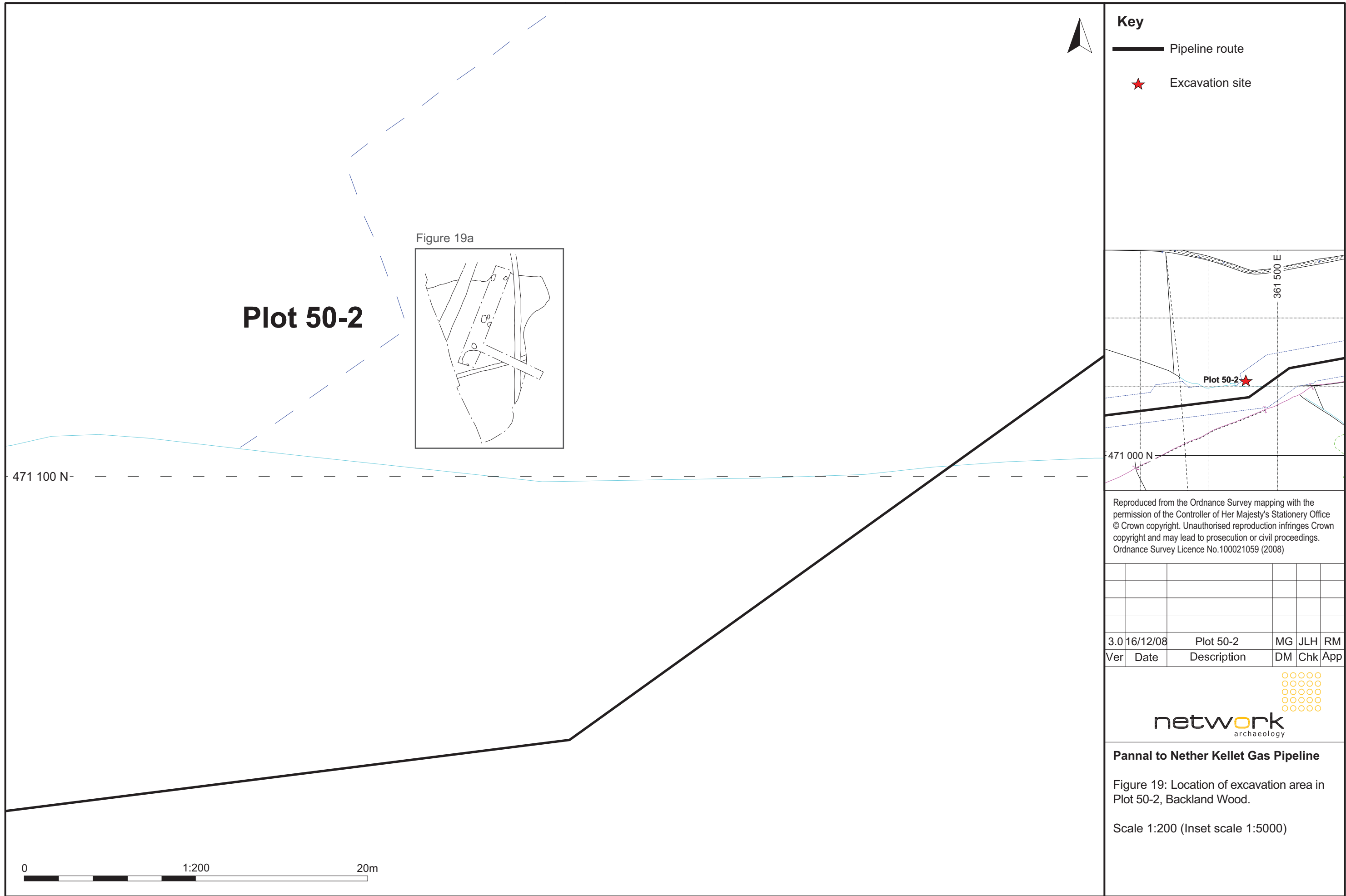
3.0	16/12/08	Plot 36-3 Kiln [2007]	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



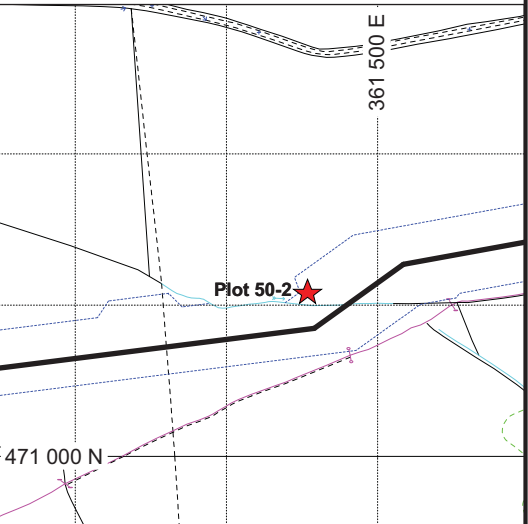
Pannal to Nether Kellet Gas Pipeline

Figure 18a: Plot 36-3, Kettle Beck, plan and sections of kiln [2007].

Plan scale 1:50, Section scale 1:25



- Key**
- Pipeline route
 - ★ Excavation site



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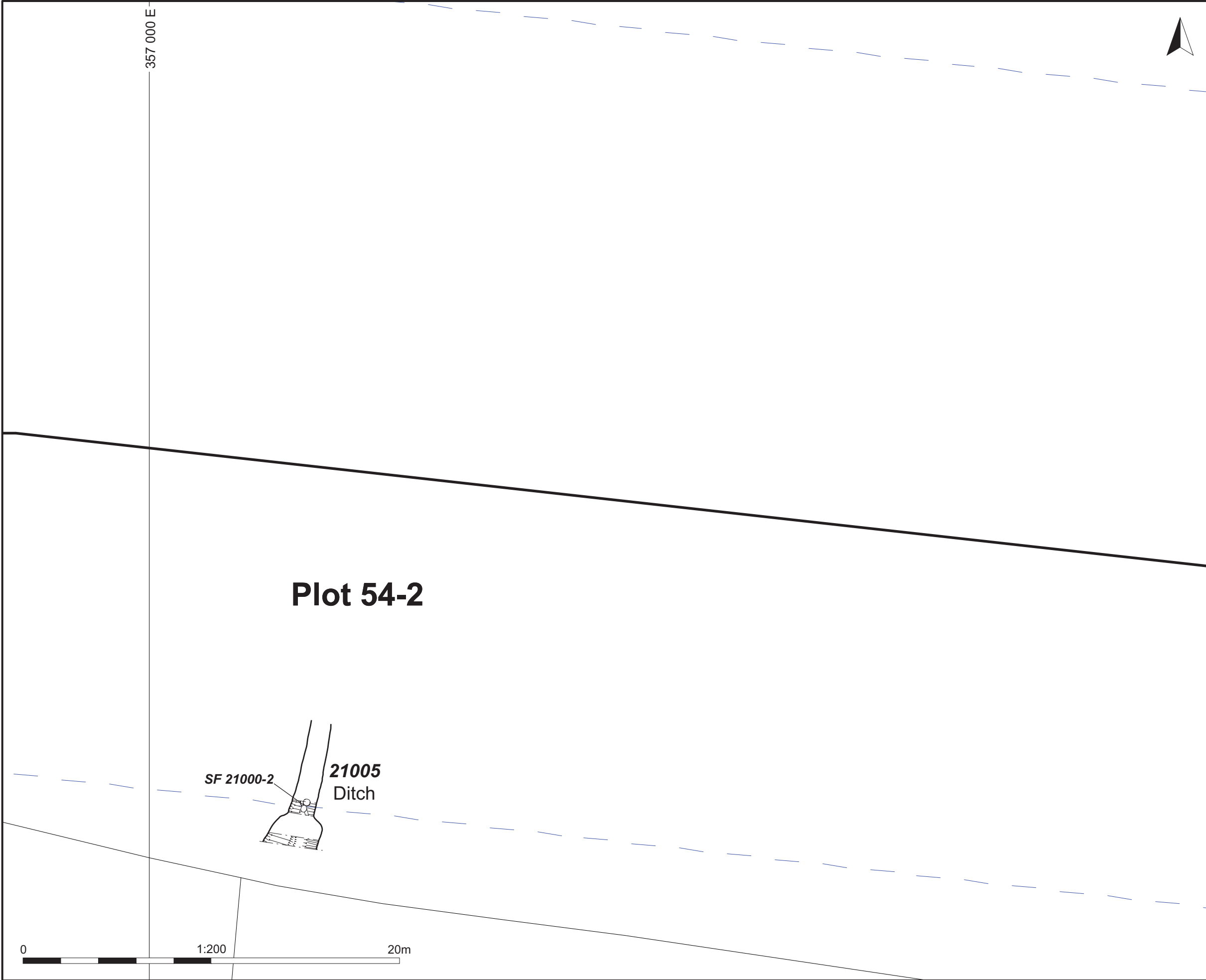
3.0	16/12/08	Plot 50-2	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 19: Location of excavation area in Plot 50-2, Backland Wood.

Scale 1:200 (Inset scale 1:5000)



Key

Pipeline route

Excavation site

469 800 N
357 000 E
Gressingham
Plot 54-2

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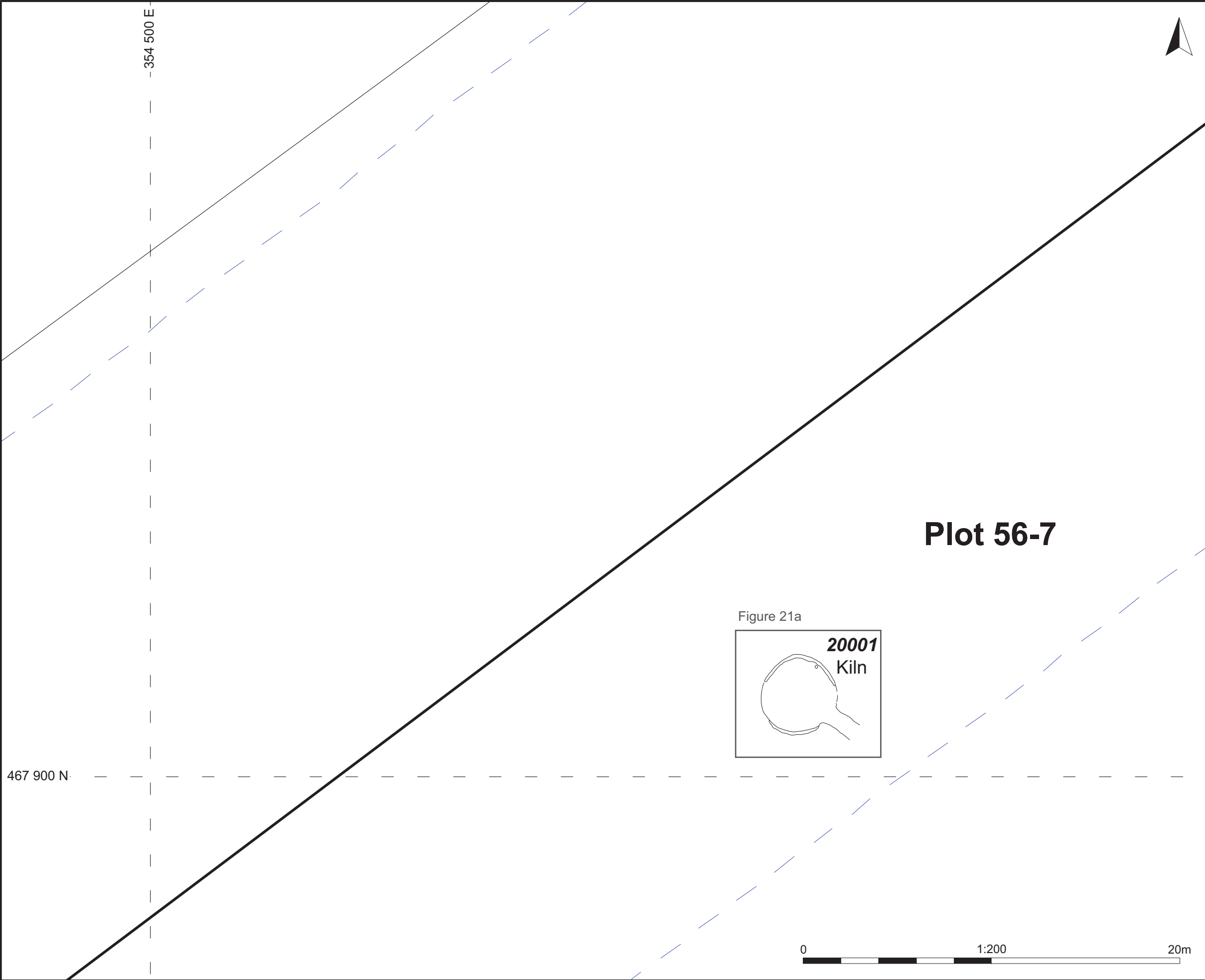
3.0	16/12/08	Plot 54-2	MG	JLH	RM
Ver	Date	Description	DM	Chk	App

network
archaeology

Pannal to Nether Kellet Gas Pipeline

Figure 20: Location of excavation area in Plot 54-2, Gressingham.

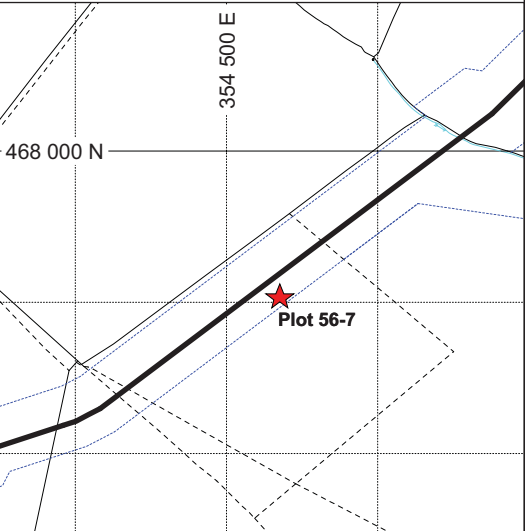
Scale 1:200 (Inset scale 1:5000)



Key

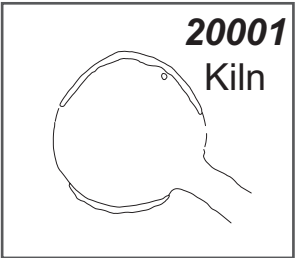
— Pipeline route

★ Excavation site



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Figure 21a



3.0	16/12/08	Plot 56-7	MG	JLH	RM
Ver	Date	Description	DM	Chk	App



Pannal to Nether Kellet Gas Pipeline

Figure 21: Location of excavation area in Plot 56-7, Whinney Hill.

Scale 1:200 (Inset scale 1:5000)



PLATES

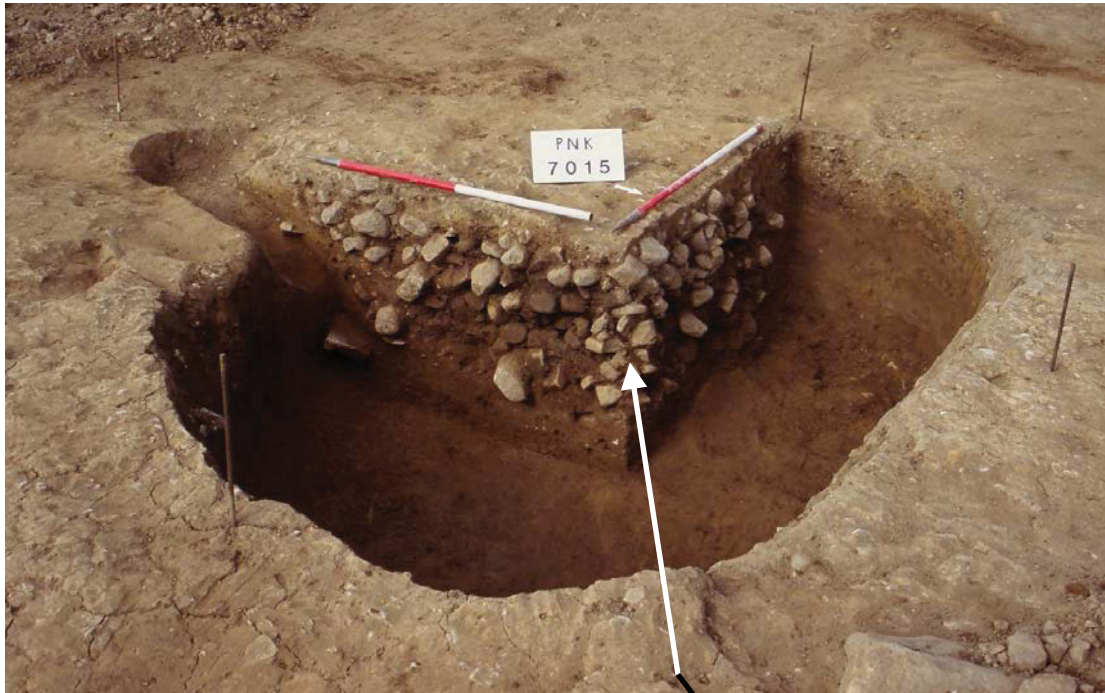


Plate 1

Plot 3-5: Excavated kiln from which part of a Roman glass bangle was recovered



Plate 2

Plot 3-5: Excavated section through bank



Plate 3: Plot 6-7: The remains of the northern brick clamp represented by five rows of fired red bricks

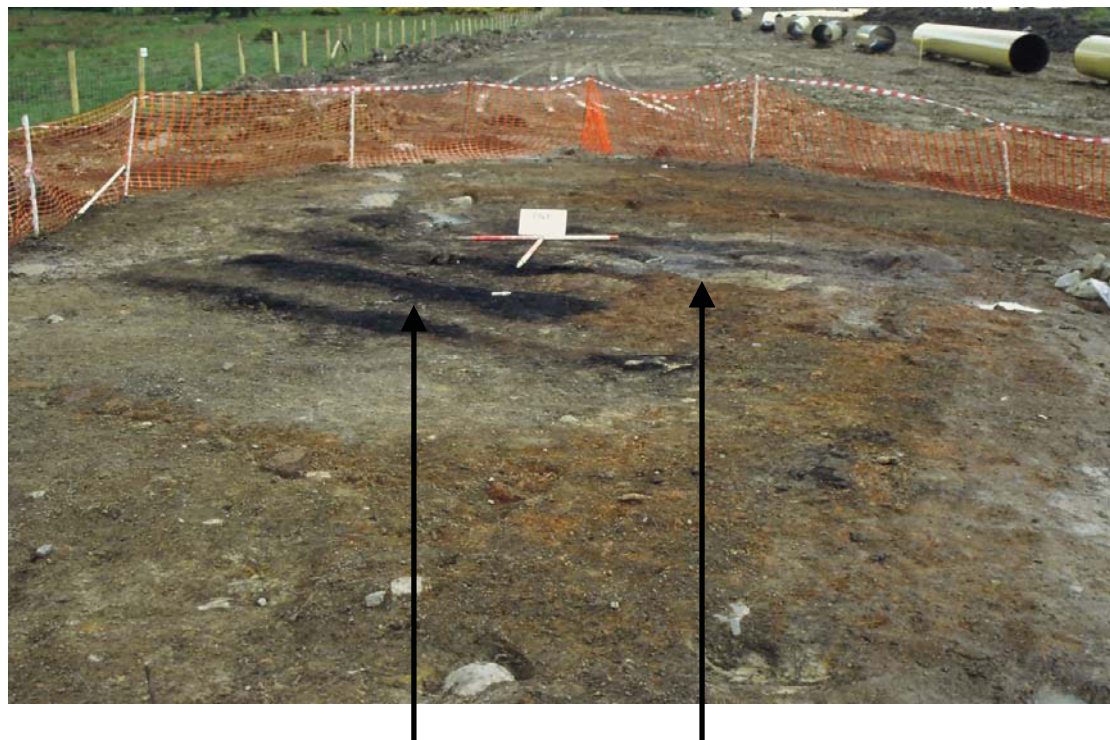


Plate 4
Plot 6-7: Rows of burnt deposits between the fired red brick walls of the southern brick clamp



Plate 5

Plot 7-18: Floor and wall of the medieval remains in the foreground



Plate 6

Plot 7-18: North-west corner of the building showing surface [13110] and pit [13080]



Plate 7
Plot 7-18: Early fork



Plate 8
Plot 7-18: Northamptonshire Militia button



Plate 9

Plot 7-18: North side of the building after removal of floor surface [13024]

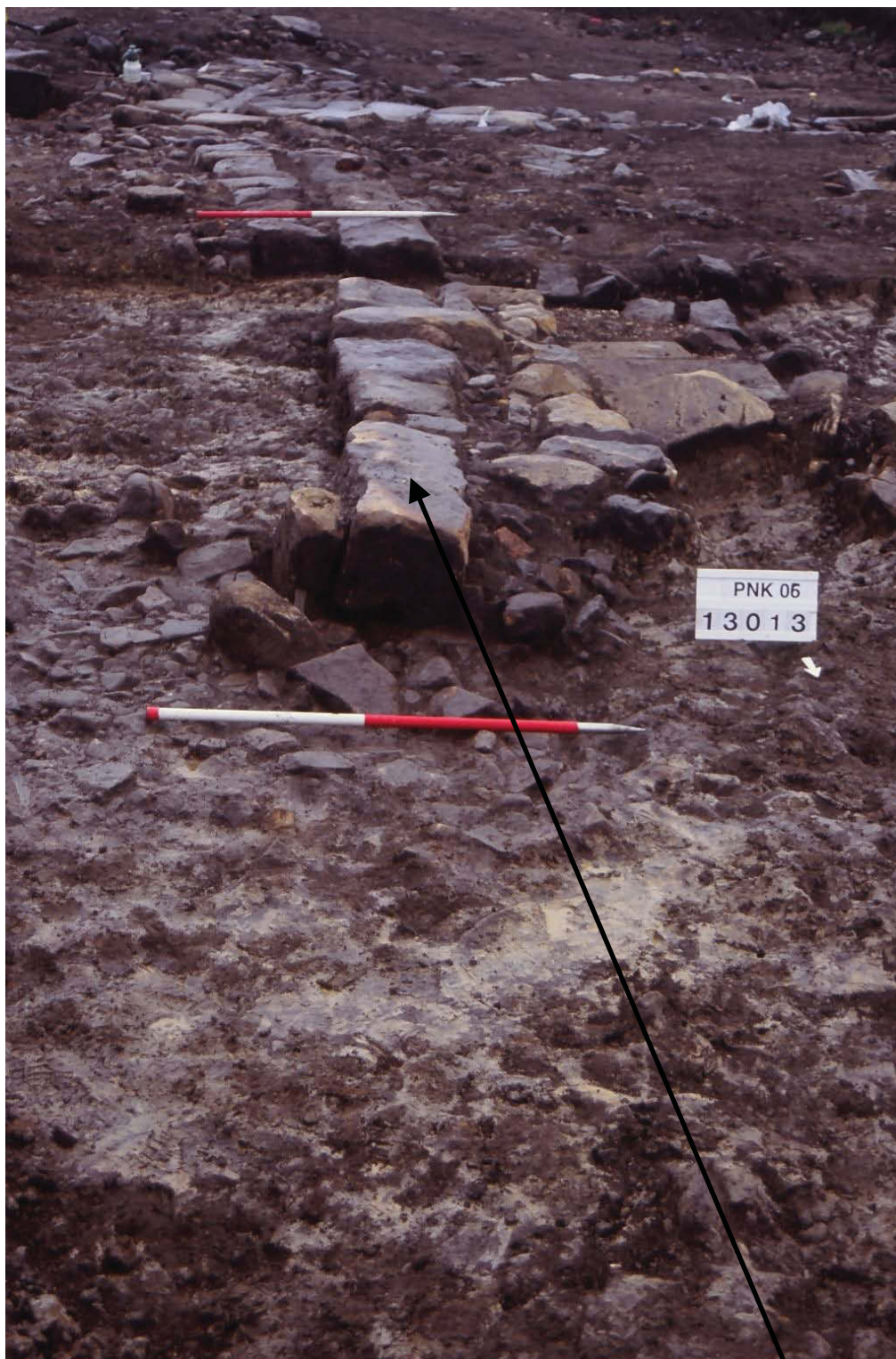


Plate 10

Plot 7-18: The eastern wall [13013], constructed with re-used stone [13031]



Plate 11

Plot 7-18: Threshold stone [13031] reused as part of the base of the eastern wall



Plate 12

Plot 7-18: Drain [13004] and floor surface [13008]

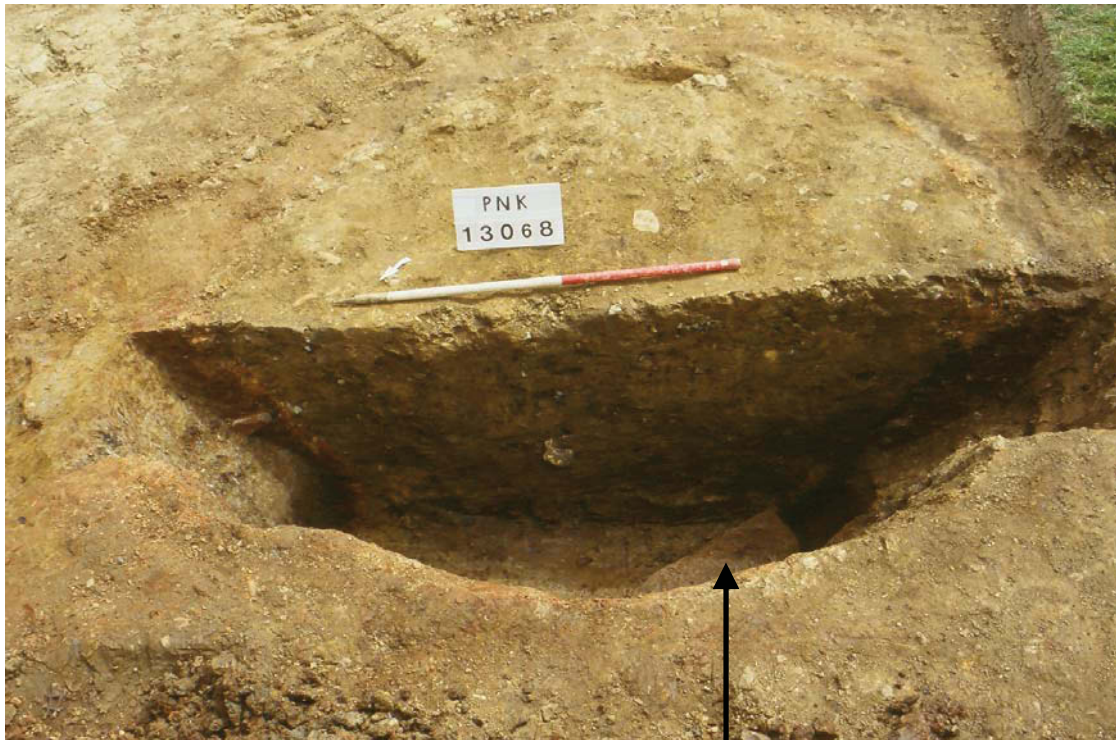


Plate 13

Plot 7-18: Excavated kiln section with ashlar masonry visible at the base



Plate 14

Plot 8-5: Metal working site



Plate 15: Plot 8-5: The furnace



Plate 16
Plot 8-5: Extent of the furnace tap and flue



Plate 17: Plot 11-6: Ditch [5123] appearing as a slight earthwork in the field beyond the working width of the pipeline



Plate 18: Plot 11-6: Excavated section through stone-filled ditch [5123]



Plate 19: Plot 12-4: Burnt clay lining from secondary firing of field kiln



Plate 20: Plot 13-9: Final recording of the stone building as the pipeline groundworks approach the site



Plate 21: Plot 13-19: Extent of the stone building, with a relatively complete cross passage



Plate 22
Plot 13-19: Cross passage situated perpendicular to stone-lined ditch



Plate 23: Plot 13-19: Stone surface adjacent to carved stone socket for upright beam

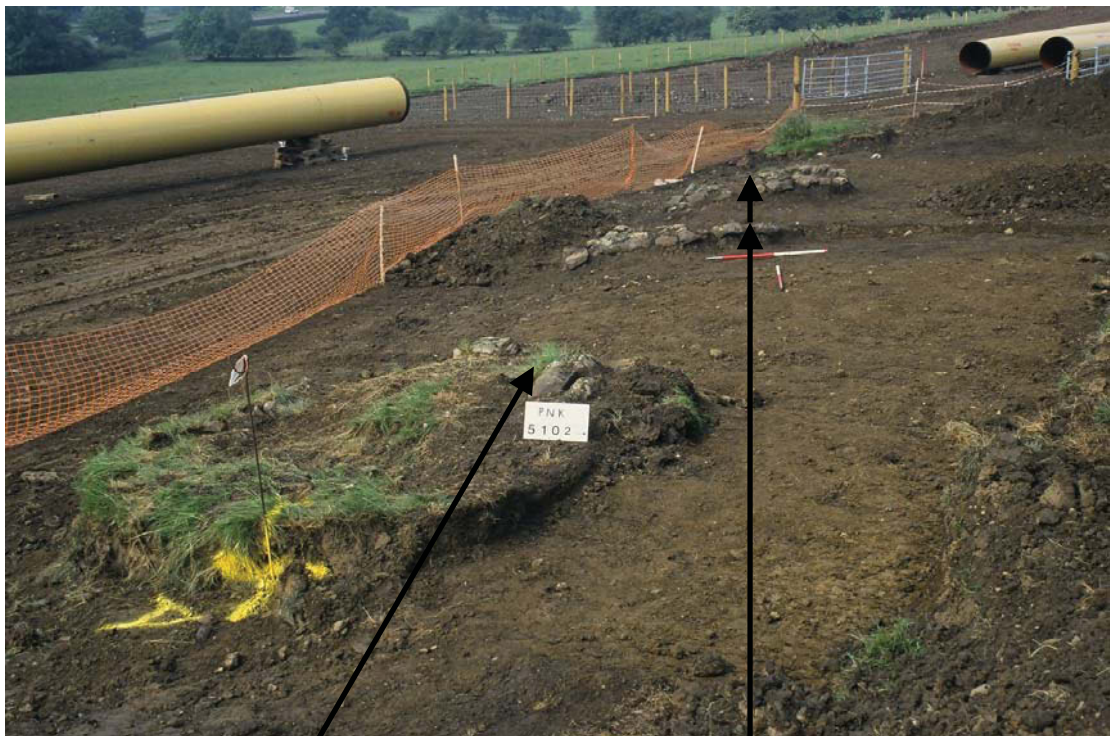


Plate 24
Plot 14-1: Stone-lined features



Plate 25: Plot 14-1: Shallow stone-lined pit, interpreted as a recent garden feature



Plate 26: Plot 15-1: General view of the site at the beginning of excavation



Plate 27: Plot 15-1: The kiln



Plate 28

Plot 15-8: Stone feathering observed within kiln

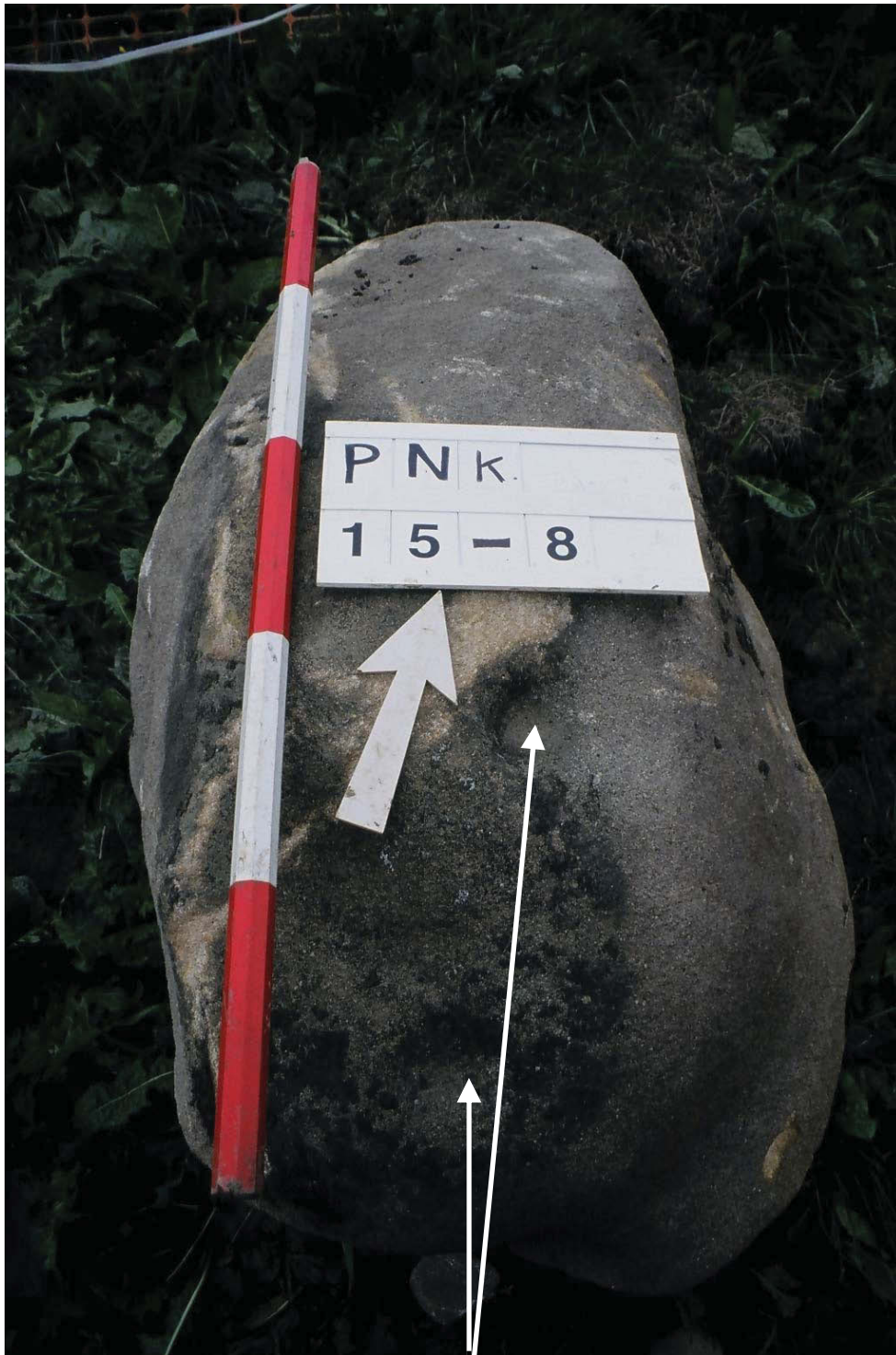


Plate 29

Plot 15-8: Prehistoric rock art, cup marks on boulder



Plate 30: Plot 19-1: General view of the site before the start of excavation



Plate 31
Plot 19-1: The horseshoe-shaped structure before excavation



Plate 32: Plot 19-1: Excavation of horseshoe-shaped structure



Plate 33
Plot 21-10: General view of the site, showing the topography of the wider landscape



Plate 34

Plot 21-10: Remains of a wooden trough in the base of the pit below the burnt mound



Plate 35: Plot 21-18: The possible ring cairn during excavation



Plate 36:
Plot 21-18: Kerbing in main cairn wall



Plate 37: Plot 21-18: The outer kerbing, [10109], revealed after the removal of the rubble spread



Plate 38: Plot 21-18: The central structure of the stone ring, with the outer kerbing beyond



Plate 39

Plot 21-18: the ring cairn, with buried soil in its centre



Plate 40

Plot 21-18: Bone ring from layer (10219)



Plate 41
Plot 21-18: Possible house platform



Plate 42
Plot 21-18: Three possible house platforms



Plate 43

Plot 21-18: Polished quern fragment, special find no. 473



Plate 44

Plot 21-18: Quern stone fragment, special find no. 474



Plate 45: Plot 21-18: Polished quern stone fragment, special find 479



Plate 46: Plot 21-18: Quern stone fragment, special find no. 480



Plate 47

Plot 21-18: Quern stone fragment, special find no. 483



Plate 48

Plot 21-18: Quern stone fragment, special find 484



Plate 49

Plot 21-18: Quern stone fragment, special find 485



Plate 50

Plot 21-18: Quern stone fragment, special find no. 486



Plate 51

Plot 21-18: The circular millstone (with plugged hole) incorporated into floor surface



Plate 52

Plot 21-18: The large millstone with the stone plug removed



Plate 53

Plot 28-1: General view of the site during excavation



Plate 54

Plot 28-1: Stone-lined tank



Plate 55

Plot 28-1: Natural hollow filled with a stone spread overlying redeposited drift geology



Plate 56

Plot 31-2: Underlying geology



Plate 57

Plot 34-5: General view of the extent of the excavated stone building



Plate 58

Plot 34-5: Stone-lined trough on exterior of the building



Plate 59

Plot 34-5: Flagstone flooring within building, with remains of a cobbled surface



Plate 60

Plot 34-5: Excavation in progress, revealing stone walls and surfaces



Plate 61: Plot 35-8: The modern burnt spread



Plate 62: Plot 35-8: Excavated section through the burnt spread



Plate 63

Plot 36-3 Excavation of kiln in opposing quarters, with flue to the north-west



Plate 64

Plot 36-3: Section through kiln pit, showing large limestone block fill

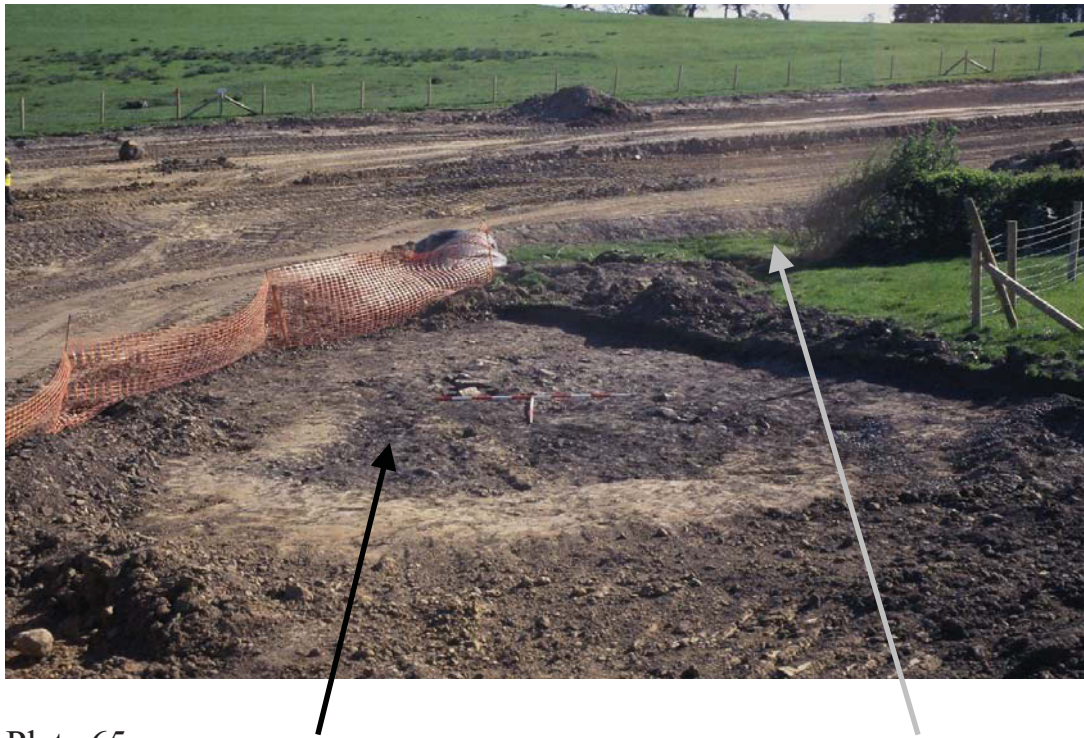


Plate 65

Plot 50-2: Burnt mound pre-excavation shot, showing the close proximity of a natural watercourse

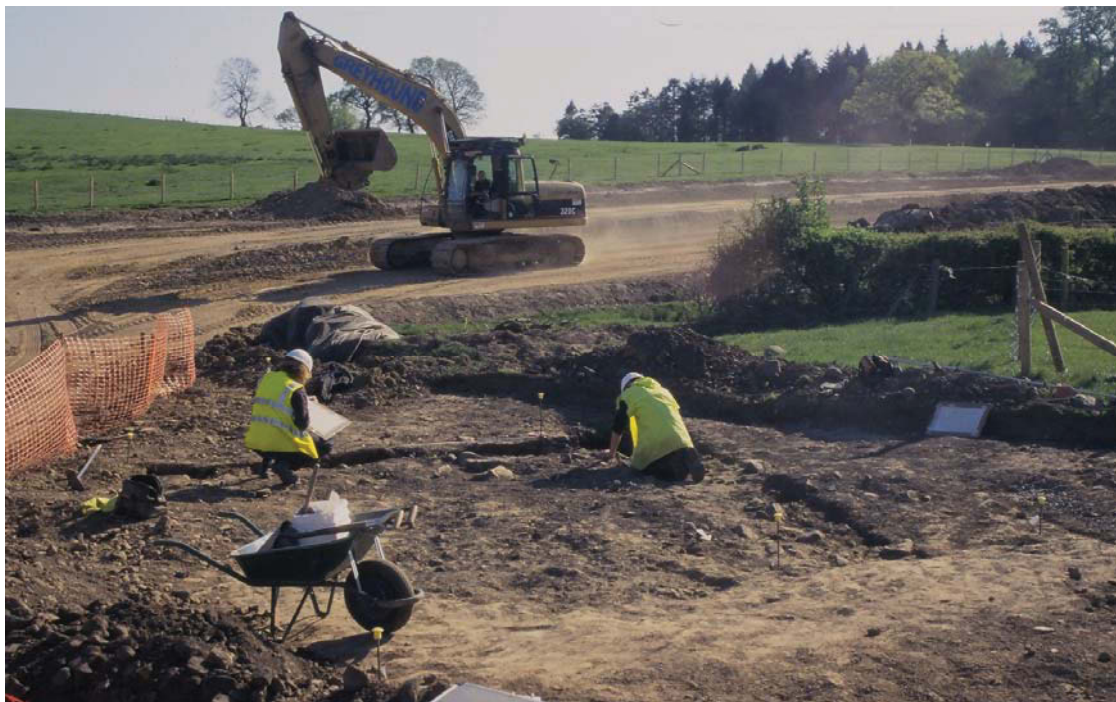


Plate 66

Plot 50-2: Excavation and recording of the burnt mound



Plate 67

Plot 54-2: Group of iron cauldrons located in the boundary ditch, associated with a glass beer bottle (marked with a white arrow)

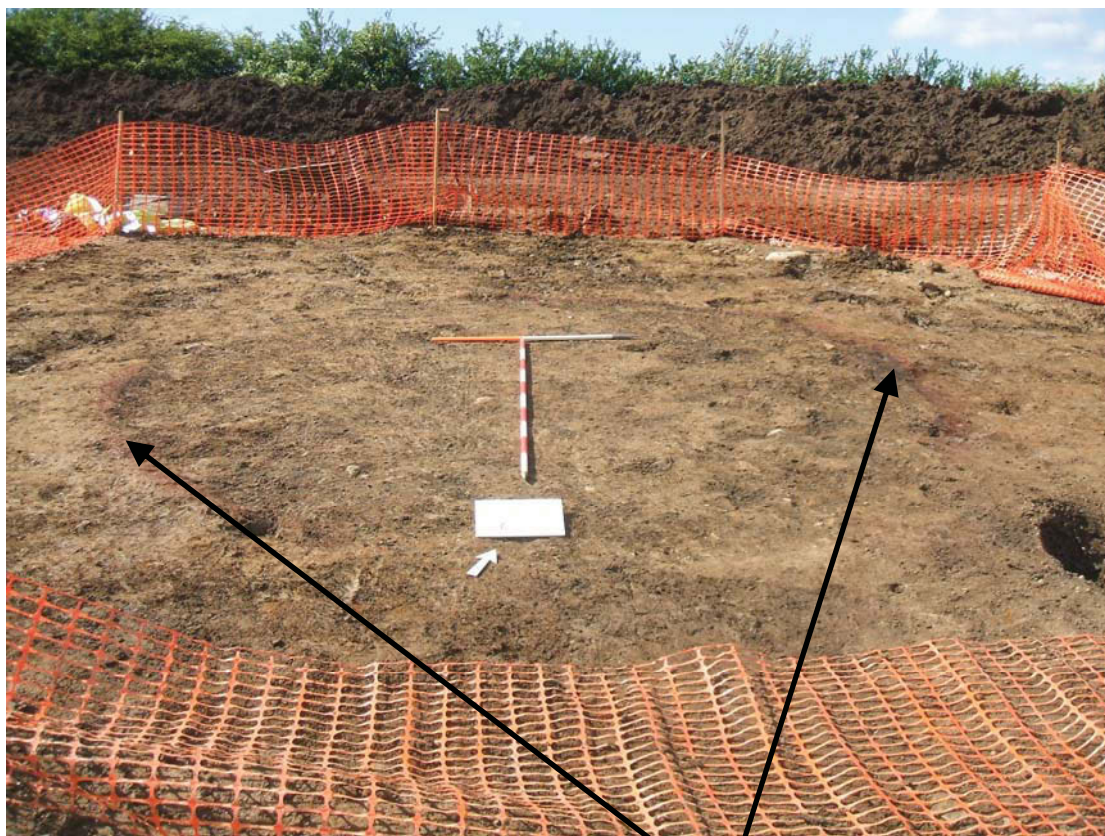


Plate 68

Plot 56-7: Pre-excavation shot, showing the burnt corona of the kiln pit lining



Plate 69
Plot 56-7: The kiln during excavation



Plate 70

Plot 56-7: Excavated kiln, displaying the burnt lining of the pit and flue