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March 1998

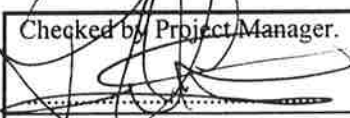
RIMINGTON LEAD MINES, LANCASHIRE

Archaeological Survey Report

Rimington Lead Mines,
Lancashire

Archaeological Survey Report

Report no 1997-98/058/7763

Checked by Project Manager.	
	Date 25/3/98.
Passed for submission to client.	
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March 1998

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ACKNOWLEDGEMENTS

LUAU would like to thank Peter Iles of the Lancashire County Archaeological Service and the local and historical knowledge of Mary Higham. We would also wish to thank Brian Lee for a helpful discussion of the site.

The assessment survey was undertaken by David Cranstone and Neil Rimmington of the Cranstone Consultancy, and by Nick Hair of LUAU. The detailed survey was undertaken by Andrea Scott and Ian Scott. The report was written by David Cranstone and Ian Scott. The report was edited by Jamie Quartermaine and Richard Newman. Overall project management was by Jamie Quartermaine.

SUMMARY

The Lancaster University Archaeological Unit (LUAU) was commissioned by Lancashire County Council to undertake an archaeological survey on the site of the disused Rimington Lead Mines in order to inform future proposals for the scheduling of the monument. The site had previously been reviewed by the English Heritage sponsored Monument Protection Programme (Cranstone 1992).

The whole mining complex was field walked, the locations of the features were plotted using a Global Positioning System, and a gazetteer of the features recorded was prepared. An area at the northern end of the complex was also surveyed in detail.

Mining on the site was first documented in the late sixteenth century and there is evidence for activity in the 1660s. The site was leased twice in the eighteenth century but no workings from this date are apparent. Mining restarted in 1822 and continued intermittently until 1885. Lead was the main product, but calamine was also extracted in the nineteenth century, and barytes was mined from the 1850s and the 1920s.

The mining complex can be divided into three distinct groups of features, situated in the north, south and east of the site. At the northern end of the complex, 25 distinct features were identified, the majority relating to two phases of mining activity, the earlier of which overlies the remains of agricultural activity of a likely medieval date. The earlier mining features are faint and difficult to interpret, but the later features are well-preserved. The latter include a possible cog-and-rung gin circle, which suggests a date of the seventeenth or eighteenth centuries. The northern group also includes a quarry with three associated 'clamp' limekilns; its relationship, if any, to the mining remains is unclear.

The southern group is dominated by nineteenth century features and has also been affected by various attempts at extraction made this century.

The features in the eastern group are all very poorly preserved. The character of the features is compatible with a date of the sixteenth or seventeenth centuries, although positive dating evidence is lacking.

If an early date is confirmed, the northern group of features will be of national importance as physical evidence for early lead mining rarely survives as surface evidence. As such the sites should be considered for scheduling. The other features are of apparently later date and are less well preserved but merit evaluation in the event of any development proposal. It is recommended that any evaluation include geophysical survey utilising ground penetrating radar to identify sub-surface features and assist in targeting evaluatory/mitigative work. It is also recommended that consideration be given to commissioning aerial photography of the agricultural features, if adequate coverage does not already exist, in order to clarify details of the remains themselves, and their relationship to the mining features.

1. INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 An archaeological survey was undertaken by the Lancaster University Archaeological Unit (LUAU) on behalf of Lancashire County Council to assess the archaeological significance of the Rimington lead mining complex, near Clitheroe, Lancashire (centred on NGR SD 8148 4496). The site has been reviewed as part of the Monument Protection Programme (Cranstone 1992), which indicated that the site could be of national importance, but that there was insufficient information from site survey and documentary research to inform the scheduling process. The prime purpose of the present survey was therefore to assess the archaeological and documentary evidence for early mining at the site and to establish, in the light of the study, if the site warrants scheduling.
- 1.1.2 Fieldwork was undertaken in January 1998, in accordance with a verbal brief from Lancashire County Council and a project design prepared by LUAU (*Appendix 1*). The whole area of the mining complex was field walked, feature locations were plotted by GPS, and a gazetteer (*Appendix 2*) was prepared. The northern part of the complex, consisting of a group of shafts, was subject to a detailed survey.

1.2 TOPOGRAPHICAL AND GEOLOGICAL BACKGROUND

- 1.2.1 The south-eastern part of the study area consists of a plateau, lying at around 190m OD. From this plateau, the ground slopes down gently to the north, and steeply to the south-west to Ings Beck.
- 1.2.2 The solid geology of the area consists of Carboniferous Chatburn Limestones, locally steeply-dipping due to folding and faulting. The limestones are cut by a number of mineral veins, mainly running from north-west to south-east, and forming the foci of mining activity. These mineral deposits include Galena, Sphalerite, Pyrites, Cerussite, Smithsonite, Limonite, Siderite, Flourite, Barytes and Calcite.
- 1.2.3 Ground conditions consist of permanent pasture, with continuous turf cover over most features. As a result, the composition of positive features was rarely visible, and evidence of contaminated ground and specialised lead-tolerant flora was very limited.

1.3 HISTORICAL BACKGROUND

- 1.3.1 **Documentary History:** Mining is first documented in the later sixteenth century, when William Pudsey is reputed to have obtained, and perhaps coined, silver from the mine. The ore was tested by an assayer around 1656 and it was reported that there were 26 pounds of silver to the ton (Webster 1671). There is some evidence of further working in or around the 1660s when two petitions were made to work the *Mines Royal* in the north of England. These petitions proved unsuccessful however and it would appear that Pudsey was forced to sell much of his estates in order to cover his debts (Williamson 1959).

- 1.3.2 There is no documentary evidence of mining at the site for this period, following the sale by Pudsey, until the mines were leased at least twice in the eighteenth century. The scale of the working, however, is not apparent. The Craven Muster roll of 18XX does not list any lead miners for the area, suggesting that the mines had been abandoned by the start of the nineteenth century.
- 1.3.3 A 20 year lease was agreed between the lessor George Lane-Fox and John Tomkinson and Henry Hayes in 1822 and it would appear that they continued intensive lead mining until there occurred a dramatic reduction in the price of lead between 1830 and 1833 (Gill 1987, 40). Activity on the site became restricted to a very low scale of extraction, which is confirmed by the 1851 census which shows that only four miners were present and that they were mining Barytes rather than lead. By 1876 Messrs Baynes and Colville had taken the mine and it was producing small amounts of lead, barytes and zinc.
- 1.3.4 In 1880 the York and Lancaster Mining Company took over the mine and barytes production increased dramatically. The 1881 census indicates that four lead miners, one washer and two mine agents were employed and the extraction continued in fits and starts until 1885.
- 1.3.5 There was a brief working for barytes in about 1920 by Whalley and Stanworth who extracted approximately 80 tons before the vein they were working proved too narrow and the mine was abandoned. A shaft was sunk or cleared in 1933 by Clay, and subsequently some barytes was produced (perhaps from the tips) in the early 1950s. Following this the area returned to rough pasture.
- 1.3.6 **Cartographic Evidence:** the earliest map available at the time of survey was the OS 1st edition 6" to 1 mile map dated 1853 (Fig 2). This shows that the early mining area (north group) was out of use at this time, as they are described as the 'Skeleron Old Mines'. However, there had been relatively little development of the southern group at this time; the only features shown are an 'Old Smelting House' near Ings End and a chimney near the north-western end of the site group.
- 1.3.7 The OS 2nd edition map of 1892 shows a dramatically different picture (Fig 5), there are two shafts shown, there is a large reservoir in place, substantial spoil tips and many associated structures. The character of the south group is broadly similar to that found in the present day. It is evident, therefore, that the main development of the south group workings took place between the times of the first and second edition maps and probably between 1876 and 1885.
- 1.3.8 The third edition map of 1908 (Fig 3) describes the site as disused and shows far fewer features on the site by comparison with the 2nd edition map of only sixteen years earlier; in particular previously extant tracks, field boundaries and some structures are not shown indicating a significant period of disuse. There is, however, at least one structure shown on the 1908 map that is not on the 1892 map, namely a large square lead processing house with associated chimney (Plate 1). A long building is shown on the 2nd edition map in this location, but the shape is very different to that depicted on the later map, implying that it was either significant alteration or demolition and replacement with another building. In either case this demonstrates that some development of the site took place subsequent to the 1892 map.

2. METHODOLOGY

2.1 PROJECT DESIGN

- 2.1.1 A project design (*Appendix 2*) was submitted by LUAU in response to a request from Lancashire County Council, for an archaeological survey of Rimington Lead Mines. This was intended assess the archaeological significance of the site and to record a group of shafts at the northern end of the site.
- 2.1.2 The project design was produced in accordance with a verbal brief supplied by Peter Iles of the Lancashire County Archaeological Service. The work has been carried out in accordance with the project design. This written report presents the results of the recording programme.

2.2 DESK-TOP STUDY

- 2.2.1 The site's interpretation is informed by various published works dealing with the site (Williamson, 1959; Raistrick, 1973; Gill, 1987; Higham, 1989; Lee, nd.), and by an early (c late nineteenth/early twentieth century) but undated photograph (supplied by Eric Higham). The 1853 6":1 mile, and 1892-3 and 1908 25":1 mile, OS maps were consulted, but the 1892-3 map was only available as a photocopy covering the southern half of the site.
- 2.2.2 An enquiry as to the survival of records of the Lane-Fox family (lessors of the site in the nineteenth century) has been made, and a reply is awaited. A late sixteenth century map of Downham is known to exist in Lancashire Record Office, but is uncatalogued and not yet available for study; it may not extend to the present study area (Mary Higham, pers comm). The conclusions of this report are therefore subject to modification should the results of these enquiries yield useful information.

2.3 ASSESSMENT SURVEY

- 2.3.1 A systematic surface inspection of the study area was undertaken to ensure complete coverage of the ground. The whole of the area subjected to field walking was open pasture and was walked on 20m transects to identify earthworks. The archaeological detail, as well as significant topographic detail, was mapped to an accuracy of ± 1 m, using differential Global Positioning System (GPS) techniques, which uses electronic distance measurements along radio frequencies to satellites to enable a fix in Latitude and Longitude, which were subsequently converted mathematically to Ordnance Survey National Grid. The survey data was incorporated into a computer aided draughting (CAD) system and superimposed with present day topographic survey data (supplied by Lancashire County Council) and digitised survey data from the 1892 25" to 1 mile OS map.

2.4 DETAIL SURVEY

- 2.4.1 A mitigative level 3 survey (*Appendix 3*) was undertaken of the mining landscape which had been identified within the study area by the Monuments Protection Programme (Cranstone 1992). This is a detailed level of survey undertaken to assess the internal character of archaeological features and serves to provide a mitigative record of a landscape in advance of development. A level 3 survey defined the extent and character of all surface archaeological features, in relation to the main topographical elements, and the interpretative data of each archaeological element was plotted.
- 2.4.2 All the internal survey control was undertaken by closed traverse using a total station and was able to maintain an internal control accuracy of better than $\pm 0.05\text{m}$. The control was located by the use of a Global Positioning System (GPS). The accuracy of the method is $\pm 1.0\text{m}$ but is adequate for the general location of the sites.
- 2.4.3 The archaeological detail and significant topographical detail were surveyed using a Zeiss ELTA 3 total station and data-logger. The digital survey data were transferred, via DXF file format, into a CAD system. The archaeological detail was drawn up in the field with respect to field plots of the survey data and these edits were then transferred onto the raw survey data within the CAD system.

2.5 GAZETTEER

- 2.5.1 All of the information concerning archaeological sites in the affected area has been collated into a site gazetteer (*Appendix 2*). This provides details of their location, origin, and an assessment of their archaeological potential. The sites have been marked onto a map showing their location (Figs 4 and 5). Locations are given as eight- or ten-figure National Grid References where possible. A summary description of each site is provided. An assessment has been given of the interpretation and archaeological potential of the site.

3. ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL

3.1 INTRODUCTION

- 3.1. The surviving features can be divided into three clear groups, on the basis of their character, topography, and associations: the northern, southern, and eastern groups. The northern group was identified as suitable for more detailed survey and a more detailed assessment is provided for this group.

3.2 NORTHERN GROUP - GENERAL ASSESSMENT

- 3.2.1 The northern group of features (features 01-24, 27) occupy the crest of a ridge, and there is a gentle slope down from this to the north and south-west; feature 27 forms a continuation down the steep slope to the Ings Beck valley. The mining-related features in this area follow the lines of two veins, entering the area from the south-east and south-south-east and converging at feature 04. All the features are simple and of earthwork form. However at least two phases of activity are present, since the larger shaft-mounds (04, 08, 09) overlie more subtle features. To an extent the present mining features also overlie faint ridge-and-furrow; however, it is noticeable that the furlong boundary within this field system follows the line of the vein as defined on the surface by the line of shafts. This would suggest that the cultivation pattern was established after mining activity had been started along this vein.
- 3.2.2 The earlier features within this group are consistently slight, and difficult to interpret. Some features are likely to be the remains of infilled shafts, whereas others may be ore-processing areas or building platforms. To the south-east, there is a continuous 'rake' working (13 and 27) along the southern vein; the different form of exploitation may indicate a difference in dating, or the relative richness of the veins.
- 3.2.3 The later features are a small but well-preserved group, of which 04 is the most noteworthy. This feature includes a possible cog-and-rung gin circle, suggesting a seventeenth to early eighteenth century date.
- 3.2.4 This group forms an interesting sequence of mining features, with relationships to the open field agricultural system. It is likely, but not proven, that they relate to the documented sixteenth and seventeenth century mining. The underground mine workings beneath this area are also likely to be of interest. Quarry 14 with its three associated 'clamp' limekilns is also of archaeological interest. Its dating and relationship (if any) to the mining are, however, uncertain.

3.3 NORTHERN GROUP - DETAIL SURVEY

- 3.3.1 The detail survey identified 25 distinct features within the study area. Of these monuments, the majority relate to mining activity associated with two veins which appear to converge on a large shaft (*Feature 04*) located to the north of the area. The remainder of the features identified comprise the relict remains of an extended period of agricultural use.

- 3.3.2 An area of distinct ridge and furrow extended in a north to south alignment along the western side of the study area (18). It was characteristic, in terms of width and form of headland, with examples encountered throughout the region that are typically dated to the middle ages. A second area of ridge and furrow extended northeast from the first, and they were separated by a probable furlong boundary, which followed the line of the vein.
- 3.3.4 Both areas of ridge-and furrow were faint, especially near the mine workings and towards the boundaries of the modern field (probably due to slight erosion by later human and animal trampling in these areas). Consequently the boundaries and stratigraphic relationships were not always clearly apparent, however, the present mining features cut or overlaid the ridge-and-furrow wherever a relationship was visible. The presence of a furlong boundary following the line of shafts suggests that the cultivation post-dates an early phase of mining which has also been overlain by the present workings.
- 3.3.5 The mine workings occupied a strip running from north-west to south-east, and comprised two large shafts (2 and 4) with several smaller shafts in a spatially haphazard arrangement along the alignment of the vein. They typically comprised well defined largely earthfast banks arranged in a circular pattern around a shallow depression and varied in diameter from 1.5m to 10.6m. Where relationships were visible, the larger and sharper earthworks overlay the smaller and more subtle features, indicating that there were two phases of mining activity.
- 3.3.6 Two large quarries (21 and 28) were identified within the study area, presumably for building stone. A track leads from the largest of these quarries to the main east/west track which extends along the top of the valley and links Hollins and Ings End. The quarries are shown on the OS 1st edition map (1853). The same map describes the adjacent lead workings as 'Old Mines', indicating that they were no longer in use, but the mine workings at the bottom of the valley were shown as in use. The quarries probably post-date the adjacent northern group of lead workings but were contemporary with the major lead mining and processing complex (south group) along the floor of Ings Beck valley and may potentially have supplied stone for the mine buildings. A further probable quarry (7), in the west corner of the survey area, was excluded from the detailed survey.
- 3.3.7 A stone and brick constructed building (22) was assessed at the south-east corner of the designated area which may have been constructed for the purposes of mining activity associated with the shafts identified to the north. At the time of the study the building was in use as a cattle shelter, however evidence of multiple repairs within the building fabric suggested that the building had been in use for some period of time. It is atypical of other cattle shelters identified within the region and it may be that the building was formerly employed for mining purposes prior to its alteration.
- 3.3.8 At the base of the Ings Beck valley and adjacent to the area of the northern group of shafts is a rock cut adit, which is still open. It has a maximum height of 1.5m and extends slightly up-slope into the hill-side. For safety reasons it was not possible to undertake a detailed examination of the adit, but it would appear to be orientated towards the shafts of the northern group. Extending south-west from the adit is a

narrow water channel. There is no associated spoil and no direct relationship between this adit and the workings of the south group. It was either an adit intended to explore the same veins as the shafts of the northern group or it may have been a drainage tunnel for the shafts of the northern group.

3.4 SOUTHERN GROUP

- 3.4.1 The earliest features on the site are of agricultural origin and include an area of small rectangular fields, defined by low banks and lynchets (Site 47). These are bounded to the south-east by a sharper bank with trees, and to the north-west by a faint bank above feature 40. These features are partially obscured by a modern track to the north-east, and by mining features to the south-west, confirming that they are one of the earliest elements on the site. Part of the system comprises ten metre wide strips running down the steep south-west facing slope.
- 3.4.2 The field system displays a character that is reminiscent of Iron Age/Romano-British 'Celtic' systems and is different in form to ridge-and-furrow elsewhere on site. However, elements of the system, and the field boundaries in particular, have continued in use at least into the nineteenth century. The south-east boundary is shown on the OS 1st edition (1853) map but is not indicated on the 1892 or 1908 maps.
- 3.4.3 The southern group of mining features (features 28-48) occupies the steep slope and flat valley floor of the Ings Beck valley. This area is dominated by nineteenth century features; the detailed sequence cannot be disentangled, but it is suspected that many of the features relate to the late nineteenth century York and Lancaster Mine. There is no surface evidence of the 'Old Smelting House' as shown on the 1853 OS map, and the prospects for below-ground stratigraphic survival appear moderate. The presence of a flue system on the map indicates that the 'Smelting House' was used in the nineteenth century, though an earlier origin cannot be excluded. The area has also been modified by the various twentieth century attempts at extraction.

3.5 EASTERN GROUP

- 3.5.1 The eastern group (features 49-70) consists predominantly of a strip of features, extending from features 87 to 92, following the continuation of the more northerly vein in the western area. In general they are for the most part small localised hollows and are about 3-4m across. In their surviving form, all these features are very slight, although at least one (97) was much more substantial in 1908 when it was depicted on the 3rd edition OS map. It is likely that the slight nature of these features is due to poor preservation, as a result of flattening for agriculture or industrial reprocessing. They are probably the truncated and filled remains of shafts; however, there is at least one site (feature 99) which comprises an area of dressing waste and probably represents the damaged remains of a manual ore-dressing area. The character of the features is entirely compatible with a sixteenth to seventeenth century date, but positive dating evidence is lacking. Although below surface stratigraphic survival is limited, the associated underground mine workings potentially could prove to be better preserved.

4. DISCUSSION

4.1 INTRODUCTION

- 4.1.1 The archaeological recording programme has established a complex multi-phased landscape, which has been exploited for both agriculture and metal mining. The earliest activity would appear to be agricultural.

4.2 AGRICULTURAL ACTIVITY

- 4.2.1 The agricultural features located form two very different groups. The field system in the southern group of features lies on the steep slope to Ings Beck. It pre-dates the mining activity on the site and could possibly be a surviving fragment of a 'celtic' (Iron Age or Romano-British) field system, surviving where the steep slope has discouraged later ploughing. No earthwork remains of any contemporary farm or settlement can be identified within the study area, though sub-surface remains may possibly survive.
- 4.2.2 Parts of two furlongs of a ridge-and-furrow field system survive in the area of the northern group. The limits of this system were not clear, since it was sufficiently faint to be readily obscured by later disturbance. The character of the ridge-and-furrow, being fairly broad and associated with extant headland, is usually ascribed to the medieval period. Where intersections occurred, the agricultural features were cut or overlain by present mining features; however, the furlong boundary does appear to follow the line of the main mineral vein as defined on the surface by the line of shafts. This may indicate that the cultivation pattern was established while mining was already occurring, in which case many of the earliest mining features may have been obscured on the surface by later workings.

4.3 MINING ACTIVITY

- 4.3.1 The published references refer to the features in the northern group as "bell-pits". This term is deliberately not used in the present report as it implies an underground form that cannot be reliably inferred from the surface feature (Cranstone 1994, 145). The terms "shaft mound" (for a shaft surrounded by a ring of spoil, and showing primarily as an upstanding feature) and "shaft hollow" (for a shaft showing as a depression, with little or no surrounding spoil) are used instead.
- 4.3.2 The features in the northern group are all well-preserved, and retain their stratigraphic relationships to each other and to the adjacent ridge-and-furrow. Where relationships occur, the smaller and more subtle features are overlain by the prominent and sharp features, suggesting that two separate phases of mining activity may be represented. The smaller features are hard to interpret in detail, but may include ore-processing remains as well as mining features *senso strictu*.
- 4.3.3 The dating of these later mining features cannot be closely established, except within the limits that they post-date the (broadly medieval) ridge-and-furrow, and pre-date the

1st edition OS survey (1853). However, their character would fit well with a sixteenth/seventeenth century date, and it is probable that they include the remains of Pudsey's mining. This group of features is identified as being of considerable interest, and probably of national importance. The mine-workings beneath them cannot be assessed on surface evidence, but also may be of interest.

- 4.3.4 Most of the features in the eastern group seem to be of a similar date, but they are very much less well preserved, although the mine-workings beneath them may be better preserved, and potentially of greater importance.
- 4.3.5 The southern group of features, along the Ings Beck valley, represent the remains of several nineteenth and twentieth century phases of mining activity, perhaps incorporating or overlying earlier features. They are considered generally to be of a lesser significance.

5. RECOMMENDATIONS

5.1 SCHEDULING

- 5.1.1 The most important area of mining activity is the northern group of shafts. These were clearly early, and could potentially be of sixteenth or seventeenth century date, though it has not been possible to confirm that they relate to the documented Pudsey mine. Ongoing documentary research could provide further correlation between the physical evidence and the documented early history, but in any case a recommendation for Scheduling should be considered.
- 5.1.2 The other visible features in this area (southern and eastern groups) are considered to be of sufficient interest to merit full recording in the event of any disturbance, but not necessarily to merit statutory long-term protection on the present evidence.

5.2 SITE MANAGEMENT

- 5.2.1 The southern and eastern groups appear at present to be of much less interest than the northern group, in view of their later date and relatively poor preservation. However, they are of regional importance and as such warrant detailed recording in the event of any further development of the site. The southern group, in particular, has been extensively disturbed by twentieth century reworking of the site, but there may be extant elements of the nineteenth century workings buried beneath the redistributed spoil. It is also possible that there is surviving below-ground stratigraphy relating to the earlier mining (and possibly smelting), and this possibility should be evaluated by trial trenching in the event of any development proposal.
- 5.2.2 The eastern and southern groups warrant intensive topographic survey in the event of any development which might form the basis for specific mitigation proposals.
- 5.2.3 The quality and importance of underground mining features, in particular those relating to the sixteenth and seventeenth century activity, cannot be assessed from surface evidence. In general terms, the northern area is likely to contain underground features of interest, and the eastern area may also. Geophysical survey by Ground Penetrating Radar may allow such features to be more positively located, and assist the targeting of any evaluation or mitigation.
- 5.2.4 The details of the field systems, and their relationship to the mining features will be best understood from air photographs. Commissioning of air photographs should be considered if adequate coverage does not already exist.

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6.2 CARTOGRAPHIC SOURCES

Ordnance Survey 1st edition 6" to 1 mile map 1853

Ordnance Survey 2nd edition map 25" to 1 mile Yorks CLXXXIII 1892

Ordnance Survey 3rd edition map 25" to 1 mile Yorks CLXXXIII 1908

APPENDIX 1 PROJECT DESIGN

November 1997

Lancaster
University
Archaeological
Unit

YORK AND LANCASTER LEAD MINES
SKELERON

RIMINGTON

LANCASHIRE

ARCHAEOLOGICAL SURVEY

Proposals

The following project design is offered in response to a request from Lancashire County Council for an archaeological survey at the Rimington Lead Mines, near Rimington, Lancashire.

1. INTRODUCTION

- 1.1 Lancashire County Archaeological Service have requested that an archaeological survey be undertaken of the Rimington Lead Mines (York and Lancaster Mines), Rimington, Lancashire (NGR SD 815450) to inform proposals for the scheduling of the monument.
- 1.2 The York and Lancashire Mines are documented as having been worked for lead and silver in the sixteenth and seventeenth centuries. There were intermittent later reworkings in the eighteenth, nineteenth and twentieth centuries for lead, calamine (zinc ore) and Barytes, and there was a smelt mill on the site (disused by 1850). The site has been reviewed as part of the Monument Protection Programme, which indicated that the site could be of national importance, but that there was insufficient information site survey and documentary research to inform the scheduling process. Specifically it was not possible to correlate the documentary evidence for seventeenth century activity with the surface evidence (Cranstone pers comm). If it proves possible to identify physical evidence of early activity on the site then it will be possible to demonstrate that the mines are of national importance.
- 1.2 A documentary study has been undertaken by Mary Higham and the information has been passed to the Lancashire Sites and Monuments Record. There is considerable survival of later mining and processing activity, but there is a possibility that this has obscured evidence for earlier phases of processing and working.
- 1.3 The Lancaster University Archaeological Unit has considerable experience of the evaluation and survey of sites of all periods, having undertaken a great number of small and large scale projects during the past 15 years. Surveys have been undertaken at Lead Mines and processing complexes all around the country; these include the Snailbeach mines in Shropshire, the Thirlmere mines in the Lake District, the Sargill Lead furnace in Wensleydale, the Nenthead lead mines of Cumbria and the Gunnerside Gill mines of Swaledale. LUAU has the professional expertise and resource to undertake the project detailed below to a high level of quality and efficiency. LUAU and all its members of staff operate subject to the Institute of Field Archaeologists (IFA) Code of Conduct.

2. OBJECTIVES

- 2.1 The following programme has been designed in accordance with a verbal brief by Peter Iles of Lancashire County Archaeological Service, to provide an appropriate level of archaeological survey of the lead mine complex, within its broader context. The required stages to achieve these ends are as follows:
- 2.2 **Project Preparation**
Assess and evaluate the documentary records held by Lancashire County Council.
- 2.3 **Assessment Survey**
An assessment survey to be undertaken by an archaeologist experienced in both Lead Mining and the Monument Protection Process. This would provide a detailed description of the principal features of the site in conjunction with a Level GPS survey of the main features.
- 2.4 **Detailed Survey**
A level 3 survey of an area of bell pits on top of the hill above the mines (near Hollins Farm).
- 2.5 **Survey Report**
A written survey report will assess the significance of the data generated by this programme within a regional and particularly its national context. It will make recommendations for the future management and status of the site.

3. METHODS STATEMENT

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

3.2 PROJECT PREPARATION

- 3.2.1 As a preliminary to the survey, digital data and documentary results will be accessed from the Lancashire County Archaeological Service. Base drawings for the survey will be prepared.

3.3 ASSESSMENT SURVEY

- 3.3.1 **Access:** Liaison for basic site access will be undertaken through Lancashire County Archaeological Service.
- 3.3.2 It is proposed to undertake a level 1 survey of the study area. Its aim is to record the existence, location and extent of the principal features within the site. The emphasis for the recording is on the written description which will assess the character, and establish the relationships between individual features. The descriptive assessment will examine specifically the evidence for early features, and areas of working and will be undertaken in conjunction with available documentary sources.
- 3.3.3 The significant features will be located by means of Global Positioning System (GPS) techniques to locate and record the features. GPS instrumentation uses electronic distance measurement along radio frequencies to satellites to enable a positional fix in latitude and longitude which can be converted mathematically to Ordnance Survey National Grid. The use of GPS techniques has proved to be an essential and extremely cost effective means of locating monuments, which can achieve accuracy of better than $\pm 1\text{m}$. A photographic record will be undertaken simultaneously.
- 3.3.4 The survey data will be transferred digitally into a CAD system and can there be superimposed with topographic digital data provided by Lancashire County Council (under license). It is proposed to superimpose the survey locational data onto raster scanned images of historic maps to demonstrate the association of recorded features with historic features. This will result in the production of plans at a scale of 1:2,500 or any other scale required, recording the location of each of the sites listed in the gazetteer. All archaeological information collected in the course of field inspection will be recorded in standardised form, and will include accurate national grid references. This will form the basis of a gazetteer, to be submitted as part of the report.

3.4 DETAIL SURVEY

- 3.4.1 It is proposed to undertake a level 3 survey (see LUAU survey levels, Appendix 1) of the study area, which is equivalent to RCHM(E) level 3. The survey will involve the detailed mapping of the area of bell pits to the west of the mining complex. All appropriate survey detail will be recorded to provide an appropriate context for the archaeological detail. Although the survey data will include altitude information this will not be used for the production of the level 3 survey.
- 3.4.2 Survey control will be established over the site by closed traverse and internally will be accurate to $\pm 15\text{mm}$; the control network will be located onto the Ordnance Survey National Grid by the use of Global Positioning Survey (GPS), which will locate to an accuracy of $\pm 1\text{m}$.
- 3.4.3 The surface features will be surveyed by EDM tacheometry using a total station linked to a data logger, the accuracy of detail generation will be appropriate for a 1:200 output. The digital data is transferred onto a portable computer for manipulation and transfer to other digital or hard mediums. Film plots will be output via a plotter. The archaeological detail is drawn up in the field as a dimensioned drawing on the plots with respect to survey markers. Most topographic detail is also surveyed, particularly if it is archaeologically significant or is in the vicinity of archaeological

features. The survey drawings will be generated within a CAD system and can be output at any scale. The survey would be plotted as wet ink drawings on stable polyester film sheets.

- 3.4.4 In conjunction with the archaeological survey a photographic archive will be generated, which will record significant features and general landscapes.

- 3.4.5 The survey would be accompanied by a gazetteer description of individual archaeological features, which will relate directly to the survey mapping. This stage of the survey will involve a detailed assessment of the industrial site and its general context and will be undertaken by an experienced industrial archaeologist.

3.5 EVALUATION REPORT

- 3.5.1 **Archive:** The results of Stages 3.1-4 will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*The Management of Archaeological Projects, 2nd edition, 1991*). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. It will include summary processing and analysis of any features and finds recovered during fieldwork. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IFA in that organisation's code of conduct.

- 3.5.2 This archive can be provided in the English Heritage Central Archaeology Service format, both as a printed document and on computer disks as ASCII files, and a synthesis (in the form of the index to the archive and the report) will be deposited with the Lancashire Sites and Monuments Record. LUAU practice is to deposit the original record archive of projects (paper, magnetic, and plastic media) with the Lancashire SMR.

- 3.5.3 **Report:** One bound and one unbound copy of a written synthetic report will be submitted to the Lancashire County Archaeological Service. The report will include a copy of this project design, and indications of any agreed departure from that design. It will present, summarise, and interpret the results of the programme detailed above and will include a full index of archaeological features identified in the course of the project, together with appropriate illustrations, including a map and gazetteer of known or suspected sites identified within or immediately adjacent to the study area. It will also include a complete bibliography of sources from which the data has been derived, and a list of further sources identified during the programme of work, but not examined in detail.

- 3.5.4 This report will examine the significance of the industrial landscape within a national and regional context. It will specifically present the evidence for early mining and processing remains. Illustrative material will include a location map, documentary mapping and survey plans; it can be tailored to the specific requests of the client (eg particular scales etc), subject to discussion. The report will be in the same basic format as this project design; a copy of the report can be provided on 3.5" disk (IBM compatible format).

- 3.5.5 **Proposals:** The report will make recommendations for the management of the site and will examine if there is a case for changing the archaeological status of the site.

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

3.6 OTHER MATTERS

- 3.6.1 **Health and Safety:** Full regard will, of course, be given to all constraints (services etc) during the excavation of the trenches, as well as to all Health and Safety considerations. LUAU provides a Health and Safety Statement for all projects and maintains a Unit Safety policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the

Standing Conference of Archaeological Unit Managers (1991) and risk assessments are implemented for all projects.

3.5 PROJECT MONITORING

- 3.5.2 **Lancashire County Council:** Any proposed changes to the project brief or the project design will be agreed with the County Archaeologist, Lancashire County Council, in conjunction with the client. LUAU will arrange a preliminary meeting, if required.

4. WORK TIMETABLE

The phases of work will comprise:

4.1 Project Preparation

A half day period is required to collate the data from the Lancashire County Council.

4.2 Assessment Survey

A one day period is required for the assessment survey fieldwork

4.3 Detail Survey

A one day period is required to undertake the targeted trenching programme

4.3 Prepare Survey Report

An 3 day period would be required to complete this element.

- 4.4 LUAU can execute projects at very short notice once an agreement has been signed with the client.

5. OUTLINE RESOURCES

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

5.1 Project Preparation

0.5 man-days Project Manager

0.5 man-days External Consultant

5.2 Assessment Survey

1 man-day External Consultant

1 man-day Project Supervisor

5.3 Detail Survey

1 man-day Project Supervisor

1 man-day Project Assistant

5.4 Survey Report

2 man-days External Consultant

2 man-days CAD Operator

1 man-day Project Supervisor

2 man-days Project Assistant

- 5.5 The project will be under the project management of **Jamie Quartermaine**, BA Surv Dip MIFA (LUAU Project Manager) to whom all correspondence should be addressed. All Unit staff are experienced, qualified archaeologists, each with several years professional expertise. It is proposed that the site assessment will be undertaken by **David Cranstone** (External Consultant) who has considerable experience of working on the lead industry and is familiar with this site; he has worked extensively on reports on industrial landscapes for the English Heritage Monument Protection Programme.

APPENDIX 2 SURVEY GAZETTEER

Notes on the gazetteer

"Condition" is a subjective and qualitative category and expresses the apparent survival of a feature.

Maps are referred by date: 1853 OS map = 1st edition 6"; 1892 OS map = 1st edition 25"; 1908 OS map = 2nd edition 25". The 1853 map shows less detail due to its smaller scale, and the 1892 copy currently available only shows the southern part of the site (south from a line through the north ends of features 30 and 37).

Site Number	01
NGR	SD 81347 45122
Site type	Earthwork
Period	sixteenth - seventeenth centuries ?
Source	Assessment/Detail survey
Condition	Good
Dimensions	2.5m diameter
Description	This was a circular hollow, with a shallow rounded profile. A slight spoil tip to the north was probably either a shaft or a prospecting pit.

Site Number	02
NGR	SD 81358 45120
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	8 x 5 m
Description	This was a large oval hollow, or pair of conjoined hollows, on a north-east to south-west axis. There is a substantial spoil tip to the north (downslope) which is mainly below the larger hollow. This number lies over a ridge-and-furrow, feature 19.

Site Number	03
NGR	SD 81361 45103
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	6m diameter
Description	This was a circular hollow, with a rounded profile. A spoil tip lies to the south-west and is 1m high, there is also a low spoil mound to north. The feature is shown on the 1908 OS map.

Site Number	04
NGR	SD 81373 45087
Site type	Earthwork
Period	Sixteenth - seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	4m diameter from inner edge of banks; shaft 2m diameter.

Description	This was a large shaft mound consisting of a central shaft-hollow. There was a circular flat area around the shaft which looks like the remains of a cog-and-rung gin circle. There was a neatly circular ring spoil tip around the outside of the shaft and gin circle. This had a carefully graded inner edge which was possibly revetted and an entrance upslope to the south-east. The ring spoil tip is 0.3-1m high internally and 2-4m externally. The whole feature is very well-constructed and well-preserved and is shown on the 1853 and 1908 OS maps.
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Site Number	05
NGR	SD 81380 45079
Site type	Earthwork
Period	Sixteenth - seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	Hollow c5m diameter, spoil 5m
Description	This was a hollow, with a shallow rounded profile, surrounded by a low ring of spoil mainly downslope to the north-west it was probably a shaft-hollow.

Site Number	06
NGR	SD 81386 45085
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	6m x 4m
Description	This feature was a kidney shaped hollow which was concave to the north-west. There was a bank of spoil to the north-east, and also a faint bank elsewhere. The site was possibly a shaft-hollow which was filled in from the north-west. It lies on top of a ridge-and-furrow, feature 17.

Site Number	07
NGR	SD 81315 45053
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	10 x 3.5m
Description	There was a faint hollow to the east, with a slight platform to the west, and a further slight hummock beyond this to the west. It was possibly an ore-processing area? which lies under feature 8.

Site Number	08
NGR	SD 81394 45069
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	8m diameter foot-to-foot, 6m rim-to-rim.
Description	This feature was a c2m deep hollow which had a sharply-defined ring of spoil and a possible entrance to the west. It was a shaft-mound. There was a slight hollow outside the spoil ring to the east, measuring 3 x 2.5 m, which may be an earlier feature related to feature 7 but is not separately numbered. This site lies on top of feature 7 and is shown on the 1853 and 1908 OS maps.

Site Number	09
NGR	SD 81405 45066
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	5m diameter rim-to-rim
Description	This was a hollow c4m across, with a rim of spoil to the west and north, which was a shaft hollow. The hollow was possibly backfilled from the south-east, and is shown on the 2nd edition OS map (1892).

Site Number	10
NGR	SD 81413 45063
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	5 x 5 m
Description	This was a sub-circular platform which is virtually flat to the south-east. It was defined by an edge downslope to the west and north. The feature could be a building platform, spoil tip, or a buddling area.

Site Number	11
NGR	SD 81423 45062
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	13 x 5m; 1m deep.
Description	This was an irregular hollow with an east/west axis. There was no spoil tip visible. It was possibly a small quarry.

Site Number	12
NGR	SD 81411 45051
Site type	Earthwork
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	6 x 4m
Description	This feature consists of irregular humps and hollows with a possible shaft-hollow at the north-west end, otherwise the function is uncertain.

Site Number	13
NGR	SD 81398 45038
Site type	Earthworks
Period	Sixteenth / seventeenth centuries?
Source	Assessment/Detail survey
Condition	Good
Dimensions	60 x 8m
Description	This feature was a linear irregular hollow with spoil heaps along its south-west side and a slight spoil tip to the north-east. This probably reflects 'rake' working along the vein as there were traces of lead ore and contaminated ground. The feature continues as feature

27 to the south-east. It was obscured by a modern track to the north and possibly lies over ridge-and-furrow (feature 18).

Site Number	14
NGR	SD 81357 45042
Site type	Earthwork
Period	Uncertain
Source	Assessment/Detail survey
Condition	Good
Dimensions	c 33 x 20m
Description	<p>This was an 'arrow-shaped' quarry, with its point to the north. The rock face was exposed on the eastern edge and in the central unquarried area. Entry was probably from the south but there was no specific entrance visible.</p> <p>The feature included three 'clamp' type limekilns which could be seen as sub-circular banked hollows. The first was in the central area and had a large tree growing in its centre. The bank contained burnt stone/brick and coal fragments. The second was in the south-east corner and consisted of a hollow with a bank of spoil to the north. The bank contained burnt stone and barytes. The third was in the south-west corner and was oval in shape but open to the west. There were traces of rough stone lining on its south side.</p>

Site Number	15
NGR	SD 81363 45068
Site type	Earthwork
Period	Uncertain
Source	Assessment/Detail survey
Condition	Good
Dimensions	1.5m diameter
Description	<p>This was a hollow with a shallow rounded profile and a faint rim of spoil. It was possibly a shaft-hollow or prospecting pit. The feature cuts ridge-and-furrow (18).</p>

Site Number	16
NGR	SD 81356 45061
Site type	Earthwork
Period	Uncertain
Source	Assessment/Detail survey
Condition	Good
Dimensions	c 3m diameter
Description	<p>This was a slight hollow with a rounded profile and a vague rim of spoil to the north. It was possibly a shaft-hollow or prospecting pit which cuts ridge-and-furrow (18).</p>

Site Number	18
NGR	SD 81343 45098
Site type	Ridge and furrow
Period	Medieval?
Source	Assessment/Detail survey
Condition	Moderate
Dimensions	2.5-3.5m ridge to ridge
Description	<p>This is an area of slight ridge-and-furrow which extended between the west and south edges of the field. There was a possible faint continuation (19) east of the track and extending to the furlong boundary. The ridges were curved and orientated roughly north/south, measuring. The lines were fainter to the south of features 14-16. The feature was parallel to feature 13 but no clear relationship was visible. This site was cut by features 14 - 17.</p>

Site Number	19
NGR	SD 81378 45122
Site type	Ridge and furrow
Period	Medieval?
Source	Assessment/Detail survey
Condition	Moderate
Dimensions	c 3m ridge to ridge
Description	This is faint ridge-and-furrow running east/west along the hill slope. It ended to the west at the furlong boundary running north from feature 2 - the faint north/south ridge and furrow to the west of this may be a continuation of feature 18. This site was cut by feature 2, possibly 3? feature 4, possibly 6? and feature 20. The furlong boundary appeared to follow the line of the vein exploited by features 01-04, 13, and 27; this could indicate that the vein was exploited when the open field system was set out.

Site Number	20
NGR	SD 81387 45131
Site type	Earthwork
Period	Post-Medieval
Condition	Good
Dimensions	50m x 1m
Description	This feature consisted of a field bank of grassed-over stones with slight ditches on each side. It ran north from the standing field wall at the north-west corner of the quarry, feature 21, and faded out to the north. It overlies feature 19 and was not shown on the 1853 or 1908 OS maps; it was probably disused by 1853.

Site Number	21
NGR	SD 81436 45105
Site type	Earthwork
Period	Nineteenth century?
Source	Assessment/Detail survey
Condition	Good
Dimensions	58m x 18m
Description	This was a quarry, c5m deep with the rock face on the south, west and east sides and a slope to the north. It had its entrance at the eastern end constructed from limestone which dipped quite steeply to the south. There was a faint access track along the base. An oval hollow to the north of this, near the entrance (6 x 5m), could be a clamp limekiln but there was no visible burning to confirm this. A second small quarry, possibly later in date, cuts in from the south just north of the possible limekiln. To the east and west of this there were hollows along the hillside that were probably also small-scale quarrying. The feature is shown on the 1853 and 1908 OS maps and the plan form is unchanged from 1853 to the present, but access was modified between 1853 and 1908.

Site Number	22
NGR	SD 81439 45051
Site type	Building
Period	Nineteenth century?
Source	Assessment/Detail survey
Condition	In use
Dimensions	7.1m x 6.3m
Description	This feature was a building with walls of limestone rubble and rough quoins; bedded in with hard lime mortar containing coal flecks. The walls were 0.5m thick. The west wall was the re-used east wall of an earlier building. Evidence was encountered of wall returns which had been broken off externally and the rest of the building abuts the quoined corners. There were no other features to the wall. The north wall had a blocked window

at the base which at the west end measured 0.6m wide, +0.3m high internally and had a wooden lintel. There was a central window which splayed inwards (0.99m wide internally, 0.6m high), had a wooden lintel and machine-moulded bricks on the jambs. A cart door, (2.3m wide at the east end) had machine-made brick quoins. The east wall had no features

The south wall had a doorway in the centre which was possibly a later insertion. Its full height was to the eaves and it measured 1.06m wide with brick jambs. A blocked window in the base of the wall at the west end measured 0.5m wide by +0.45m high. There was no fireplace or other indications of domestic or industrial use except for some boiler cinder nearby. The feature was probably an agricultural building but could have originated as a smithy, for example. It is now in agricultural use and is shown on the 1853 OS map as a roofed building called 'Skeleron Lathe' but was apparently roofless on the 1908 map.

Site Number	23
NGR	SD 81452 45088
Site type	Earthwork
Period	Nineteenth century?
Source	Assessment survey
Condition	Moderate
Dimensions	10 x 5m
Description	A building platform, the north side of which was defined by a 0.2m wide strip of small stones and the west end by two flat iron plates embedded in the ground. These may have been padstones. A small bank of stones ran west from the south-west corner and measured 6 x 1m. The use was probably agricultural.

Site Number	24
NGR	SD 814 450
Site type	Earthwork
Period	Sixteenth / seventeenth?
Source	Assessment survey
Condition	Moderate
Dimensions	4m long
Description	This earthwork showed as a line of stones in a faint bank that probably formed the south-west side of a platform or structure. The rest of the feature is indeterminate. It has been omitted from the plan.

Site Number	25
NGR	SD 81433 45048
Site type	Earthwork
Period	Nineteenth century?
Source	Assessment survey
Condition	Poor
Dimensions	9m (E-W) x 7m (N-S)
Description	This feature was the site of a possible building platform. The west end showed as a north/south wall line parallel to the west wall of feature 22. The rest of the structure was unclear but probably formed the west end of the building whose east end was re-used as the west wall of feature 22. The feature is omitted from the plan.

Site Number	26
NGR	SD 81432 45028
Site type	Earthwork
Period	Uncertain
Source	Assessment survey

Condition	Moderate
Dimensions	c25 x 10m, x 4m deep
Description	This was a quarry that was cut into the lip of the south-west facing slope. The rockface could be seen to the south-east but the rest was obscured by non-recent rubble tipping. The entrance to the quarry lies to the south-west. A separate hollow, just north of the entrance measuring c8 x 4m, may have been a limekiln. Some burnt stone and lime residues were present but not very regular.

Site Number	27
NGR	SD 81423 45002
Site type	Earthworks
Period	Sixteenth / seventeenth? to the twentieth century
Source	Assessment survey
Condition	Moderate
Dimensions	c 50 x 12 m
Description	This consisted of a continuous line of hollows that were partially separated by banks of irregular limestone rubble and individual hollows which typically measured c5 x 3m. Scattered hillocks of spoil were located along the west side of the hollows. To the south was an exposed section where it took the form of an infilled opencut (1.7m wide) between limestone blocks. To the south of this area, the feature was largely cut out by feature 28 but one clear shaft, feature 29, was present on line within the floor of feature 28. This looked more recent than feature 27. There were possible traces beyond but they were obscured by later features. This feature was a 'Rake' or opencut lead working. Williamson (1959) identified the opencut as belonging to the final twentieth century period of working, but the remainder of the feature is likely to be of an earlier date. Feature 27 is a continuation of feature 13 and is cut by feature 28.

Site Number	28
NGR	SD 81448 44999
Site type	Earthwork
Period	Twentieth century?
Source	Assessment survey
Condition	Moderate
Dimensions	c 36m x 33m
Description	Feature 28 was a quarry, c10m deep cut into the steep hillslope. The rockface could be seen to the north-east. The quarry was open to the south-west but had small finger tip projects down the slope, with a slight path/barrow run onto it. Feature 29 partly blocks mouth of the quarry, but the path perhaps respects 29. This was not shown on the 1853 or 1908 OS map. In view of the size, this suggests that it post-dates 1908.

Site Number	29
NGR	SD 81433 44995
Site type	Earthwork
Period	Twentieth century?
Source	Assessment survey
Condition	Moderate
Dimensions	5 x 3 m, x 2m deep
Description	This was an oval shaft which could be seen as hollow with very steep 'raw' sides and brambles and debris in the base. The feature probably post-dates quarry 28, but may be contemporary with it. Rather than being a 'new' shaft, feature 29. It may possibly be the collapse cone of a much earlier shaft forming part of feature 27. Williamson (1959) identified this as "Ashworth's Shaft", the identity and date of Ashworth is, however, not stated.

Site Number	30
NGR	SD 81472 44962
Site type	Earthwork and structure
Period	Late Nineteenth century
Source	Assessment survey
Condition	Good
Dimensions	c 30 x 10m, x 1.5m deep
Description	This dry hillside reservoir was defined by a bank 1.5m high to the north-west, south-west, south-east, and was cut into the steep slope to north-east. The north end was revetted by a battered concrete wall. It was not on the 1853 map, but was shown in its present dry state on the 1892 map (the north end was omitted from the extract) and the 1908 map. This was presumably the water supply for York and Lancaster Mines steam engine and dressing floor. There was no obvious inlet, outlet or overflow!

Site Number	31
NGR	SD 81490 44936
Site type	Earthwork
Period	Late Nineteenth century
Source	Assessment survey
Condition	Poor
Dimensions	c 8 x 8 m
Description	This was a rectangular platform cut into the hillside and to the south-west it was open to a rather steep downslope. It was separated from feature 32 by a bank. There was no feature at this location on the 1853 map. The platform was shown on the 1892 map and contained a complex two-part structure that was possibly a wheelpit and crusher. The 1908 map showed the platform, with an 'L'-shaped remnant of a structure. The structure has been modified since then.

Site Number	32
NGR	SD 81490 44920
Site type	Earthwork
Period	Twentieth century
Source	Assessment survey
Condition	Poor
Dimensions	c 17m x 3m
Description	This feature was a steep-sided gully which ran to the north-east, to a 'blind' end, into the hillside and was c8m deep there. The floor was gently sloping and rather 'raw'. There was no feature here on the 1853 map. The 1892 and 1908 maps showed a probable adit portal, which differed in form between the two maps, where the south-west end of feature 32 now lies. The 1892 map identified a shaft on the site of the north-east end of feature 32. This feature was almost certainly the run-in portal of a 19th century adit, but has been considerably remodelled since 1908, probably including recent disturbance.

Site Number	33
NGR	SD 81477 44910
Site type	Earthwork
Period	Twentieth century?
Source	Assessment Survey
Condition	Moderate
Dimensions	25m x 20m
Description	This was a set of rather poorly defined finger-tips, up to 2m high, fanning out south-west from the lobby of feature 32. They were composed of angular limestone rubble where they were visible. The western tip contained a dump of boiler clinker, and also one piece of probable lead-smelting slag. The feature was not shown on the 1908 OS map, so presumably it was derived from twentieth century working of the adit. The 1853 map

Dimensions	c 50 x 10m, x 2m high
Description	This feature was the tip(s) of earth and deads of veinstuff and limestone, with much barytes. It is best interpreted as a continuation of feature 33 which was separated by a later track and disturbed possibly by prospecting and reprocessing. This feature does not correspond to features shown on the 1892 or 1908 OS maps and are presumably of twentieth century in their present form, but they may overlie the surviving remains of a nineteenth century dressing floor.

Site Number	38
NGR	SD 814449
Site type	Earthwork
Period	Late Nineteenth century?
Source	Assessment Survey
Condition	Good
Dimensions	c 35 x 10m
Description	This was a terrace which was defined by a cut into the hillside to the north-east, a slight bank to the north-west and the edge of feature 36 to the south-east. It was continuous with the valley floor to the south-west. The feature was shown on the 1892 map as an enclosure defined by boundaries to the north-east and north-west, and buildings and structures to the south-east and south-west with a small building in the north corner, on the 1908 map it is shown as walls to the north-east and north-west. It was probably part of the late nineteenth century works and was perhaps a yard, dressing area or settling tank.

Site Number	39
NGR	SD 81342 44957
Site type	Earthworks
Period	Twentieth century
Source	Assessment Survey
Condition	Moderate
Dimensions	c 51m x 9.3m
Description	This feature consisted of a run of tips continuing the alignment of feature 37 but at a lower level and much less regular. Veinstuff and coarse dressing waste were visible within the tips. The feature was probably eroded by a stream to the south-west and a partially buried stone revetment is now visible on this side of the feature about half way along, and at the south-east end just below feature 37. An irregular hollow to the north-east, near the south-east end of the feature, may be a test pit and shows that deads extended down for 1.5m below the modern ground level. The area is occupied by a range of features and structures on the 1892 and 1908 maps. The stone revetments may form parts of these, and further remains probably underlie the feature which must itself be of twentieth century origin.

Site Number	40
NGR	SD 81492 44900
Site type	Earthwork
Period	Nineteenth century?
Source	Assessment Survey
Condition	Moderate
Dimensions	c 40 x 5-10m
Description	A flat-topped terrace, defined by a slight cut into the hillside to the north-east and a steep slope down to feature 32, feature 33 to north-west, and a steep slope to the valley floor in the south-west. The south-east end of the feature funnels onto the trackway between features 41 and 42; this feature also cuts 41 and 42. This site is shown in more or less its present form on the 1892 and 1908 OS maps.

Site Number	41
NGR	SD 81504 44873
Site type	Earthwork
Period	Late Nineteenth century?
Source	Assessment Survey
Condition	Moderate
Dimensions	c 20 x 10 m, x 1-3 m high
Description	Feature 41 was a flat-topped tip, which appeared to be of limestone rubble where visible, sloping down to all sides. The feature looks like the end of a finger tip running to the south-west from shaft 43 and cut off by the track of feature 40. There were no features shown in this area on the 1853 map, but they were shown on the 1892 and 1908 OS maps

Site Number	42
NGR	SD 81516 44895
Site type	Earthwork plus structure
Period	Late Nineteenth century
Source	Assessment Survey
Condition	Good
Dimensions	c 30 x 20 m
Description	This feature comprised a terrace with steep slopes to the west, south-west, and south-east, and also comprised a hillslope to the north-east. Overall it formed a composite feature with a higher tip of deads to the west and a stone-lined setting (9m long) forming the north-east half of an oblong with a straight side and rounded ends, of which the south-west side was destroyed. There was an irregular hollow to the south-west of this area. The stone-lined feature looks like the setting for a boiler. The area is occupied by two buildings on the 1892 map, and a building with a chimney on the 1908 map. This is shown in ruins in the early photograph (Plate 1). It is interpreted as the site of an engine house for shaft 43.

Site Number	43
NGR	SD 81524 44887
Site type	Earthwork
Period	Late nineteenth century/twentieth century
Source	Assessment Survey
Condition	Moderate
Dimensions	5 x 5 m, x 2m deep
Description	This shaft and survives as a steep-sided hollow with a tree in the base. There are small tips to the south-west. The feature is shown on the 1892 map, but not on the 1908 map, although the adjacent engine house is depicted. Documentary evidence makes it clear that this was the late nineteenth century York and Lancaster shaft, although it may have been re-used in the twentieth century.

Site Number	44
NGR	SD 81530 44878
Site type	Structure
Period	Twentieth century
Source	Assessment Survey
Condition	Poor
Dimensions	6 x 6 m
Description	This feature was a machine base, consisting of two masses of badly spalling white concrete, with dense angular limestone aggregate, with holding-down bolts. This was presumably the base for a winder, serving shaft 43. It was either from the York and

Lancaster working or from the twentieth century reworking. The feature is not on the 1892 or 1908 map.

Site Number	45
NGR	SD 81538 44875
Site type	Earthwork
Period	Nineteenth century?
Source	Assessment Survey
Condition	Poor
Dimensions	c 10 x 10 m x 0-6m high
Description	This was an amorphous rounded tip of limestone and veinstuff situated to the south-east of feature 44. The 'raw' appearance suggests that considerable disturbance by modern prospecting has occurred, but the feature probably has earlier origins. The feature was shown on the 1892 and 1908 OS maps, although the shape may have been modified more recently.

Site Number	46
NGR	SD 81532 44875
Site type	Earthwork
Period	Nineteenth century?
Source	Assessment Survey
Condition	Moderate
Dimensions	c 20 x 1.4m, x 0.5m deep
Description	This feature was a leat, contoured south-east/north-west and cut-off to the south-east by an active meander of Ings Beck. The leat is obscured to the north-west by the track to feature 40. The leat is a clear channel in the better-preserved parts, with a bank to the south-west. This feature was probably a continuation of leat 34; it is not shown on any OS map edition. The line was probably 'slighted' by features on the 1892 map.

Site Number	47
NGR	SD 81560 44906
Site type	Earthworks
Period	Iron Age-Roman/Medieval ?
Source	Assessment Survey
Condition	Moderate
Dimensions	c 100 x 60m
Description	This feature consists of an area of small rectangular fields that were defined by low banks and lynchets and occupies a steep south-west-facing slope. It is bounded to the south-east by a sharper bank with trees on it, to the north-west by a faint bank above feature 40. The feature was obscured by the modern track to the north-east, by mining features to the south-west and a possible positive boundary lynchets in places. Parts of this field-system seem to consist of strips c10m wide running downslope. The character of the feature is reminiscent of Iron Age/Romano-British 'Celtic' field systems and is quite different in form to the ridge-and-furrow elsewhere on site. The field-system may possibly have been incorporated into the modern field boundaries. The south-east boundary is shown on the 1853 map, with trees, but is not indicated on either of the 1892 or 1908 maps.

Site Number	48
NGR	SD 81278 45004
Site type	Structure
Period	Uncertain
Source	Assessment Survey
Condition	Good
Dimensions	2-3m wide

Description This feature was an open adit into the base of a slope, at the extreme west end of the southern area. It has a small drainage channel leading south-west from the adit entrance. It was possibly a drainage adit for workings beneath features 1-13, or a later attempt to prospect beneath these workings.

Site Number 49
NGR SD 81581 44992
Site type Earthwork
Period Uncertain
Source Assessment Survey
Condition Poor
Dimensions 4m diameter
Description This feature consists of a circular depression with a faint spoil ring to the north, west and south.

Site Number 50
NGR SD 81577 44935
Site type Structure
Period Twentieth century
Source Assessment Survey
Condition Good
Dimensions 4m x 4m
Description This feature consists of a stone lined air shaft, known as Whalley's Shaft. Centrally located within the structure is a 1m diameter circular shaft. In each of the four corners of the structure are a vertical metal rod with threaded ends. These stand 1m free of the stonework on the west side and 0.5m on the east side. The metal rod in the north-west corner retains its washer and nut. These rods are assumed to be the holding-down bolts, possibly for a winch. The shaft is shown on the 1892 and 1908 OS maps, but the reference to the shaft as "Whalley's Shaft" implies that the surface features date to a refurbishment in the 1920s.

Site Number 51
NGR SD 81643 44899
Site type Earthwork
Period Uncertain
Source Assessment Survey
Condition Good
Dimensions 40m x 15m
Description This feature was a limestone quarry straddling the track from Ings End to Hollins Farm. A limestone rockface is exposed in the north-east section of the quarry on the north-west, north-east and south-east sides. The section to the south-west of the track contains a lime-kiln, feature 52, and a series of earthworks. The quarry and kiln were shown on the 1853 map with the quarry slightly smaller than its later outline. The quarry only was shown on the 1892 and 1908 maps.

Site Number 52
NGR SD 81610 44896
Site type Lime-kiln
Period Uncertain
Source Assessment Survey
Condition Good
Dimensions 4m x 4m
Description This lime-kiln was situated within feature 51 just beside, and to the south-west, of the track. The top of the lime-kiln is at the same as the level of the track. In plan, the lime-

kiln forms a 4m diameter circle. A stone arch is preserved in the south-west face of the kiln, the span of which is 2m and the height 1m. The lime kiln was shown on the 1853 OS map, but not on later editions.

Site Number	53
NGR	SD 81557 45000
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	15m diameter rim -to-rim
Description	This feature was a faint, large circular hollow with spoil to the south-west side. This feature may contain a further 4m circular feature in the eastern half which is only defined by the yellow colour of the grass (Chlorosis), suggesting heavy metal contamination. Feature 53 is overlain on its eastern side by feature 54.

Site Number	54
NGR	SD 81569 45005
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	11m diameter rim-to-rim
Description	This was an 11m diameter circular hollow with spoil on its west side and which overlays feature 53. There is evidence of coal and barytes in the soil within this hollow. The large diameter of features 53 and 54 indicates that they were unlikely to be shaft hollows. The position on the line of a vein, the presence of small fragments of barytes in the soil and the area of chloritic grass suggest an area of manual ore dressing.

Site Number	55
NGR	SD 81540 45021
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	4m diameter rim-to-rim
Description	This feature was a hollow c4m in diameter with spoil present along all its circumference.

Site Number	56
NGR	SD 81522 45007
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	4m diameter rim-to-rim
Description	This feature was a hollow c4m in diameter with a faint spoil mound on the south-west side.

Site Number	57
NGR	SD 81494 45034
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey

Condition	Poor
Dimensions	5m diameter
Description	This hollow was c5m in diameter with no evidence of spoil.

Site Number	58
NGR	SD 81506 45038
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	6m diameter
Description	This feature was a hollow c6m in diameter with no evidence of spoil.

Site Number	59
NGR	SD 81524 45130
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	25m x 7m
Description	This feature can be subdivided into two features: an east hollow and a west hollow. The east hollow is a circular feature c7m in diameter excavated into the north facing slope with an opening in the north side. The west hollow is larger and rectangular measuring c18m x 7m. It is excavated into the north facing slope and is open on the north side. The earthworks of this feature respect the nearby fence line to the north of feature. The feature was probably a limestone quarry as the 1853 OS map refers to "limestone quarries" in this area. It was shown on the 1908 OS map as a circular earthwork.

Site Number	60
NGR	SD 81808 45035
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	3m diameter rim-to-rim
Description	The feature was a hollow c3m in diameter and c1m deep with no evidence of spoil in the vicinity.

Site Number	61
NGR	SD 81892 44928
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	8m diameter rim-to-rim
Description	This hollow was c8m in diameter with no evidence of spoil.

Site Number	62
NGR	SD
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor

Dimensions	6m x 3m
Description	This was an oval shaped mound with its longest axis north-west/south-east. It stands c0.3m high. A faint circular feature c4m to the north-east of the mound may define it as a spoil mound.

Site Number	63
NGR	SD 81732 44881
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	4m diameter rim-to-rim
Description	This feature was a hollow c4m in diameter with no evidence of spoil.

Site Number	64
NGR	SD 81741 44876
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	4m diameter rim-to-rim
Description	This was a hollow c4m in diameter with spoil on the rim to the south-east. It was overlain by feature 94 on the north-west side.

Site Number	65
NGR	SD 81729 44883
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Moderate
Dimensions	4m diameter rim-to-rim
Description	This hollow was c4m in diameter with a pronounced central hollow c2m in diameter and 0.5m deep. It overlies feature 93 and was probably a shaft hollow.

Site Number	66
NGR	SD 81714 44893
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Moderate
Dimensions	4m diameter rim-to-rim
Description	This hollow is c4m in diameter with a central hollow c2m in diameter and 0.5m deep. It was probably a shaft hollow

Site Number	67
NGR	SD 81700 44903
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	2 x 4m diameter rim-to-rim

Description	This feature consisted of two circular hollows. The north-east hollow was c4m in diameter and the south-west hollow was c4m diameter with spoil on its rim to the south-east.
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Site Number	68
NGR	SD 81688 44915
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	6m diameter rim-to-rim
Description	This was a circular hollow c6m in diameter with a central hollow measuring c2m in diameter. The central hollow has a one metre extension to the south-east which is not as deep as the central hollow itself. There is no evidence of spoil in the vicinity. The feature was shown on the 1st edition map (1892) and the 1908 OS map, but has probably been infilled since then as the current form would not merit the map definition. It was not depicted on the 1853 OS map due to the scale. The feature was probably a shaft hollow.

Site Number	69
NGR	SD 81667 44931
Site type	Earthwork
Period	Uncertain
Source	Assessment Survey
Condition	Poor
Dimensions	5m diameter rim-to-rim
Description	This was a circular hollow c5m in diameter with no evidence of spoil.

Site Number	70
NGR	SD 81620 44964
Site type	Earthwork
Period	Uncertain
Source	✓ Assessment Survey
Condition	Poor
Dimensions	8m x 8m
Description	This feature was an area of dressing waste which has been damaged by modern excavation. The modern excavation showed soil below a thin layer (50mm) of topsoil which contained waste of 10mm or less in size and mainly composed of barytes. The area contains a circular feature c4m in diameter defined by the yellow colour of the grass (chlorosis) and by being a small hollow. The feature is probably the damaged remains of a manual ore-dressing area.

ILLUSTRATIONS

Figures

- Fig 1 Rimington Location Map
- Fig 2 OS 1st edition 6" to 1 mile map (1853)
- Fig 3 OS 3rd edition 25" to 1 mile (1908)
- Fig 4 Assessment site map of the Rimington mines
- Fig 5 Assessment site map of the southern and eastern groups (superimposed on the OS 2nd edition 25" to 1 mile map (1892))
- Fig 6 Detail site survey of the northern group

Photographs

- Plate 1 Undated photograph (about early twentieth century) of the chimney and processing site - south group
- Plate 2 Shaft 4 (western group) from the south-east
- Plate 3 Western group of shafts and spoil mounds from the south-east
- Plate 4 Building 22 which may have originated from mining activity.

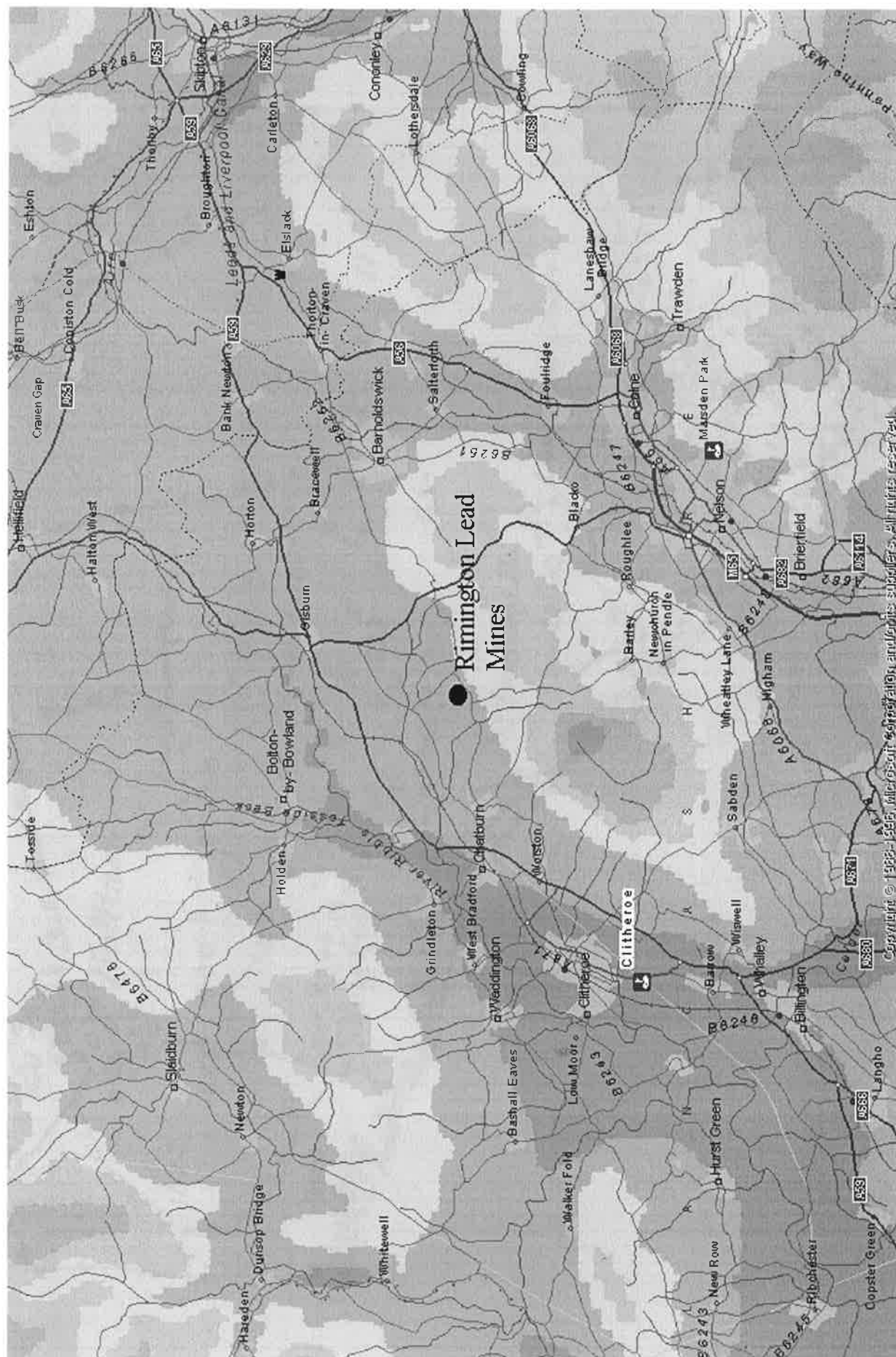


Fig 1 Rimington Location Map

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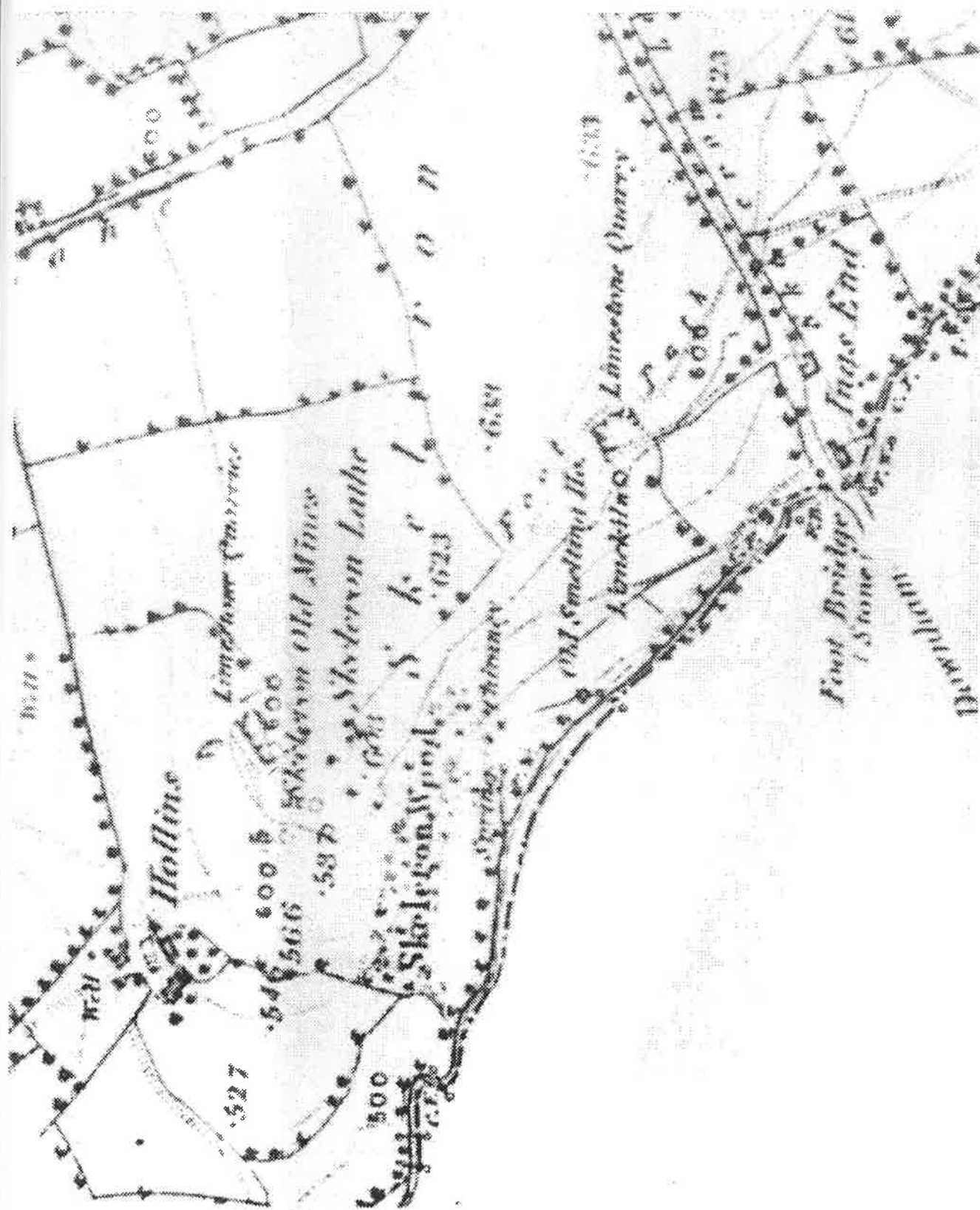


Fig 2 OS 1st edition 6" to 1 mile map (1853)

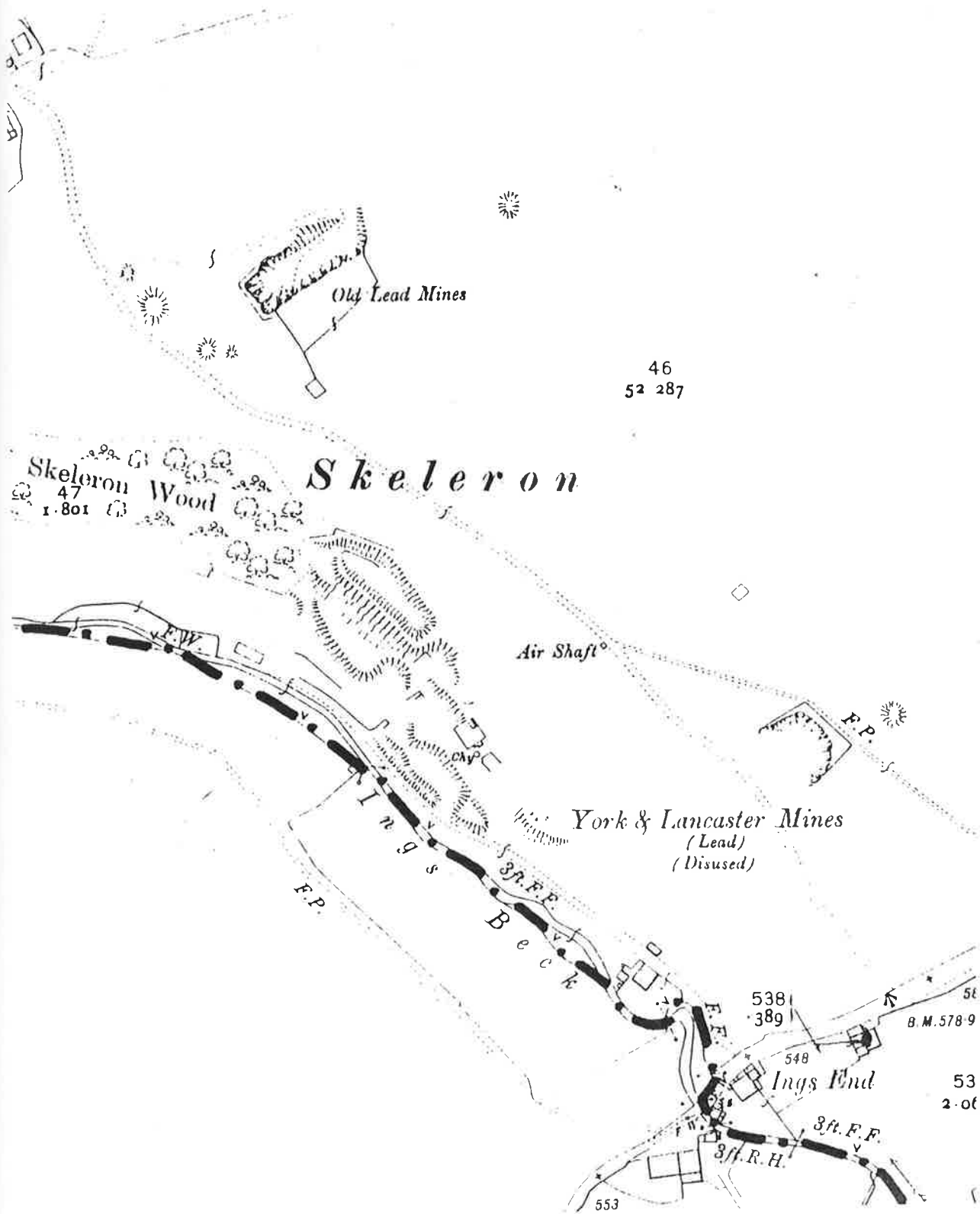


Fig 3 OS 3rd edition 25" to 1 mile map (1908)

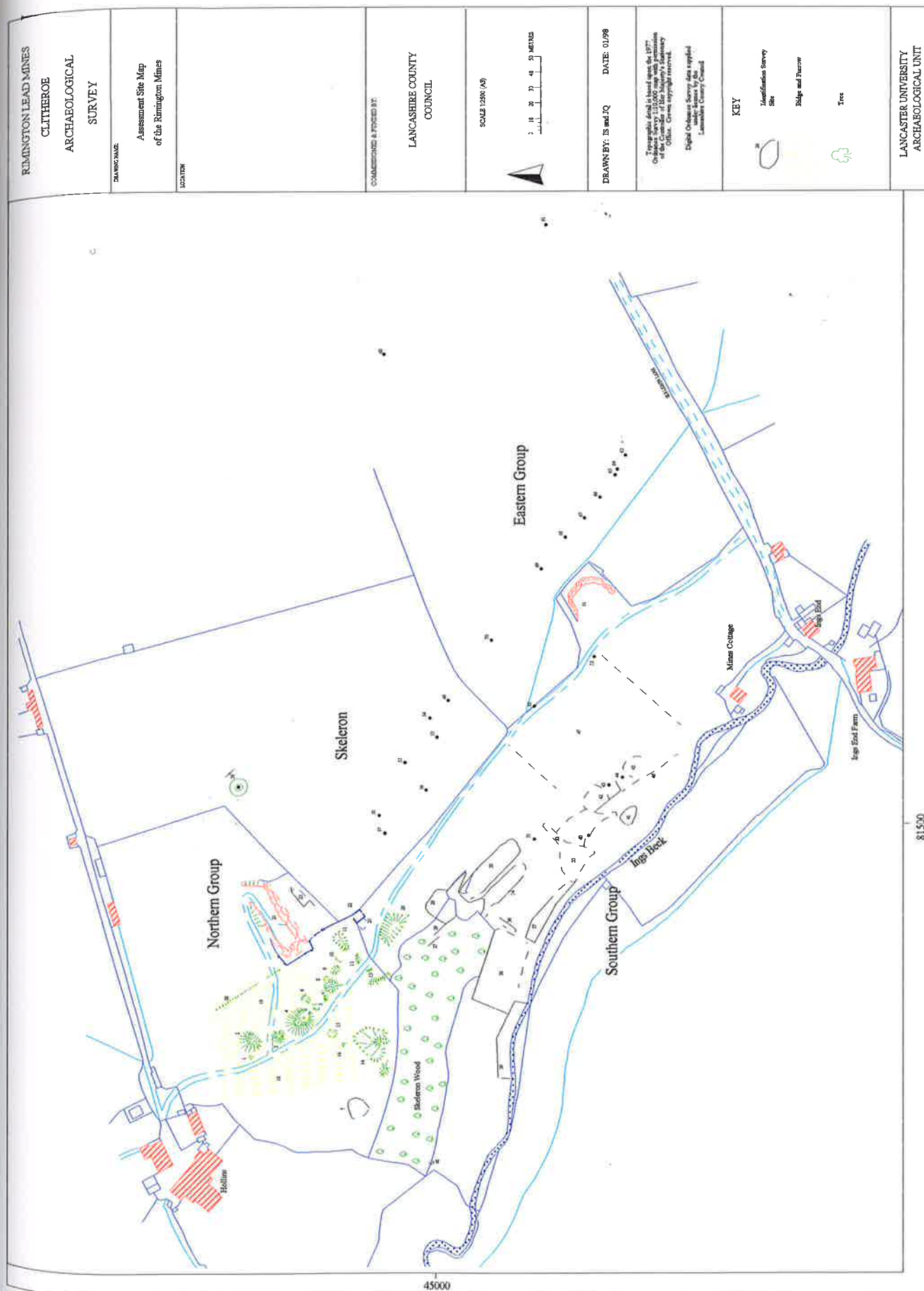


Fig 4 Assessment Site Map of the Rimington Mines

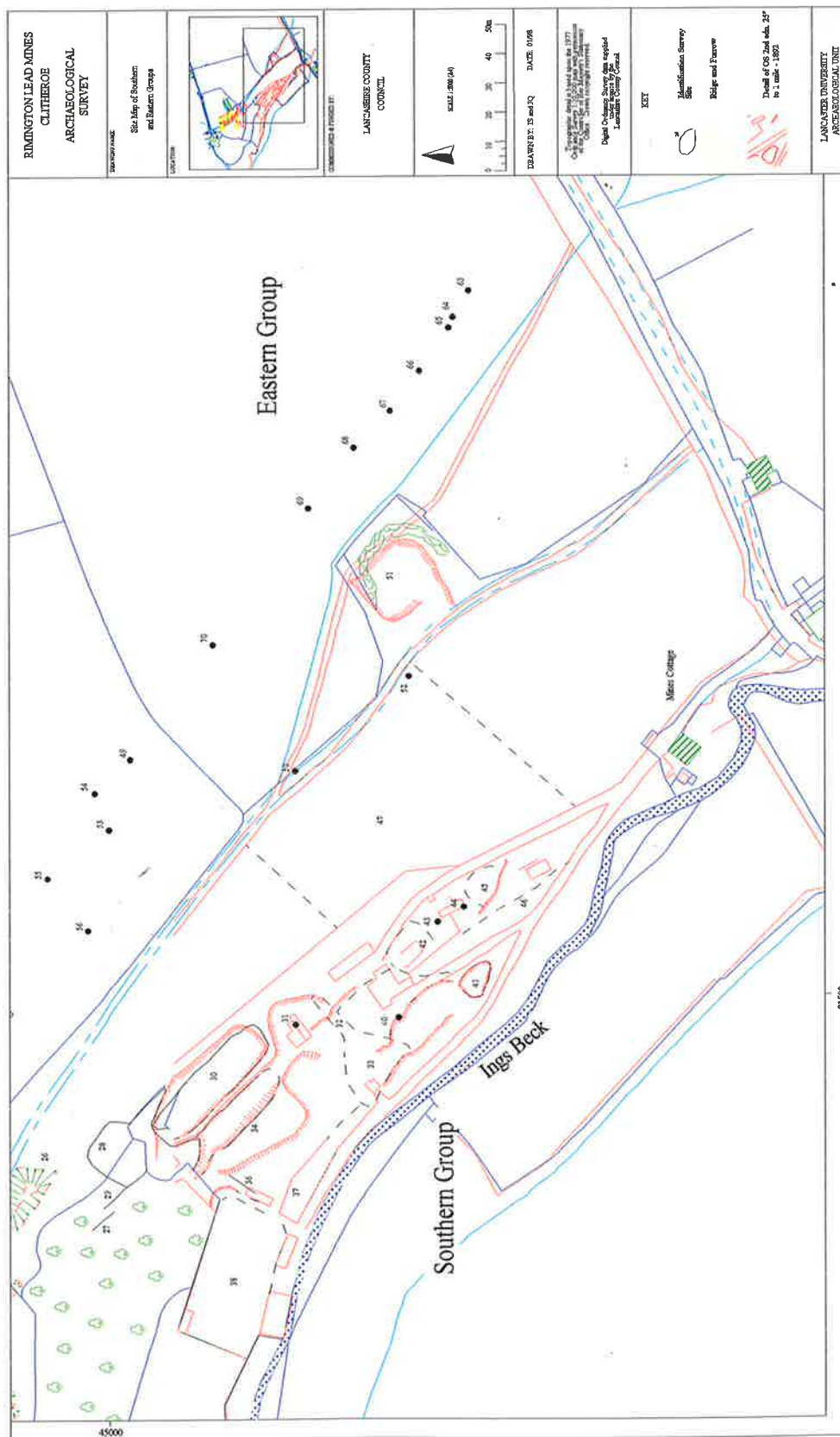


Fig 5 Assessment Site Map of Southern and Eastern Groups (superimposed on the OS 2nd edition 25" to 1 mile map (1892))

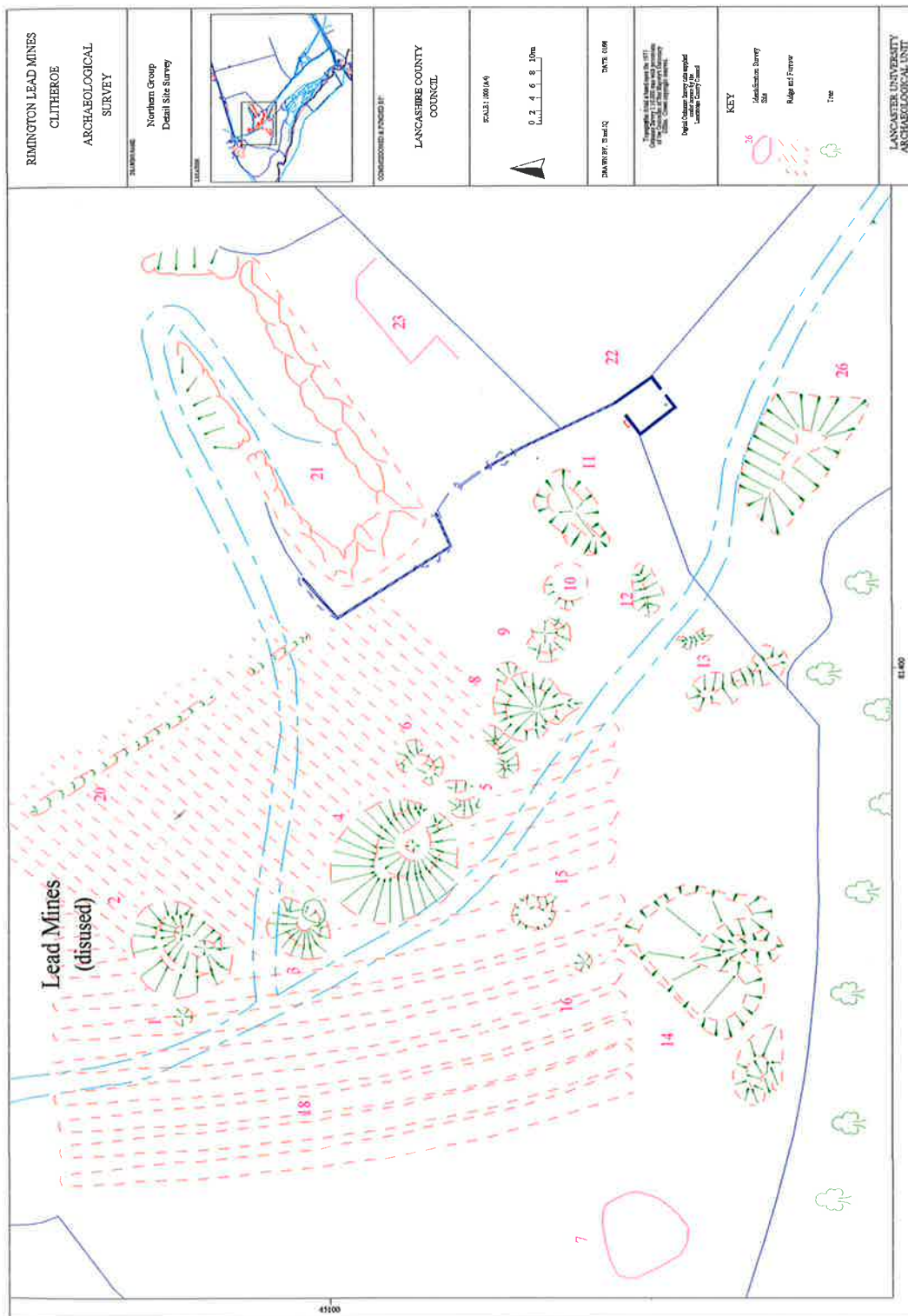




Plate 1 Late Nineteenth/Early Twentieth Century Photograph of the South Group and former Chimney



Plate 2 Shaft 4 (Western Group) from the South East



Plate 3 Western Group of shafts and Spoil Mounds from the South-East



Plate 4 Building 22 which was a former mine building