



February 2000

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**BACKBARROW PUG MILL**  
**CUMBRIA**

**Artefact Inventory Report**

Backbarrow Pug Mill, Backbarrow  
Cumbria

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Archaeological Inventory Report

Report no 1999-2000/054/AUA8908

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

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February 2000

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## SUMMARY

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Lancaster University Archaeological Unit has undertaken an archaeological inventory of artefacts contained within the Pug Mill (Turbine House) at Backbarrow Ironworks (SD 3555 8470). The work was requested by John Hodgson, Archaeologist for the Lake District National Park Authority, and funded by English Heritage, in advance of the construction of a new turbine house.

The investigation revealed less artefact material than had been anticipated, but nevertheless did identify a significant assemblage, some of which had previously been removed to the nearby house at Birkdault, Haverthwaite, which was the residence of Julius Barratt, co-owner of the pug mill.

The assemblage from the pug mill included a series of cast iron bars, some stamped LORN and others VALLEY, there was also a single wooden mould, corresponding to the shape of the 'Valley' castings. The assemblage remarkably included an unopened wooden crate enclosing an unused black-leaded cast for one wheel of a hand-barrow, and was dated to 1958.

From the adjacent river bank were five pigs of cast iron bearing the 'VALLEY' Stamp. From Birkdault were five mould stamps which were all used to stamp the various types of iron produced at Backbarrow up to the closure of the works in 1962.

All of the assemblage has been temporarily stored at Birkdault, and it is recommended that a permanent resting place be found either within the Backbarrow site or at an appropriate industrial museum

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## ACKNOWLEDGEMENTS

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Thanks are due to Mike Davies-Shiel for his assistance in locating and recording the artefacts and for invaluable advice and interpretative information. Thanks are also due to Mr Ian Clark for his assistance during the initial search of the Pug Mill. The staff of Askam Construction are thanked for allowing access to the building and in particular to Grant Griffiths and Haiko Akkermans for assisting in the initial search of the Pug Mill.

John Hodgson is thanked for facilitating the project and for his assistance during its implementation.

The work was undertaken in September 1999 by Iain Hedley. The report was compiled by Iain Hedley and edited by Jamie Quartermaine and Richard Newman. The project was managed by Jamie Quartermaine.

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## 1. INTRODUCTION

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### 1.1 PROJECT BACKGROUND

- 1.1.1 Following plans to redevelop the former Pug Mill (SD 3555 8470), at Backbarrow Ironworks, Lancaster University Archaeological Unit (LUAU) was invited to undertake an assessment of artefacts relating to the former ironworks which were known to exist within the building. The Pug Mill is now a turbine house and the development involved the refurbishment of the building with new turbines. The survey was at the request of John Hodgson (Archaeologist for the Lake District National Park Authority) in conjunction with English Heritage and was required to inform future decisions concerning more appropriate long-term storage for the artefacts. These artefacts were believed to include a number of wooden moulds and iron castings, together with a charging barrow.

### 1.2 SITE LOCATION

- 1.2.1 The Backbarrow Ironworks are situated at the south end of the village of Backbarrow, approximately 4 km south west of Newby Bridge. It lies within the South Lakeland District of Cumbria and is within the Lake District National Park (Fig 1).

### 1.3 BACKBARROW IRONWORKS

- 1.3.1 The Backbarrow Ironworks are of very considerable archaeological significance, which is reflected in its designation as a scheduled monument (SAM Cumbria no. 506). The Backbarrow site represents a small-scale, essentially eighteenth century, ironworks which has been modified throughout its history with the minimum of capital investment, and is now the only site in which examples of many technological developments can be studied. It was the second blast furnace to be built in Cumbria, the first being at Cleator Moor (Riden 1987, 29-30 and Philips 1977, 26), and the last in Britain to convert to coke-firing. It also has a number of associations with important historical figures such as Wilkinson and Darby. Whilst a number of charcoal-fired blast furnaces survive in Britain, all are essentially eighteenth century in date and embody no nineteenth century developments (Crossley 1980, 3). The nineteenth century form of blast furnace, which differed markedly in its scale, build and site plan, has now totally disappeared. Backbarrow, therefore, is now the only site in Britain in which the development of nineteenth century blast furnace technology can be demonstrated (Crossley 1980, 4).

### 1.4 PREVIOUS WORK

- 1.4.1 In the latter part of the 1970s interest in the preservation and development of the site was encouraged by Cumbria County Council, Lake District National Park Authority and the centre for North West Regional Studies at the University of Lancaster. In 1976 a survey and discussion paper was produced by the Director of Planning, Cumbria County Council, and the Lake District National Park Officer. In addition, the Northern Mill Engine Society produced a report on the condition of the blowing engine. Further to this interest Dr David Crossley undertook a rapid survey of the structural condition of the monument in 1980. The survey, which included a photographic record, addressed the prioritisation of conservation measures and also paid particular attention to the storage

sheds on the west side of the site' which had been largely overlooked by previous surveys.

- 1.4.2 Subsequent to the 1980 report little archaeological work was undertaken until an archaeological investigation in 1992 by the Lancaster University Archaeological Unit (LUAU 1992). This programme of work involved an assessment of the ironworks in conjunction with a fabric survey of the furnace area, including elevation drawings of the furnace and roaster house. This was followed by a programme of survey by the RCHM(E) (report pending) which generated a ground plan of the whole site in conjunction with an oblique photographic survey of all the buildings. A programme of evaluation trenching, examining principally the areas to the south of the furnace, was undertaken by LUAU in 1998 (LUAU 1998) in order to assess the potential for a commercial development of the site.

## **1.5 AIMS AND OBJECTIVES**

- 1.5.1 A project design was compiled by LUAU (*Appendix 1*) in accordance with a verbal brief by John Hodgson (LDNPA) and was subject to discussions with Gerry Friel (English Heritage Inspector of Ancient Monuments). The main aim of the inventory was to provide a record of the archaeological artefactual assemblage stored within the Pug Mill in advance of the anticipated improvement/replacement of the turbines within the structure. This was to be achieved by the compilation of a written descriptive and interpretative text cross-referenced to a photographic record.

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## 2. METHODOLOGY

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### 2.1 SITE RECORDING

- 2.1.1 The project design allowed for the detailed investigation of the artefactual assemblage held within the Pug Mill. The interior of the building was in a very untidy state and was very dark and an extensive search was undertaken, using torch light, in order to identify artefacts of potential importance from the relative large amount of less significant metal artefacts and refuse. This work was undertaken in conjunction with Mike Davies-Shiel and Ian Clark, together with Haiko Akkermans on behalf of Askam Construction.
- 2.1.2 Artefact recording was undertaken on pro forma sheets which incorporated a brief written description, interpretation, measurements and photographs were taken of the artefacts in daylight conditions.

### 2.2 SURVEY CATALOGUE

- 2.2.1 **Database:** a database was compiled within Access 97 format, which defined all the pertinent details of the artefacts and were cross referenced to the photographic record.
- 2.2.2 **Photographic record:** a photographic catalogue was generated for all photographic images which are cross-referenced to the principal artefact database. The catalogue incorporated monochrome prints and digital colour images.



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### 3. DESCRIPTION OF THE ASSEMBLAGE

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#### 3.1 INTRODUCTION

- 3.1.1 The project design allowed for the identification and assessment of a number of artefacts which were believed to be stored within the Pug Mill. It soon became apparent, however, that the range and significance of the identified assemblage was considerably smaller than anticipated, with most, if not all, of the assemblage dating to the late 1950s or early 1960s. A small number of additional artefacts were recovered from the adjacent river bank.
- 3.1.2 The Pug Mill was used as a smiths' shop in the later years of the ironworks and a considerable number of artefacts relating to this function remain stacked on shelves and also lay scattered across the floor. An examination of the cupboards and drawers in these areas revealed a substantial paper archive of receipts, invoices and furnace diagrams relating principally to the 1950s and 1960s. In addition a unique plan of the Ironworks dating to the late 1950s was also uncovered, which is presently held by Mike Davies-Shiel.
- 3.1.3 The anticipated discovery of mould stamps, initially recovered by Mike Davies-Shiel, and which were believed to be 'hidden' within the Pug Mill was not realised during the initial search of the building. Immediately prior to the commencement of the second visit, and due largely to the extensive enquiries of Mike Davies-Shiel, the location of the stamps was discovered, not in the Pug Mill but at the house of Birkdault, Haverthwaite, the residence of Julius Barratt, co-owner of the site. The items had been removed from the Pug Mill by Mr Barratt's son shortly before this project was commissioned.

#### 3.2 ARTEFACTUAL ASSEMBLAGE

- 3.2.1 **Pug Mill:** within the Pug Mill itself, a total of eight artefacts were uncovered and recorded, comprising six of metal and two of wood. Of the metal artefacts all were cast iron bars with four stamped 'LORN' and one 'VALLEY', and a further unstamped bar. A single wooden mould, corresponding to the shape of the 'VALLEY' castings, was also recorded. Quite remarkably the assemblage included an unopened wooden crate enclosing an unused black-leaded cast for one wheel of the hand-barrows used to wheel ore, scrap, fuel, etc, into the furnace. The despatch note survived on the crate indicating that it was made by East Hecla Works of Hadfields Ltd, Sheffield. It was despatched to the Charcoal Iron Company on 1st December 1958. In addition, a number of small unstamped iron castings and a square piece of wood, with an embossed letter 'B', were photographed but not otherwise recorded.
- 3.2.2 **Riverbank:** a total of five whole or fragmentary pigs of cast iron were recovered from the river bank, each bearing the 'VALLEY' stamp, though most were barely legible. The pigs are believed to have eroded out of the riverbank and, therefore, date to the period when the former spoil heap expanded into the River Leven, sometime between 1888 and the 1911 (LUAU 1998).
- 3.2.3 **Birkdault:** five mould stamps were located at the nearby house of Birkdault, Haverthwaite. The stamps consisted of 'DUD LNF 'CES DUD' signifying Lorn Furnaces, 'GRAZEBROOK' whose origin is uncertain, 'A/SV' signifying Anglo-Swedish Valley, and two of 'VALLEY' which was the iron type specifically produced at Backbarrow from 1711-12 onwards. These particular stamps were all used to stamp the various types

of iron produced at Backbarrow up to the closure of the works in 1962. The Lorn Furnace in Argyle, for instance, closed in 1847 and the production of Lorn iron was continued at Backbarrow.

### **3.3 DOCUMENTARY ASSEMBLAGE**

- 3.3.1 An assemblage of documents was identified and removed from the Pug Mill, principally from the smithy section. These are presently held by Mike Davies-Shiel who is in the process of sorting and cataloguing them in anticipation of submitting them to the Barrow Record Office. The records comprise a large variety of sundry paperwork, and comprises upward of 50-60 items. The assemblage included specifications for alterations to the furnace, note books, timesheets, newspaper cuttings, receipts from suppliers, instructions / manuals for equipment which included fire extinguishers. Most of the material, where dated was from the period 1954-1956, although there were also some newspaper cuttings that post-dated the closure of the site (1972).
- 3.3.2 The most important item was a dimensioned pencil plan, *c* 30" x 30" in size, which was a proposal for the expansion of the furnace, for 186', in a direction towards the pug mill. It was drawn by 'CI co' and was dated to January 1956. As well as showing the proposed extension, which was never implemented, it shows the extent and character of the works at that date. This includes, in addition to the furnace complex, the road, the laboratory, fitting shop, gantry house, smithy, diesel house, pug mill, generator house, the tail race and two garages. It is of very considerable importance as it is the only surviving dimensioned plan of the layout of the Backbarrow works at the time of the closure.

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## 4. RECOMMENDATIONS

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- 4.1 All of the artefacts which were assessed by LUAU, in conjunction with Mike Davies-Shiel, have now been removed from the site by Mr Julius Barratt and are now stored at Birkdault, Haverthwaite. This is not considered, however, to be a long term solution, but rather a short term measure to ensure their survival in the face of future redevelopment of the site and/or its continual decay. Mr Barratt is sympathetic to the importance of this material and has agreed to find appropriate storage space for the entire assemblage until a decision has been made about its future.
- 4.2 The documentary material is in the keeping of Mike Davies-Shiel who is undertaking a catalogue of the material in advance of its deposition with Cumbria Records Office (Barrow). The 1950s plan of the site is considered to be a very important cartographic source for the site, as it shows the layout and function of the buildings in the years immediately preceding the closure of the ironworks.
- 4.3 The final resting place of the artefacts needs to be decided, but it would not be appropriate for them to remain within the Pug Mill, as this material would be considered as 'scrap' by most developers and contractors and would probably be sold on if left. Subject to the future development of the site, there is the possibility that one of the original structures, possibly the engine house could be retained as a museum, and this would be the most appropriate final depository. Alternatively, subject to the approval of the owner, English Heritage and the LDNPA, it may be appropriate to advertise the material in the newsletters of the Historical Metallurgy Society and the Association for Industrial Archaeology in order that any interested parties, such as Industrial Museums, can be made aware of its potential availability.

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## 5. BIBLIOGRAPHY

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RCHM(E) Backbarrow Ironworks Survey: Draft Plan

### 5.2 PUBLISHED SOURCES

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APPENDIX 1  
PROJECT DESIGN

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Lancaster  
University  
Archaeological  
Unit

**March 1999**

**BACKBARROW PUG MILL  
CUMBRIA**

**ARCHAEOLOGICAL INVENTORY  
PROJECT DESIGN**

*This project design is presented in accordance with current English Heritage guidelines, as specified in Management of Archaeological Projects, 2nd edition, 1991*

***Proposals***

*The following project design is offered in response to a request by the Lake District National Park Authority, to produce an archaeological inventory of artefacts relating to the Backbarrow Ironworks, Cumbria, held in the adjacent Pug Mill.*

## **1. INTRODUCTION**

### **1.1 CIRCUMSTANCES OF PROJECT**

- 1.1.1 This project design is offered in response to a request by John Hodgson, the Lake District National Park Archaeologist, for an assessment of the predominantly ferrous artefacts stored within the Pug Mill at Backbarrow Ironworks, Haverthwaite, Cumbria (SD 3555 8470). The project proposal is submitted in application for a grant award from English Heritage.

### **1.2 BACKGROUND**

- 1.2.1 The Backbarrow Ironworks is of very considerable archaeological significance, reflected in its scheduled status (SAM Cumbria no. 506); there has been documented iron processing here since 1685, when John Machel built a bloomery forge until 1964, when the Backbarrow furnace closed. The first blast furnace in the Lake District was built here in 1711 and, after a long and successful history, the furnace was, in the 1920's, the last British furnace to convert from charcoal to coke. During this period the site has seen considerable changes; during its life the furnace stack appears to have been rebuilt at least three times - in 1770, 1870 and finally in the 1920's as a result of the conversion from charcoal as fuel to coke. This conversion also resulted in substantial alterations to the works, as evidenced by surface photographs taken before and after the conversion (LUAU 1992).

### **1.3 PREVIOUS WORK**

- 1.3.1 The Backbarrow Ironworks was the subject of an archaeological investigation in 1992 by the Lancaster University Archaeological Unit (LUAU 1992), which involved an assessment of the ironworks in conjunction with a fabric survey of the furnace area. This was followed by a programme of survey by the Royal Commission on the Historical Monuments (England) which generated a ground plan of the whole site in conjunction with an oblique photographic survey of all the buildings. The LUAU survey generated elevation drawings for the furnace and roaster house, but otherwise there are no elevation drawings for the remaining buildings of the complex. Subsequently LUAU undertook an evaluation of the site in advance of a proposed factory development on the site (LUAU 1998)

### **1.4 LANCASTER UNIVERSITY ARCHAEOLOGICAL UNIT**

- 1.4.1 LUAU has considerable experience of the archaeological survey and evaluation of sites and monuments of all periods, having undertaken a great number of small and large projects during the past 15 years. LUAU has particular experience in the archaeological recording and analysis of standing ancient monuments, historic buildings and industrial landscapes. Projects have been undertaken to fulfil the different requirements of various clients and planning authorities, and to very rigorous timetables. LUAU has considerable experience of the investigation of the North-West Iron and Steel industry. LUAU undertook the original assessment of the Backbarrow site in 1992 and the evaluation in 1998. LUAU has undertaken an assessment of the Iron and Steel Industry Steps 2 and 3 as part of the English Heritage Monuments Protection Programme, during which the Backbarrow Ironworks was examined as part of that assessment. LUAU undertook a detailed Level 3 survey of the Leighton Beck ironworks complex, near Arnside which was the sister ironworks to Backbarrow. LUAU has undertaken a mitigative excavation of the Netherhall Blast furnace, in Maryport, Cumbria. LUAU is involved in leading the Society of Antiquaries excavations at the Glantlees Farm medieval bloomery iron smelting complex.
- 1.4.2 LUAU has the professional expertise and resources 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.

### **1.5 ARCHIVE AND DEPOSITION**

- 1.5.1 The results of the survey will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*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.

- 1.5.2 Arrangements will be made for the deposition of the archive with the Cumbria Record Office, as recommended by the Museum and Galleries Commission. A copy of the report will be deposited with Cumbria County Council, for inclusion, as appropriate, in the county SMR.
- 1.5.3 All finds will be treated in accordance with LUAU standard practice which follows current IFA guidelines. No artefacts will be removed from the Pug Mill.

## 2. AIMS AND OBJECTIVES

- 2.1 The following programme has been designed in accordance with a verbal brief by the Lake District National Park Archaeologist and is subject to discussions with the English Heritage Inspector of Ancient Monuments. The inventory is required in order to provide a record of the archaeological artefactual assemblage stored within the Pug Mill in advance of the anticipated improvement / replacement of the turbines within the structure.
- 2.2 The required stages to achieve the project objectives are as follows:
- 2.3 **SITE RECORDING**
  - 2.3.1 An inspection of the whole assemblage will be made in conjunction with the production of a photographic record of the ferrous assemblage.
- 2.4 **SURVEY CATALOGUE**
  - 2.4.1 A database of all artefacts will be assimilated, which would include a description, an interpretation and cross reference to a photograph.

## 3. METHOD STATEMENT

- 3.1 In line with the objectives and stages of the archaeological work stated above the following work programme is submitted.
- 3.2 **SITE RECORDING**
  - 3.2.1 It is proposed to undertake an investigation of the artefactual assemblage held within the Backbarrow Pug Mill. This will involve a detailed examination of all artefacts stored, and descriptions of each element/artefact will be produced. The survey will be undertaken in conjunction with specialist verbal advice from Mike Davies Shiel, who has considerable knowledge as to the workings of the Backbarrow furnace and also undertook an inspection survey at the closing of the site in the 1960's. He will be in a position to provide the important interpretation of the disparate, predominantly ferrous, components stored in the Pug Mill.
  - 3.2.4 **Artefact Recording:** all elements of the work will, as a matter of course, be recorded in accordance with current English Heritage guidelines (*Management of Archaeological Projects, 2nd edition 1991*) and the best practices formulated by English Heritage's Central Archaeology Service. The component will be generated on pro-forma sheets, which will incorporate a description, interpretation, measurements, type and form. Although it is anticipated that the artefacts will be moved, their present locations will be recorded in order to enhance the identification and management of the assemblage.
  - 3.2.3 In conjunction with the artefact survey a photographic record will be generated of significant features and components identified as well as the general landscape and will enhance the photographic record already undertaken. This will be undertaken within 35mm black and white, colour print and digital photographic formats.
- 3.3 **SURVEY CATALOGUE**
  - 3.3.1 **Database:** The data generated in the field will be incorporated into an Access 97 database. The format of the database will be compiled in accordance with the format of the pro-forma source sheets. Each entry will be linked to a digital image of the relevant artefact to enable a clear visual understanding of

the artefact form. The database will be output within both the database format and also as a word processed file which can be presented as a hard copy output.

- 3.3.2 **Photographic Catalogue:** a photographic catalogue will be generated for all photographic images which will be cross referenced with the principal artefact database. The catalogue will incorporate contact prints and digital images as appropriate. The catalogue will be presented in a digital format and will be submitted alongside the main database.
- 3.3.3 **Archive:** The results of Stages 3.1-3.2 above will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*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. The deposition of a properly quantified, ordered, and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the Institute of Field Archaeologists in that organisation's Code of Conduct. This archive will be provided in the English Heritage Central Archaeology Service format, as a printed document, and a synthesis will be submitted to the relevant Sites and Monuments Record.
- 3.3.4 The archive will be formed of all the primary documentation, including the following:
- Cross referenced database in digital and hardcopy formats
  - Photographic Catalogue in digital and hardcopy formats
  - General location map of the Pug Mill
  - Photographic negatives, prints and colour transparencies
  - Administrative records
- 3.3.5 **Report:** a short summary report of the artefactual assemblage will be submitted to English Heritage and the Lake District National Park Authority which will be delivered within three weeks of completion of the field work. The report will consist of an acknowledgements statement, list of contents, introduction summarising the project design, methodology, summary description of the assemblage. The report will be in the same basic format as this project design. A copy of the report can be provided on 3.5" IBM compatible disk in either ASCII or Word for Windows format and the drawings can be provided as DXF files if required.

#### 4. GENERAL CONDITIONS

- 4.1.1 **Access:** it is understood that LDNPA will ensure access to the site.
- 4.1.2 **Health and Safety:** full regard will, of course, be given to all constraints (services) during the survey, as well as to all Health and Safety considerations. The LUAU Health and Safety Statement conforms to all the provisions of the SCAUM (Standing Conference of Unit Managers) Health and Safety manual. Risk assessments are undertaken as a matter of course for all projects.
- 4.1.3 **Project Monitoring:** any proposed changes to this project design will be agreed with the Lake District National Park Archaeologist and the English Heritage Inspector of ancient monuments.
- 4.1.4 **Insurance:** the insurance in respect of claims for personal injury to or the death of any person under a contract of service with the unit and arising out of an in the course of such person's employment shall comply with the employers' liability (Compulsory Insurance) Act 1969 and any statutory orders made there under. For all other claims to cover the liability of LUAU, in respect of personal injury or damage to property by negligence of LUAU or any of its employees, there applies the insurance cover of £ 1m for any one occurrence or series of occurrences arising out of one event.

#### 5. RESOURCES AND PROGRAMMING

- 5.1 It is envisaged that the various stages of the project outlined above would follow on consecutively, where appropriate. The phases of work would comprise:
- i* **Survey Recording**  
1 days (on site)
  - ii* **Survey Catalogue**  
2 days (desk based)



- 5.1.2 LUAU can execute projects at very short notice once an agreement has been signed with the client. The project (field work, report and archive) is scheduled for completion within three weeks from the completion of the field work.
- 5.1.3 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. Jamie Quartermaine undertook the fabric survey of the Backbarrow furnace as part of the 1992 LUAU assessment. He also undertook the detailed survey of the Leighton Beck Ironworks and the fabric survey of the Netherhall Blast Furnace, undertaken alongside the excavation.
- 5.1.4 It is proposed that the artefact survey be undertaken by **Ian Hedley BA AIFA** (Project Officer). Ian Hedley undertook the 1998 evaluation of Backbarrow and is very familiar with all aspects of the site. He has undertaken industrial MPP coverage for the Arsenic, Coal, Copper, Lead, Lime, Minor Metals, Stone Quarrying, Tin and Zinc industries. He has recently undertaken the excavation of the Carlton Bank Alum works, North Yorks. He is a member of the Historical Metallurgy Society and is currently undertaking field research into the medieval bloomery iron industry of Northumberland. He is site director of the Society of Antiquaries excavations at Glantles Farm medieval bloomery iron smelting complex, Long Framlington, Northumberland.
- 5.1.5 All Unit staff are experienced, qualified archaeologists, each with several years professional expertise.

## APPENDIX 2 GAZETTEER

Note: all artefacts have now been removed from the locations listed in the gazetteer.

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**Number:** 1  
**Location:** Pug Mill  
**Material:** Wood  
**Measurements:** L 0.68m          W 95mm          D 70mm  
**Date:** >1962  
**Description:** Wooden mould for casting iron bar. The mould would have been pressed in to casting sand.  
**Condition:** Good  
**Photo ref:** 1.25-26; 2.25-26

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**Number:** 2  
**Location:** Pug Mill  
**Material:** Pig iron  
**Measurements:** L 0.53m          W 100mm          D 60mm  
**Date:** >1962  
**Description:** Broken unstamped fragment of cast pig iron bar.  
**Condition:** Moderate  
**Photo ref:** 1.27-28; 2.27-28

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**Number:** 3  
**Location:** Pug Mill  
**Material:** Pig iron  
**Measurements:** L 0.32m          W 60mm          D 40mm  
**Date:** >1962  
**Description:** Broken fragment of a cast iron bar bearing the 'LORN' stamp  
**Condition:** Moderate  
**Photo ref:** 1.29-30; 2.29-30

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**Number:** 4  
**Location:** Pug Mill  
**Material:** Pig iron  
**Measurements:** L 0.345m          W 50mm          D 30mm  
**Date:** >1962  
**Description:** Fragment of cast pig iron bearing the 'LORN' stamp  
**Condition:** Moderate  
**Photo ref:** 1.31-32; 2.31-32

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**Number:** 5  
**Location:** Pug Mill  
**Material:** Pig iron  
**Measurements:** L 0.36m          W 100mm          D 80mm  
**Date:** >1962  
**Description:** Fragment of cast pig iron bar, with attached 'sow', bearing the 'VALLEY' stamp. It was produced from the hot blast process.  
**Condition:** Moderate

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**Photo ref:** 1.33-34; 2.33-34

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**Number:** 6  
**Location:** Pug Mill  
**Material:** Wood  
**Measurements:** L 0.84m W 0.82m D 0.21m  
**Date:** 1958  
**Description:** A wooden crate enclosing a 76.37m diameter (30") black-leaded casting of a wheel used on the hand barrows used to transport ore, scrap, fuel, and limestone (flux), to the furnace. An attached despatch note indicates that it was produced by the East Hecla Works of Hadfields Ltd, Sheffield, for the Charcoal Iron Company, Backbarrow.  
**Condition:** Excellent  
**Photo ref:** 1.23-24; 2.23-24

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**Number:** 7  
**Location:** Birkdault  
**Material:** Cast iron  
**Measurements:** L 0.775m W D  
**Date:** >1962  
**Description:** A cast iron stamp bearing 'A/S V' in raised lettering signifying Anglo-Swedish Valley. The stamp was used to stamp the moulds for pig iron bar. The stamp comprises a rectangular iron plate measuring 0.21m by 55mm by 42mm which has a 0.773m long handle consisting of circular iron bar measuring 13.5mm in diameter.  
**Condition:** Excellent  
**Photo ref:** 1.3-4, 11-12; 2.3-4, 11-12

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**Number:** 8  
**Location:** Birkdault  
**Material:** Cast iron  
**Measurements:** L 0.76m W D  
**Date:** >1962  
**Description:** A cast iron stamp bearing 'GRAZEBROOK' in raised lettering whose origins remain uncertain. The stamp was used to stamp the moulds for pig iron bar. The stamp comprises a rectangular iron plate measuring 0.273m by 41mm by 55mm which had a 0.705m long handle consisting of a single circular iron bar measuring 13.5mm in diameter.  
**Condition:** Excellent  
**Photo ref:** 1.1-2, 11-12; 2.1-2, 11-12

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**Number:** 9  
**Location:** Birkdault  
**Material:** Cast iron  
**Measurements:** L 0.86m W D  
**Date:** >1962  
**Description:** A cast iron stamp bearing 'DUD LNF 'CES DUD' in raised lettering signifying Lorn Furnaces. The stamp was used to stamp the moulds for pig iron bar. The stamp comprises a rectangular iron plate measuring 0.495m by 55mm by 35mm with a 0.755m long handle of looped circular iron bar measuring 13.5mm in diameter.  
**Condition:** Excellent  
**Photo ref:** 1.5-6, 11-12; 2.5-6, 11-12

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**Number:** 10  
**Location:** Birkdault  
**Material:** Cast iron

**Measurements:** L 0.624 W      D  
**Date:** >1962  
**Description:** A cast iron stamp bearing 'VALLEY' in raised lettering signifying the iron type synonymous with Backbarrow. The stamp was used to stamp the moulds for pig iron bar. The stamp comprises a rectangular iron plate measuring 0.342m by 66mm by 25mm with a 0.599m long handle of looped circular iron bar measuring 11mm in diameter.  
**Condition:** Excellent  
**Photo ref:** 1.7-8, 11-12; 2.7-8, 11-12

**Number:** 11  
**Location:** Birkdault  
**Material:** Cast iron  
**Measurements:** L 0.855m      W      D  
**Date:** >1962  
**Description:** A cast iron stamp bearing 'VALLEY' in raised lettering signifying the iron type synonymous with Backbarrow. The stamp was used to stamp the moulds for pig iron bar. The stamp comprises a rectangular iron plate measuring 0.328m by 66mm by 25mm with a 0.825m long handle of looped circular iron bar measuring 14mm in diameter.  
**Condition:** Excellent  
**Photo ref:** 1.9-12; 2.9-12

**Number:** 12  
**Location:** Riverbank  
**Material:** Pig iron  
**Measurements:** L 0.69m      W 90mm      D 65mm  
**Date:** 1888 - 1911  
**Description:** A pig iron bar bearing a poorly defined 'VALLEY' stamp  
**Condition:** Poor  
**Photo ref:** 1.13-14; 2.13-14

**Number:** 13  
**Location:** Riverbank  
**Material:** Pig iron  
**Measurements:** L 0.69m      W 105mm      D 55mm  
**Date:** 1888 - 1911  
**Description:** A pig iron bar bearing a poorly defined 'VALLEY' stamp  
**Condition:** Poor  
**Photo ref:** 1.15-16; 2.15-16

**Number:** 14  
**Location:** Riverbank  
**Material:** Pig iron  
**Measurements:** L 0.82m      W 95mm      D 70mm  
**Date:** 1888 - 1911  
**Description:** A pig iron bar bearing a poorly defined 'VALLEY' stamp  
**Condition:** Poor  
**Photo ref:** 1.17-18; 2.17-18

**Number:** 15  
**Location:** Riverbank  
**Material:** Pig iron  
**Measurements:** L 0.67m      W 90mm      D 65mm

**Date:** 1888 - 1911  
**Description:** A pig iron bar bearing a poorly defined 'VALLEY' stamp  
**Condition:** Poor  
**Photo ref:** 1.19-20; 2.19-20

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**Number:** 16  
**Location:** Riverbank  
**Material:** Pig iron  
**Measurements:** L 230mm W 160-180mm D 50mm  
**Date:** 1888 - 1911  
**Description:** A broken fragment of pig iron from a double bar mould bearing two 'LEY' stamps from 'VALLEY'.  
**Condition:** Poor  
**Photo ref:** 1.21-22; 2.21-22

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**Number:** 17  
**Location:** Pug Mill  
**Material:** Pig iron  
**Measurements:** L 1.38m W 58mm D 45mm  
**Date:** >1962  
**Description:** A long rectangular-sectioned cast bar of pig iron bearing the 'LORN' stamp at each end.  
**Condition:** Moderate  
**Photo ref:** 1.35-36; 2.35-36

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**Number:** 18  
**Location:** Pug Mill  
**Material:** Pig iron  
**Measurements:** L 0.64m W 54mm D 40mm  
**Date:** >1962  
**Description:** A small rectangular-sectioned cast bar of pig iron bearing a 'LORN' stamp  
**Condition:** Moderate  
**Photo ref:** 1.37-38; 2.37-38

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**Number:** 19  
**Location:** Pug Mill  
**Material:** Pig iron and wood  
**Measurements:** L W D  
**Date:** >1962  
**Description:** Miscellaneous assemblage (not recorded in detail) of five small pig iron fragments and a square piece of wood with a raised letter B in the centre, probably for stamping B for Backbarrow in a mould.  
**Condition:** Moderate  
**Photo ref:** 1.39; 2.39

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## ILLUSTRATIONS

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Fig 1 Backbarrow, Cumbria, site location

Fig 2 The Pug Mill, Ordnance Survey 1938 1:2500 map



Fig 1: Backbarrow, Cumbria, Location Map

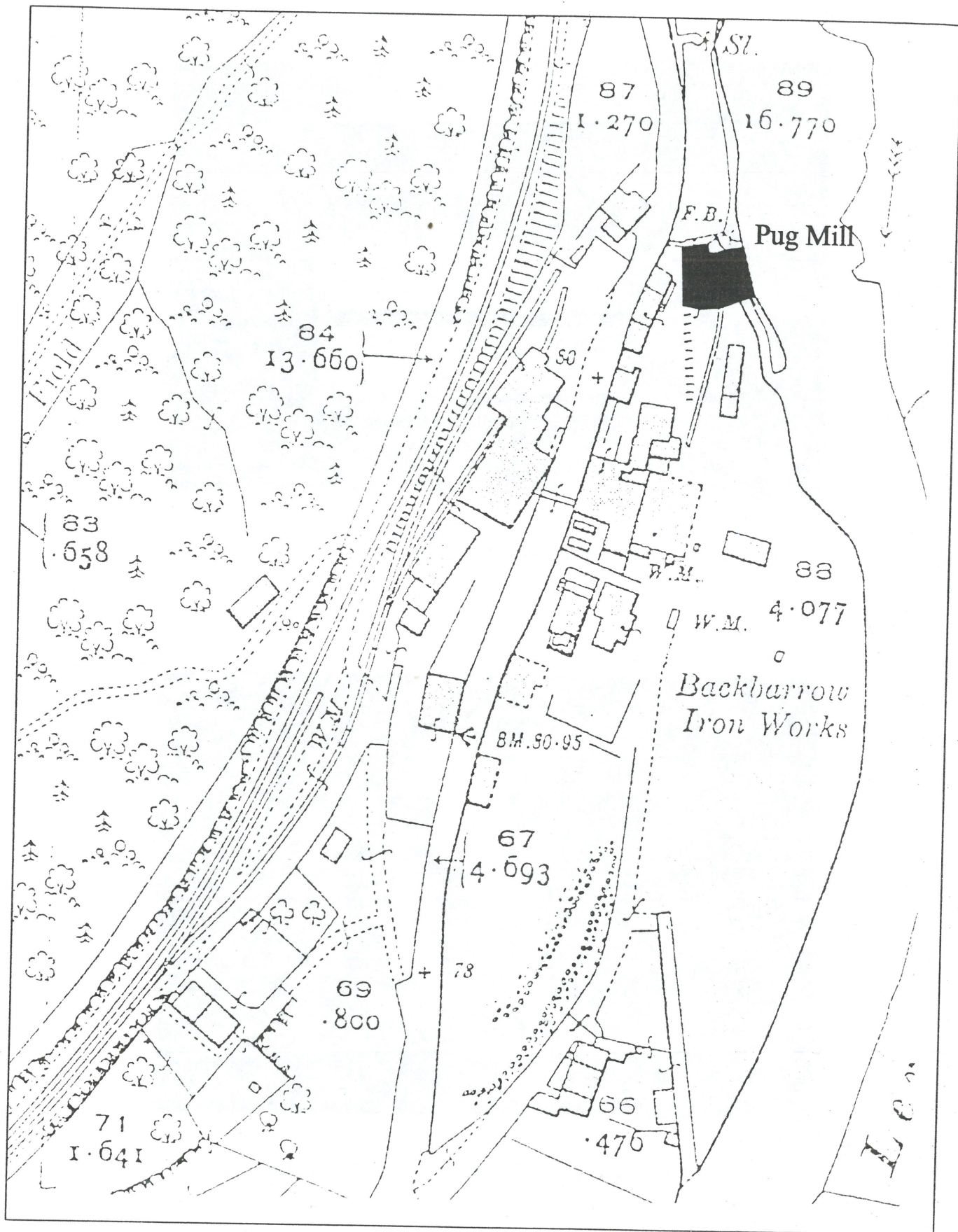


Fig 2 The Pug Mill; OS 1938 1:2500 map



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## PLATES

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- Plate 1 Artefact 6: casting of a wheel with an original wooden crate
- Plate 2 Artefact 19: assemblage of five small pig-iron fragments
- Plate 3 Artefact 1: wooden mould for casting iron bars
- Plate 4 Artefact 7: a cast-iron stamp with 'A/S V' raised lettering
- Plate 5 Artefacts 7-11: a series of cast-iron stamps
- Plate 6 Artefact 10: a cast-iron stamp with 'VALLEY' raised lettering



Plate 1 Artefact 6: casting of a wheel with an original wooden crate



Plate 2 Artefact 19: assemblage of five small pig-iron fragments



Plate 3 Artefact 1: wooden mould for casting iron bars



Plate 4 Artefact 7: a cast-iron stamp with 'A/S V' raised lettering



Plate 5 Artefacts 7-11: a series of cast-iron stamps



Plate 6 Artefact 10: a cast-iron stamp with 'VALLEY' raised lettering