



Jubilee Colliery, Shaw, Oldham

Community-led Archaeological Investigation



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Rochdale**

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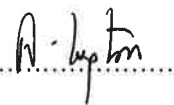
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SUMMARY

In June 2014, Oxford Archaeology North (OA North) was commissioned by Groundwork Oldham and Rochdale, to carry out a programme of archaeological investigation of the former Jubilee Colliery near Shaw, Oldham (centred on NGR 394310 410841). The archaeological works involved the delivery of a community-led excavation on the site as part of the ‘*Jubilee Colliery: Preserving the Past*’ project, a six-month scheme that has been funded by the Heritage Lottery Fund. The principal aim of the archaeological work was to enable local volunteers to further examine the remains of the colliery that had been subject to an earlier investigation in 2012.

Jubilee Colliery was one of the most important collieries in the Oldham Coalfield, supplying coal and coke to many of the cotton mills and factories in the area. The colliery was founded in 1845, when a shaft was sunk into the Mountain Mine, which lies 99m below the surface. Owned originally by the Edge Lane & Dryclough Colliery Company, Jubilee Colliery was bought in 1883 by Platt Brothers & Co Limited of Oldham, one of the largest manufacturers of textile machinery in the world. The Platt Brothers were keen to secure a cheap source of coke for their iron works in Oldham, where some 500 tons per week were being used, and the coal gained from the Mountain Mine at Jubilee was ideal for producing coke.

Many of the buildings were demolished when the colliery closed in 1932, and the abandoned site was allowed to be reclaimed by nature. It is currently managed as a local nature reserve by Groundwork Oldham and Rochdale, and is colonised by a diverse range of flora that thrives amongst the remains of the colliery structures. These remains include part of a double bank of coke ovens, the foundations of the winding engine for the downcast shaft, the dynamo house, and a raised mound that marks the site of the boiler house and chimney.

The public-led excavation investigated four distinct elements of the colliery complex, including the boiler house and associated chimney, the coke ovens, structures associated with the upcast flue, and the washing/crushing plant. The location of each area targeted for excavation was determined following consultation with the participating volunteers, and with regard to the continued use of the site as a nature reserve. The excavation was undertaken between July and August 2014, and was coupled with several dedicated educational sessions with five local primary schools and public open days.

The excavation revealed well-preserved remains of the colliery in each of the trenches, and enabled a better understanding of the industrial development of the site. The *in-situ* foundations of the boiler house were revealed, which appeared to have housed three small Lancashire boilers that were probably associated with the expansion of the coking process in the late nineteenth century. The remains of the coke ovens survive almost intact at floor level across part of the site, and beyond its present northern boundary. The external stone wall and brick floor within the washing/crushing plant also survives at original floor level, although the area is now heavily waterlogged for much of the year.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank Joanna Fullman of Ground Oldham and Rochdale for commissioning and supporting the project. OA North is also grateful to Norman Redhead, the Heritage Management Director with the Greater Manchester Archaeological Advisory Service (GMAAS), for his support and advice.

The excavation of the site was undertaken by a core team of volunteers, without whom the project would not have been possible. In particular, Gary Brain, Anthony Dean, Mark Harrison, Charles Hicklin, John Keatings, Alyson Kingham, Ed Kramer, Peter Lax, Charles Moffatt, Stephen Rimmer, David Schofield, Martin Smith, Shaun Smith, Andre Street, Terence Travis, and James Tulley, all provided invaluable input.

Numerous other volunteers provided invaluable assistance during the course of the excavation and the events throughout the project. In particular, thanks are expressed to John Abraham, Henryk Adaszkiwicz, Maqsood Ahmed, Kerry Bailey, Luke Barrass, John Battersby, Nicholas Bennett, Darcy Bevan, Luke Bibby, Craig Bone, Calvin Bradshaw, Christine Broadbent, Gary Canning, Michael Case, Daniel Charnock, Mavis Clark, Marc Dolman, Gillian Fielding, Liam Gordon, Robert Gordon, Sarah Hardman, Mandy Hayes, Ray Hayes, Trisha Heathcote, Daniel Heywood, Adam Howarth, Kevin Hurst, Kathryn Isaacs, Gordon Marino, John McCollough, Jacob Miller, Lesley Mills, Michael Moran, Reece Morris, Catherine Ng, Stewart Newton, Marta Perez Merino, Nick Randall, Waqase Sabir, Andrew Spence, Shelagh Stewart, Ray Taylor, John Unwin, Anthony Williams, and Steven Winterbottom.

Pupils from five local primary schools, Firbank, Rushcroft, Holy Cross, Whittaker Moss and Crompton, all participated in the excavation. The educational sessions for the students, both on-site and classroom based, were delivered by Rachel Street.

The excavation was directed by Phil Cooke, who was assisted variously by Chris Wild, Peter Schofield, Lewis Stitt, Graham Mottershead and Sarah Mottershead, all from OA North. The report was written by Chris Wild and Ian Miller, and Mark Tidmarsh prepared the illustrations. The project was managed by Ian Miller, who also edited the report.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

- 1.1.1 Jubilee Colliery at Shaw in Greater Manchester was one of the most important collieries in the Oldham Coalfield, supplying coal and coke to many of the cotton mills and factories in the area. The colliery was founded in 1845, when a shaft was sunk into the Mountain Mine, which lies 99m below the surface. Owned originally by the Edge Lane & Dryclough Colliery Company, Jubilee Colliery was bought in 1883 by Platt Brothers & Co Limited, one of the largest manufacturers of textile machinery in the world. The Platt Brothers were keen to secure a cheap source of coke for their iron works in Oldham, where some 500 tons per week were being used, and the coal gained from the Mountain Mine at Jubilee was ideal for producing coke.

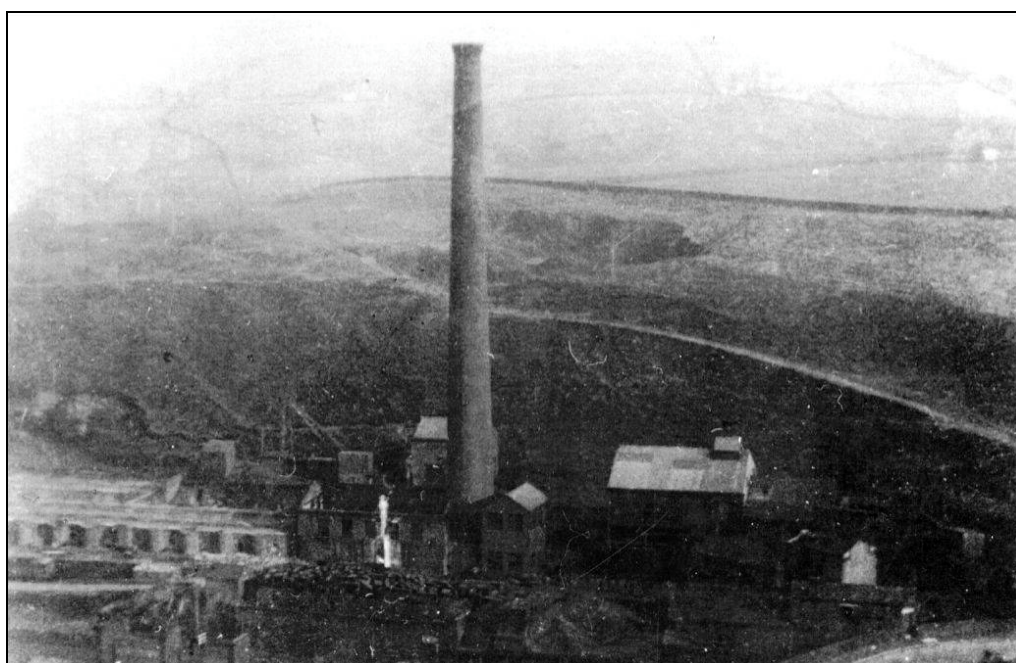


Plate 1: Jubilee Colliery in the 1930s, shortly after it had closed, showing the pit bank around the downcast shaft, including the winding engine house (to the rear), chimney and boiler house (missing its roof), coke ovens (far left), and railway sidings in the foreground

- 1.1.2 Many of the buildings were demolished when the colliery closed in 1932, and the abandoned site was allowed to be reclaimed by nature. In 1991, the site was opened as a local nature reserve, which is currently managed by the environmental charity Groundwork Oldham and Rochdale, and is colonised by a diverse range of flora that thrives amongst the remains of the colliery structures. These remains include part of a double bank of coke ovens, the foundations of the winding engine for the downcast shaft, the dynamo house, and a raised mound that marks the site of the boiler house and chimney.

- 1.1.3 A network of paths from a small car park, together with several interpretation panels and benches, were installed some time ago to provide basic facilities for visitors, although it was primarily a nature site with some interesting industrial structures. In recent years, however, the remains of the colliery have become overgrown and some of the information panels have been removed, making it difficult for visitors to appreciate the industrial heritage of the site.
- 1.1.4 In 2012, Groundwork Oldham and Rochdale launched ‘*Unearthing the Past*’, a pilot project that was intended to rekindle the local interest in the historic colliery by revealing the hidden structures and establishing the extent of the surviving remains. This project confirmed that well-preserved buried remains of the colliery survived across the site, and that it is a heritage asset of significant regional importance. Building on the success of this initial work, Groundwork Oldham and Rochdale secured additional funding from the Heritage Lottery to run a second, larger, stage to the project. Known as ‘*Jubilee Colliery: Preserving the Past*’, the principal aims of the project were to increase an awareness of Oldham’s rich mining heritage through engaging local communities, provide a unique learning opportunity for those volunteers involved, and develop a plan to preserve the site for future generations.
- 1.1.5 A core component of the project was to enable local volunteers to carry out the excavation of key elements of the colliery. This provided the participants with professional training in the techniques of archaeological excavation, recording and interpretation, coupled with a programme of educational outreach with local primary schools (delivery of classroom-based sessions on the story of the colliery, the historic importance of coal mining to the area, plus fieldwork days with the opportunity to look at historic structures and undertake excavation). Local groups also visited and participated, including the Parish Council, local Friends groups, a food-growing group and some disabled visitors.

1.2 LOCATION AND GEOLOGY

- 1.2.1 The site of Jubilee Colliery (centred at NGR 394310 410841) lies on the eastern side of Milnrow Road, approximately midway between New Hey and Shaw, in the foothills of the South Pennines (Fig 1). The site of the colliery forms the heart of the Jubilee Nature Reserve, a linear wooded area that follows lies adjacent to the former railway that is now used as the Metro line.
- 1.2.2 The solid geology of the area, as mapped by the British Geological Survey (BGS), comprises Pennine Lower Coal Measures Formation, which includes mudstone, siltstone and sandstone. This sedimentary bedrock formed approximately 314 to 316 million years ago during the Carboniferous Period, when the local environment was dominated by swamps, estuaries and deltas. These rocks were formed in marginal coastal plains with lakes and swamps periodically inundated by the sea, or estuaries and deltas, and shallow seas (www.bgs.ac.uk/geologyviewer).



Plate 2: Recent aerial view over the study area and its environs, with arrow marking the site of Jubilee Colliery

2. METHODOLOGY

2.1 AIMS AND OBJECTIVES

2.1.1 The principal aim of the archaeological programme was to involve, guide, encourage, train, and nurture the volunteers in the techniques of archaeological excavation, and further the archaeological understanding of this important site. This was achieved via the careful targeting of site components for investigation. The precise location of the excavation areas was formulated in consultation with Groundwork and the Greater Manchester Archaeological Advisory Service (GMAAS), and targeted the site of the boiler house, chimney and the relationship with the central flue from the coke ovens, and the extensions to the coke ovens. The remains of the beam engine connected to the dynamo house also merited investigation (Fig 2). Another primary aim of the excavation was to provide a detailed record of the buried archaeological remains that exist in the targeted parts of the site.

2.2 EXCAVATION TRENCHES

2.2.1 Given the shallow nature of the overburden above the archaeological deposits, all excavations were undertaken manually by the volunteers, under the supervision of professional archaeologists. All deposits were levelled and related to the Ordnance Datum and Ordnance Survey.

2.2.2 All information was recorded stratigraphically with accompanying documentation (plans, sections and photographs, both of individual contexts and overall site shots from standard view points). Photography was undertaken with high-resolution digital format cameras, all frames including a visible, graduated metric scale. Photographic records were maintained on special photographic *pro-forma* sheets.

2.3 FINDS

2.3.1 Finds' recovery and sampling programmes were carried out in accordance with best practice (following current Institute for Archaeologists' guidelines), and subject to expert advice in order to minimise deterioration. All artefacts recovered from the excavation were retained.

2.4 ARCHIVE

2.4.1 A full archive of the work has been prepared to a professional standard in accordance with current English Heritage guidelines (1991) and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990). The archive will be deposited with the Gallery Oldham in Oldham on completion of the project. In addition, a copy of the report will be forwarded to the Greater Manchester Historic Environment Record (HER).

3. HISTORICAL BACKGROUND

3.1 BACKGROUND TO MINING IN SOUTH LANCASHIRE

- 3.1.1 The principal coalfields in the United Kingdom at the beginning of the nineteenth century were divided into districts, each with its own inspector. By the twentieth century, these comprised East Scotland, West Scotland, Newcastle, Durham, York and Lincoln, Manchester and Ireland, of which the South Lancashire Coalfield was a part, Liverpool and North Wales, Midland District, Stafford District, Cardiff, Swansea and Southern Districts (Greenwell 1910, 74-5).
- 3.1.2 The South Lancashire Coalfield is bounded to the north and east by the uplands of Rossendale and the Pennines. To the west, the coalfield merges with the Wigan coalfield, and to the south lies the Cheshire Plain. Within these boundaries lie Manchester and Salford with their satellite towns, including Bolton, Bury and Oldham. The largest collieries were situated on areas opening onto the Cheshire Plain (Hayes 2004, 7).
- 3.1.3 The general topography of the South Lancashire Coalfield consists of steep-sided rounded hills with irregular intervening hollows. Evidence of the geological structure is mainly hidden as thick deposits of glacial sands and clays cover the solid rocks. The oldest rock is the Millstone Grit which is visible around Chorley, due to an east to west anticline, and dips to the south to form a base to the coal measures.
- 3.1.4 Within the coalfield, the millstone grit is overlaid by the coal bearing strata, which is for convenience subdivided into Lower, Middle and Upper Coal Measures. Above the coal measures are the Permo-Triassic rocks commonly known as the New Red Sandstones. A feature of the coalfield is the peat mosses. Principal amongst these is Chat Moss and Tyldesley Moss. The presence of these often waterlogged deposits and the underlying water-bearing New Red Sandstones have in the past caused difficulties in the sinking of colliery shafts.
- 3.1.5 The Coal Measures lie above a bed of Millstone Grit, and are interspersed with sandstones, mudstones, shales, and fireclays and outcrop in the Oldham district. The Gannister Beds or Lower Coal Measures occupy the high ground of the West Pennine Hills above Oldham where the most productive seam is the Mountain mine (Fanning 2001, 21). The Lower Coal measures were worked north-east of a line from High Crompton to Greenacres and the Middle Coal Measures to the south-west (*op cit*, 8). The deepest seam in the Middle Coal Measures is the Royley mine. The coal seams dipped in the direction of central Manchester and were broken by numerous faults including the Oldham Edge, Chamber, Oak and Great Faults (*op cit*, 9).

3.2 EARLY COAL MINING IN SOUTH LANCASHIRE AND OLDHAM

- 3.2.1 Coal was being mined in small quantities in many places where seams were accessible near the surface during the fourteenth and fifteenth centuries, corresponding with the growth of the use of coal for domestic purposes. The holes and quarries from which the supplies of coal were at first obtained had in the middle of the fourteenth century been superseded by regular mine works, consisting of pit and adit, or vertical shaft and gallery. The arrangement was simple and effective, and remained the typical form so long as coal workings were carried on above the level of free drainage (Galloway 1882, 17). The discovery of cannel coal, valued for its clear flame, in the areas around Wigan created a profitable industry in the district from the sixteenth century onwards, and many new mines were opened by the local landowners. Large numbers of small shallow shafts were sunk to the most easily worked seams. Small teams of men worked these shafts until excavation became unsafe (Lane and Anderson undated).
- 3.2.2 References to the mining of coal in the Oldham area date back to 1524, when a rent of 10d was paid by Richard Wild for getting coals in Leonardine (Crompton), and Richard Radcliffe left his coal mines in Chadderton to his son in 1622 (Fanning 2001, 21). There are numerous seventeenth-century references to coal mining (Bateson 1974, 48-9). Disputes about mineral rights to common land in Oldham and Hollinwood, for instance, are known in 1622 and 1639 (Shaw 1904, 59).
- 3.2.3 In 'A tour thro' the whole island of Great Britain, finished in 1727', Daniel Defoe described '...Coals...upon the top of the highest hills' around Oldham. The coal seams were close to the surface and coal was easy to get. These early coal workings would almost certainly have been either adits, or levels, on the hillside, or bell pits working coal within a small radius at a shallow depth. The adits would have accessed the coal from outcrops on the side of a hill at Crompton Moor, Oldham Edge and Werneth, employing up to a dozen workers. Shallow pits sunk from the surface with wooden headstocks were recorded in the late 1600s. These collieries had two shafts to aid ventilation. So long as the demand for coal was small, and supplies were obtainable from shallow mines above the level of free-drainage, the mining of coal had been comparatively easy. But about the beginning of the seventeenth century, this happy state of matters was coming to an end. A great demand for coal had sprung up. Much of the most easily available coal had easily been exhausted. To carry the workings down into the region below the level of free-drainage was at this time deemed impracticable. To procure sufficient coal from the previous sources was impossible. Hence the exhaustion of the coal supply was considered to be already within sight (Galloway 1882, 52).
- 3.2.4 By 1771, Oldham had 14 collieries (Mills 1976, 39). Typical workings were from unlined shafts that went as deep as 100 yards (91.44m). Initially, coal was raised by horse-powered wheels; steam power was first used for winding in 1792, and applied subsequently to power drainage pumps (Law 1999, 33). Many of the early shafts were worked for less than a year, and were rarely worked for three years or more.

- 3.2.5 In his late eighteenth-century description of Oldham, Aiken noted that ‘coals are found in great plenty in the several townships, which, besides supplying the neighbourhood, are sent in large quantities to Manchester. The price of those of the best quality is 5d per cwt at the pit’ (Aiken 1795, 237). During this period the coal trade was supposed to be hastening to its close, although the real work of mining coal was actually commencing. By the employment of machinery for raising water from the mines, the horizon of mining operations was extended indefinitely. The effectual drainage of the mines was a work of the greatest difficulty, as is sufficiently evidenced by the innumerable patents which were taken out during the course of the century for machines invented for the purpose. Indeed, the seventeenth century may aptly be termed the ‘wet period’ of coal mining (Galloway 1882, 53).
- 3.2.6 Coal mining in Oldham expanded dramatically after the later eighteenth century. With the expansion of the collieries and the working of deeper seams, the numbers of persons employed in them increased rapidly. This increase brought with it a heavy loss of life by accidents in and around the mines. This loss of life prompted the 1842 Parliamentary Bill, which prohibited the employment of girls and women underground, and boys below the age of ten. The recorded deaths for North and East Lancashire in 1908 were 51 deaths by accident out of 47,896 employees (both above and below ground) and distributed throughout 208 collieries (Greenwell 1910).
- 3.2.7 The output of coal grew rapidly due to the development of steam-powered machinery and the demands of early steam-powered cotton mills, of which 65 had been built in Oldham by 1825. In 1858 there were 380 coal mines in Lancashire producing 8,000,000 tons during the year with more than 40 collieries in operation in Oldham in 1841; the Ordnance Survey map of 1848 marks some 180 coal workings, shallow pits, or deeper collieries in the Oldham district. Amongst the particularly good coal seams to be worked in the district were the Lower Mountain Mine in the Lower Coal Measures, the Black Mine and the Royley Mine, each with four feet of good engine coal, and the Great Mine, which was eight feet thick (Law 1999, 32).
- 3.2.8 By 1874 the number of mines within the county had increased to 558 and the output of coal had doubled to 16,000,000 tons, with the Chamber Colliery Company alone having seven pits out of a total of 53 in Oldham 1890s (Ashmore 1982, 118). By 1907 the number of mines had reduced to 358 but the tonnage of coal had increased to 26,000,000, almost 10% of the total quantity mined in the whole country (Lane and Anderson undated). The Oldham Coalfield was the site of over 150 collieries during its recorded history (Nadin 2006).
- 3.2.9 The increase in the output of coal for each man employed was to some extent the result of using machines to cut the coal – a development in mining techniques introduced and fostered by the mining engineers and coal owners of the county. In about 1886 the coal owners of South Lancashire offered the sum of £500 for the best design of a coal-cutting machine and, subsequently, trials of a compressed air machine were held at Gidlow’s Ladies Lane Colliery, Wigan. This was the beginning of mechanised mining in Lancashire (Lane and Anderson undated).

- 3.2.10 During this period of expansion the area saw a growth in manufacturers serving the industry, with products such as wire rope, wagons, collieries lamp glass and surveying instruments being produced locally. Education was also affected by the growth, with institutions such as the Wigan Mining and Technical College specialising in or offering mining-related certificates (Greenwell 1910).
- 3.2.11 The coal mined during the eighteenth and nineteenth centuries was extracted from the seams of higher quality coal having such geological conditions that they were easily mined. Good coal seams having good mining conditions provided good profits. The intensity of extraction which had been achieved over the period 1860-1920, in such seams from the small Lancashire Coalfield, caused them to become exhausted during the ten years 1920-1930. Unavoidably, the more inferior seams which had been developed had to be worked more intensively resulting in the market value of the product being reduced accordingly. Lancashire coal no longer had the quality which for many years had ensured consistent demand at such a good selling price that mine owners were assured of handsome profits (Land and Anderson undated). Generally, relative to other counties the Lancashire coal was never good. It was low in rank, being what we now refer to as house coal. With the exhaustion of the most valuable coal seams at depths of about good seams at lower horizons, until mining in the 1920-1930 decade was being carried out at depths of 4,500 feet. The condition at such depths (dust and high temperatures) made mining difficult and production costs were seriously increased and the profit margins were further reduced. 2,500 feet, mine shafts were deepened to locate. This caused the closure of a number of mines in the county (Lane and Anderson undated). By this time, mining in Oldham was concentrated at four deep pits: Bower; Chamber Lane; Woodpark; and Oak Colliery.
- 3.2.12 The nationalisation of coal mines (National Coal Board) in 1947 made available the required capital and the beginning of a programme of improved mechanisation which made possible the production of more coal, without increasing the number of persons involved. The outlook for the mining industry in Lancashire appeared to be good and there were 86 collieries in production; 20 of these were in the Manchester area, 26 in the Wigan area, 22 in the St Helens area and 18 in the Burnley area; 74 were taken over by the NCB and the remainder were privately owned (*ibid*). Wood Park Colliery in Oldham produced 89,000 tons of coal in 1954. It had more than 400 employees (Ashmore 1982, 120; Dickenson 1854; Gerrard 1896; Inspector of Mines 1880).
- 3.2.13 During the 1955 to 1965 period the demand for coal fell throughout the country. A policy of concentration on the profitable mines was apparently decided upon throughout the industry and this was the beginning of the end of coal mining in Lancashire. The efforts of both management and men to keep the industry viable locally, is reflected in the record of the number of working coal mines and the annual output of coal obtained from them over the years (*ibid*). As of 2007, only two pits were still working in the Lancashire Coalfield, both having now closed.

3.3 THE DEVELOPMENT OF JUBILEE COLLIERY

- 3.3.1 Jubilee Colliery was sunk in 1845 by the Edge Lane & Dry Clough Colliery Co with an intention of gaining access to the Mountain Mine coal seam, which lay at a depth of 325ft (99m) below the surface. The initial shaft had reached a depth of 165' (50m) by early 1849, although it is thought that the colliery was not a large concern at this date, and the infrastructure that had been established was fairly simple. The site had not been developed previously, as shown on the Ordnance Survey map of 1848 that was surveyed in 1844 (Fig 2).
- 3.3.2 The colliery was being worked by Evans Barker & Co by 1854, when it was referred to by the Inspector of Mines, although very little is know about the infrastructure of the pit at that date. A fatal accident was reported in 1855, when six workers were turning a capstan to draw a pump rod out of the pump. However, the pump rod proved to be too heavy, causing the men to lose control of the capstan and 'were thrown with great violence'. One of the men was dashed against a wall of the pit cabin and died shortly afterwards (*Manchester Guardian*, 7 March 1855).
- 3.3.3 Jubilee Colliery is known to have experienced considerable problems with water in the underground workings and, in 1877, it was recorded that some 830 gallons of water per minute were being pumped to the surface (Nadin 2006, 128). The ownership of the colliery passed subsequently to the Oldham, Middleton & Rochdale Colliery Co Ltd, but it was purchased in 1883 by Platt Brothers & Company Ltd, who developed the site by building coke ovens. These ovens were used to produce coke for use in their iron works in Oldham.
- 3.3.4 Documentary sources provide little information on the infrastructure of the colliery until the late nineteenth century. One of the earliest sources is a photograph taken in c 1893, which provides a view across the pit bank (Plate 3). This shows the timber headstock by the downcast shaft and its associated tall winding engine house, with its characteristic tall arched window, surrounded by various other buildings. The largest of these included the coal crushing and washing plant, set behind the blacksmith's shop, and part of the tramway that enabled coal to be carried from the shaft to the crushing plant.

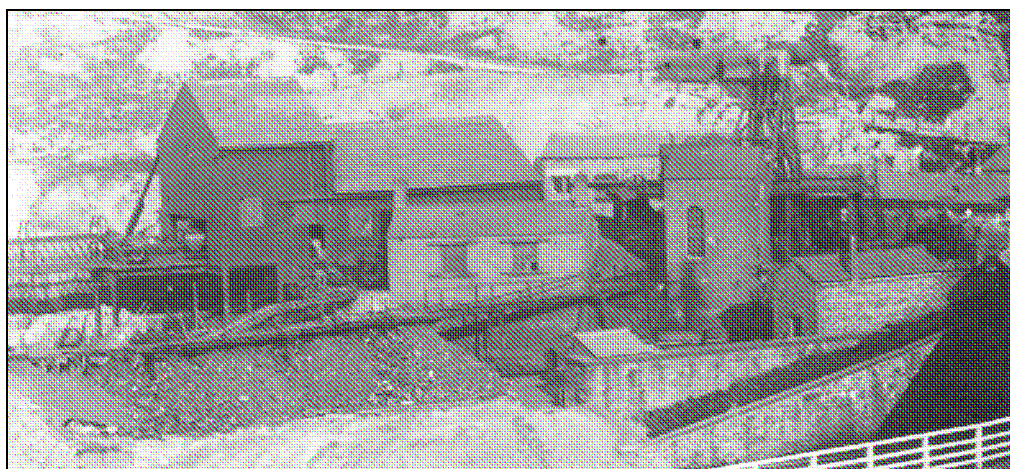


Plate 3: The pit bank in c 1893

- 3.3.5 The layout of the whole colliery site during this period is captured on the Ordnance Survey map published in 1893 (Plate 4). This shows the bank of 26 coke ovens arranged back-to-back occupying the northern part of the site, with the large boiler house and chimney immediately to the south. Another bank of coke ovens is shown along the eastern boundary of the complex, although this appears to have been a single row of ovens, suggesting that they may have been of a slightly earlier date. The railway is shown passing the colliery immediately to the west, although no direct link to the railway is evident.

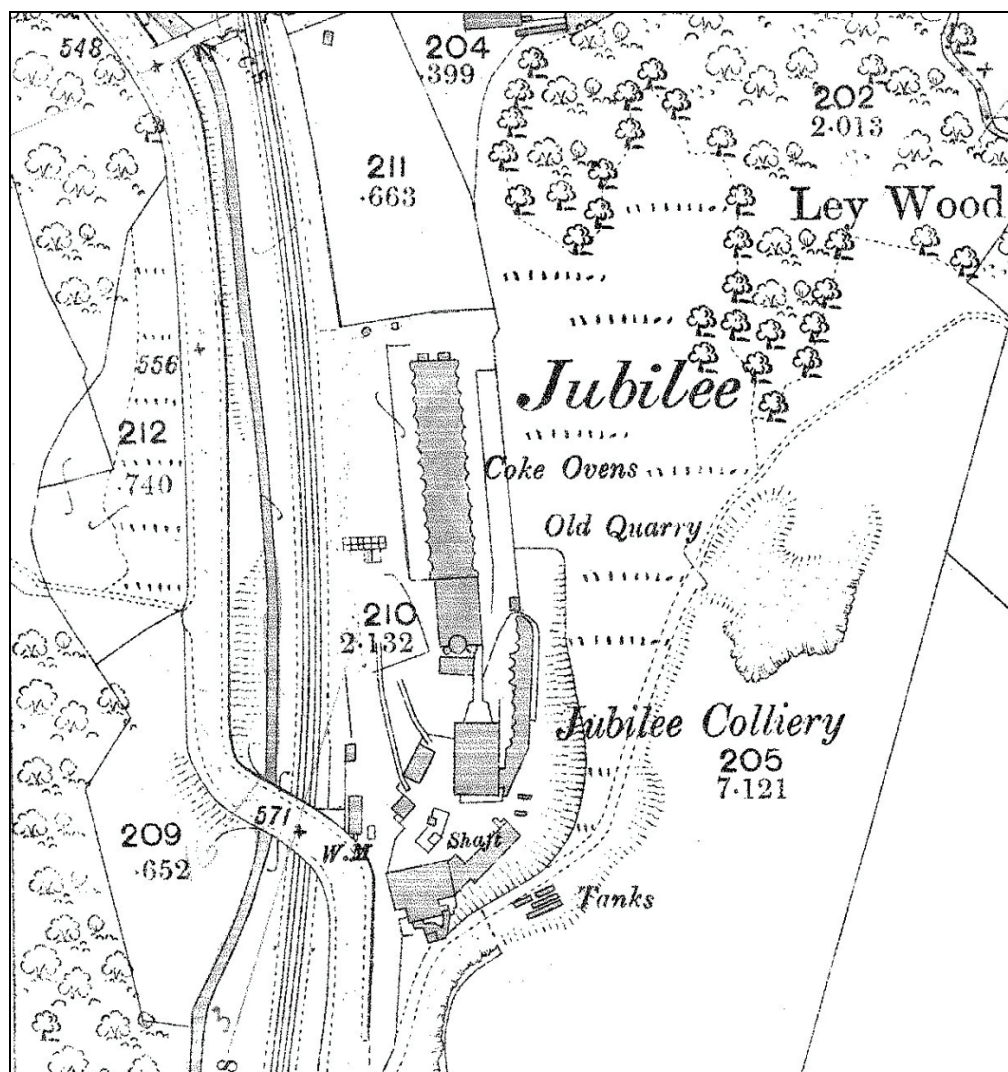


Plate 4: Extract from the Ordnance Survey map of 1893

- 3.3.6 A fatal accident at the colliery was reported in 1898. John Longstaffe of Buckley Square in Milnrow, age 18, was going down an incline in the pit with a tub laden with coal. Having failed to put the 'scotches' in the wheels of the tub, it pushed him down the incline for about 20 yards when it overturned and killed him (*Manchester Times*, 21 October 1898). By this date, the colliery employed 153 men underground and 14 surface workers. Several evocative photographs of the colliery were taken during this period, which again focus on the pit bank, and provide some evidence for improvements that were carried out to the site during the late 1890s (Plates 5 and 6).

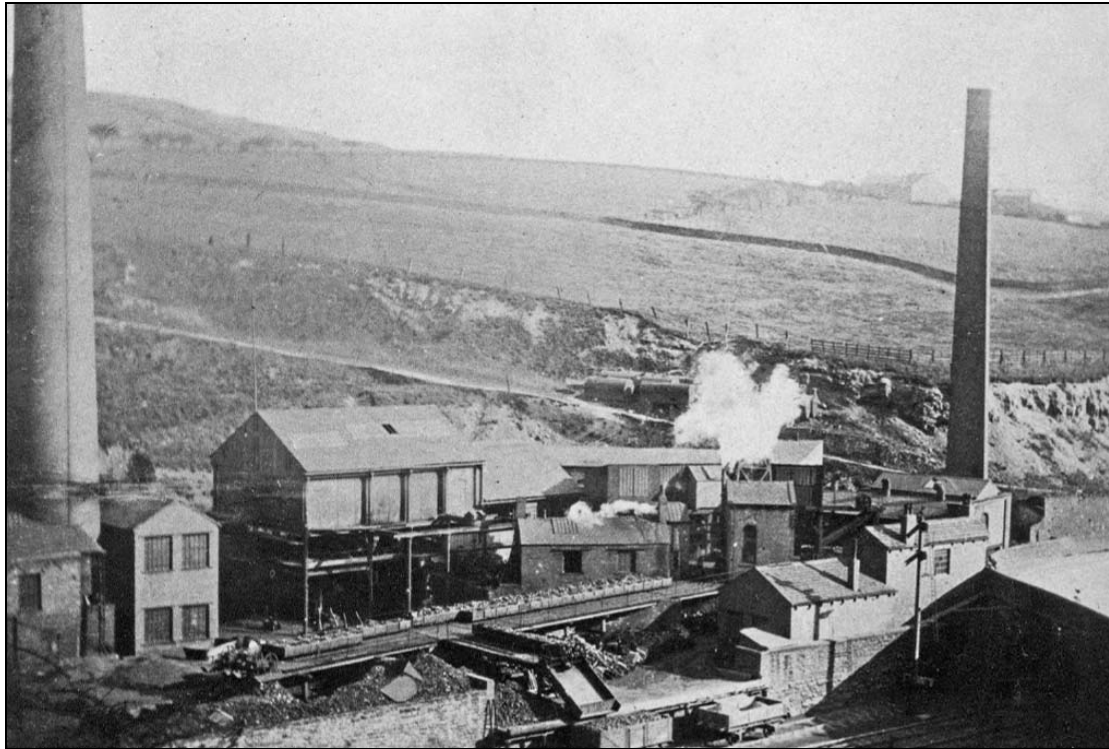


Plate 5: The pit bank in c 1900, showing some development of the site since the photograph of c 1893. The crushing and washing plant appears to have been renewed and enlarged, and a new range housing offices and the lamp room had been built in front of the winding engine house

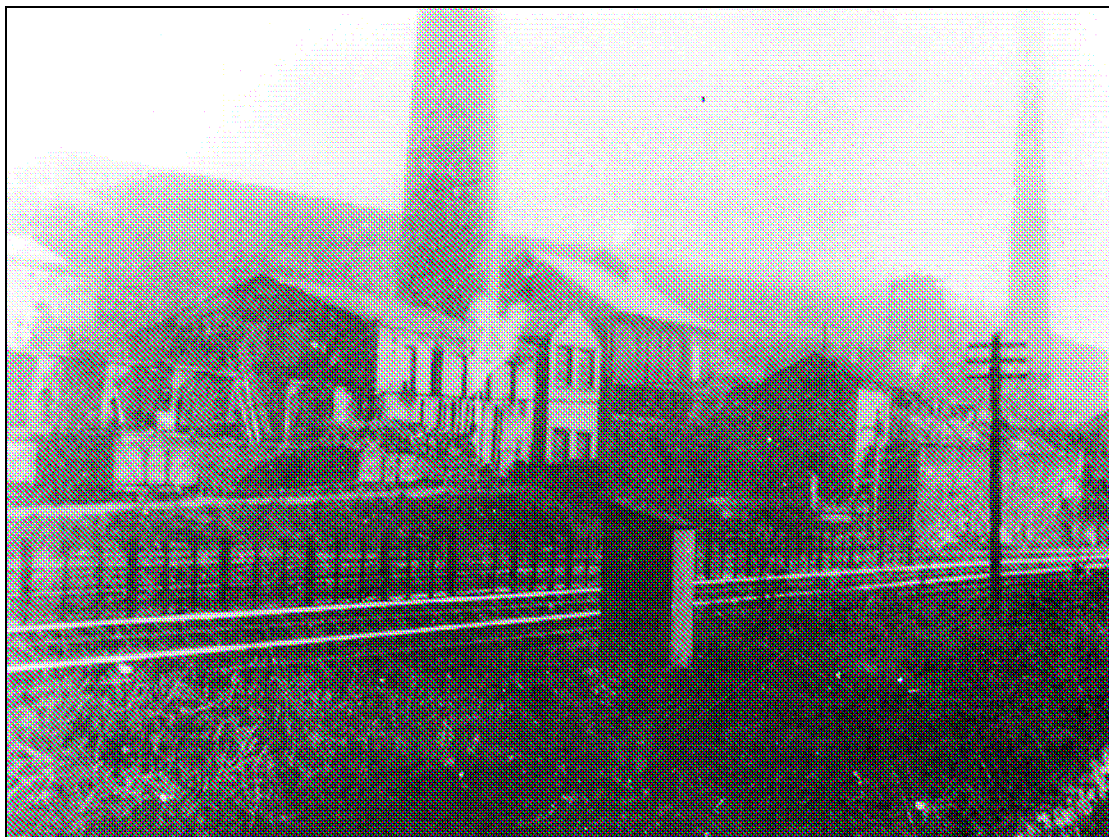


Plate 6: A view of the boiler house and railway sidings in c 1900. Part of the bank of coke ovens is also visible

- 3.1.6 Evidence of further improvements and expansion of the colliery can be elucidated by comparing the Ordnance Survey map of 1909 (Plate 7) with the previous edition of 1893. The 1909 map shows the washing and crushing plant near the downcast shaft to have been remodelled, with the new structure being slightly narrower but longer. The coke ovens to the east of the crushing plant are no longer shown, implying that they had been demolished. The main bank of back-to-back coke ovens occupying the northern part of the site is shown to have been extended, and another bank of ovens placed parallel to the east. This appears to have comprised a single row of ovens, set into the natural slope. The main bank of ovens were evidently serviced by a private railway siding by 1909, which will undoubtedly have proved to be of considerable benefit in terms of transporting the coke to the Platt Brothers' iron works in Oldham.
- 3.1.7 A notable addition to the colliery marked on the 1909 map is the upcast, or air shaft, which is shown to the east of the coke ovens. This will have been intended primarily to improve ventilation in the underground workings, which will have been assisted by a steam-driven fan. The engine that powered the ventilation fan was housed in the L-shaped building immediately to the south of the shaft. It has been suggested that the coke ovens were charged by means of a gravity-fed tramway running from the upcast shaft to the tops of the ovens (Nadin 2006, 128).

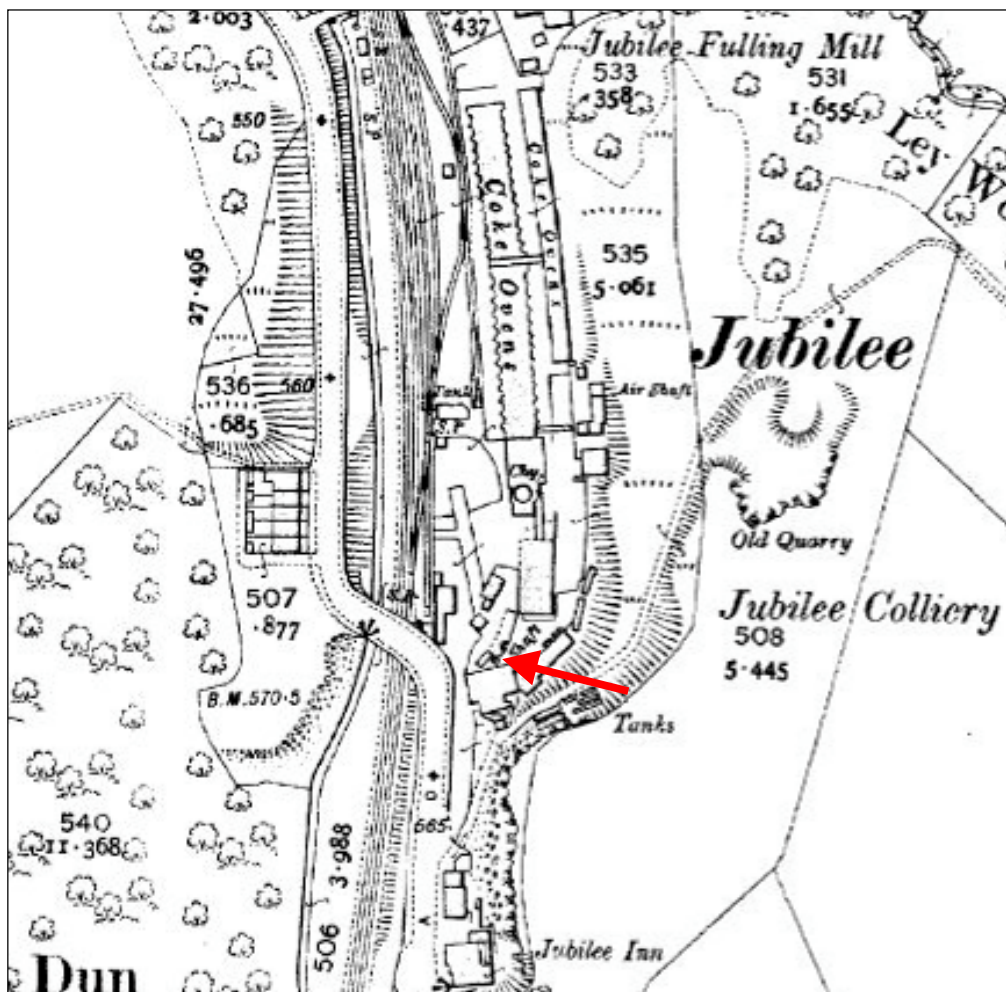


Plate 7: The Ordnance Survey map of 1909, with arrow marking the downcast shaft

- 3.1.8 A further addition to the colliery that is shown on the 1909 map is a terrace of five houses on the western side of Milnrow Road. These were owned by the Company, and were probably intended to house key employees at the colliery.
- 3.1.9 By 1926, the colliery employed 130 men underground and 88 on the surface, representing a considerable increase in the number of surface workers since the 1890s. This is likely to reflect the increased capacity for producing coke. By this date, the Platt Brothers had concentrated their coke production at Jubilee, from where coke was loaded into railway wagons and sent to their two Hartford Works at Derker and Werneth (Fanning 2001).
- 3.1.10 The layout of Jubilee Colliery at its greatest extent is captured on the Ordnance Survey map of 1930, which shows further expansion of the site since 1909 (Plate 8). In particular, the single row of coke ovens in the north-eastern part of the site appears to have been expanded creating, at least in part, back-to-back ovens.

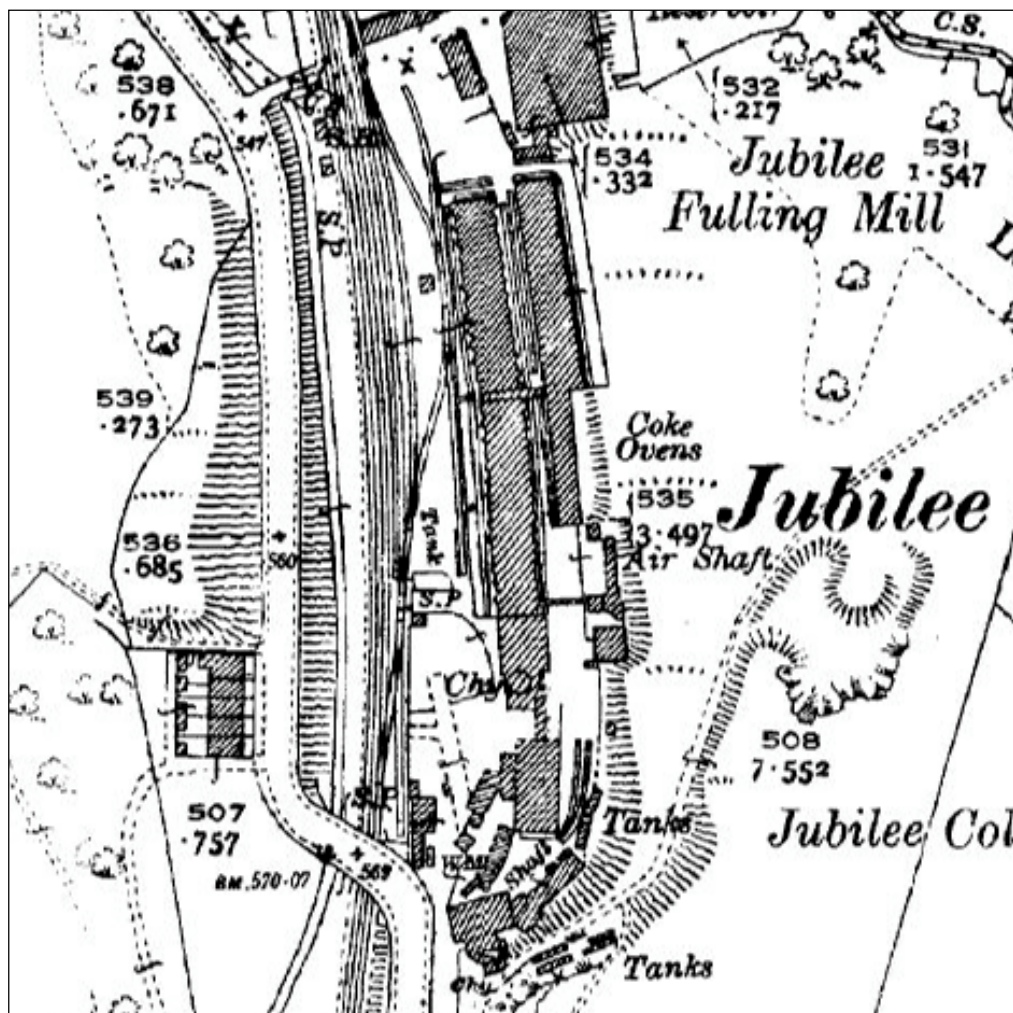


Plate 8: Extract from the Ordnance Survey map of 1930

- 3.1.11 The colliery was closed in 1932 and the site was, after being made safe, effectively abandoned.

3.4 BACKGROUND TO MAKING COKE

- 3.4.1 Charcoal was historically the fuel of choice for industrial purposes, and even following the decline of the charcoal industry from the early-seventeenth century, and the growth of coal mining, it was still preferred to coal, due to its sulphur content being only about 0.2%, whereas even the best coals contain not less than 0.5%, and a much greater amount of ash, containing silica, which requires further flux and fuel for its removal. It was soon realised that the sulphur in coal tended to make iron ‘hot short’, or brittle when hot, so that it would not stand the hammering required in the manufacture of wrought or bar iron, the form in which it was almost invariably used. In the patent grants of the early seventeenth century, inventors were concerned with methods for overcoming the effect of the sulphur, part of which would appear in the ‘smoke’ produced on heating the coal.
- 3.4.2 An early reference to coke-making is found in 1587, when Sir Francis Willoughby of Wollaton, Nottingham, wrote to the Earl of Rutland: ‘I have sent you a basket of the sea-coal. There are 20 rooks brought into charcoal and laid up in store. I have kept the party that makes them in case you want a greater number’ (Jenkins 1934). This ‘party’ was presumably a charcoal burner. In 1620, Sir William St. John, Sir Giles Mompesson and others, including the inventor, Hugh Grundie, were granted a patent to use coke (Patent No 15, Patent Office 1857). Nothing more is known of the invention of Hugh Grundie, although no success is known to have been attained. In 1630, Edward Bell and others (Patent No. 51) proposed ‘the meanes so to prepare and order the fuell of peates or turffes by reduceing it into a coale’ for smelting and refining of iron, lead and tin or for salt boiling, brick and lime burning. In 1633, Sir Abraham Williams and others (Patent No. 65) claimed ‘a new way for charcking of seacole’ for the melting of iron and other metals, and other uses. Certainly by 1640 coke was used in malt drying near Derby and here the coal was ‘cowkified’ in conical heaps (Jackson 2008). In 1654, John Copley was granted a Commonwealth patent to ‘make iron with charcked pit coal’. These references show that coke-making was known, but no details are available of the methods of making it (Mott 1936).
- 3.4.3 The first successful method of making coke from large lumps of coal was by a hearth process, in coke heaps or piles, which had been first applied for making coke for malting, was still the standard method used in the mid-eighteenth century. The process was akin to that of charcoal-burning; instead of a heap of prepared wood, covered with twigs, leaves and earth, there was a heap of coals, covered with coke dust. Only the outer layer burned, leaving the interior of the pile in a carbonized state. Only about 30% of the original coal remained after carbonisation and produced a very light and porous Coke (Jackson 2008, 1). Abraham Darby is the person credited with the first use of coke for iron smelting at his works at Coalbrookdale, c 1709, when a record book shows a payment for ‘charcking coles’ (*ibid*). Although successful, this method of substituting coke for charcoal was not widely adopted until the middle of the eighteenth century. There were other users of coke for making iron from about 1750, with coke blast furnaces started in Cumberland, at Little Clifton in 1750, Maryport in 1752 and Seaton in 1753 (*ibid*).

- 3.4.4 In 1768, John Wilkinson improved the process at Bradley, Staffordshire, by building the coal round a central chimney built of loose bricks with openings for the combustion gases to enter. A damper on the top enabled the draught to be controlled. Both the yield and density of the coke were increased by these improvements. The use of water to extinguish or quench the carbonised coal seems to have been introduced into Staffordshire in 1815 and spread to the Shropshire area by 1840. It is surprising that this discovery was not made earlier, but the amount of water required would have proved difficult to transport in the earlier years (*op cit*, 9).
- 3.4.5 Beehive ovens had been developed as early as the seventeenth century, for making wood tar (Glauber 1657), but it was not applied to the manufacture of coke until the second half of the nineteenth century, when brick-built coke ovens were developed. This was the first ‘closed’ oven, to which air, was admitted for the partial combustion of the coal. A fire brick chamber shaped like a dome is used and was typically 8-13’ wide and 8’ high. The roof has a hole for charging the coal or other kindling from the top. The discharging hole is provided in the circumference of the lower part of the wall. Coal is introduced from the top to produce an even layer of about 2-3’ (0.60-0.91m) deep. At some early beehive plants, coal was thrown into the chamber via the door in the wall. This practice was soon replaced by the more efficient method of top charging. Air is supplied initially to ignite the coal. Carbonization starts and produces volatile matter, which burns inside the partially closed side door. Carbonization proceeds from top to bottom and is completed in two to three days. Heat is supplied by the burning volatile matter so no by-products are recovered. The hot coke is quenched with water and discharged, manually through the side door, which is demolished to retrieve the coke. The walls and roof retain enough heat to initiate carbonization of the next charge. When the coke cooled, the general practice was for the coke ‘drawer’ to use a large shovel called a ‘peel’, suspended from a simple, moveable ‘crane’, to remove the coke and tip it onto the bench (a floored area adjacent to the kiln), in an operation known as ‘casting an oven’ (Jackson 2014, 5).
- 3.4.6 The exhaust gases were initially allowed to escape to the atmosphere, but following the rapid introduction of coke oven batteries, where a number of ovens are built in a row with common walls between neighbouring ovens, central flues above the ovens led into a chimney. Batteries comprised up to hundreds of ovens, sometimes built in single rows, but this had the drawback that more of the heat produced tended to escape into the atmosphere and the oven was less efficient. In double rows they could be either constructed in a wide battery with each one being exactly opposite the other, as at Jubilee Colliery, or the two rows could be staggered with the ovens being built in the space created by the void in the opposite row. Although collieries on many coalfields introduced coke ovens, the Durham Coalfield became the major supplier of coke to Iron industry by second half of nineteenth century Mitchell (1984). At the rear of each battery oven was an opening into a brick flue along the centre of the battery, which carried the exhaust gas through a number of boilers on its way to the chimney stack (Plate 10). In general it was found that 24 beehive coke ovens were capable of maintaining steam in one egg-ended Lancashire boiler (Jackson 2014, 6).



Plate 9: A bank of beehive coke ovens

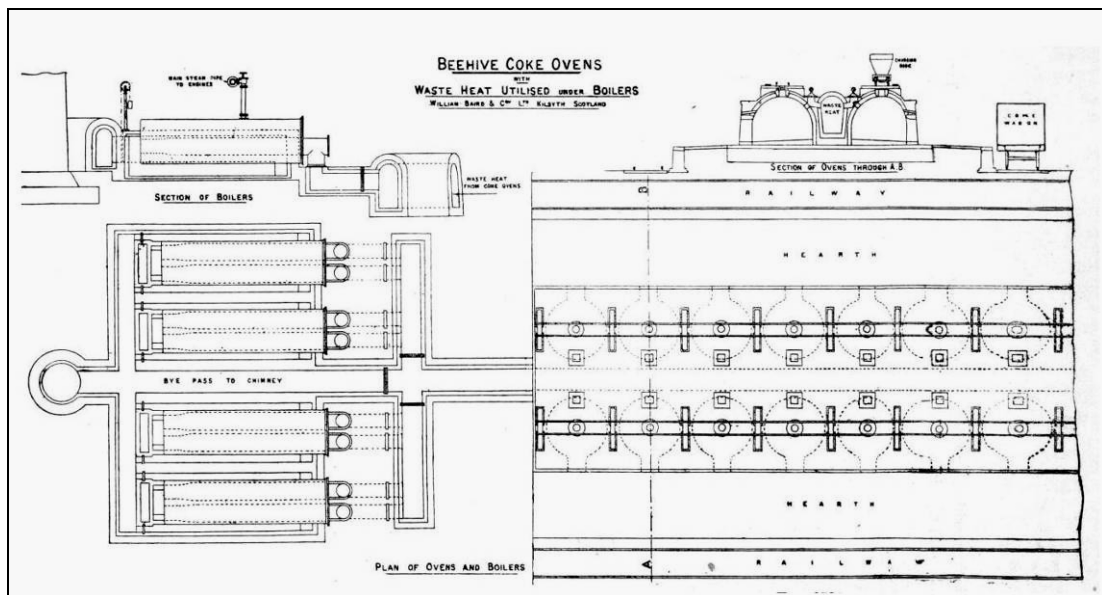


Plate 10: Plan and section of beehive ovens and associated boiler house

4. EXCAVATION RESULTS

4.1 INTRODUCTION

4.1.1 Four areas of the Jubilee Colliery site were targeted for excavation during the public-led project. These areas comprised the site of the boiler house and chimney, the coke ovens, the washing/crushing plant, and the engine house for the ventilation fan by the upcast shaft (Fig 2).

4.2 THE BOILER HOUSE

4.2.1 The boiler house occupied the central part of the colliery site, and appears to have supplied power to the northern part of the complex, and hot water for use throughout the coking site. A chimney placed on the southern edge of the pit was presumably associated with another boiler house providing power to the pumping and winding engines associated with the downcast shaft. The excavated boiler house is depicted in early photographs as a two-storey, stone-built structure with windows to each of five bays in the western long-wall at first-floor level (Plate 5). A photograph taken from its northern side, again dating to *c* 1900 (Plate 6) shows blocked windows in the northern gable, and also suggests an asymmetric plan, with the roof extending over an additional bay on the eastern side of the building. The area of the boiler house survived as a low shallow mound, planted with an understory of trees below larger established trees, and forms the entrance to the nature reserve from an extant cobbled trackway, which formed the principle access to the site.

4.2.2 An irregularly-shaped trench, with maximum dimensions of approximately 10 x 10m was placed on the southern side of an entrance path into the site, and was bounded by a southern return of the path on its eastern side, and by the extant cobbled track to the west (Fig 2-5). At its southern end, the trench was linked to a 7 x 7.5m excavation area around the chimney (*Section 4.3*). Excavation revealed well-preserved *in-situ* remains of the boiler house immediately below the present ground surface (Plate 11). The extant fabric comprised several floors surfaces, all composed of hand-made, mould-thrown bricks (Plate 12), many of which were stained red by exposure to heat. The central part of the trench was typically raised two to three courses higher than the surrounding floor, and represents the 3' (0.91m) wide base of a flue, which ran from the coke ovens to the north into the chimney immediately to the south (Plate 13). The outer part of this structure also appeared to have formed the edges of the raised beds carrying the cylindrical boilers. A similar 3' raised brick boiler bed survived to a higher level at its southern exposed end, in the north-western corner of the trench (Fig 6). This comprised six courses of horizontal and edge-set red bricks and refractory bricks at its maximum, but was marked only by the different alignment of the bricks at extant floor level, to which it had been reduced at its southern end. The area between these two raised beds was stained red, and comprised up to two courses of brickwork, mainly of refractory type, forming the floor beneath the boiler.



Plate 11: View across the excavated boiler house, looking south towards the chimney



Plate 12: The foundations for the boilers, showing part of the base of the flue



Plate 13: Base of flue from coke ovens extending beyond boiler house into chimney

- 4.2.3 The area lying between 1.5 and 1.8m from the northern edge of the exposed floor had a noticeable sag and appeared to have had several episodes of repair, including a row of sloping slates at its southern end (Plate 14). Much of the extant flooring to the north comprising only fragments of brick, bonded in a black sooty mortar, typical of the turn of the twentieth century, rather than the more regularly coursed brickwork to the south. It is possible that the floor had sunk into a void, possibly representing blow-down holes for earlier small Cornish boilers, which appear to have been replaced with longer Lancashire boilers in the late nineteenth century.



Plate 14: An area of sagging brickwork, with sloping slates to the south

- 4.2.4 To the east of the central flue, the floor was similar to that to the west, and was again heavily stained by heat (Plate 15). In the northern part of the trench, its eastern side was truncated, showing the floor to be of four-courses depth, with it surviving to its full width of 8' (2.44m) only at its southern exposed end. Here it comprised only two courses of brick fragments, bonded in a grey cementitious mortar, and overlying a sandstone rubble wall, only exposed on its outer edge, to a depth of 0.35m (Plate 15). This probably represented the original eastern wall of the original mid-nineteenth century boiler house, but this could not be investigated further without damaging the extant remains of the later phases.



Plate 15: The floor of the boiler house to the east of the central flue, showing part of the earlier stone-built wall

- 4.2.5 The stone wall of the earlier phase was overlain by a boiler bed of 3' (0.91m) width, surviving to a height of only four courses at the southern end of the trench, and as a joint in the brick floor in the small area in which it was exposed in the northern part of the trench, to the south of the charging platform. This formed the internal bench for a further boiler bed placed to the east, and of which only a very small section of burnt refractory brick floor survived at the southern end of the trench (Fig 6). A clay make-up layer below this later floor was observed, however, and was also heavily stained red by the heat of the boiler above. It was not possible to establish the eastern extent of the boiler bed, or determine the external wall of the boiler house, as it lay beneath a footpath within the nature reserve.

- 4.2.6 Another stone wall of 0.45m thickness was observed in the western part of the trench (Fig 6). It was of fragmentary sandstone construction, faced on both sides and with a rubble core, and formed the western external wall of the boiler house (Plate 16). It was abutted on its western side by a 4.5m length of 0.75m wide floor, of brick construction, comprising two rows of machine-made brick set between rows of edge-set brick (Plate 16). This was bonded in a black sooty mortar, and overlay a brick levelling course of similar width. Remains of a cast-iron rail, set within an indurated rubble deposit immediately to the west raises the possibility that the narrow short floor formed a threshold for a sliding door, probably inserted in the late nineteenth or early twentieth century.



Plate 16: The stone-built western wall of the boiler house

- 4.2.7 Within the central boiler bed, at its southern end, the well-preserved remains of an internal wall survived to a height of up to four courses. It was of refractory-brick construction, with the floor of similar brick surviving to two additional courses above that surrounding, and with a full-brick thickness wall forming its eastern side (Plate 17). It formed a narrow flue that was 0.51m wide within the boiler bed, and had a central circular aperture within its base of 0.20m diameter. This had presumably housed the base of a butterfly valve at the rear of the boiler. Although longitudinal walls within boiler beds were a feature of Lancashire-type boilers, these were generally of only single-skin thickness, and the excavated example was placed too close to the western side of the boiler bed to split the flow of exhaust gases efficiently. It is therefore probable that this represented part of the flues to the rear of the boiler, and that to the east was built following the extension of the boiler house in the late nineteenth century.



Plate 17: Narrow flue set towards the rear of the boiler bed

4.3 THE CHIMNEY

- 4.3.1 The chimney is first depicted on the Ordnance Survey map of 1893, and is shown to have been partially enclosed within the boiler house (Fig 3). By 1909, it was enclosed within a range of buildings, as can be seen on the photograph of *c* 1900 (Plate 5). This photograph also shows it to be a cylindrical tapering brick chimney. It was demolished following the abandonment of the site in the 1930s, and survived as a low mound, slightly higher than that associated with the adjacent boiler house, and with some brickwork exposed at present ground level. Excavation of a trench measuring approximately 7 x 7.5m revealed well-preserved remains of the footings of the chimney, in all but the south-eastern corner of the trench, suggesting that the chimney had fallen in that direction during its demolition (Fig 6).
- 4.3.2 The main structural element of the chimney that survived comprised six radial courses of hand-made bricks (Plate 18), forming a wall of 5'5" (1.68m) thickness around a central 7' (2.13m) diameter circular chamber (Plate 19). Externally, the six courses of the chimney wall were set on a raking plinth, observed to a depth of eight courses (Plate 20), but almost certainly extending to a much greater depth.
- 4.3.3 The foundation of the chimney had been strengthened at some point, with a 1½-2-brick thickness wall added on its outer face, with raking buttresses to the tiered base of the chimney (Plate 21). The use of black sooty mortar to bond these walls suggests it was undertaken during the expansion of the colliery in the late nineteenth century. On the southern side of the chimney, the outer wall did not follow the radial outline of the chimney, but was aligned with the structure to the south, which was also probably erected at this time.



Plate 18: General view across the excavated remains of the chimney



Plate 19: The central chamber of the chimney



Plate 20: The raking plinth foundation of the chimney



Plate 21: Strengthening wall added to the chimney

- 4.3.4 Part of the floor of the chimney was revealed during the excavation, generally comprising hand-made refractory bricks (Plate 22), although with several froged examples presumably representing repairs to the original fabric. A pair of cast-iron bars laid horizontally within the rubble infill of the chimney (Plate 23), almost certainly represent lintels to access hatches or flues, rather than remnants of control valves or fan apparatus set within the chimney base.



Plate 22: The exposed floor of the chimney



Plate 23: Cast-iron bars exposed at the base of the chimney

- 4.3.5 Within the walls of the chimney, two relieving arches, comprising three courses of brick, were placed below two brick flue bases (Plates 24 and 25). These were 2'6" (0.76m) wide internally, and with full-brick thickness side-walls, and appeared to survive to original floor level. One was placed at the northern point of the chimney, adjacent to the boiler house, and served flues from the boilers and the coke ovens further to the north, whilst the second flue was placed in the south-western quadrant, and probably served the blacksmith's workshop, which lay in that direction. Excavation on the external side of the chimney revealed that the relieving arch associated with the south-western flue was of full-wall thickness (Plate 24).



Plate 24: Relieving arch associated with a flue on the south-western side of the chimney



Plate 25: Relieving arch in the northern side of the chimney

4.4 THE COKE OVENS

- 4.4.1 The production of coke became a significant aspect of Jubilee Colliery following the success of an initial battery of ovens placed against the eastern retaining wall in the southern part of the site (Fig 3). A battery of 26 double, back-to-back ovens was subsequently erected immediately to the north of a presumably contemporary boiler house in the 1880s, with a further extension of similar size to the north in the early twentieth century. Another battery of single ovens was also built along the eastern retaining wall in the northern part of the site, which was partially extended between 1909 and 1930 into a double bank (Figs 3-5).
- 4.4.2 Much of the 1880s battery of double ovens survives extant to a height of approximately 1.8m, and although the area is now heavily vegetated, most of the damaged and vitrified rear walls, parts of several of the domed roofs, and remnants of the central raised flue and oven floors are generally visible on the surface (Plate 26). Elsewhere, the ovens have been demolished to floor level, and although several elements of flooring can be seen in the north-western part of the site, there is generally no visible evidence for their existence.



Plate 26: General view of part of the coke oven battery, looking west

- 4.4.3 Two trial trenches were excavated across the double battery of ovens during the initial phase of site investigation in 2012, and also across the secondary eastern battery, revealing well-preserved floors (ARS 2013). Two ovens, situated in the northern extension to the central battery, were originally targeted for excavation during the current project, but it became possible to examine the remains of several additional ovens during the timeframe of the excavation (Fig 7).

4.4.4 All of the excavated ovens in the main double bank were constructed with full-brick thickness external walls, with a vaulted roof, and with rubble infill between each oven, and a central high-level flue placed between the two rows of the battery. The heat generated by the coking process, combined with the chemicals released, led to the significant vitrification of the upstanding remains (Plate 27). The edge-set, hand-made brick floors did not have similar accumulations of vitreous deposits, however, as they were regularly exposed and scraped during the removal of the coke following firing. Several of the floors survive in near-perfect condition (Plates 27 and 28), whilst bricks within several of the others display the effects of heating, particularly in the form of cracking and erosion. (Plates 29 and 30). Root damage has further impacted on the survival of the single-brick thickness floors (Plate 30).



Plate 27: View of two of the surviving coke ovens in the main double bank



Plate 28: The excavated floor of one of the ovens in the main double bank



Plate 29: The remains of one of the coke ovens added to the main double bank between 1893 and 1909



Plate 30: The fragmentary remains of one of the coke ovens added to the site 1893 and 1909

- 4.4.5 Given that the later ovens only survived at floor level, and to a maximum height of two brick courses above ground level, it was difficult to assess physical differences in construction between the various phases of building. However, it would appear that in both phases of the main double battery, the edge-set brick floors were laid inside, and abutting the outer wall of each individual oven (Plate 31), whilst in the later battery to the east, the floors were continuous beneath the outer wall (Plate 32). This suggests that there may have been an intention to expand these ovens into a double bank, although this was not fully implemented.
- 4.4.6 None of the excavated ovens were perfectly circular, and neither were their floors level. The double ovens were approximately 10' (3.05m) across, and measured 11'6" (3.05m) front to back. The floor sloped slightly from the sides to the centre, and from the back to the front (Plate 31), presumably to facilitate easier extraction of the coke. In the later battery of ovens to the east, each oven was slightly larger, measuring 12' (3.66m) across, and 14' (4.27m) in depth.



Plate 31: Two coke ovens in the northern extension to the double battery

- 4.4.7 The exposed brickwork within each oven was very dark, and had been previously assumed to have comprised blue engineering brick (ARS 2013), which is of similar colour. However, the smaller size of brick, and the nature of their erosion by heat is inconsistent with this type of engineering brick, which although durable, was designed to withstand force, not heat. Exposure of the five foundation courses below floor level in the northern battery (Plate 29) revealed that the bricks were of hand-made construction, possibly using rudimentary fireclays from the colliery, but of otherwise standard construction. The upper course was heavily sooted on all but its external face, whilst the sooting on the course below was confined to its inner side, demonstrating this to be an effect of the coking process, rather than the fabric of the brick. At its base, the foundation wall had an offset plinth of a single brick, laid directly onto plastic clay, which was probably levelled natural subsoil rather than an imported layer of made ground.



Plate 32: The foundations for a coke oven placed adjacent to those added to the double bank between 1893 and 1909. However, whilst appearing to incorporate the exterior circular wall, Ordnance Survey mapping suggests that an oven was not actually built in this location

- 4.4.8 The area to the east of the extension to the double battery comprised several elements of a rough brick fragment floor. These comprised three courses, each possibly forming a weight-bearing layer below a more uniform upper surface, which had been lost subsequently. An area immediately adjacent to the eastern face of the oven had been refaced in machine-made brick, suggesting a rebuild of the access into the oven for extraction, as this would have been a particularly heavily-used area. The basal layer observed to the south appears more regularly coursed, and comprised machine-made brick, bonded with a black sooty mortar, consistent with an early twentieth-century construction date. This almost certainly formed a foundation to the platform to the east of the battery, and a curving joint in its brickwork, mirroring the line of the oven further to the east, again suggesting that it may have originally been the intention to build two double batteries at the northern end of the site, rather than a double and a single. It appears that the foundation for a second double battery was built at the time of the erection of the northern extension, but that the eastern was reduced to only a single bank prior to construction, instead forming an extension to the earlier battery of single ovens along the eastern retaining wall (Figs 4 and 5).

4.5 THE UPCAST SHAFT

4.5.1 The upcast shaft took advantage of the local topography, and was placed on higher ground to the east of the complex, above a high retaining wall. It allowed for the ventilation of the underground workings, and air would have been ‘pulled’ up the shaft with the aid of a large fan, placed in a fan house directly to the south. Two very small trenches excavated in the previous public-led excavation in 2012 revealed well-preserved remains of these twentieth-century structures (ARS 2013). A trench of approximately 12 x 7.5m was placed in the area of the fan house, adjacent to an exposed machine base. The trench was split around a mature tree (Plate 33).



Plate 33: General view of the trench to the south of the upcast shaft

4.5.2 Excavation of the northern part of the trench revealed a uniform surface of hand-made red brick, of exactly 10' (3.05m) width, and comprising north/south-aligned rows of stretchers (Plate 34). An arced scar along its southern edge, also observed in the earlier trench (ARS 2013), appeared to have been gouged by a door bolt, strongly suggesting the position of a doorway at the western end of the south wall.

4.5.3 The surface was bound on either side by parallel walls of two-brick thickness (0.44m), with facing stretcher bricks in the exposed upper two courses, above a course of headers at the lower western end of the wall. A 7 x 5" (0.18 x 0.12m) rectangular socket set within the north wall at its western end, and of a single-course depth at its extant level, appeared to have formed a socket for a vertical post set within the wall (Plate 35). The earlier evaluation trench and historic mapping suggested that the wall had a northward return almost immediately beyond the eastern limit of excavation. This appears to have formed the fan room, with the northward return representing the flue from the upcast shaft.



Plate 34: The brick floor in the ventilation fan house



Plate 35: Setting for a vertical post on the wall of the fan house

- 4.5.4 The doorway in the south wall afforded access into a small chamber of approximately 5' (1.53m) square (Plate 36). This had a concrete base below machine-made brick side walls of 1½-brick thickness bonded in black sooty mortar and with a channel along the southern edge of the brick walls, presumably housing an aperture frame forming the south wall. Many of the bricks were frogged, and had a stamp from the local New Hey Brickworks (Plate 37). The feature is certainly of a late date, and probably housed a small electrical motor or ducting associated with the upcast fan.



Plate 36: Small chamber within the fan house, probably representing the housing for an electric motor



Plate 37: New Hey bricks in the fabric of the chamber wall

4.5.5 The southern part of the trench examined square-shaped structure that was situated a short distance to the south of the fan house, as shown on the Ordnance Survey map of 1909 (Fig 4). Dressed sandstone blocks with through-bolt holes were littered around the surface in this area (Plate 38), although all appear to have been repositioned. Removal of the shallow topsoil revealed an L-shaped wall of 1½-brick thickness bonded in black sooty mortar (Plate 39), forming the western and northern walls of the structure depicted on the historic maps (Figs 4 and 5).



Plate 38: Dressed sandstone blocks in area to the south of the fan house



Plate 39: Remains of the square-shaped structure shown on historic mapping

4.5.6 The structure housed a large machine base at its western end, comprising a single course of dressed sandstone blocks (Plate 40) with a rebated surface housing what appeared to have been a small engine. The western block had a semi-circular end to this shallow rebate (Plate 41), typical of a small horizontal steam engines, suggesting that the structure housed an engine inserted after 1893 to power the ventilation fan for the upcast shaft. A pit filled with loose rubble, which formed the southern limit of the excavated area, almost certainly represented a flywheel pit for the engine. It was of brick construction, and continued below the sandstone engine bed.



Plate 40: Large stone blocks forming the base for a small steam engine



Plate 41: Shallow rebate cut into the surface of the stone engine bed

- 4.5.7 At the eastern end of the trench, beyond the northern wall of the engine house, was a concrete floor with metal strengthening bars set in its surface. This was partially overlain by a degraded concrete base, which had a large proportion of brick fragments within its matrix, typical of concrete from the earliest years of the twentieth century (Plate 42). Its intended purpose is unclear, but it appeared broadly contemporary with the engine house, and seemed to have formed a base for something placed between the engine house and fan flue.



Plate 42: Small part of the concrete surface to the north of the engine house

4.6 THE CRUSHING AND WASHING PLANT

- 4.6.1 A large rectangular structure shown on Ordnance Survey plans from 1893 to the south of the boiler house and coke ovens represents a crushing and washing plant. It is also depicted in historic photographs from *c* 1900, where it is shown as a two-storey structure with a pitched roof, the floor being open-sided on the western and northern sides (Plate 5).
- 4.6.2 This part of the site is generally damp, and forms part of an overflow area for a pond to the east of the boiler house. It was thus only feasible to excavate a small part of the area, which was bounded on its western side by the footpath that crosses the footprint of the washing/crushing plant (Fig 2). Excavation again revealed well-preserved *in-situ* remains, comprising brick floors and stone walls (Plate 43). A double-faced substantial stone wall of approximately 3' (0.91m) thickness was observed along the western boundary of the trench for the majority of its length. This wall was exposed to a depth of three courses on its western face, and was of dressed rubble built-to-course construction (Plate 44). It appears to have formed the eastern external wall of the crushing and washing plant, suggesting that this was not open, as the northern and eastern walls, or that the wall was demolished to form the later open-fronted structure.



Plate 43: General view of the excavated remains of the crushing and washing plant



Plate 44: The excavated remains of the eastern wall of the washing and crushing plant

- 4.6.3 The entirety of the excavated trench to the east contained an irregular floor of broken brick fragments. This was relatively uneven, and generally dipped slightly to the east where it became waterlogged (Plate 45). The surface appears to have formed a yard between the washing/crushing plant, and the high retaining wall to the east, apparently forming access to the original coke ovens that are shown in this area against the retaining wall to the east on the Ordnance Survey map of 1893 (Fig 3). An attempt to extend the trench towards the location of these original ovens did reveal a continuation of the brick surface, but became flooded too quickly to facilitate practical excavation within the remit of a volunteer-based excavation.



Plate 45: The excavated remains of the eastern wall of the washing and crushing plant

- 4.6.4 A short 4.5 x 1.3m extension to the southern end of the trench, placed within the washing/crushing plant structure (Figs 3-5), revealed another brick floor, which housed a rectangular sandstone machine base with a central channel with two holding-down bolts (Plate 46). Immediately to the north, the floor was overlain by a wall of machine-made brick, which formed the L-shaped north-eastern corner of a later structure (Plate 47). Many of the bricks were frogged and included a stamp from 'DHB Co Crompton'. The purpose of this structure remains unclear, but it appeared to have been associated with the latest phase of the colliery.



Plate 46: Sandstone machine base with holding-down bolts



Plate 47: Twentieth-century brick-built structure exposed in the northern part of the trench

4.7 THE FINDS

- 4.7.1 A small assemblage of artefacts was collected from the excavation. As perhaps may be anticipated, the majority of the finds were recovered from the topsoil/overburden and demolition layers, and may thus be considered to be essentially unstratified. The finds assemblage included fragments of pottery and other ceramic objects, clay tobacco pipes, and metalwork, all of which was in reasonably good condition.
- 4.7.2 **Pottery and other ceramic objects:** amongst the fragments of pottery were several sherds of large red earthenware storage jars. In broad terms, the earthenwares all had a reddish-pink, medium to coarse fabric with medium to large gritty inclusions. The identifiable forms included fragments of large bowls or pancheons and tall, cylindrical storage jars with lug handles close to the rim, typical of the forms produced in a number of centres within the south Lancashire coalfields from the eighteenth century onwards (Plate 48). For a while these potteries flourished and multiplied, their market increasing as the population rose during the eighteenth century. In response, there was corresponding rise in the number of relatively small-scale country potteries, many appearing in the later eighteenth and early nineteenth centuries (Brears 1971, 56-8). The examples from Jubilee Colliery, however, are all likely to date from the nineteenth or early twentieth century, and may have been dumped on the site following the closure of the colliery in the 1930s.
- 4.7.3 A limited range of plain and under-glaze transfer-printed refined white earthenwares, all dating to the late nineteenth and twentieth centuries, were also recovered from unstratified deposits, and may similarly have been dumped on the site following the closure of the colliery. These included a large sherd of a mug depicting a view across Loch Katrine, which can be dated to c 1810 (Plate 49).
- 4.7.4 Amongst the other ceramic objects was a large fragment of a crucible, which had clearly been used for the processing of metal alloys (Plate 50). The coarse fabric of the crucible comprised refractory material, which was stained with the residues of melting a metal alloy, possible bronze. The crucible may have been used in the blacksmith's shop in the colliery.
- 4.7.5 The finds assemblage also contained two fragments of ceramic isolators (Plate 51). These almost certainly date to the twentieth century, and were probably associated with the generation of electricity on the site.
- 4.7.6 **Clay tobacco pipes:** three fragments of clay tobacco pipes were recovered from the excavation (Plate 52). This small group comprised two stem fragments and a complete pipe bowl. This was undecorated, providing no indication of the manufacturer, and is thus difficult to date accurately, although the form of the pipe suggests that it may have been made in the eighteenth century. The stem fragments have no distinguishing features, and cannot be dated with any degree of accuracy.



Plate 48: Fragments of large red earthenware storage jars



Plate 49: Fragment of under-glaze transfer printed ware mug dating to c 1810



Plate 50: Fragment of a crucible with traces of a molten alloy residues



Plate 51: Ceramic electricity insulators



Plate 52: Clay tobacco pipe fragments

4.7.7 **Metalwork:** a range of metal objects were recovered from the excavation, although the majority appeared to be of a late date, and had probably been dumped on the site following the closure of the colliery. The most interesting metal object was undoubtedly the outer gauze of a miner's flame safety lamp (Plate 53), which was recovered from the overburden in the upcast shaft engine room.



Plate 53: Outer gauze of a miner's safety lamp

5. DISCUSSION

5.1 INTRODUCTION

- 5.1.1 The excavation revealed well-preserved and extensive buried remains of the Jubilee Colliery complex, comprising multi-phase structural elements of an increasingly rare survival of a mining site on the Lancashire Coalfield. The results achieved by the large number of local volunteers who participated in the excavation have enabled a better understanding of the key components, and historical use, of the colliery, and have confirmed that the site is a heritage asset of significant regional importance.



Plate 54: Some of the core team of volunteers, posing for a photograph with staff from Groundwork Oldham and Rochdale during the excavation of the chimney

5.2 THE BOILER HOUSE

- 5.2.1 Prior to the excavation of the boiler house, little was known about its form or arrangement. The excavation revealed two main phases of construction, and also resolved how the flue from the coke ovens to the north was integrated into the structure. The original layout of the structure comprised a central raised flue, linking the coke ovens directly to the chimney to the south. The outer edges of this flue formed the benches for boiler beds, which appear to have originally housed a pair of Cornish boilers within a stone building. These may have been of only 20' length, suggested by a dip in the floor that may mask the position of voids associated with blow-down holes in front of the original boilers. The colliery was expanded in the late nineteenth century, probably after it was purchased by Platt Brothers & Company Ltd in 1883. The boiler house was enlarged to incorporate a third boiler, with the earlier boilers apparently being replaced by longer, more efficient Lancashire-type models.



Plate 55: Excavating the rear part of one of the boiler bays



Plate 56: Volunteers engaged in the final cleaning and surveying of the boiler house

5.3 THE CHIMNEY

- 5.3.1 Excavation of the chimney revealed details of its design and construction, and provided a striking visual reminder of a formerly significant local landmark. The chimney appears typical of the second half of the nineteenth century, being a tapering brick cylindrical structure on a deep raking plinth. Few chimneys of such size have been excavated in the region, and thus the excavation at Jubilee Colliery provided a useful opportunity to study the construction of these important features of the industrial landscape.



Plate 57: An early stage in the excavation of the chimney

- 5.3.2 The chimney appears to have originally comprised two flue apertures, one linked to the boiler house to the north, and the other intended to serve buildings to the south-west, although it is unclear whether this second flue was ever used. Relieving arches were incorporated into the design of the walls of the chimney, possibly not only to spread the increased stresses caused by an aperture, but perhaps also to facilitate easier floor repair of the flue if it were damaged by hot gases, whilst maintaining the structural integrity of the chimney.
- 5.3.3 During the refurbishment of the boiler house to the north, and the insertion of additional structures immediately to the south, enclosing the base of the chimney, additional strengthening buttresses were added to the chimney base, presumably to offset any damage that may have been caused during excavation of footings for the new structures.
- 5.3.4 Somewhat surprisingly, the excavation also revealed information about the demolition of the chimney, with the almost complete loss of the south-eastern quadrant suggesting that the chimney was dropped on this side, into the heart of the complex, away from the adjacent railway line, during the making safe process following the closure of the colliery in the 1930s.

5.4 THE COKE OVENS

- 5.4.1 The excavation at Jubilee Colliery has revealed that well-preserved sub-surface remains of the later phases of beehive coke ovens survive across a large part of the site, enhancing the value of the above-ground remains of the large double-row of ovens that dominates the northern half of the former colliery complex. This impressive battery of ovens was probably built after the colliery was purchased by Platt Brothers & Company Ltd in 1883, but before the Ordnance Survey mapped the site in 1888-9 for publication of their first edition 25": 1 mile map in 1893 (Fig 3). This bank seems to have originally comprised a battery of 26 ovens, which were built back-to-back, with a central flue carrying waste gases to the chimney at the pit bank. This flue passed through the adjacent boiler house, where the hot gases were used to preheat the feed water for the boilers. The excavation of the boiler house clarified this design detail, showing the technological improvements within the industry in the late nineteenth century that allowed for the re-use of exhaust gases, and thus saving fuel costs.
- 5.4.2 Whilst this type of coke oven was once relatively commonplace, the double-row battery at Jubilee is now a rare surviving example. There are very few comparable coke ovens surviving in the Lancashire Coalfield, although extant examples include a bank of beehive ovens at Aspden Colliery near Oswaldtwistle (Plate 58), which is afforded statutory protection as a Scheduled Monument. The well-preserved remains of 24 brick and stone-built beehive ovens survive at this site, arranged back-to-back in three banks with central brick flue systems very similar to that at Jubilee Colliery. It is thought that the central and eastern rows are the earliest, whilst the western row was added between 1893 and 1910. As at Jubilee, the Aspden Colliery ovens fell into disuse when the colliery closed in the early 1930s.



Plate 58: The remains of the beehive coke ovens at Aspden Colliery near Oswaldtwistle are comparable in size, form and date to those at Jubilee, but are afforded legal protection as a Scheduled Monument

- 5.4.3 The surviving eight beehive coke ovens at Broad Head Colliery at Turton, near Bolton, are also a Scheduled Monument, whilst the bank of 12 ovens at Todmorden Road in Habergham Eaves, Burnley, is a Grade II listed building. The latter examples are arranged in two rows of six ovens, each with a diameter of *c* 4m with a height of *c* 2.5m. These are thought to have been built in *c* 1850, and are this earlier than the double bank at Jubilee Colliery, but they were superseded by ovens at the Towneley Colliery, which opened in 1874.
- 5.4.4 There are also the remains of four beehive coke ovens surviving at the site of Schofield Hall Colliery, near Littleborough (Plate 59). These ovens were in existence prior to 1851, and had probably fallen into disuse by 1870. Again, these examples are likely to be earlier than the double bank at Jubilee Colliery. As is the case at Jubilee and elsewhere, the stone facings of the ovens have been robbed out, leaving the brick-built elements to the rear exposed.



Plate 59: The remains of the beehive coke ovens at Schofield Hall Colliery, Littleborough

- 5.4.5 It is possible that the coke ovens at Todmorden Road and at Schofield Hall Colliery are of a comparable date to the single bank of coke ovens that lay to the east of the crushing and washing plant at Jubilee Colliery. The date at which these ovens were built has not been established, and whilst an attempt to investigate the site of these ovens was made during the recent excavation, this was abandoned due to the severe waterlogged nature of the ground. Consequently, it was not possible to firmly establish whether any buried remains of these ovens survive *in-situ*, although this would seem likely as the area has not been developed subsequently. Notwithstanding these limitations, it is suspected that they may have been the first coke ovens on the site. The evidence for this is rather circumstantial, being drawn from their proximity to the downcast shaft, and the fact that they had been abandoned by 1909. In addition, these oven are shown on an illustration of the colliery that was included in a souvenir guide produced by the Platt Brothers in 1913 (Plate 60).



Plate 60: Extract from a souvenir of the visit of King George V and Queen Mary to the Platt Brothers' works in Oldham on July 12th 1913

5.4.6 It is not known when the illustration of the colliery was produced, although it was almost certainly some years prior to 1913. The coke ovens in the eastern part of the colliery are depicted clearly, whilst the double bank in the northern part of the site do not appear to be shown. By 1913, the Platt Brothers also owned Butterworth Hall Colliery and Moston Colliery in addition to Jubilee. However, by 1929, they only owned Moston and Jubilee collieries, with the later producing all of the coke required at the works iron foundry (Platt Brothers & Co Ltd 1929, 26). This concentration of coke production is likely to have been a factor in deciding to further expand the ovens in the northern part of the site between 1909 and 1930.



Plate 61: Revealing the remains of the ovens built between 1909 and 1930

5.5 THE UPCAST SHAFT

- 5.5.1 The upcast shaft was an important element of the colliery, providing the necessary ventilation to the underground workings. Fresh air was drawn into the workings via the downcast shaft as a result of the draft created by the upcast shaft and its associated ventilation fan. A long, narrow structure to the immediate south of the upcast shaft is shown on the Ordnance Survey map of 1909, and was identified in the extant remains during the excavation. This almost certainly represented the ventilation fan house and its associated flue.
- 5.5.2 The absence of the fan house from the Ordnance Survey map of 1893 suggests that it was added to the colliery between the 1890s and 1909, and thus could be seen to represent a relatively late improvement to the pit's infrastructure. However, whilst the first steam-powered ventilation fan is thought to date from 1837, and was introduced to a colliery in Leeds by William Fourness (Hughes 1994), it has been estimated that only a quarter of collieries had implemented the use of fans by 1880 (Mitchell 1984). Against this background, the infrastructure at Jubilee Colliery was not necessarily
- 5.5.3 The southern part of the excavated trench revealed a small engine house, which was presumably intended to power the ventilation fan. This building was similarly first depicted cartographically on the Ordnance Survey map of 1909. The fabric of the excavated remains of the building was consistent with a twentieth-century construction date, reinforcing the interpretation of this having been a late addition to the colliery.

5.6 THE WASHING/CRUSHING PLANT

- 5.6.1 The fourth excavation area was targeted on the footprint of the washing/crushing plant, but also intended to assess the survival of the original coke oven battery to the east. Severe water-logging of this part of the site in recent years prevented the excavation of the trench into the area of the coke ovens, but well-preserved remains of an adjacent brick-paved yard were exposed, suggesting that elements of the coke ovens may survive at floor and foundation levels.
- 5.6.2 The substantial 3' east wall of the washing/crushing plant was revealed within the trench, implying that it not to have been open-fronted on its eastern side within the original construction. It can be seen to have been open-fronted on its western and northern sides in photographs dating to *c* 1900, although the building depicted may have been rebuilt in the late nineteenth century.
- 5.6.3 The base of a small machine was also revealed internally, set within a further brick floor. This was overlain by an L-shaped wall, which appeared to represent the final phase of the colliery, and may relate to the housing of updated machinery.

6. PUBLIC ENGAGEMENT

6.1 THE PARTICIPANTS

6.1.1 The primary focus of the project was to engage the local community with their local heritage in the form of a ten-week archaeological excavation. During the course of the project, more than 300 visitors of varying ages and backgrounds participated in the excavation or attended open-day events on site. Many of the volunteers attended gave of their time readily to the project, with a core team of around ten volunteers being involved for the entire time. A range of activities were carried out including excavation, survey, and archaeological recording.



Plate 62: Volunteer engaged in the instrument survey of the boiler house

6.1.2 Another key component of the project was the involvement of five local primary schools. A programme of visits into schools, prior to them attending the site, was followed by subsequent liaisons with the school to provide a complete teaching experience. The on-site activities included an opportunity to participate in the excavation of the site, and specifically the coke ovens, which was coupled with practical sessions with historic maps to help explain the history and surviving structures on the site (Plates 63 and 64). Some students returned to site during one of the public open days (Plates 65 and 66).



Plate 63: School students on a tour of the colliery complex



Plate 64: Students from Holy Cross Primary School excavating the base of a coke oven



Plate 65: Members of the public visiting during an Open Day



Plate 66: Volunteers in fancy dress forming part of the team during the public Open Day

7. CURATION AND CONSERVATION

7.1 RECIPIENT MUSEUM

- 7.1.1 Gallery Oldham has been nominated as the ultimate repository for the archive generated from the excavation:

Oldham Cultural Quarter,
Greaves Street,
Oldham OL1 1AL

7.2 CONSERVATION

- 7.2.1 There are no conservation requirements.

7.3 STORAGE

- 7.3.1 The complete project archive will be prepared for long-term storage following the guidelines set out in *Environmental standards for the permanent storage of excavated material from archaeological sites* (UKIC 1984, Conservation Guidelines 3).

7.4 DISSEMINATION

- 7.4.1 The archaeological results obtained from the project are incorporated in this final excavation report. In addition to Groundwork Oldham and Rochdale, copies of the report will be forwarded to Gallery Oldham, the Heritage Lottery Fund, the Greater Manchester Historic Environment Record, and the core team of volunteers who participated in the excavation.
- 7.4.2 In order to disseminate the results from the project to a national audience, Groundwork Oldham and Rochdale has maintained a web page dedicated to 'Preserving the Past'. This provides a record of the archaeological work carried out, together with the numerous other facets of the wider project. This can be viewed at: <http://jubileecolliery.wordpress.com/>

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Maps

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ILLUSTRATIONS

FIGURES

Figure 1: Site location

Figure 2: Excavated features superimposed on the Ordnance Survey map of 1848

Figure 3: Excavated features superimposed on the Ordnance Survey map of 1893

Figure 4: Excavated features superimposed on the Ordnance Survey map of 1909

Figure 5: Excavated features superimposed on the Ordnance Survey map of 1930

Figure 6: Plan of the boiler house and chimney

Figure 7: Plan of the excavated coke ovens

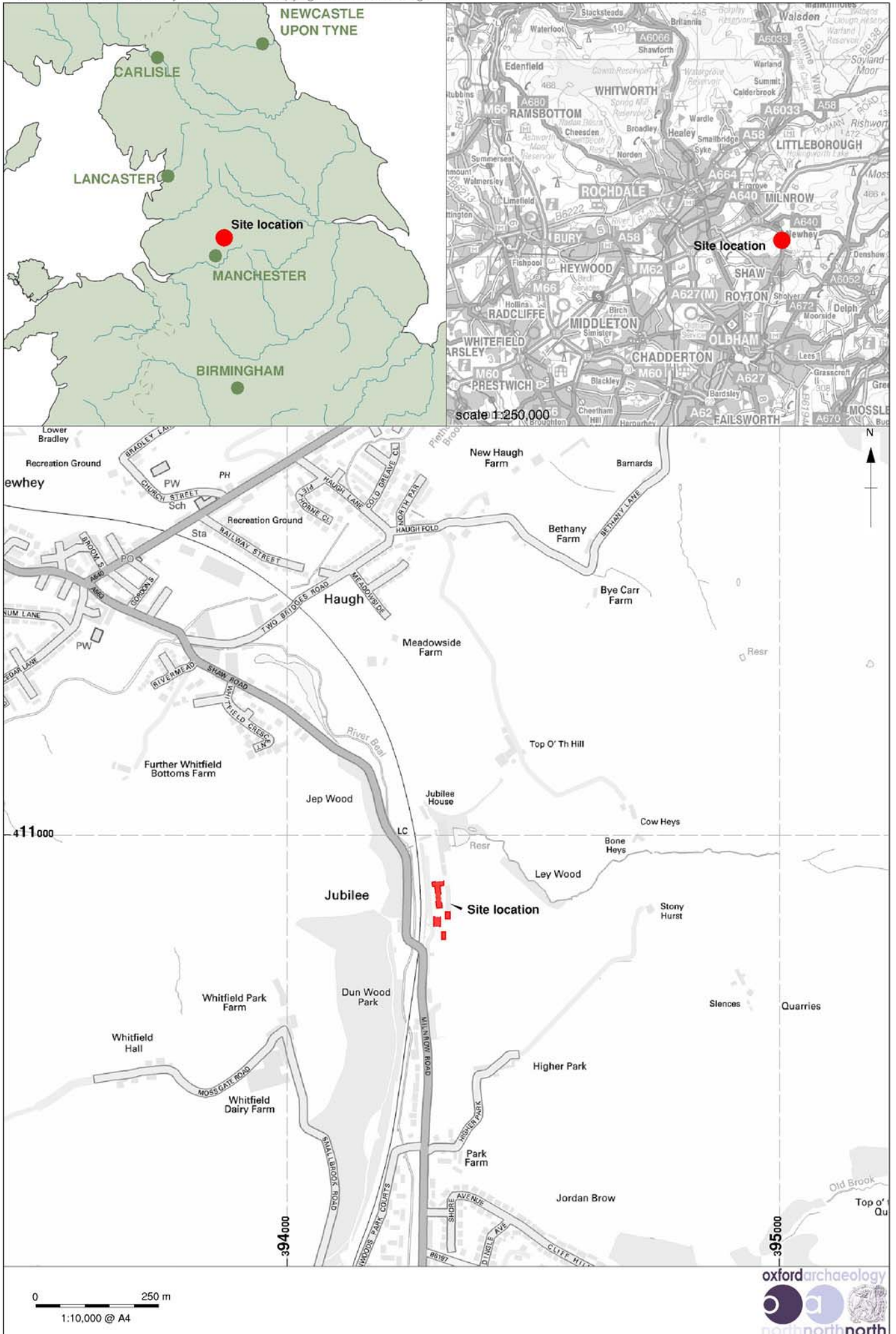


Figure 1: Site location

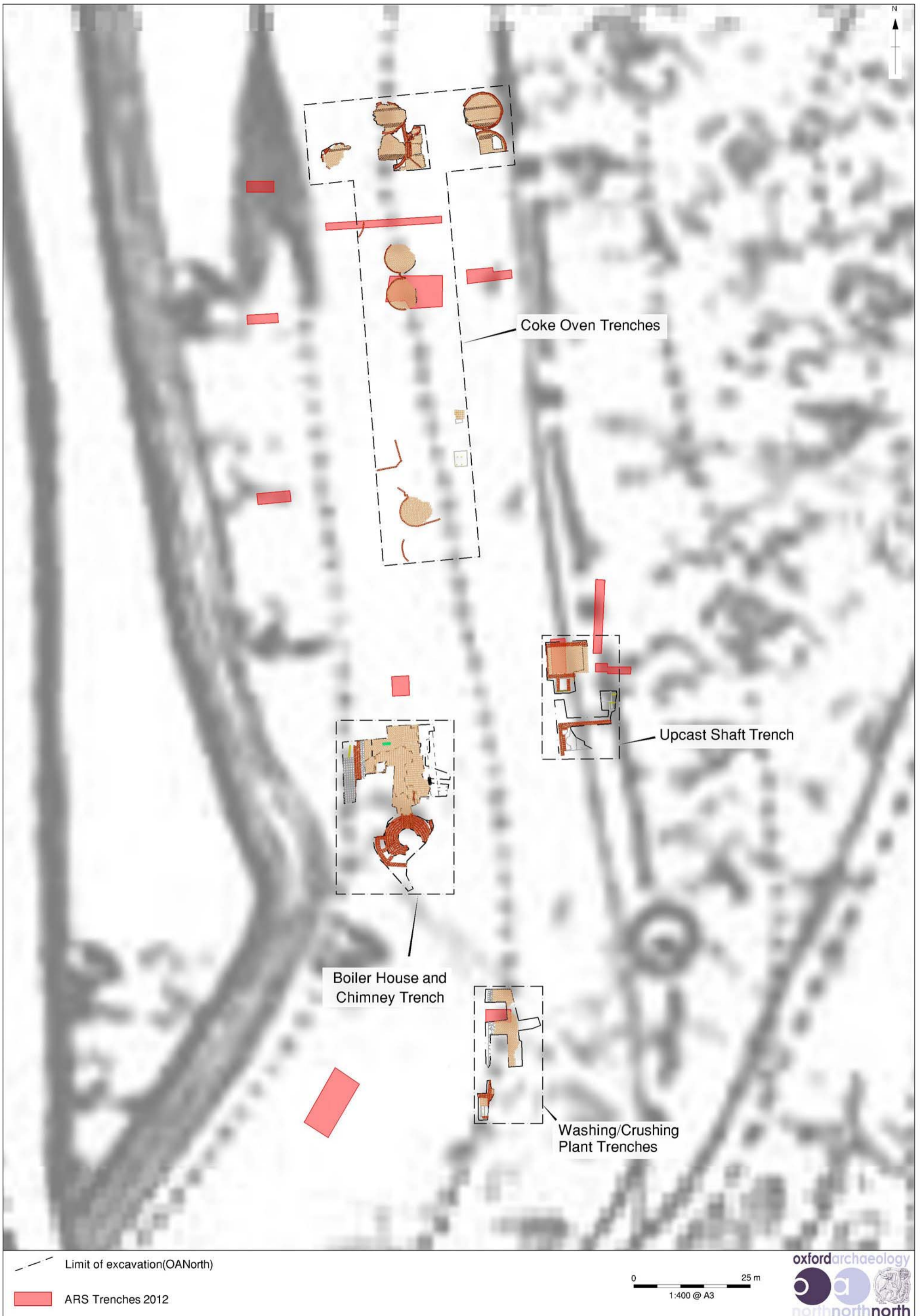


Fig 2: Excavated features superimposed on the Ordnance Survey map of 1848

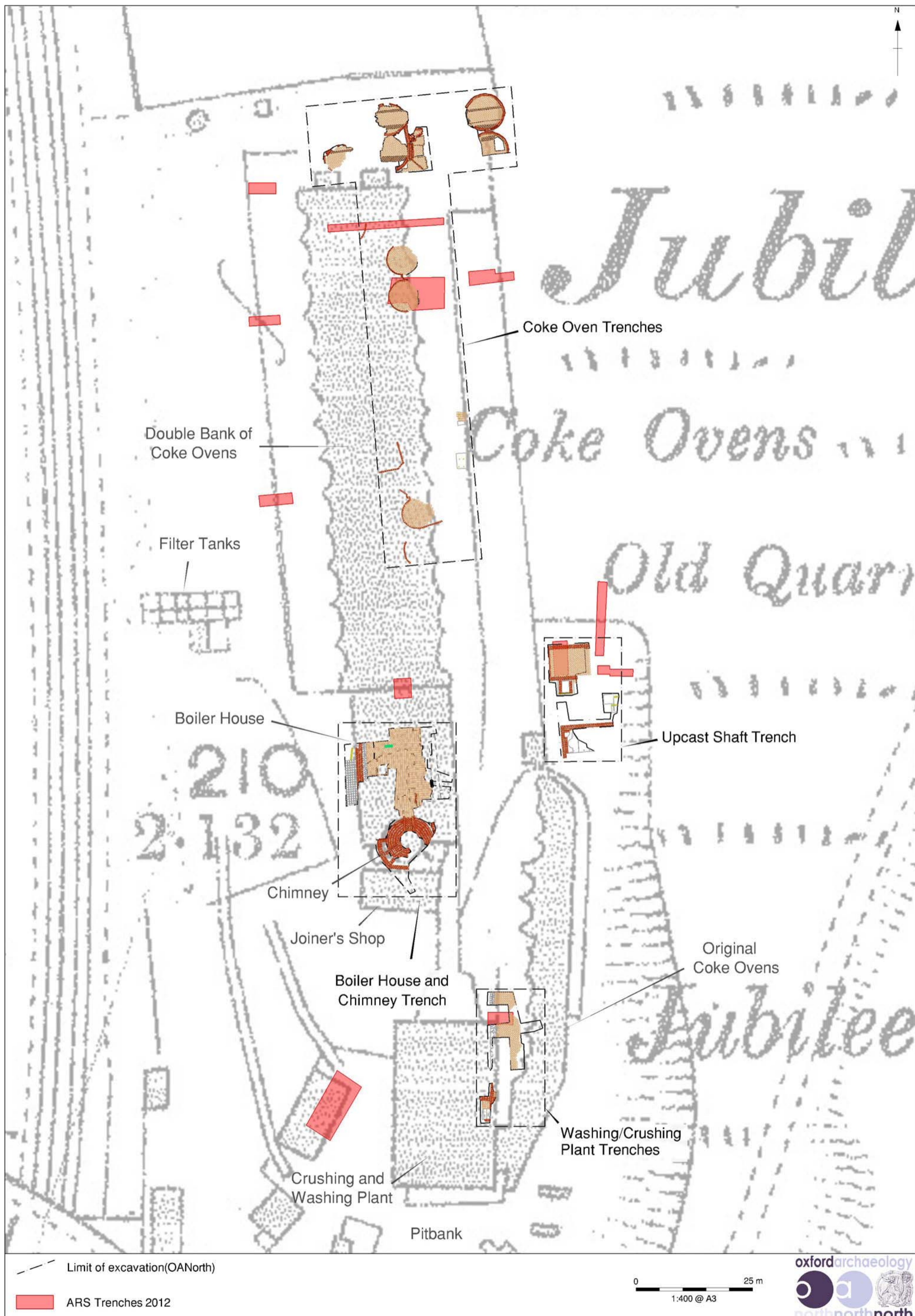


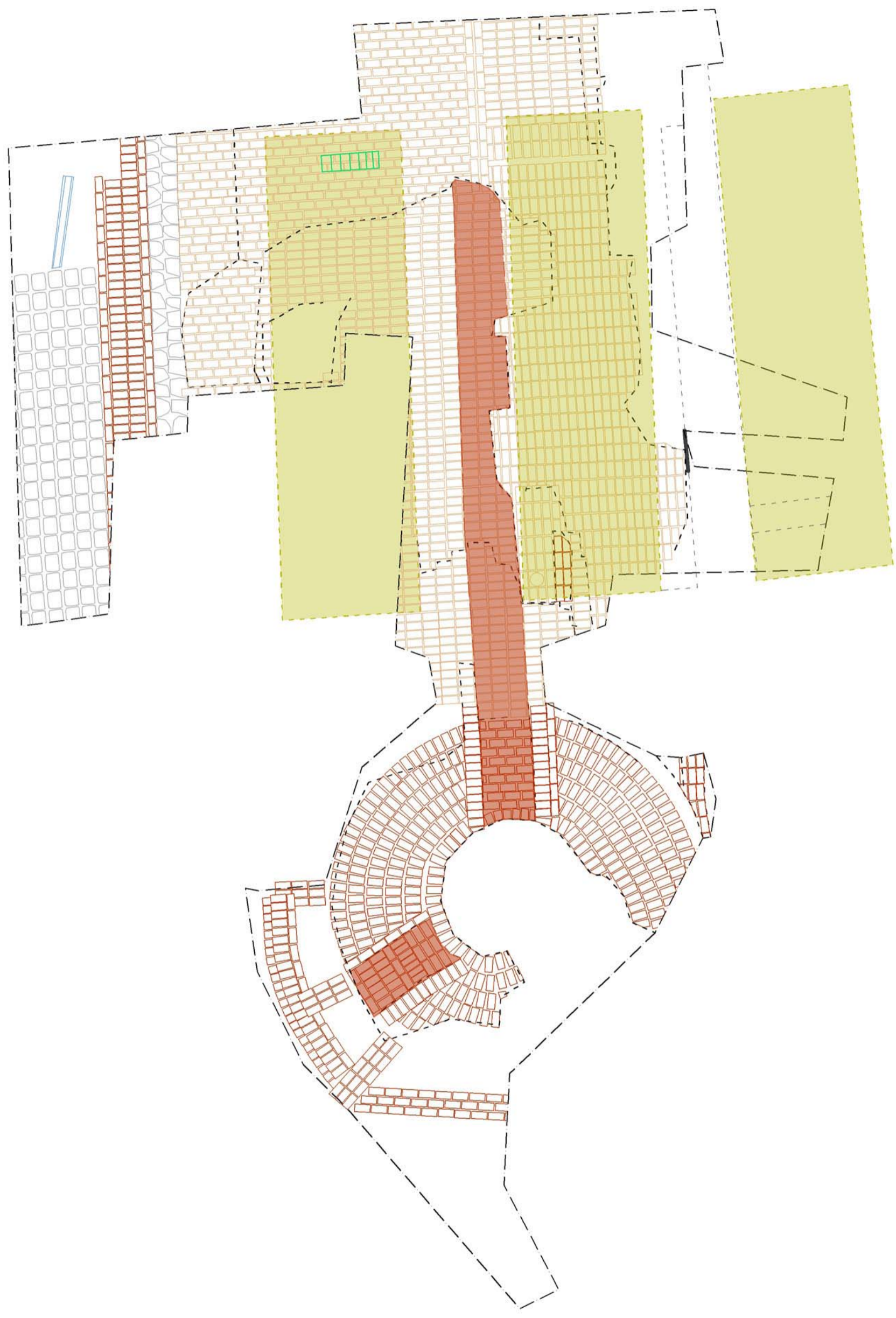
Fig 3: Excavated features superimposed on the Ordnance Survey map of 1893



Fig 4: Excavated features superimposed on the Ordnance Survey map of 1909



Fig 5: Excavated features superimposed on the Ordnance Survey map of 1930



- Limit of excavation
- Boiler Bed
- ▤ Slate Ramp
- Flue

0 1.5m
1:60 @ A3



Fig 6: Plan of the Boiler House and Chimney

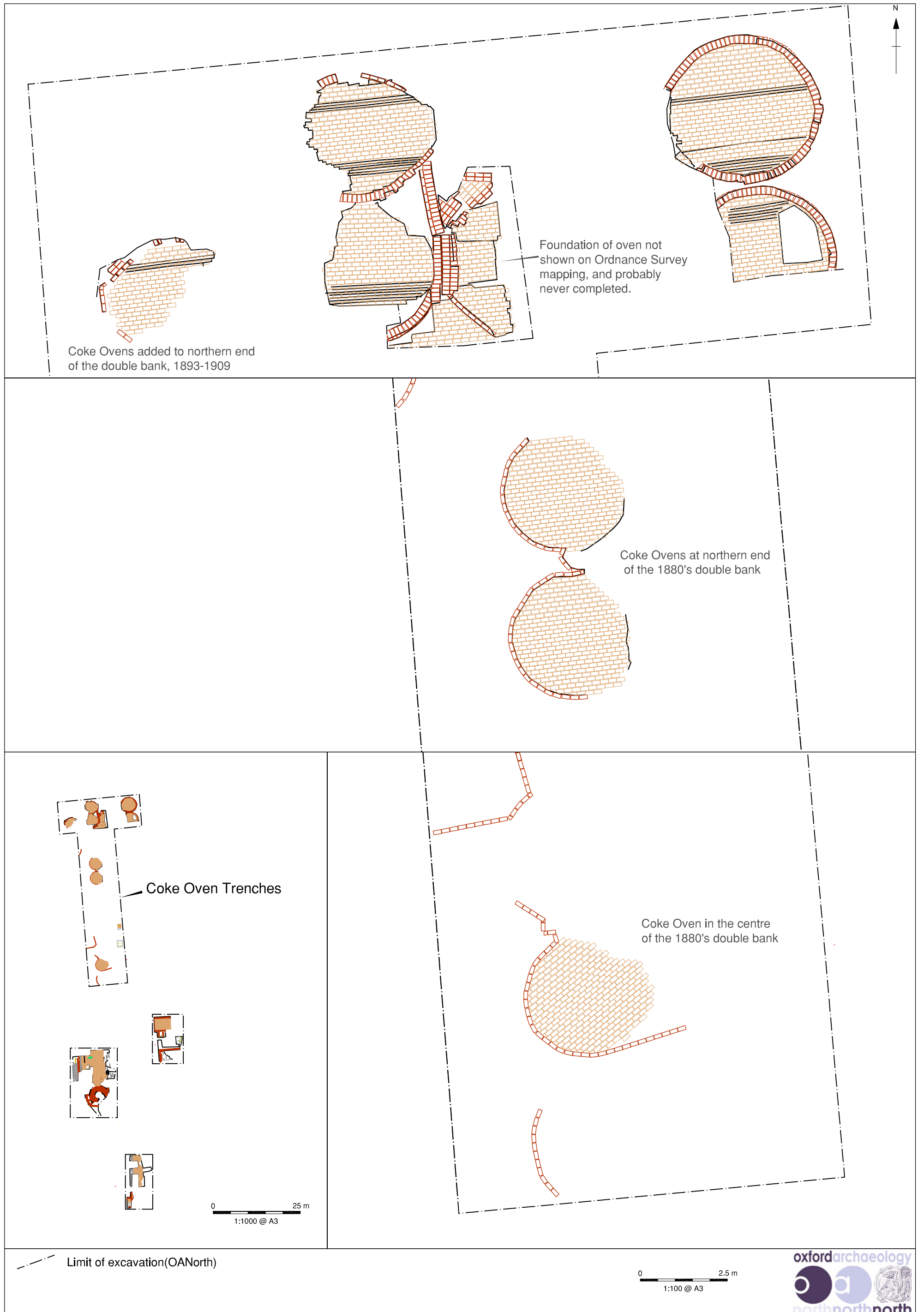


Fig 7: Excavation detail of the coke ovens