



HOLE HOUSE MILL, KENYON STREET, BLACKBURN, LANCASHIRE

**Archaeological Building
Investigation**



Oxford Archaeology North

March 2015

Capita

Planning Application: 10/14/1138

Issue No: 2014-15/1606

OA North Job No: L10823

NGR: 370145 428570

Document Title: HOLE HOUSE MILL, KENYON STREET, BLACKBURN

Document Type: Archaeological Building Investigation

Client: Capita

Planning Application: 10/14/1138

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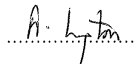
National Grid Reference: 370145 428570

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CONTENTS

SUMMARY	2
ACKNOWLEDGEMENTS.....	3
1. INTRODUCTION.....	4
1.1 Circumstances of the Project	4
1.3 Survey Methodology.....	5
1.4 Archive.....	6
2. HISTORICAL BACKGROUND	7
2.1 Development of Blackburn's Textile Industry.....	7
2.2 Development of Hole House Mill.....	8
3. RESULTS.....	14
3.1 Introduction.....	14
3.2 Spinning Block.....	14
3.3 Nineteenth-Century Power Plant	17
3.4 Twentieth-Century Power Plant.....	22
3.5 Original Weaving Shed.....	23
3.6 Second Weaving Shed	27
3.7 Third Weaving Shed	35
3.8 South-West Preparation Range	35
3.9 South Preparation Block	38
3.10 Central Warehouse.....	40
3.11 South-East Warehouse	42
3.12 North-East Range.....	48
4. DISCUSSION.....	56
4.1 Introduction.....	56
4.2 Phase 1: Mid/Late-Nineteenth Century.....	56
4.3 Phase 2: Late-Nineteenth Century	57
4.4 Phase 3: Early-Twentieth Century	57
4.5 Phase 4: 1914-1920.....	58
4.6 Phase 5: Mid-Twentieth Century	58
4.7 Conclusion	58
BIBLIOGRAPHY	60
Primary Sources	60
Secondary Sources	60
APPENDIX 1: WRITTEN SCHEME OF INVESTIGATION	62
ILLUSTRATIONS	69
List of Figures	69

SUMMARY

Blackburn with Darwen Council has granted planning permission (Application No 10/14/1138) for the demolition of Hole House Mill on Kenyon Street in the Audley area of Blackburn, Lancashire (centred at NGR 370145 428570). In order to secure archaeological interests, however, Blackburn with Darwen Council recommended that an appropriate programme of archaeological investigation of the mill was undertaken in advance of demolition. Following consultation with the Lancashire County Archaeology Service (LCAS), it was recommended that an archaeological building investigation commensurate with an English Heritage Level 2/3-type survey should be carried out.

The erection of Hole House Mill as a purpose-built cotton spinning mill commenced in 1860, although the building was not completed until the mid-1860s due to the Cotton Famine. The spinning block was completely destroyed by fire in 1879, and the site was remodelled as a weaving mill that remained in production until 1959.

The Hole House Mill complex comprises one extant weaving shed, and four preparation blocks and warehouses, with the partial remains of two engine houses and the original spinning block. Its development charts the rise of the cotton-weaving industry within the region, with the later structures being typical of the localised use of mainly single-storey structures for preparation and warehousing, not generally seen throughout the wider region.

Although the buildings chart the chronology of the development of the site, and are typical of such structures, most are heavily remodelled, and significant elements of the site have previously been lost.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank Andrew Davies of Capita for commissioning and supporting the project. Thanks are also expressed to Doug Moir, the Planning Officer (Archaeology) for Lancashire County Council for his advice and guidance, and the staff of the Lancashire Record Office for their assistance with the documentary research.

The archaeological building investigation was carried out by Chris Wild. The report was compiled by Chris Wild, and the illustrations were produced by Mark Tidmarsh. The report was edited by Ian Miller, who was also responsible for the background research and project management.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

1.1.1 Blackburn with Darwen Council has granted planning permission for the demolition of Hole House Mill on Kenyon Street in Blackburn (Application No 10/14/1138) in advance of the proposed development of the Pennine Reach Gorse Street link road scheme. The mill was established in the 1860s and originally comprised a three-storey spinning mill, although a weaving shed was added to the site in the early 1870s. Following the complete destruction of the spinning block during a fire in 1879, the site was remodelled as a weaving mill, which remained in production until 1959.

1.1.2 In order to secure archaeological interests, Blackburn with Darwen Council recommended that an appropriate programme of archaeological investigation of the mill was carried out in advance of demolition. Following consultation with the Lancashire County Archaeology Service (LCAS), it was recommended that an archaeological building investigation commensurate with an English Heritage Level 2/3-type survey should be carried out. In accordance with this recommendation, Blackburn with Darwen Council attached a condition to consent for demolition that stated:

No demolition shall take place on the site until the applicant has secured the implementation of a programme of building and recording analysis. This must be carried out in accordance with a written scheme of investigation, which shall first have been submitted to and agreed in writing by the Local Planning Authority.

REASON: To ensure and safeguard the recording and inspection of matters of archaeological/historical importance associated with the site, in accordance with Saved Policy HD18 of the Blackburn with Darwen Borough Local Plan.

1.1.3 In December 2014, Capita commissioned Oxford Archaeology North (OA North) to undertake the required scheme of archaeological building investigation. In the first instance, a Written Scheme of Investigation (*Appendix 1*) was produced, which outlined the methodology, timescale and staffing to be employed in the delivery of the project. Following the formal approval of the Written Scheme of Investigation by the Planning Officer (Archaeology) for Lancashire County Council, OA North carried out the building investigation in January 2015.

1.2 LOCATION AND GEOLOGY

1.2.1 Hole House Mill (centred at NGR 370145 428570) is situated in the Audley area of Blackburn, which lies on the north-eastern fringe of the town centre (Fig 1). It occupies land between Burnley Road and the Leeds and Liverpool Canal, with the disused Kenyon Street forming the southern boundary of the mill complex (Plate 1).



Plate 1: Recent aerial view across Hole House Mill, the canal and Imperial Mill, looking west

1.3 SURVEY METHODOLOGY

- 1.3.1 The building investigation was carried out in January 2015. It aimed to provide an understanding of the historic fabric and key architectural features of the former mill complex, and to provide an archive record of the component structures. It has provided a drawn, photographic and textual record of the buildings to English Heritage (2006) Level 2/3 standard. Records were made of all principal structural elements, both internal and external, as well as any features of historical or architectural significance. Particular attention was paid to the relationship between the earliest and latest parts of the building, especially those that would show their development and any alterations.
- 1.3.2 **Photographic Survey:** a photographic archive of the buildings was compiled, consisting of both general and detailed interior photographs, which were captured using digital formats
- 1.3.3 **Instrument Survey:** floor plans of the buildings were surveyed by means of reflectorless total-station survey to produce plans and a cross-section through the main mill buildings. The drawings were used as a basis for annotation to illustrate the phasing and development of the buildings. The final drawings are presented through an industry standard CAD package (AutoCAD 2004).
- 1.3.4 **Interpretation and Analysis:** a visual inspection of the buildings was undertaken, and a description maintained to English Heritage (2006) Level III. These records are essentially descriptive, and provide a systematic account of the origin, development and use of the mill complex.

1.4 ARCHIVE

- 1.4.1 The results of all archaeological work carried out will form the basis for a full archive to professional standards, in accordance with current English Heritage guidelines (*Management of Research Projects in the Historic Environment*, 2006). The original record archive of project will be deposited with the Lancashire County Record Office.
- 1.4.2 The Arts and Humanities Data Service (AHDS) online database *Online Access to index of Archaeological Investigations* (OASIS) will be completed as part of the archiving phase of the project.

2. HISTORICAL BACKGROUND

2.1 DEVELOPMENT OF BLACKBURN'S TEXTILE INDUSTRY

- 2.1.1 Blackburn had strong associations with the textile industry for hundreds of years prior to its industrial growth after the late eighteenth century, and had established a national reputation as a centre of fustian 'checks' by 1650. The basis for the dramatic expansion of industrial activity in Blackburn was the introduction of calico printing to the area in the last quarter of the eighteenth century. This branch of the textile industry was introduced to the area by relatives of the Peel family, and was coupled with the development of large bleaching crofts along the banks of the rivers Blakewater and Darwen.
- 2.1.2 The earliest cotton 'factories' in Blackburn were water-powered carding and jenny mills, such as Lower Darwen Mill, which was established in *c* 1774 (Rothwell 1985, 15). The first water-powered cotton-spinning mill in the town was built in *c* 1775 at Wensley Fold (Abram 1877, 230), with a second mill being established at Mill Hill in *c* 1790. Several textile-finishing works were also established in Blackburn during this period, including Derriken's Bleachworks at Brookhouse (*c* 1775), Ewood Printworks (*c* 1780), and Whitebirk Bleachworks of 1793 (Rothwell 1985, 13).
- 2.1.3 A major expansion of Blackburn's textile industry commenced in the 1820s, which coincided with the introduction of power-loom weaving. This led to the development of several large integrated spinning and weaving factories during the 1830s. The following decade brought the introduction of separate weaving concerns, which erected purpose-built weaving sheds. This bolstered Blackburn's reputation as an emerging centre of Lancashire's power-loom weaving trade.
- 2.1.4 The town's textile industry experienced a further boost in the 1850s, not least as a consequence of a growth in the national railway network. The second half of the nineteenth century, however, brought an increasing specialisation in the weaving trade, and many enterprises which had originated as spinning mills either closed in the late nineteenth century or were converted to textile weaving (Beattie 1992, 15-6).
- 2.1.5 Following a final period of growth during the early Edwardian era, the textile industry in Blackburn fell into chronic decline in the 1920s. Wholesale closures became common during the 1930s, and again in the 1950s. Of the 101 textile mills which survived in Blackburn in 1951, only four were still operational in 1991.

2.2 DEVELOPMENT OF HOLE HOUSE MILL

- 2.2.1 The origins of Hole House Mill can be traced to 1860, when William Kenyon & Brothers commenced with the erection of three-storey spinning mill on the southern bank of the Leeds and Liverpool Canal, off Burnley Road in Blackburn. The mill was intended to house 20,000 spindles, although the building was not completed until the mid-1860s due to the Cotton Famine. The mill was taken over in 1869 by John Smith, who may have been responsible for starting to build a weaving shed on the site, together with a new engine house. The updated steam-power plant comprised two coupled horizontal engines, of 35 and 27hp. However, the weaving shed remain incomplete at the time of John Smith's bankruptcy in 1870.
- 2.2.2 It seems that the mill remained in use for spinning during the 1870, albeit spasmodically, with J & JH Kenyon occupying the building for a short while until it was purchased by Thomas Abbott. Abbott also held the lease of Wharf Street Mill in Blackburn, and had also obtained a patent for 'an invention of improvements for machinery employed in the sizing of yarn' in 1871 (*Morning Post*, 18 November 1871). However, in August 1878, Thomas Abbott filed for liquidation, with estimated liabilities amounting to £24,000 (*Blackburn Standard*, 10 August 1878).
- 2.2.3 The spinning block was completely destroyed by fire in 1879, and the site was purchased eventually by the partnership of Thomas and Richard Livesey, Thomas Smith and William Forrest, who also owned Quarry Street Mill in Blackburn. Trading under the title of Livesey, Smith & Forrest, the firm completed the weaving shed that had been started by John Smith, and 440 looms were installed in 1881 to produce jacconettes, mulls and cambrics (Worrall 1891, 53).
- 2.2.4 In April 1889, the partnership between the Liveseys, Smith and Forrest was dissolved by mutual consent (*London Gazette*, 30 April 1889). Production at Hole House Mill was continued by Thomas Smith and William Forrest, trading as Smith & Forrest; Smith & Forrest are listed as cotton manufacturers at Hole House Mill in trade directories subsequently (eg Barrett 1903, 302).
- 2.2.5 The earliest detailed plans of the mill is provided by an Ordnance Survey 1:500 plan of the town of Blackburn (Plate 2), and by the first edition 25":1 mile map of 1894 (Fig 2). Both show a block of rectangular buildings, concentrated in the central and western parts of a large enclosed complex, with a detached circular chimney situated to the west, with a building to the north almost certainly representing a boiler house.

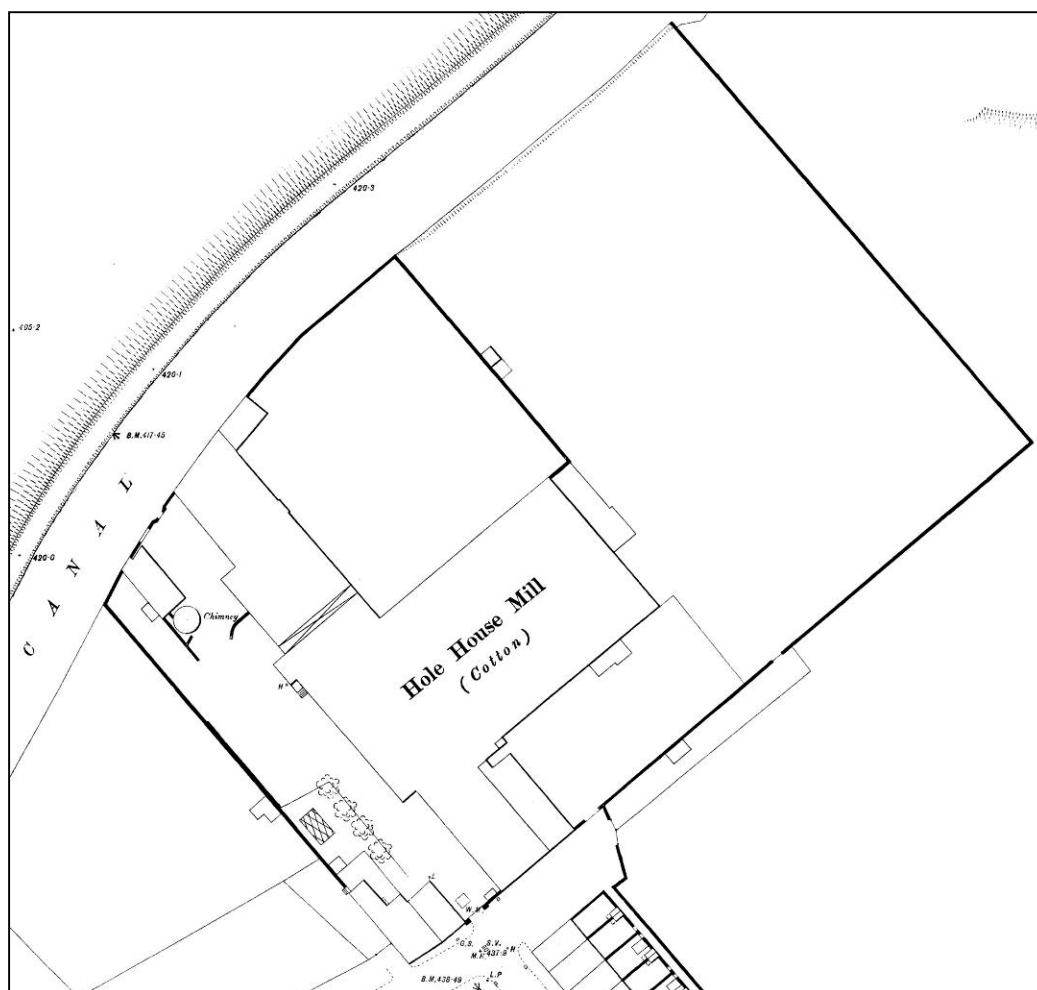


Plate 2: Extract from the Ordnance Survey 1:500 map of 1893

- 2.2.6 In February 1905, Clayton Goodfellow & Co Ltd submitted plans for an extension to the mill on behalf of Smith & Forrest (CBBN/3/3/1 Plan 8470). This extension comprised a second weaving shed, which was built on the site of the destroyed spinning block, increasing the mill's capacity to 770 looms. This was coupled with an investment in a new steam-power plant, and a horizontal cross-compound engine supplied by Clayton, Goodfellow & Co Ltd replaced the earlier engines, and a rope drive system was installed. In the same year, plans for a new watch house were submitted by EN Briggs submitted plans on behalf of Smith & Forrest (CBBN/3/3/1 Plan 8486). Briggs submitted supplied plans for further small additions to the mill complex in October 1909 (CBBN/3/3/1 Plan 9862), which were erected in the same year.
- 2.2.7 Plans for further additions, presumably another weaving shed, were submitted by Thomas Frost on behalf of Smith & Forrest in July 1914 (CBBN/3/3/2 Plan 1111). The plans were approved by the local authority, although the building was not completed until 1917, increasing the weaving capacity by 156 looms.
- 2.2.8 Thomas Frost also supplied plans for a new warehouse at Hole House Mill (CBBN/3/3/2 Plan 1325). The plans were drawn up in July 1916, and the building was erected in the same year.

2.2.9 In September 1919, W Grundy submitted plans to erect a roof over the yard at Hole House Mill on behalf of Smith & Forrest (CBBN/3/3/2 Plan 1546). The plans were approved, and the structure erected. Further additions were proposed in February 1920, again to the design of W Grundy (CBBN/3/3/2 Plan 1647), and proposing the infilling of the north-eastern part of the complex, to the north of the 1916 warehouse with a large weaving shed at the lower level, and with a warehouse on its eastern side (Plates 3 and 4). Whilst the deposited plan shows that the additions were implemented, then main element of the proposal, the weaving shed, was never built, with only the warehouse on the western side being constructed. This was followed in April 1920 with plans for additions to the warehouse, again designed by W Grundy (CBBN/3/3/2 Plan 1688). This comprised the addition of a two-storey block to the north-eastern corner of the 1916 warehouse (Plate 5), linking it to the proposed lower-level warehouse along the north-eastern boundary of the complex. The two structures were almost certainly erected simultaneously.

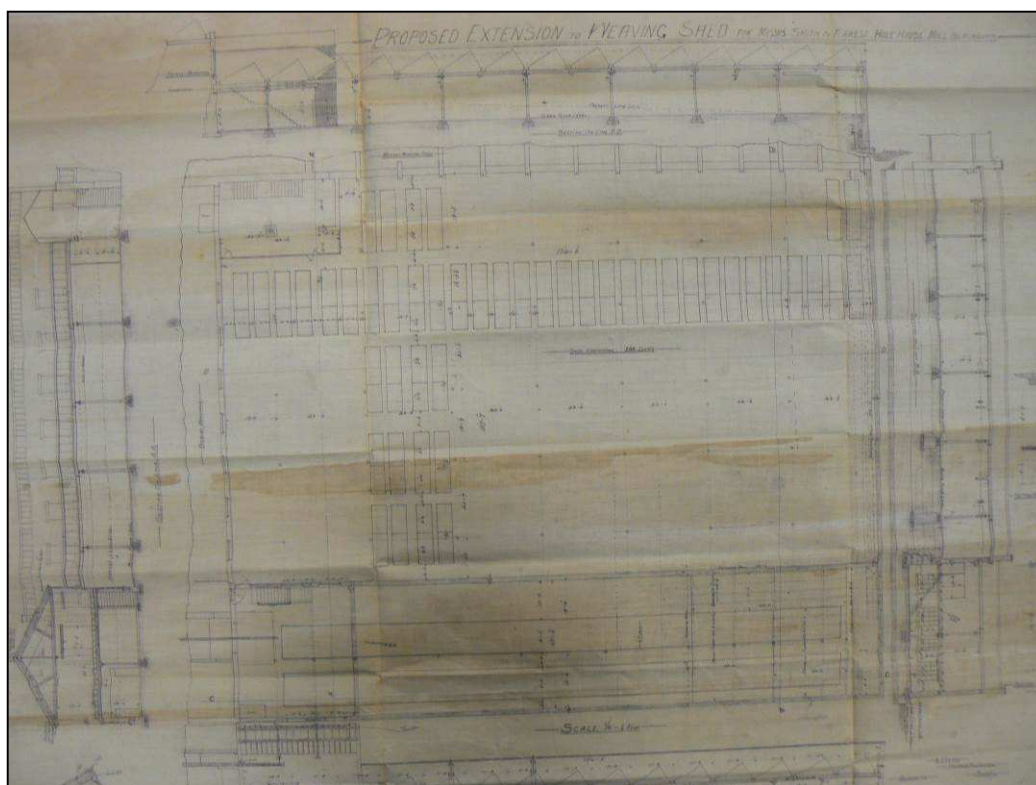


Plate 3: Architect's plan for proposed weaving shed, dated 1920

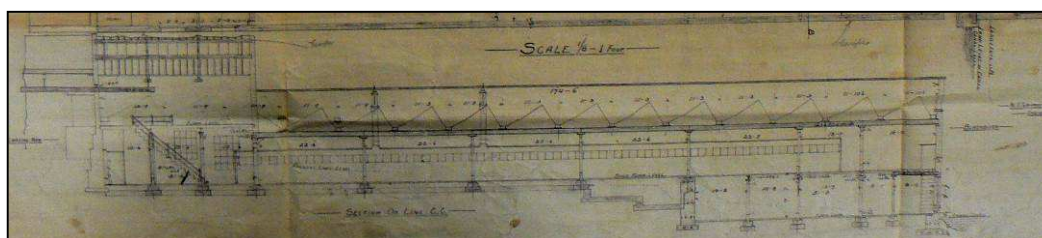


Plate 4: Architect's plan for proposed warehouse to east of weaving shed

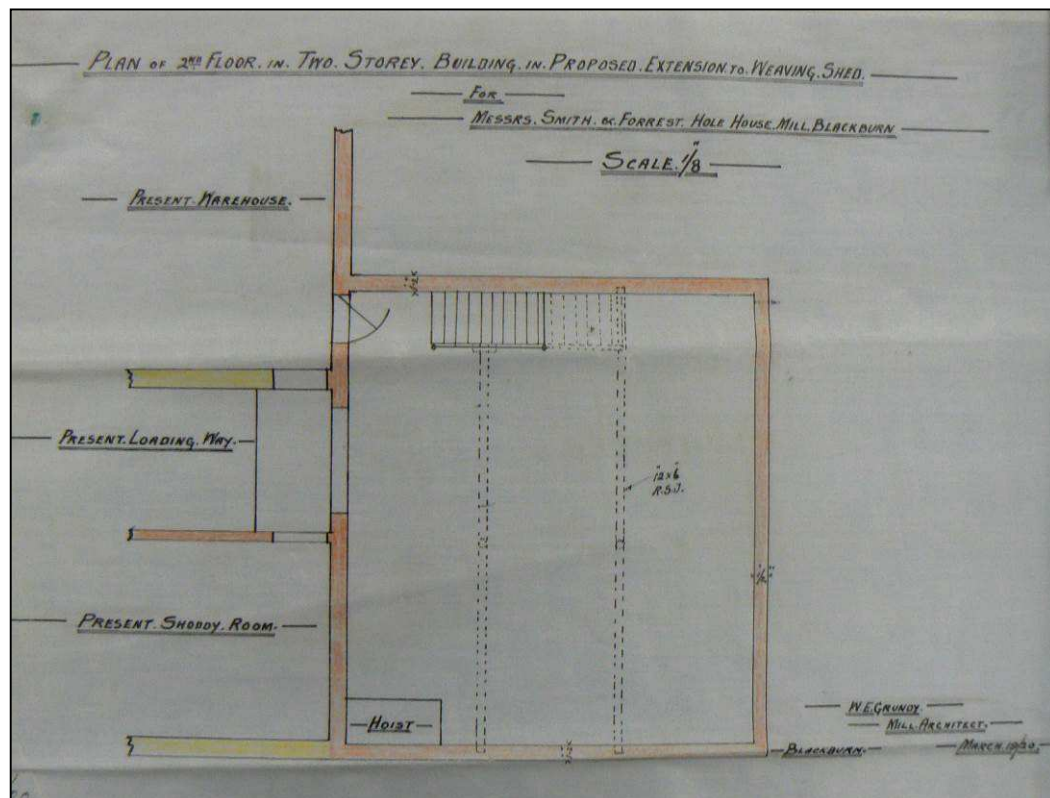


Plate 5: Architect's plan for proposed two-storey warehouse, dated 1920

- 2.2.10 The firm of Smith & Forrest Ltd of Hole House Mill in Blackburn was constituted on 1 October 1920. In 1923, the mill housed 926 looms, and produced twills, serges, cords, stripes etc (Skinner 1923, 363). Smith & Forrest Ltd joined the Lancashire Cotton Corporation 1929, and the newer part of mill was leased to Woolly Mill Co Ltd for worsted manufacture; Whitebirk Weaving Co Ltd briefly ran 575 looms at Hole House Mill until wartime closure. Smith & Forrest Ltd is not listed in Skinner's directory for 1940-41.
- 2.2.11 After the Second World War, Sir E Armitage & Co Ltd re-equipped the mill with 200 automatic looms for canvas weaving (Rothwell 1985, 41). However, the mill finally closed 1959 in connection with Cotton Industry Act (Pope 1989, 29).

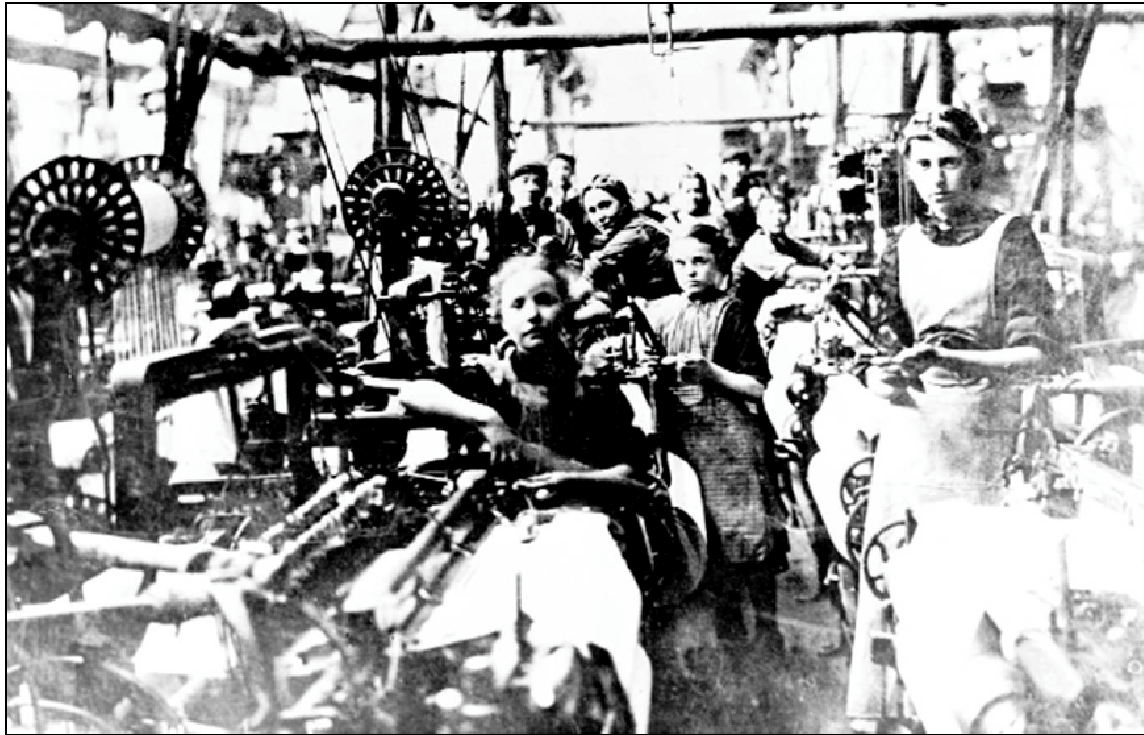


Plate 6: A view inside one of the weaving sheds at Hole House Mill in c 1910



Plate 7: Aerial view taken in 1932, showing the eastern part of Hole House Mill



Plate 8: Aerial view across Hole House in 1949, showing Hole House Mill behind Imperial Mill

3. RESULTS

3.1 INTRODUCTION

- 3.1.1 The Hole House Mill complex forms the remains of a multi-phase Late-Victorian and Edwardian steam-powered weaving mill. The mill was initially erected as a spinning mill, and although this burnt down relatively early within the history of the site, elements of fabric from the spinning block survive.
- 3.1.2 The complex comprises three extant single-storey sheds with northern-light roofs, with a larger weaving shed occupying the position of the original spinning block having been demolished, leaving only its external walls. External walls also survive for elements of two engine houses in the western part of the site, with a single-storey warehouse to its south, also without roof, and a later, square single-storey preparation block in the south-west corner, reduced from two stories. A further small two-storey warehouse survives along the western edge of the complex (Fig 5). Post-weaving additions include a loading bay in the north-east corner of the site, and a large steel-framed engineering shed placed on the southern side of Kenyon Street between 1956 and 1971 (Fig 1).
- 3.1.3 The mill was sub-divided prior the WWII, with the north-eastern part of the complex becoming a woollen and worsted mill, before being refurbished as a sheet metal fabrication plant prior to 1956. The entire complex has more recently been subdivided into small industrial units, and the numbering of these units has been adopted within the text (Fig 4).

3.2 SPINNING BLOCK

- 3.2.1 The earliest extant fabric identified within the Hole House Mill complex relates to the original spinning block, erected from 1860, and placed in the position of the structures presently occupied by Units 5-7 (Fig 5). It was destroyed by a catastrophic fire in 1879, with the remains of the structure subsequently incorporated into a weaving shed, with alterations in machine-made brick.
- 3.2.2 The main visible remains of this structure survive in its remodelled western wall, which became an internal partition within the complex subsequently, following the addition of a preparation block/warehouse (Fig 5). The wall is externally of built-to-course local sandstone rubble, surviving to a height of approximately 1½ storeys, and with a central pilaster projecting 4" from the façade (Plate 9). It has a grey sandstone string perforated by two probable beam sockets, brick-blocked subsequently, and with the lower approximately 3' (0.91m) of the elevation having been cut back to the face of the adjacent wall and re-faced in brick (Plate 9). The feature is of unclear purpose, although was probably decorative, as a similar projection survives in an approximately central position on the west external face of the original weaving shed (Section 3.4.1).



Plate 9: Projecting pilaster in centre of west external façade of original spinning block

- 3.2.3 Either side of the pilaster, the remains of seven tall ground floor windows survive, but were stone blocked during the addition to the west (Plates 9 and 10), and have flush dressed grey sandstone lintels and sills. Immediately below the head of the extant wall, five sandstone sills of first-floor windows project through the render, with a further window to the south, and two to the north almost certainly concealed beneath it (Plate 10).



Plate 10: West external façade of spinning block with blocked tall ground-floor windows and sills for first-floor apertures

- 3.2.4 The spinning block was terraced into the hillslope with a stone-built part-basement surviving in the extant north wall (Plate 11), and with blocked apertures into the basement in the two bays at either end (Plates 11 and 12). However, Projecting rusticated quoins between the two eastern doorways probably represent the return of the original spinning block, with the additional half bay representing a narrow attached structure, presumably of later date, and shown on the Ordnance Survey plans of 1893 and 1894 (Fig 2; Plate 12). This

suggests that the original spinning block was of four bays and almost 100' (30.48m) width, and of probably seven bays and approximately 125' (38.1m) length (Fig 5).



Plate 11: External stone north face of spinning block, with red brick of later weaving shed above



Plate 12: Quoined return of spinning block, with wall scar for first weaving shed to left

3.3 NINETEENTH-CENTURY POWER PLANT

- 3.3.1 No evidence survives for the original power plant for the spinning block, which appears to have been of insufficient power for its intended purpose, being replaced in 1869 shortly after manufacture finally commenced (*Section 2.2.1*). The replacement power plant was cited at the north-western corner of the spinning block, adjacent to the weaving shed, which appears to have been under construction by this time, but which was not completed until considerably later (*Section 2.2.3*). The new structure measured approximately 50 x 20', and housed two coupled horizontal engines, of 35 and 27hp. A concrete platform marks the footprint of the structure (Fig 5; Plates 13 and 14), which was only recently demolished, being shown extant on satellite imagery in 2011 (Plate 1). The southern and eastern walls however, form part of extant structures, and retain important details.



Plate 13: Concrete base denoting position of 1869 engine house with weaving shed wall to left



Plate 14: Raised concrete base of 1869 engine house and extant reduced south wall

- 3.3.2 The southern wall retains quoins for its western return, clearly visible on the southern face (Plate 15), and with significant rebuilding in brick on the inner face (Plate 14). Two doorways to the east have both been blocked, with surrounding brickwork suggesting that both were inserted following the addition of Unit 4 to the south (Fig 5; Plate 14). A row of blocked sockets above lintel height (Plate 14) represent ceiling beam sockets, presumably to a floor at deck level of the twin engines. Four large rectangular tie plates (Plate 14) form the rear of corbels for a valley gutter placed on the opposite side of the wall during the construction of Unit 4 (Plate 15), with the wall above having been reduced in height following the removal of the engine, and probably during the demolition of the western and northern walls.



Plate 15: Quoined return of 1869 engine house with doorway in later Unit 4 extension

- 3.3.3 The east wall of the engine house also retains significant detail relating to the engines and power transfer (Plate 16). An oversailing string course of sandstone block, approximately 5' above floor level forms the base of an area of roughly dressed sandstone blocks (Plate 16), below two courses of larger dressed blocks in the centre of the top of the extant wall (Plates 16 and 17). The central block has a cut-out on its internal, western, face, with grease and oil staining within the rebate and in the wall below (Plate 16). Power appears to have been translated from the northern side of the wall at this height into the weaving shed to the south through a bearing box immediately to the east, which although removed, retains the majority of its dressed sandstone surround (Plate 17).



Plate 16: East wall of 1869 engine house with dressed sandstone blockwork



Plate 17: Upper east external elevation of 1869 engine house with bearing box position into weaving shed to left

3.3.4 The location of the original boiler house is not certain, but it is unlikely that the chimney was rebuilt during the remodelling of the power plant. It is therefore highly likely that the boilers were also retained. The Ordnance Survey 1:500 plan of 1893 shows a rectangular structure on the northern side of the chimney, adjacent to the canal (Plate 2), with this almost certainly representing the boiler house. Slabs of concrete flooring within the present yard denote the probable

position of the chimney (Plate 18), which is depicted clearly on the Ordnance Survey mapping (Figs 2-4). The boiler house originally lay to the north of the chimney, against the canal, and is clearly depicted on the Ordnance Survey plan of 1894 (Fig 2). The lower part of its northern elevation survives as the retaining wall to the canal (Plate 19) and is of sandstone rubble construction, with the boundary wall continuing to the west in a slightly darker stone (Plate 19). Its eastern return retains quoins above the single-piece sandstone jamb to a landing stage from the canal, the eastern jamb also surviving, but the aperture infilled with stone (Plate 20). This part of the complex is currently occupied by a late single-storey brick shed with lattice-framed steel roof (Plates 19 and 21).



Plate 18: Joints in concrete slab denoting possible position of chimney and flue



Plate 19: Boundary wall of north-west corner, with late brick shed above



Plate 20: Blocked loading wharf entrance in canal wall



Plate 21: Late brick shed above original power plant

3.4 TWENTIETH-CENTURY POWER PLANT

- 3.4.1 The 1869 pair of engines was replaced in 1905, with the installation of a horizontal cross compound engine by Clayton, Goodfellow & Co Ltd, within a new power plant (*Section 2.2.6*). Nothing survives of the new structure, but the Ordnance Survey 25" edition of 1911 shows an expansion of the complex at the northern end on the western side of the mill, opposite the chimney (Fig 3). Remodelling of the original west wall of the weaving shed to incorporate the new engine house and its associated rope drive does, however, survive within the extant fabric. This comprised the insertion of a 16'6" width of ashlar block sandstone, placed centrally within a 20' wide projection within the external face of the wall (Plate 13), and flush with the internal wall face, with a central 4' wide aperture in the centre, blocked with brick subsequently (Plate 22). Bolt holes on alternate courses adjacent to either side of the aperture almost certainly fixed the housing for a rope drum or pulley, placed at the eastern end of the engine house, overlapping into the weaving shed, to allow the first motion shaft to run along the western internal wall, in an extension from the shaft from the earlier engine house to the south. However, the engine itself became redundant, possibly after the cessation of weaving, with the rope drive being removed, and the northern light roof of the weaving shed replaced across what was presumably originally a small rope race to the rear of the engine house, projecting slightly above the roof of the shed.



Plate 22: Ashlar blockwork of bearing for rope drum, with bolt holes and infilled wheel pit

3.5 ORIGINAL WEAVING SHED

- 3.5.1 Although the mill was erected as a cotton-spinning mill, the growth of the weaving industry within East Lancashire in the second half of the nineteenth century led to the addition of a weaving shed to the Hole House complex, which briefly served as an integrated spinning and weaving mill, prior to the destruction of the spinning block in 1879.
- 3.5.2 The first weaving shed was erected to the north of the spinning block, and its associated power plant, bounded on its northern side by the Leeds and Liverpool Canal (Fig 5). Ground level was significantly lower in this part of the site, approximately 7'6" (2.28m) below ground-floor level in the upper extant part of the site. The shed was of slightly more random sandstone rubble construction than the original spinning block, and was of single storey height.
- 3.5.3 The earlier part of the structure had rubble sandstone walls, with a saw-toothed, multi-span northern-light roof, the scars of which survive, suggesting the structure had 12 internal bays of 11' width (Plate 23). Twelve blocked apertures in the internal face of the north wall, each with flush sandstone sill (Plate 24), probably represent line shaft end bearing sockets for seven transverse bays of 20' width (Fig 5). These also indicate that power appears to have been orientated perpendicular to the spinning block, with blocked bearing mounts with more substantial sandstone pads in the internal face of the west wall almost certainly representing corbel mounts carrying the main drive shaft along the wall of the shed from the engine house (Plates 23 and 25). A transverse drive shaft was almost certainly placed against the south internal wall, to power the individual line shafts, but the wall was rebuilt at this level, obscuring any detail of this phase of power transmission (Plate 11).



Plate 23: West internal wall of first weaving shed



Plate 24: Detail of blocked end bearing sockets in north wall



Plate 25: First floor window sills and valley gutter sockets, west wall

- 3.5.4 Thin horizontal sandstone blocks at the upper extent of the west elevation (Plate 25), appear to represent external window sills at first floor level of a structure to the west, shown on the late-nineteenth century Ordnance Survey mapping (Fig 2; Plate 2). These survive for a length of 20.5m, comprising six bays, almost certainly cut at its southern end by the insertion of an engine bed (Fig 5; Plate 23). To the south, the wall survives to a slightly lower height (Plate 23), but patches of rebuilding and fragments of blocks of similar thickness suggest a further possible three bays, with the detailed 1:500 Ordnance Survey plan showing a passage through the block, suggesting that it was of greater than single storey height at its southern end (Plate 2). Two blocked doorways at ground floor level towards the northern end of the west wall (Plate 25) are later insertions, but a brick-blocked doorway to the south of the later engine house has a similar lintel to the sills above, and may represent an original doorway into the narrow two-storey range to the west, shown on the Ordnance Survey plans of 1893 and 1894 (Fig 2; Plate 2).

- 3.5.5 On the canal-side northern elevation, the western 11.75m are raised higher than the remainder of the wall (Plate 26), corresponding to a re-entrant in the weaving shed, shown on the historic mapping (Figs 2-4) and externally can be seen to comprise a stone pier at its western end at first-floor level, with random stone to the east, clearly bonded in a different mortar (Plate 26). The inner edge of the pier has rusticated quoins and probably represented the outer jamb of a first-floor level window in tower above the weaving shed. Similar quoins at the opposite end of the wall appear to form part of the rebuild, but probably denote the width of the original structure.



Plate 26: Rebuild at top of external north wall of weaving shed

- 3.5.6 The shed was extended on its eastern side by 60', between 1914 and 1917, providing a further three bays to house an additional 156 looms (*Section 2.2.7*). This formed part of an eastward expansion of the complex, and was externally faced in random rubble sandstone, matching the earlier structures (Plate 27). The join between the two phases of the shed is barely distinguishable on the canal-side elevation, with the quoins apparently having been removed above the extant raking plinth of five roughly dressed blocks (Plate 27). The sandstone of the extension is also slightly darker and with slightly deeper mortar beds (Plate 27). Internally, the wall was of frogged, but un-stamped machine-made brick, bonded in a black sooty mortar and erected in a variable seven to ten-stretcher English Garden Wall bond (Plates 28 and 29), below a parapet of full-thickness sandstone rubble (Plate 29). The majority of the eastern wall was demolished subsequently, but elements of the channel-section external rain-water gully and associated valley gutter end-pieces and supporting corbels survive at either end of the extant wall fragments (Plate 30).



Plate 27: Joint between original and expanded weaving shed with offset raking plinth



Plate 28: North internal wall of weaving shed, with extension in brick



Plate 29: Brick internal facing of extension to weaving shed



Plate 30: Two-storey tower and external gutter of weaving shed to right

3.6 SECOND WEAVING SHED

- 3.6.1 Although the spinning block is shown on the Ordnance survey plans of 1893 and 1894, it was destroyed by fire in 1879, suggesting that the ruined and derelict building was left partially standing. It was not until 1905 that Clayton, Goodfellow & Co Ltd, erected a new structure in its place, comprising a further weaving shed for a new power plant (*Section 2.2.6*). This accommodated approximately 330 new power looms within one large open-plan weaving shed, which extended slightly beyond the eastern extent of the original spinning block, to the level of the 1881 weaving shed (Fig 5).
- 3.6.2 Unit 5 represents the partitioned western part of the weaving shed, all of which has been significantly remodelled. The northern-light, multi-span span roof comprised I-section steel beams, carried on 5½" diameter cast-iron cylindrical columns (Plate 31), below a roof with T-section cast-iron rafters to the roll-moulded timber-glazed northern-light pitch (Plates 31 and 32). The roof also retains timber-framed vents adjacent to ridge, set into the lath and plaster southern pitch (Plate 32). Several of the 12 x 6" I-section beams are stamped with 'Frodingham Iron & Steel Co Ltd' (Plate 33), with the Frodingham Iron Company not commencing the rolling of steel joists until 1890 (Armstrong 1983), demonstrating that the shed could not represent that of 1881. The style of the roof, incorporating I-section steel beams above the column rows is also typical of early-twentieth century weaving shed construction, rather than an 1870/1880s date of construction of the original shed. Although most of the columns are encased in late steel shuttering, their form remains visible, with the style also inconsistent with a mid/late-nineteenth century date, not only having projecting lugs from the ribbed head plate, clasping the steel beam above (Plate 34), but also having bolting plates on their northern face with a long slit bolt hole above a securing lug, and a T-shaped bolt hole below (Plate 34), again more typical of a twentieth century date.



Plate 31: General view of Unit 5 looking north



Plate 32: Timber vent in northern-light roof



Plate 33: Rolling stamp on I-section ceiling beam



Plate 34: Column within Unit 5, looking west

- 3.6.3 Further evidence for a rebuilding of the structure can also be seen in the north external elevation, where the stone rubble wall of the original shed is capped with engineering brick in five-stretcher English Garden Wall bond (Plate 11). The southern wall of the shed, which presently forms an internal partition to Unit 9, which appears to represent a preparation block, added between 1894 and 1911, when it is depicted on the Ordnance Survey 25" map (Fig 3), and almost certainly representing the extension of 1909. The partition between the two structures appears to date to the extension, comprising machine-made red brick, built in five-stretcher English Garden Wall bond and of 1½-brick thickness (Fig 5). Both the north and south walls retain tall cast-iron pillars against the internal face (Figs 5 and 6; Plate 35), each with a rib to carry a pillow bearing for an east/west aligned line shaft placed on the inner face of the wall (Plate 35). The north wall retains two pillars, whilst the south has only one, with an additional pair of more conventional line shaft hangers, and a large angled cast-iron bearing supporting a brick pier in the south-west corner of the room (Fig 5; Plate 36). Both the southern pillar, and the western of the two northern pillars are stamped with a number 1 on the eastern face of the rib (Plate 35).



Plate 35: Cast-iron pillar for line shaft bearing, Unit 5



Plate 36: Cut-away angled pier in south-west corner of Unit 5

- 3.6.4 Power appears to have entered the shed from an aperture in the north wall, adjacent to the west wall, where a further brick pier probably carried a bevel gear (Plate 37). The pier against the south wall may have carried an end bearing for the primary drive shaft, or possibly the footstep bearing for an upright shaft associated with the earlier three-storey spinning block. No evidence for end bearings for east/west aligned line shafts or bevel gear housings survive within the west wall, with the exception of a clinker-blocked aperture at its northern end which presumably transferred power into the later Unit 4 to the west (Plate 37). The translation of the line shafting through 90° from the original structure allowed for the looms to be arranged more efficiently within the shed, placed in longitudinal rows powered by longitudinal line shafts.



Plate 37: Angled brick pier with blocked bearing boxes, north-west corner of Unit 5

- 3.6.5 Unit 6 forms a continuation of the weaving shed, partitioned by clinker block walls, but has been more recently re-roofed and extended in height to form a steel-framed unit with a pitched roof (Plate 38). It does retain a cast-iron pillar against the south wall, bearing the stamped number 3 (Plate 39) with the stub of a further pillar surviving next to an inserted loading the door into the preparation block, Unit 9 (Fig 5).



Plate 38: General view of Unit 6, looking north



Plate 39: Cast-iron bearing support, Unit 6

- 3.6.6 Unit 7 is slightly larger than Unit 5, and formed the eastern extent of the original weaving shed. It retains two columns, similar to those within Unit 5, within the dividing wall to Unit 6 (Fig 5; Plate 40), and also two further columns encased within brick (Plate 40) forming part of a southern column row (Fig 5). Elsewhere, the columns have been replaced with I-section steel stanchions. Three cast-iron pillars against the south wall are numbered 5, 6, and 7, whilst a solitary pillar against the north wall is aligned with the central of the three column rows (Fig 5; Plate 41). Immediately to the east, the wall projects forwards into the room by 0.2m, and is of stone rubble construction beyond, with a return to the east wall which (Plate 41) is entirely of stone rubble construction. This represents the joint between the position of the original spinning block, which was rebuilt to the west in brick, and a narrow structure placed on its western side, level with the eastern extent of the first weaving shed, and probably of broadly contemporary late-nineteenth century date (Fig 2; Plate 2). The eastern ceiling beam is carried at its northern end by a sandstone corbel, with shallow convex base (Plate 41), with an adjacent, blocked rectangular aperture (Plate 41) possibly representing a bearing box.
- 3.6.7 A loading doorway has been inserted at the south end of the east wall and blocked horizontal windows and doors survive within the brick partition wall into the preparation block, with an extant door at the western end (Fig 5).



Plate 40: General view of Unit 7, looking north



Plate 41: Cast-iron pillar adjacent to butt joint in wall, with sandstone corbel to right, and possible blocked bearing box, Unit 7

3.7 THIRD WEAVING SHED

- 3.7.1 A third weaving shed, proposed in drawings submitted by W Grundy in March 1920 (Plate 3), and approved by the local authority appears never to have been erected, with only the associated warehouse on its eastern side being depicted on the Ordnance Survey 25" edition of 1931 (Fig 4) and in an aerial photograph of 1932 (Plate 7).

3.8 SOUTH-WEST PREPARATION RANGE

- 3.8.1 Preparation of cotton and storage of raw and finished goods within the spinning mill would have been undertaken within the spinning block itself, and possibly a few small ancillary structures. However, the conversion of the complex into a weaving mill in the latter part of the nineteenth century required dedicated structures for the purpose of warehousing and storage, as the weaving sheds were almost exclusively erected to house power looms. This appears to have initially been undertaken in a range to the west of the weaving shed, and subsequently expanded into structures to the south of the 1869 engine house within Unit 4, and the western part of Unit 9 (Fig 5).
- 3.8.2 **South-West Preparation Block:** the earlier of the two structures forming the south-west range is a preparation block, located at the junction of Hole House Street and Kenyon Street (Fig 1), and is shown on the first edition Ordnance Survey 25" plan of 1894 (Fig 2). It is externally rendered on its southern and western faces (Plates 42 and 43), with the southern wall having been extensively remodelled for the insertion of an electricity sub-station. The west wall has a loading door flanked by a pedestrian doorway punched through its southern part (Plate 43), but three extant windows to the north appear to occupy original apertures, with three further lintels projecting slightly through the render suggesting that the west wall comprised seven bays, each with a window.



Plate 42: Kenyon Street façade of south-west preparation block



Plate 43: Western façade of south-west preparation block

- 3.8.3 The north wall, however, was enclosed subsequently, within an addition to the preparation block and is presently exposed, revealing it to be of sandstone rubble construction, with rusticated quoins to each return (Plates 42, 43, and 44). Windows to each of the three bays in the north wall were remodelled into full-height doorways, and blocked subsequently (Plate 44), with the extant projecting sills and jambs of first floor windows above (Plate 44) demonstrating the building to have originally been of at least two-storey height. The structure has been heavily remodelled internally with brick and stud partitions forming offices below a flat concrete roof, and with a large roller-shutter loading door inserted into the west wall (Fig 5; Plate 45), and an electricity sub-station inserted into its south-western corner, with Flemish bond brick partitions (Fig 5).



Plate 44: North wall of south-west preparation block, with first-floor window apertures at wall head



Plate 45: Remodelled interior of south-west preparation block

3.8.4 **West Loading Bay:** the structure to the north, latterly comprising Unit 4 (Fig 5), represented the infilling of an area between the two-storey preparation block/warehouse to the south, and an engine house to the north. The structure extended 8'6" (2.59m) beyond the earlier structures, allowing doorways to be placed in either end wall (Fig 5). Both had monolithic sandstone surrounds, with the southern doorway using the return of the west wall as its western jamb, creating a wider doorway than that to the north, which was blocked subsequently (Plate 15). Windows in the west wall of the earlier spinning block (Unit 5) were also blocked during the addition to the west (Fig 5), with a central projecting pilaster being of unclear purpose, possibly decorative. As with the south wall, the tall windows had the sill and projecting, presumably external jamb of windows from a floor above surviving at extant wall head height (Plate 10). The sills of five windows, which were observed in all but the northern bay and the projecting pilaster, were set slightly higher than those in the south wall (Plates 10 and 44).

- 3.8.5 The infilled structure was covered with a six-span saw-toothed roof, with render scars and the northern channel-section cast-iron gutter providing the only extant remains, but with wall scars of a later roof that had two symmetrical pitched gables towards the northern end, each with three purlins to each pitch, and no ridge board (Plate 9), and still extant at the time of the aerial view of 2011 (Plate 1).

3.9 SOUTH PREPARATION BLOCK

- 3.9.1 The principal preparation block, latterly comprising Unit 9, was erected to the south of the southern weaving shed comprising Units 5-7 (Fig 5). It was separated from the rebuilt spinning block to the north by a 1½-brick thickness wall which appears contemporary with the preparation block (Plate 46), which has a similar internal brick lining to the south wall, although it is almost entirely obscured by late coverings (Plate 47). Externally, the south wall is of sandstone rubble, with a low doorway down from Kenyon Street at its eastern end, with dressed quoined surrounds and a flush sandstone lintel (Plate 48). The east wall was also of stone rubble externally, with a projecting plinth (Plate 49).



Plate 46: Northern part of Unit 9, looking west, with dividing brick wall on right and late concrete block internal partition to left



Plate 47: Southern part of preparation block, looking west



Plate 48: South external wall of Units 9 and 10, with low entrance into Unit 9



Plate 49: External plinth of preparation block, and loading door to central warehouse

- 3.9.2 Internally, the construction was similar to that of the weaving shed to the north, comprising a single storey, with six asymmetrical northern-light roofs carried on three rows of columns similar to those to the north, but with the bolting faces placed on the southern side of the column, and with the central bay being wider than the outer bays (Fig 5; Plate 45). Longitudinally, the block was also split into wider bays of 24', compared to the 19' bays of the earlier structure, giving an offset floor plan of columns (Fig 5). A row of cast-iron pillars set against the north wall were similar to, but offset from those to the north, on the opposite side of the wall but were without stamped numbers (Plate 46).

3.10 CENTRAL WAREHOUSE

- 3.10.1 Although Unit 8 is visually similar to Units 5 and 7, and of similar proportions (Plate 50), it represents a much later addition, having been erected after 1911 (Figs 3 and 4), and almost certainly representing the roofing of a yard referred to in architect's plans of 1919 (*Section 2.2.9*). It formed part of a structure that included Unit 10 to the south, and representing an extension to the eastern side of the earlier weaving shed and its preparation block addition (Fig 5), infilling the gap to a newly-constructed large warehouse to the east (Unit 3 (Fig 5)). The west wall of Unit 8 is of random stone rubble, with that in Unit 10 having an internal stone plinth forming the external base of the wall of the earlier preparation block (Plate 46). Elsewhere the walls are of machine-made brick bonded with a black sooty mortar, and built in five-stretcher English Garden Wall bond, and originally sealed with dolly blue paint, latterly replaced with a white finish (Plate 51).

- 3.10.2 The roof and column style within the structure match those of the buildings to the west, with two rows of extant columns surviving within Unit 10, complete with north-facing bolting plates, whilst those within Unit 8 have been replaced with I-section steel stanchions during the replacement of the central bay of the roof with a raised flat-roofed lattice-steel structure (Plate 50). The I-section steel beams of the original roof are clasped by steel stirrups at their junction with the north wall, with the eastern example also being carried on a curved sandstone corbel, similar to that within Unit 7.



Plate 50: General view of Unit 8, looking north



Plate 51: East wall of central warehouse with blocked double doorway

- 3.10.3 A small bearing box at ceiling level in the west wall in the southern bay represents power transfer into the later weaving shed to the east, whilst a wide double doorway on its northern side north has a dressed sandstone surround and mullion (Fig 5; Plate 51), possibly representing doorways into two privy blocks for the warehouse placed within the open yard. Although the yard was enclosed within only three years, the aperture, which was mostly placed below the higher floor level of the warehouse structure to the east, appears to have been retained for a significant period of time, having a clinker block infill, uncommon until the second half of the twentieth century, and suggesting that it was only blocked significantly after the partition of the complex into two separate concerns in the 1930s, suggesting that the privy was retained until it was replaced by a block to the north of the warehouse (*Section 3.11.2*).
- 3.10.4 The south wall within Unit 10 is externally faced with sandstone rubble (Plate 48), but the internal face forms a return of the brick-built western wall. At its western end it has a raised wide loading doorway onto Kenyon Street to the south (Fig 5; Plates 48 and 49), with a substantial sandstone threshold and sloping sill internally (Plate 49). Externally, the full height aperture has roughly dressed quoins and is brick-blocked (Plate 48).

3.11 SOUTH-EAST WAREHOUSE

- 3.11.1 Unit 3 represents the largest extant structure within the complex, and was added to the eastern side of the complex after 1911, almost certainly representing the warehouse of 1916. Externally it matches the earlier structures, with random sandstone rubble and projecting dressed quoins (Plate 52). A large loading door with flanking entrance doorway to the east of centre in the south wall (Plate 52) is inserted, with a slightly smaller door at the western end of the façade having dressed quoined jambs below a cast-iron lintel (Plate 53) representing an original entrance into the warehouse.



Plate 52: South elevation of Unit 3, with inserted loading door in foreground



Plate 53: Western loading door in Unit 3

3.11.2 Internally it differs, having white tile-glazed brick in five-stretcher Flemish Garden Wall bond (Plate 54), manufactured by Place & Sons Ltd, Darwen (Plate 55), who's brickworks was located at Hoddlesden Colliery, approximately 5 miles to the south. It also has a much greater roof height than the earlier sheds (Fig 6; Plates 54 and 56), reflecting its use as a warehouse, comprising I-section steel beams by Dorman Long, Middlesbrough, supported beneath alternate valley gutters by columns of similar style to those used elsewhere, but without bolting faces for line shafting (Plate 54). No evidence for power survives within the shed, with the exception of a blocked bearing box in the southern end of the west wall, suggesting that a single line shaft was sufficient to power machinery within the warehouse. The structure of the roof also replicates that of the earlier sheds, with several sections having been replaced with raised lattice steel frames (Plates 54 and 56).



Plate 54: White-glazed brick wall of warehouse, with column detail and ceiling beam



Plate 55: Frogged and stamped brick from warehouse



Plate 56: General view of warehouse looking south-east

3.11.3 The internal face of the western wall retains octagonal-section hoppers and downpipes, inserted into the shed following the enclosing of the yard to the west (Plate 57), the roof of which was significantly lower than that of the warehouse. A bull-nosed rebate to the low level opening, also into the yard, and almost certainly into a privy block therein (Plate 57). The east wall has a doorway with dressed sandstone surrounds at its northern end retaining a fireproof sliding door into an external loading bay (Fig 5; Plate 54), with a further door of similar style into the southern end of the loading bay being blocked with brick (Plate 54). The north wall appears to have originally housed a pair of nine-light vertical windows to each of the eastern three bays (Fig 5), with three having been converted into doorways subsequently (Plate 58). The western part of the western bay has a doorway to a straight sandstone stair (Plates 59 and 60), affording access to an open yard to the north via a narrow two-bay, two-storey tower (Plate 30), which also had an entrance into the half-basement of Unit 8 (Fig 5). This structure is probably contemporary with the weaving shed, and was certainly in place by 1920, but pre-dates a privy block added to the northern side of the adjacent two bays of the weaving shed between 1939 and 1956 (Fig 5; Plate 59), and which blocks windows in the east wall of the earlier structure. This was itself extended further to the east, to the end of the weaving shed, and comprising offices at weaving shed-level above a lower level store/workshop with a row of I-section stanchions carrying a concrete plank ceiling on BSC Steel 15" I-section beams (Plate 60).



Plate 57: Blocked doorways to yard and internal downpipe hoppers



Plate 58: Windows in north elevation of warehouse



Plate 59: Privy block inserted at west side of north wall



Plate 60: Stairs to open yard to north from warehouse, and to basement of Unit 8



Plate 61: Extension to north of warehouse

3.12 NORTH-EAST RANGE

3.12.1 The north-eastern range of buildings forms part of the final phase of construction relating to the weaving complex, incorporating four structural elements (Fig 5).

3.12.2 **Loading Bay:** the earliest of the buildings within the range is the southern structure, which comprised a 4x1 bay, two-storey sandstone rubble building with a pitched Welsh Slate Roof (Plate 62). The upper floor has a window inserted into each bay of the east wall, with external ground-floor level loading and adjacent pedestrian doors in the south elevation (Fig 5; Plate 63), the small door being inserted and the loading door having been remodelled and probably enlarged. Internal doorways at either end of the west wall at this level also afforded access into the warehouse, which was presumably a contemporary structure, with the doorways being blocked subsequently. The timber roof structure comprises king post trusses with two jointed butt-ended purlins to each pitch and a slender ridge board clasped by the jowled head of the king post (Plate 64).



Plate 62: General view of warehouse loading bay and brick office block



Plate 63: Loading bay, looking north-west



Plate 64: Trusses within loading bay

- 3.12.3 An office was partitioned with brick in the north-eastern corner of the building, but this appears to have originally represented a shoddy store, adjacent to the loading bay access to the hoist, both features being shown on a plan for a proposed extension to the north in March 1920 (Plate 5). The lower floor appears to have comprised only the hoist, recessed into the north wall (Plate 65), affording access from the lower external ground level in the northern part of the complex.



Plate 65: Hoist in north wall of loading bay

- 3.12.4 **Office Block:** This two-storey extension is of three bays and of machine-made brick construction in five-stretcher English Garden Wall bond (Plate 62). The upper floor has a similar style roof to the earlier structure to the south (Plate 62) and has been converted into offices with stud partitions, and a stair to an attic for storing administrative files, but the original layout appears to have been open plan with a stair and a hoist. The stair was depicted against the west wall (Plate 5), but a re-boarded rectangular aperture in the floor against the south wall, suggests that it was instead placed adjacent to the existing hoist (Plate 66), and that a new hoist was not built.
- 3.12.5 The ground floor is of non-fireproof construction, with a single row of columns carrying I-section steel beams by Shelton, and the timber joists of the ceiling above (Plate 67). The columns are of similar style to those in the 1916 warehouse, and are also without bolting plates (Plate 67). A small loading door in the east wall afforded external access at its northern end, with a similar doorway in the west wall affording access to a straight concrete stair to the upper 1916 warehouse.
- 3.12.6 A much larger column, placed in the centre of the north wall, supports a transverse I-section steel beam, manufactured by Erskine Grove, England, carrying the wall of the upper floor over a full-width opening into the contemporary warehouse to the north (Fig 5; Plate 68). This column is of 7" diameter, with a projecting plate on its northern side to carry the I-section central, longitudinal beam of the new warehouse (Figs 5 and 6; Plate 69). This was removed subsequently within the southern few bays of the new warehouse during the insertion of a loading bay on its eastern side and the replacement of that part of the roof with a wider, taller pitched roof of corrugated metal sheet on a steel frame (Plate 68).

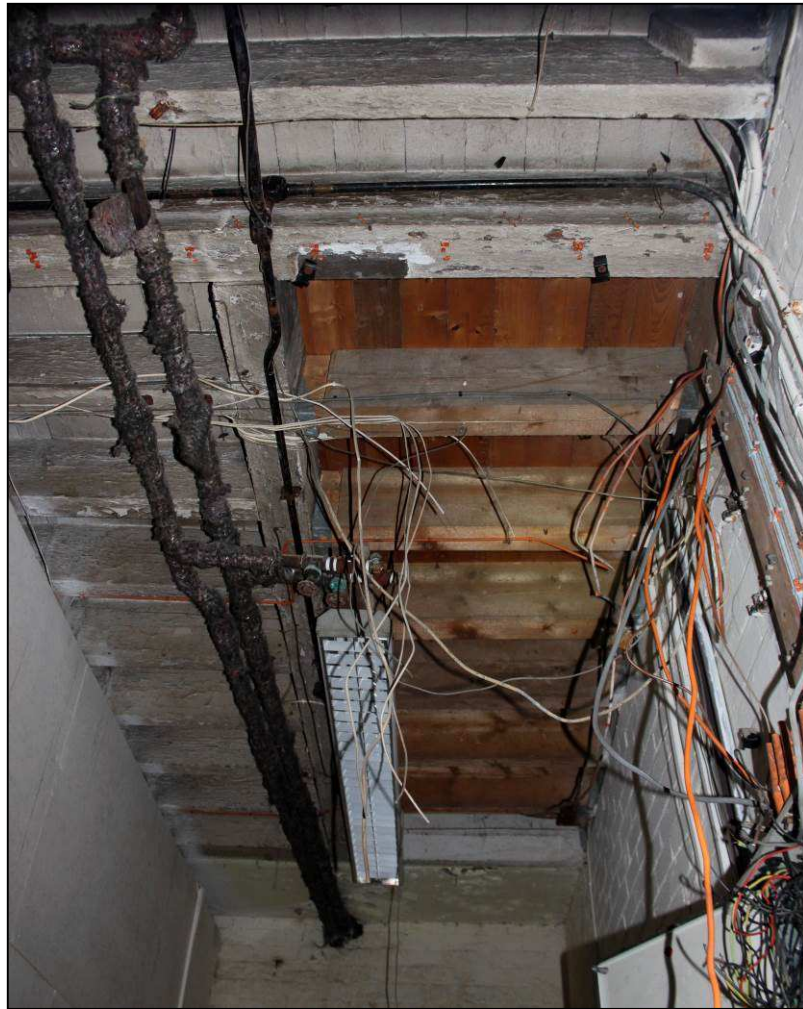


Plate 66: Infilled stairwell in office block

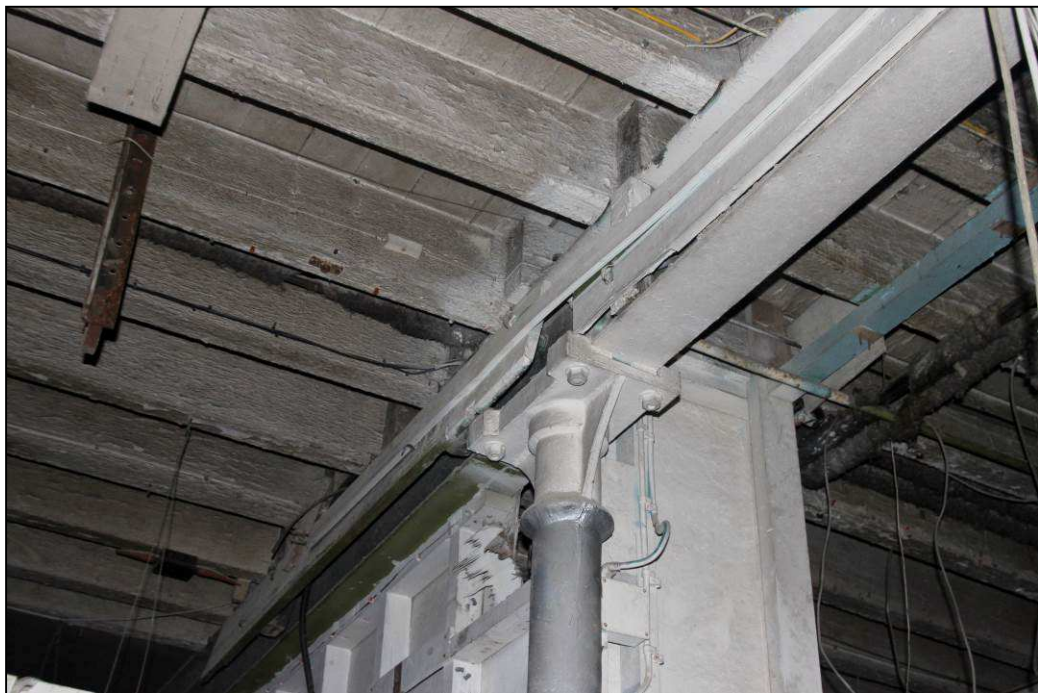


Plate 67: Column detail in lower ground floor



Plate 68: North wall of office block and replacement steel roof of north-east warehouse

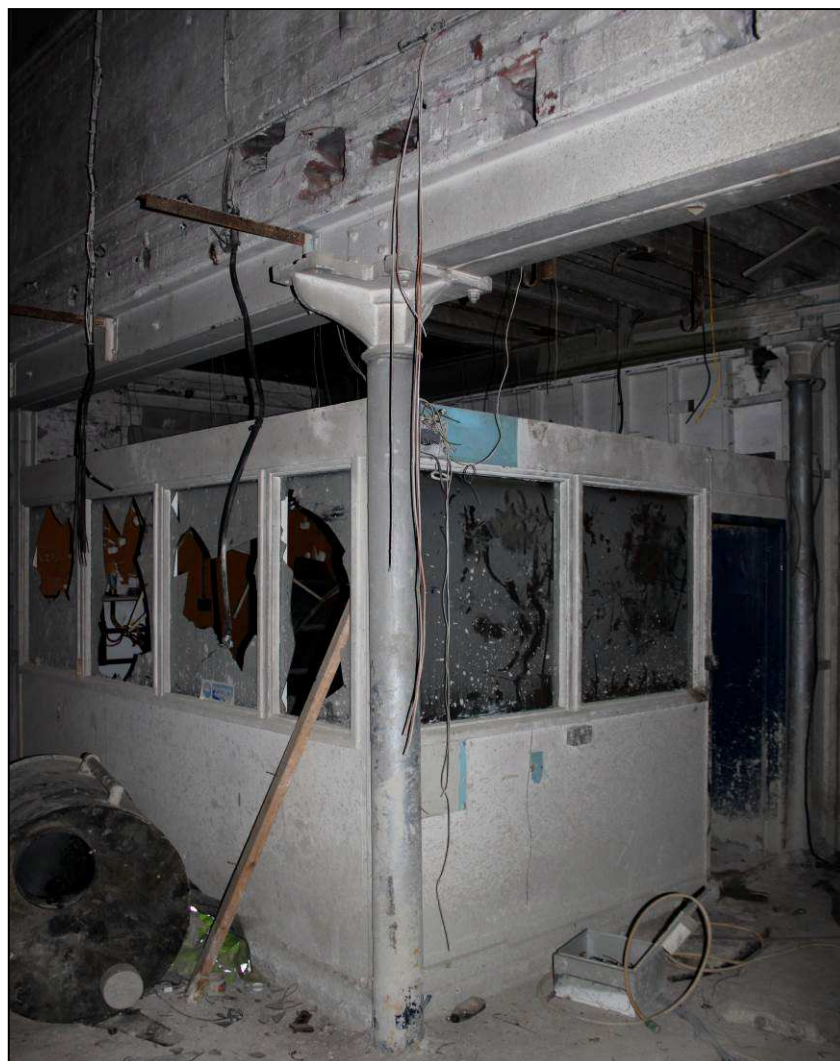


Plate 69: Column in north wall, with corbel for warehouse ceiling beam

3.12.7 **North-East Warehouse:** the northern part of the range comprised a single-storey 7x2 bay warehouse, with a narrow asymmetrical northern-light roof (Fig 6; Plate 1). It was intended to form part of the construction of a much larger weaving shed to the west, but appears to have been the only part of the architects plan, submitted by W Grundy in February 1920 (Plates 3 and 4), that was ever constructed. It was not externally faced in sandstone rubble, unlike the earlier extensions to the complex, but was instead of machine-made brick in five-stretcher English Garden Wall bond, with rusticated quoins to the returns of each elevation, and with a basal string of four courses of Staffordshire Blue engineering brick above the stone base of the canal wall (Plate 70). The channel-section valley gutters of the saw-toothed roof were carried on a row of 12x6" I-section steel beams (Plate 71), supplied by Dorman Long of Middlesbrough. The columns that supported this central longitudinal beam were not placed beneath alternating valleys (Fig 6; Plate 71), as would have represented a standard construction technique, but were instead placed on 22'6" centres from the north wall of the two-storey brick warehouse, where the inserted column at lower ground floor level had a projecting corbel to receive the end of the beam. This is clearly depicted on the original architect's drawings (Plate 4), with the northern two bays being reduced in length to accommodate this unusual arrangement (Fig 6). The cross-section of the proposed extension also shows a stair to a half-basement of five shorter bays (Plate 4), erected as a timber stair extant within a timber planked stairwell in the north-west corner of the warehouse, with an external doorway at the northern end of the east wall onto a flagstone slab landing (Plate 70).



Plate 70: View of warehouse across the Leeds and Liverpool Canal, with stone-built fuse room to left



Plate 71: Interior of warehouse with offset columns, looking south-east

3.12.8 The basement has four windows in its canal-side elevation, three housing six-light horizontal timber frames, with the penultimate eastern window, at the foot of the stair being significantly narrower, and housing a four-light frame (Plate 70). All windows have flush sandstone lintels and projecting sills (Plate 70). The concrete basement ceiling is carried on a single row of columns (Plate 72), similar in style to those above, but with cruciform-shaped head-plates to carry a ribbed crush box around the I-section ceiling beam to attach to the baseplate of the column above (Plate 73). A transverse 1½-brick thickness partition wall placed 30' from the north wall is probably inserted, being placed almost adjacent to a supporting column (Plate 73).

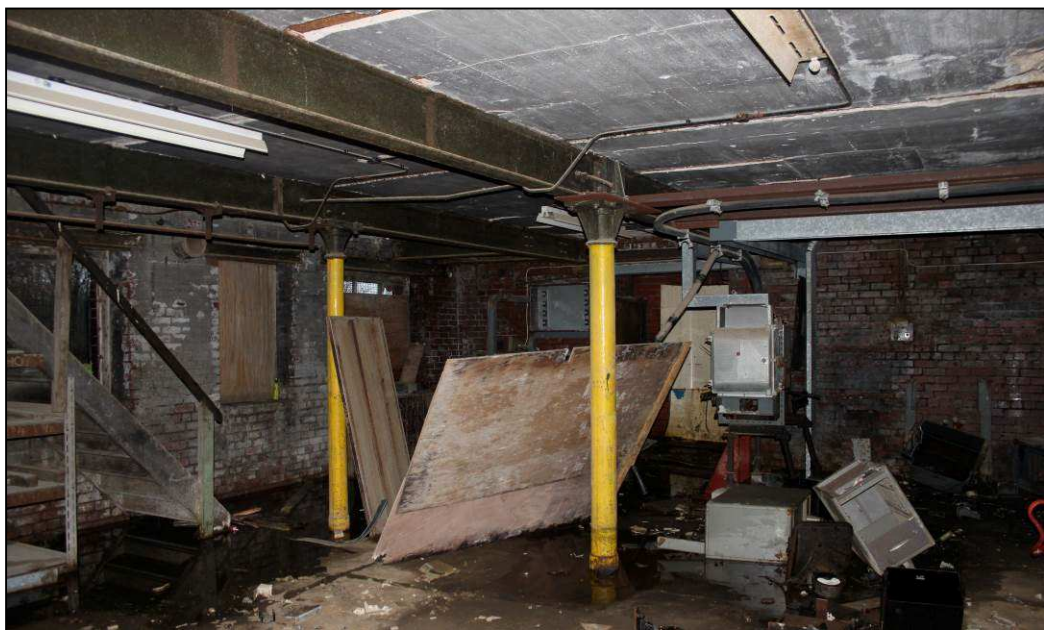


Plate 72: Basement within warehouse, looking north-east



Plate 73: Detail of column capital and crush box in basement

- 3.12.9 A small rectangular stone rubble-built single-storey shed at the north-eastern corner of the warehouse (Fig 5; Plate 70) represents a fuse room for the new warehouse, suggesting that the processes within the building were powered by electrical motors, which would have been available by this date, and given the distance of the structure from the engine house on the opposite side of the complex.

4. DISCUSSION

4.1 INTRODUCTION

- 4.1.1 Hole House Mill represents a good example of a late Victorian cotton-weaving complex that expanded rapidly in the early twentieth century. The mill was erected as a spinning mill, but was converted to a weaving shed following a catastrophic fire.
- 4.1.2 Five broad phases of construction were identified, with the original T-shaped complex expanding to the east into open ground along the southern side of the Leeds and Liverpool Canal.

4.2 PHASE 1: MID-/LATE NINETEENTH CENTURY

- 4.2.1 The original spinning mill was placed on the eastern fringes of the town of Blackburn, between the main road between Blackburn and Padiham and the Leeds and Liverpool Canal, both of which would have provided useful transport links. The wide rectangular spinning block was placed perpendicular to the canal, occupying the higher ground level, and had a width of almost 100'. This was typical of cotton mills of the second half of the nineteenth century, that were erected to house large mules of between 800-1200 spindles (Williams with Farnie, 1982, 92). This represented a significant departure from the earliest generation of cotton mills that were of typically only 25' wide, and spanned by a single timber beam. The increased width of the later mills presented problems for roofing, being too wide for a standard pitched roof. Flat roofs above fireproof brick-vaulted ceilings were a popular solution in larger centres like Manchester, or double or triple span pitched roofs, typical of the mid-nineteenth century mills of Rossendale (OA North 2012; OA North 2014). A third option was the use of multiple-span, often asymmetrical roofs, typically seen above single-storey weaving sheds, and a design that was rapidly evolving at this time. Given the use of this type of roof within all the extant structures of the Hole House Mill complex, it is likely that this was the style of roof used within the spinning block, and may explain its orientation on an approximately east/ west alignment, allowing fewer roof spans to be required. Slight architectural embellishment appears to have been provided in the form of projecting panels within the external façade, but only that in the west wall survives, possibly representing the only example, facing an entrance yard to the west.
- 4.2.2 The power plant was detached from the mill, again an increasingly popular feature of mid- and late nineteenth-century mills, and with the steam generating plant and chimney placed unusually further from the engine. This was almost certainly undertaken to allow for more efficient delivery of coal from the canal, and the easier use of water from the canal within the steam plant, a common process from which the canal company generated significant revenue.

- 4.2.3 A preparation block in south-west corner of the site originally had at least one additional storey, and probably served as a gatehouse to the complex from the newly-constructed Hole House Street.

4.3 PHASE 2: LATE-NINETEENTH CENTURY

- 4.3.1 Following a very stuttering early start to production through the 1860s and 70s, and an apparently failed attempt to add a weaving shed to create an integrated cotton spinning and weaving complex, the spinning block was destroyed by fire. This appears to have acted as a catalyst for the conversion of the complex into a weaving mill, with the original weaving shed being completed in 1881. This was placed at the lower ground level on the northern side of the spinning block, infilling the space to the canal, although it appears to have had no communication for loading with the canal. The weaving shed also had a projecting panel on its western face, possibly a relic from the original attempt to construct a weaving shed, and matching that on the western face of the spinning block. A Probable two-storey structure on its western side almost certainly served as a warehouse, utilising a loading wharf to the canal placed adjacent to the boiler house, and appears to have overlain the entire western façade.
- 4.3.2 The shed was powered by north/south aligned line shafts, driven by the original engine, and powering 440 transversely arranged power looms. A further warehouse/preparation block was added to the western side of the apparently ruinous spinning block, infilling the western façade from the engine house to the site entrance.

4.4 PHASE 3: EARLY-TWENTIETH CENTURY

- 4.4.1 The opening years of the twentieth century saw three significant alterations to the Hole House Mill complex. The first of these involved the rebuilding of the spinning block as a single storey weaving shed. The Ordnance Survey mapping of the previous decade showed the spinning block (Fig 2; Plate), suggesting that the ruined structure had not been levelled, and the 1905 erection of the weaving shed utilised significant elements of the earlier structure. The construction of the roof was of fairly typical construction of the period, comprising I-section steel ceiling beams spanning two transverse bays, allowing less columns to be used. The cast-iron pillars used to carry shafting along the outer walls of the shed are of an unusual type, and appear to reflect a desire to have the shaft self-supported, presumably not wishing to put strain onto the rebuilt wall of stone and brick. The looms were arranged perpendicular to those of the earlier shed, allowing fewer longitudinal line shafts to be driven directly from a drive shaft entering the shed from the north-west corner.
- 4.4.2 The new shed was accompanied by the erection of a new engine house, with the increase of looms from 440 to 770 requiring a significant increase in power demand. This appears to have been placed on the western side of the earlier shed, and incorporated a rope drive, further increasing its efficiency.

- 4.4.3 Following the completion of the shed, it appears to have quickly become necessary to increase or relocate the preparation facilities. This was solved by infilling the space to the south of the second weaving shed, on the north side of an extension to Kenyon Street, which provided direct access for materials from the higher road deck level, although pedestrian access was restricted to the main site entrance at this time. This provides a good visual reminder of the importance placed on the control of the movements of the workforce, even in the post-Victorian period, with particular emphasis being placed onto primary access into and from the site.

4.5 PHASE 4: 1914-20

- 4.5.1 The period of the First World War and its immediate aftermath represents a short phase of almost continuous expansion within the complex, almost doubling its size to the east. The first planned enlargement was a relatively small extension to the original weaving shed, adding only around 150 extra looms, and it may have been the relatively small-scale nature of the work that saw it delayed for the addition of a very large warehouse in the south-eastern corner of the site. Its construction was similar to the earlier sheds, and access was again restricted to vehicles. Its position, away from the canal demonstrates the increasing importance of road transport through the early part of the twentieth century.
- 4.5.2 The 1914 expansion to the weaving shed was finished in the following year, creating a large storage yard on its southern side, between the new warehouse and the earlier weaving and preparation sheds. Given the climate of the east Lancashire Pennines, adding a roof over this yard, which is shown as gated as early as 1893, would have offered a very cost-effective increase in dry warehousing space, and this was undertaken in 1919.
- 4.5.3 A final planned expansion was intended to complete the rectangular block in the northern part of the site, infilling between the new 1916 warehouse and the canal, with plans being produced and accepted in early 1920. However, the post WWI rapid decline in the textile industry in the region may have led to the postponement of the weaving shed phase of the project, which appears to have been designed to house in excess of 300 further looms. However, it appears that the proposal was not entirely abandoned at this stage, as the warehouse and preparation area to the east was erected in its intended position, rather than to the rear of the 1916 warehouse.

4.6 PHASE 5: MID-TWENTIETH CENTURY

- 4.6.1 The complex was divided into two separate concerns prior to 1939, when it is depicted as Hole House Mill and Woolly Mill, apparently divided along the western boundary of the 1916 warehouse. This appears to have instigated the relocation of the privy block associated with the warehouse from within the yard to the west into a new extension on the northern side of the warehouse. This was subsequently extended further to provide offices and workshops.

- 4.6.2 Late alterations include the insertion of partitions throughout, latterly in concrete block, and the replacement of roof sections, initially as raised sections in L-section lattice steel construction, but subsequently as entire steel-framed pitched roofs to Units 6 and part of Unit 2. This was expanded on its western side to add a loading bay for larger wagons.

4.7 CONCLUSION

- 4.7.1 The Hole House Mill complex represents a good example of the evolution of the textile industry on the margins of the industrial towns of Lancashire, and as such, forms a notable landmark. The individual structures, however, are all heavily remodelled, and do not offer simple visual representation of this important period of local history, with many key elements of the site having been removed. It is therefore suggested that the present project has provided a suitable record of the complex prior to its demolition.
- 4.7.2 One important element of the site has not been fully explored during the current phase of archaeological work. This concerns the original steam-raising plant that lay in the north-west corner of the site, and whilst the position of the chimney can be inferred from joints within concrete flooring, nothing is known about any of the phases of steam generation. This includes the type, or number of boilers required, and their probable placement adjacent to the canal, and how coal was loaded from the probable wharf has not been established. The majority of this part of the site lies beneath or within close proximity to a late brick shed, which is being retained within the present proposal. However, any future development proposals for the site should perhaps consider the potential for buried archaeological remains of interest in the north-west corner of the site.

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APPENDIX 1: WRITTEN SCHEME OF INVESTIGATION

December 2014

**Oxford
Archaeology
North**

**HOLE HOUSE MILL,
HOLE HOUSE STREET,
BLACKBURN,
LANCASHIRE**



Recent aerial view of Hole House Mill

ARCHAEOLOGICAL BUILDING INVESTIGATION WRITTEN SCHEME OF INVESTIGATION

Proposals

The following Written Scheme of Investigation is offered in response to a request from Andrew Davies of Capita, for an archaeological building investigation in advance of the proposed redevelopment of the site of the Hole House Mill in Blackburn.

1. INTRODUCTION

1.1 Project Background

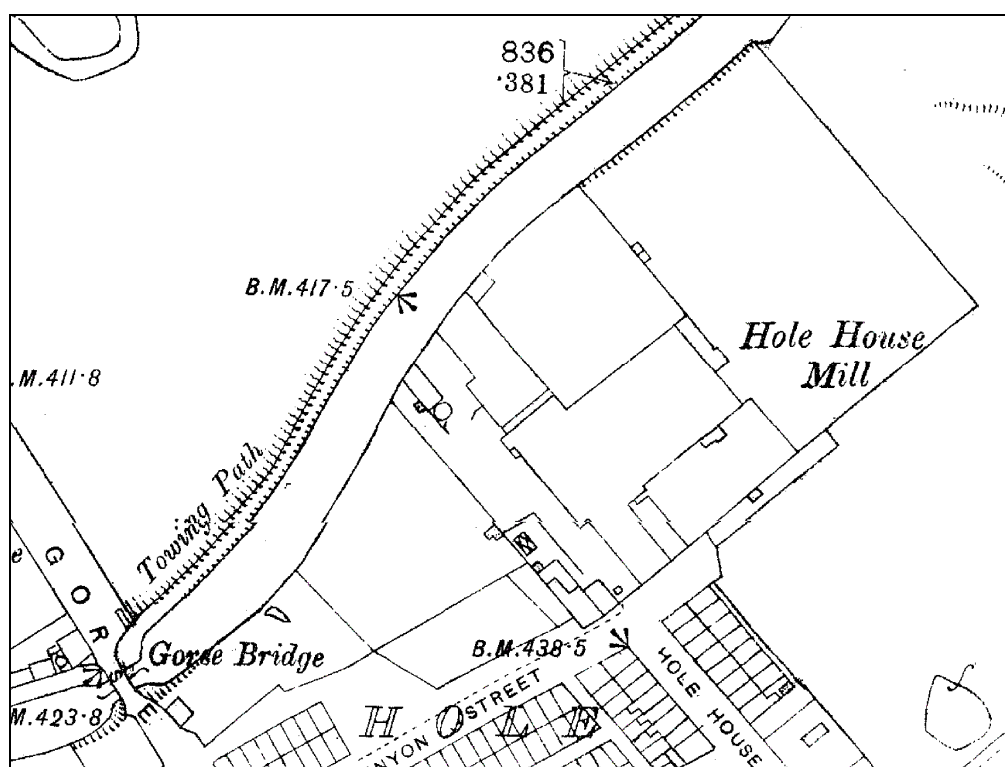
- 1.1.1 Blackburn with Darwen Borough Council has granted planning permission for the redevelopment of Hole House Mill on Hole House Street in Blackburn, Lancashire (centred at NGR 370139 428596). The planning permission allows for the complete demolition of a late nineteenth-century weaving mill, as part of the Furthergate Bus Lane and Gorse Street to Whitebirk Improvement project.
- 1.1.2 The mill was commenced in 1860 as a purpose-built spinning mill, later expanded to a weaving complex, and has been assessed during the current Lancashire Textile Mills Survey as being potentially of ‘medium significance’ (OA North 2010). In order to secure archaeological interests, Blackburn with Darwen Council has recommended that an appropriate programme of archaeological investigation of the mill is carried out in advance of demolition. Following consultation with the Lancashire County Archaeology Service (LCAS), it was recommended that an archaeological building investigation commensurate with an English Heritage Level 2/3-type survey should be carried out. In accordance with this recommendation, Blackburn with Darwen Council attached a condition to planning consent that stated:

No demolition works shall start until the developer has secured the implementation of a programme of archaeological recording, in accordance with a written scheme of investigation which has been submitted to and approved in writing by the local planning authority. A copy of the archaeological record shall be lodged with the local planning authority within two months of its completion.

1.2 Hole House Mill

- 1.2.1 The origins of Hole House Mill can be traced to 1860, when William Kenyon & Brothers commenced with the erection of three-storey spinning mill on the southern bank of the Leeds and Liverpool Canal, off Burnley Road in Blackburn. The mill was intended to house 20,000 spindles, although the building was not completed until the mid-1860s due to the Cotton Famine. The mill was taken over in 1869 by John Smith, who may have been responsible for starting to build a weaving shed on the site, together with a new engine house. The updated steam-power plant comprised two coupled horizontal engines, of 35 and 27hp. However, the weaving shed remain incomplete at the time of John Smith’s bankruptcy in 1870.
- 1.2.2 It seems that the mill remained in use for spinning during the 1870, albeit spasmodically, with J & JH Kenyon occupying the building for a short while until it was purchased by Thomas Abbott. Abbott also held the lease of Wharf Street Mill in Blackburn, and had also obtained a patent for ‘an invention of improvements for machinery employed in the sizing of yarn’ in 1871 (*Morning Post*, 18 November 1871). However, in August 1878, Thomas Abbott filed for liquidation, with estimated liabilities amounting to £24,000 (*Blackburn Standard*, 10 August 1878).

- 1.2.3 The spinning block was completely destroyed by fire in 1879, and the site was purchased eventually by Livesey, Smith & Forrest (later Smith & Forrest). The weaving shed that had been started by John Smith was completed in 1881, and 440 looms were installed to produce jacconettes, mulls and cambrics (Worrall 1891, 53).
- 1.2.4 The earliest detailed plan of the mill is provided by the Ordnance Survey first edition 25":1 mile map of 1894. This shows a block of rectangular buildings, with a detached circular chimney situated to the west.



Extract from Ordnance Survey 25" edition of 1894

1.3 Oxford Archaeology North

- 1.3.1 OA North has considerable experience of the interpretation and analysis of buildings of all periods, having undertaken a great number of small and large-scale projects during the past 24 years. Such projects have taken place within the planning process, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. In recent years OA North also has extensive experience of archaeological work in Northern England. In particular, OA North undertook a rapid appraisal of the surviving structures of the Lancashire Textile industry, which identified all the surviving textile-manufacturing sites in the modern county of Lancashire (OA North 2010), and is presently carrying out a second, more detailed, study of the county's former textile mills.
- 1.3.2 OA North has the professional expertise and resources to undertake the project detailed below to a high level of quality and efficiency. OA North is an Institute for Archaeologists (IfA) registered organisation, registration number 17, and all its members of staff operate subject to the IFA Code of Conduct.

2. OBJECTIVES

- 2.1 The archaeological building investigation aims to provide a drawn, photographic and textual record of the complex prior to its demolition. The complex contains
- 2.2 The buildings comprise a façade formed by an engine house, warehouse and twist store, with a single-storey winding, warping and taping room to the rear. Several phases of weaving sheds extend to canal. Early twentieth-century additions include a range of brick-built store-rooms and warehouses, with the complex now comprising 10 industrial units.
- 2.3 To achieve these objectives, the following listed specific aims are proposed:
 - **Building Investigation:** to provide a drawn, photographic and textual record of all the buildings to English Heritage (2006) Level 2/3 standard, which will provide a lasting record of the structures in their present state. In addition, the investigation will ascertain if further archaeological investigation will be necessary, prior to or during any demolition work;
 - **Report and Archive:** to complete a written report, which includes information about the building's age, fabric, form and function. This will be followed by a discussion of the sequence of development, process layout and use over time, and its relationship with other buildings in the vicinity, in terms of architecture and function. Suggested recommendations for additional archaeological investigation will also be included, where appropriate.

3. METHOD STATEMENT

3.1 Building Investigation

- 3.1.1 **Historical Research:** cartographic sources relating to the area will be consulted, in order to produce a map regression to provide an appraisal of the archaeological or historical significance and development of the complex. In addition, any relevant documents relating to the building will also be examined to provide a broad historical context for the building investigation.
- 3.1.2 **Photographic Archive:** a photographic archive will be produced utilising a high-resolution digital camera. A full photographic index will be produced and the archive will comprise the following:
 - (i) The external appearance and setting of the buildings, including a mixture of general shots and detailed views taken from perpendicular and oblique angles;
 - (ii) General shots of the surrounding landscape;
 - (iii) The general appearance of principal rooms and circulation areas;

- (iv) Any external or internal detail, structural or architectural, which is relevant to the design, development and use of the buildings, and which does not show adequately on general photographs;
 - (v) Any internal detailed views of features of especial architectural interest, fixtures and fittings, or fabric detail relevant to phasing the buildings.
- 3.1.4 **Site Drawings:** instrument survey techniques described below will be utilised to produce measured drawings within a CAD environment, which will be included within the final report as figures:
- (i) floor plans for each building;
 - (ii) a cross-section through the short axis of the three listed buildings, and any other structures where the roof structure is of historic interest;
 - (iii) principal elevations of the Canal House, the warehouse range and the forge range.
- 3.1.5 **Reflectorless Electronic Distance Measurer (REDM) survey:** the proposed plans, elevations and cross-sections will be surveyed by means of a reflectorless electronic distance measurer (REDM). The REDM is capable of measuring distances to a point of detail by reflection from the wall surface, and does not need a prism to be placed. The instrument to be used will be a Leica TCR805. This emits a viable laser beam, which can be visually guided around points of detail. The digital survey data will be captured within a portable computer running TheoLT software.
- 3.1.6 Detail captured by the instrument survey will include such features as window and door openings, evidence for power transmission, outline of decorative detail, evidence for machinery, an indication of ground and ceiling level, and changes in building material. The drawings will usually be produced at a scale of 1:50. The existing drawings will be digitised into an industry standard CAD package (AutoCAD MAP 2011) for the production of the final drawings.
- 3.1.7 **Manual Survey Techniques:** hand-measured survey techniques will be utilised to record areas that are not accessible for instrument survey. The drawings will be tied into the remainder of the survey through the use of a survey control established by the instrument survey.
- 3.1.8 **CAD System:** the drawings will be manipulated in AutoCAD MAP 2004. The advantage of a CAD system is that it allows for efficient manipulation and editing of drawings. The adoption of a layering system has significant benefits during the analysis stage as it allows for the display of information such as feature types, fabric and phasing as necessary to the requirements of the analysis, without the necessity to produce further drawings.
- 3.1.9 **Visual Inspection:** a visual inspection of the building will be undertaken utilising the OA North building investigation *pro forma* sheets. A description will be maintained to English Heritage (2006) Level 2/3 standard. The records will be essentially descriptive and provide a systematic account of the origin, development and use of the building, which will include a description of the plan, form, fabric, function, age and development sequence of the complex.

3.2 REPORT

3.2.1 **Report:** the content of the report will comprise the following:

- (i) A site location plan related to the national grid;
- (ii) A front cover to include the planning application number and the NGR;
- (iii) A brief account of the building investigation results. This will include a description of the buildings' layout, as well as their age, fabric, form and function. This will be followed by a discussion of the sequence of development, process layout and use over time, its relationship with other buildings in the vicinity, in terms of architecture and function;
- (iv) An explanation to any agreed variations to the brief, including any justification for any analyses not undertaken;
- (v) A description of the methodology employed, work undertaken and results obtained;
- (vi) Copies of plans, photographs, and other illustrations as appropriate;
- (vii) Recommendations for further archaeological investigation where appropriate;
- (viii) A copy of this project design, and indications of any agreed departure from that design;
- (ix) The report will also include a complete bibliography of sources from which data has been derived.

3.2.2 The report will be in the same basic format as this project design; a copy of the report can be provided on CD, if required. **Two** copies of the report will be supplied to the client as requested, and further digital copies will go to the appropriate repository.

3.2.3 **Archive:** the results of all archaeological work carried out will form the basis for 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 ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IfA in that organisation's code of conduct. OA North practice is to deposit the original record archive of projects with the County Record Office.

3.2.5 The Arts and Humanities Data Service (AHDS) online database project *Online Access to index of Archaeological Investigations* (OASIS) will be completed as part of the archiving phase of the project.

3.2.6 **Confidentiality:** all internal reports to the client are designed as documents for the specific use of the Client, for the particular purpose as defined in the project brief and project design, and should be treated as such. They are not suitable for publication as academic documents or otherwise without amendment or revision.

4. HEALTH AND SAFETY

- 4.1 OA North provides a Health and Safety Statement for all projects and maintains a Unit Safety policy. A written risk assessment will be undertaken in advance of project commencement and copies will be made available on request to all interested parties.

5. PROJECT MONITORING

- 5.1 **Access:** liaison for basic site access will be undertaken through the client. Whilst the work is undertaken for the client, LCAS will be kept fully informed of the work and its results and will be notified a week in advance of the commencement of the fieldwork. Any proposed changes to the project design will be agreed with LCAS in consultation with the client.

6 WORK TIMETABLE

- 6.1.1 **Historical Research:** one day in the field will be required to complete this element.
- 6.1.2 **Building Investigation:** approximately four days in the field will be required to complete this element.
- 6.1.3 **Report/Archive:** the report and archive will be produced within eight weeks of completion of the fieldwork. OA North can execute projects at very short notice once a formal written agreement has been received from the client.

7. STAFFING

- 7.1 The project will be under the overall charge of **Ian Miller BA FSA** (OA North Senior Project Manager) to whom all correspondence should be addressed. Ian has considerable experience and particular research interests in Industrial Archaeology and, amongst numerous other projects, managed the Lancashire Mills Textile Survey.
- 7.2 The project will be directed in the field by **Chris Wild BSc** (OA North Project Officer), who specialises in building recording, and was also involved in the Lancashire Textile Mill Survey.

8. INSURANCE

- 8.1 OA North has a professional indemnity cover to a value of £5,000,000; proof of which can be supplied as required.

ILLUSTRATIONS

LIST OF FIGURES

Figure 1: Site location

Figure 2: Extract from the Ordnance Survey 25": 1 mile map of 1894

Figure 3: Extract from the Ordnance Survey 25": 1 mile map of 1911

Figure 4: Extract from the Ordnance Survey 25": 1 mile map of 1931

Figure 5: Plan of Hole House Mill

Figure 6: Cross-sections of Hole House Mill

Figure 7: Phase plan of Hole House Mill

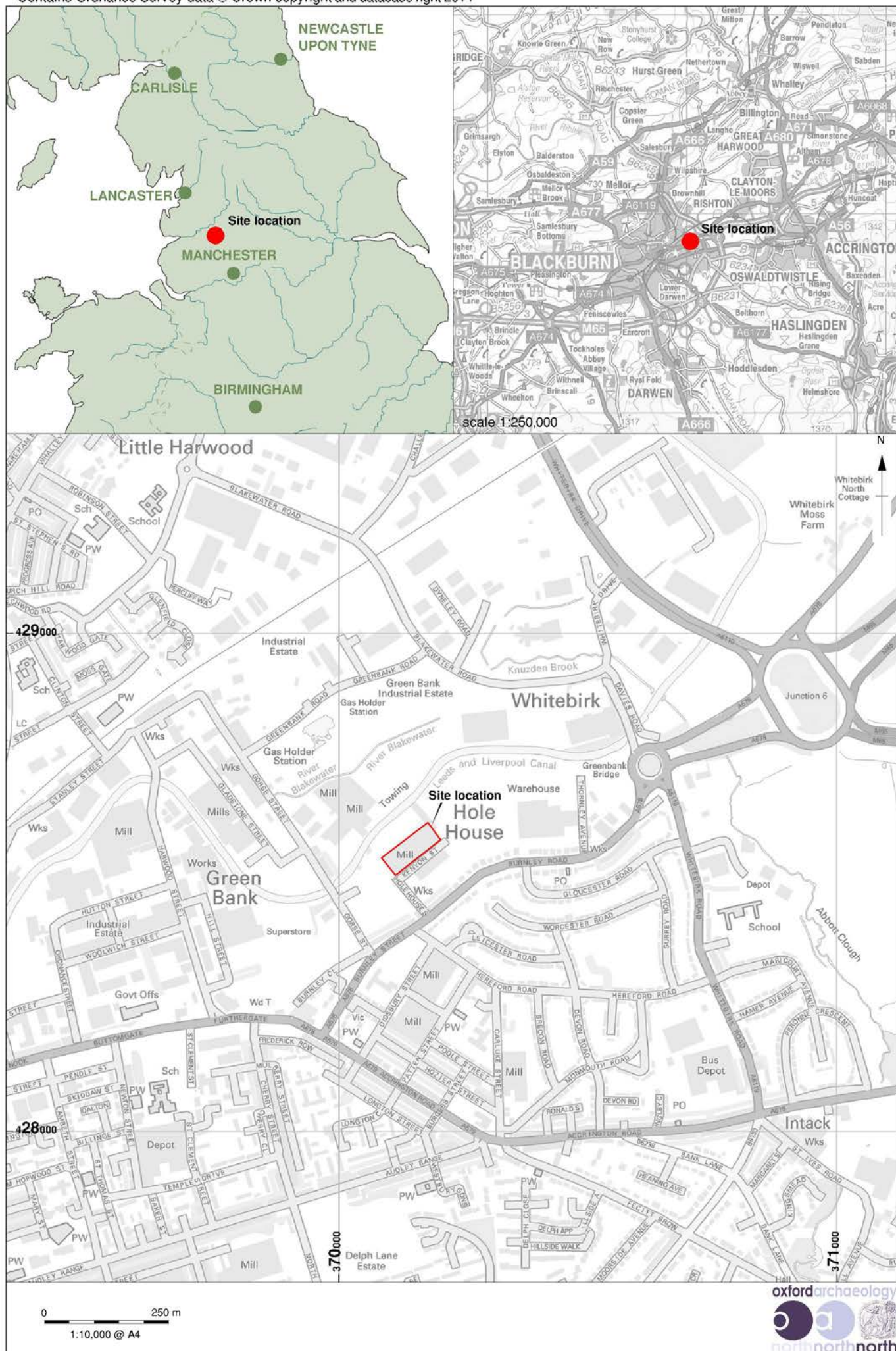


Figure 1: Site location

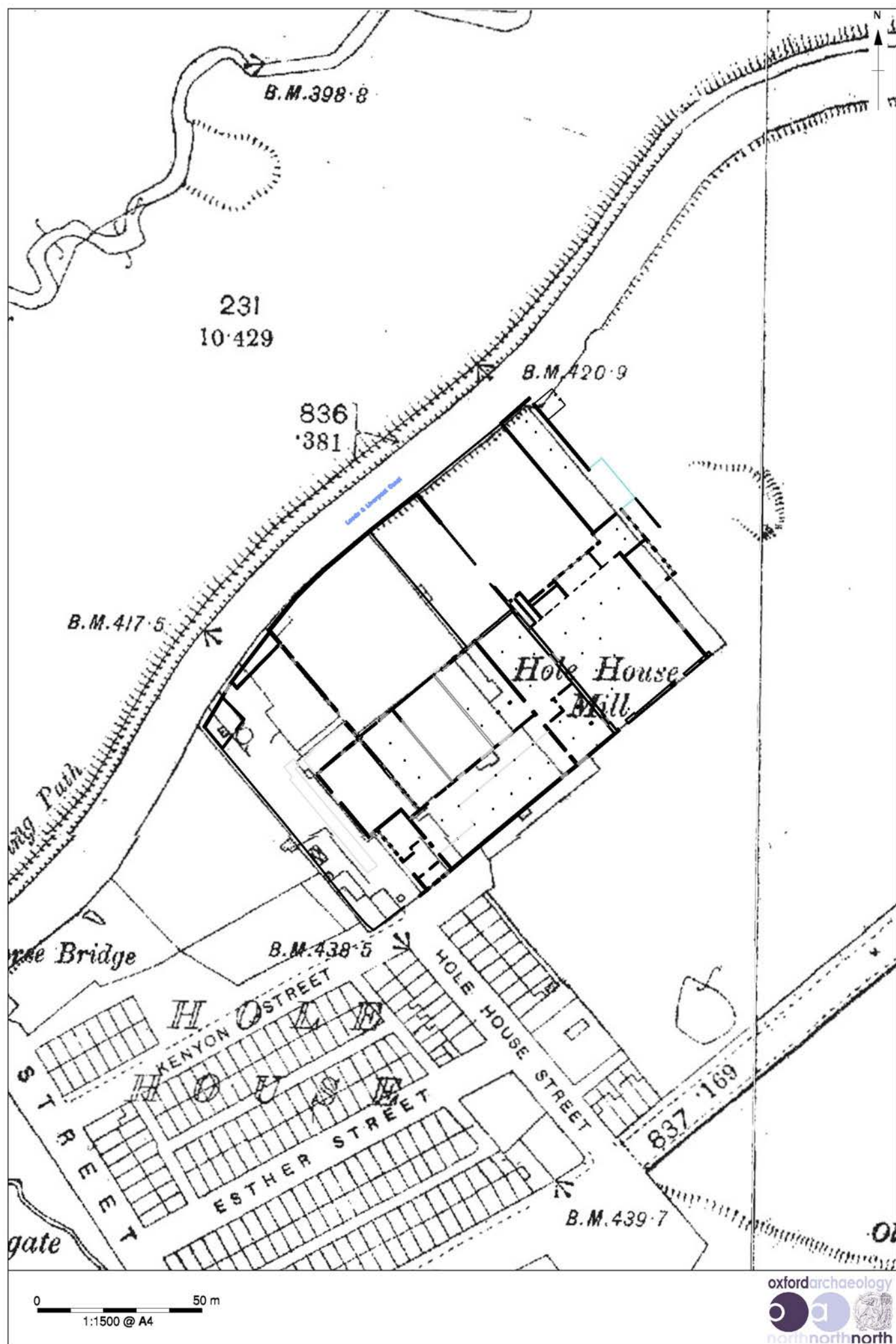


Figure 2: Extract from the Ordnance Survey 25":1 mile map of 1894

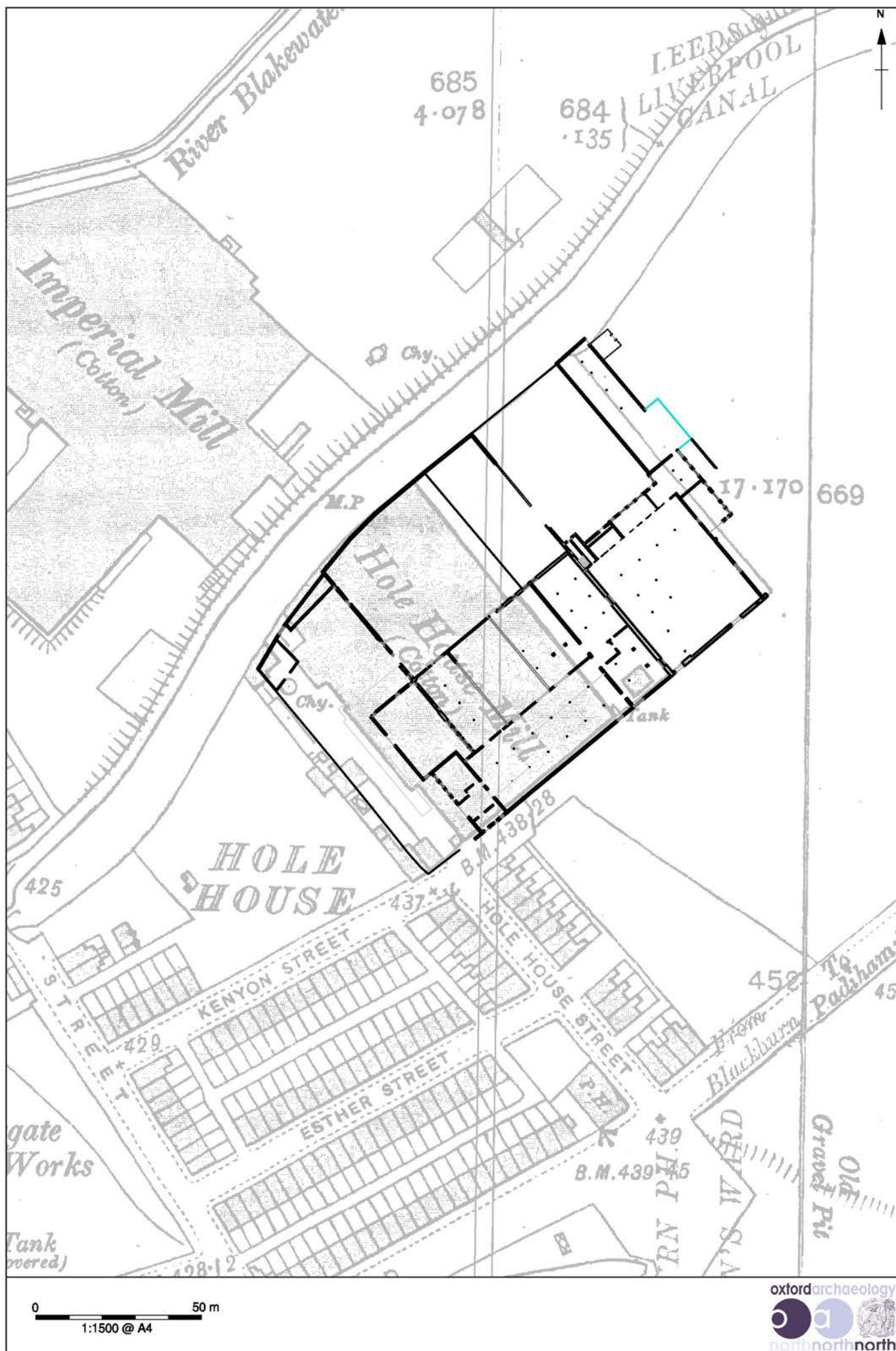


Figure 3: Extract from the Ordnance Survey 25":1 mile map of 1911

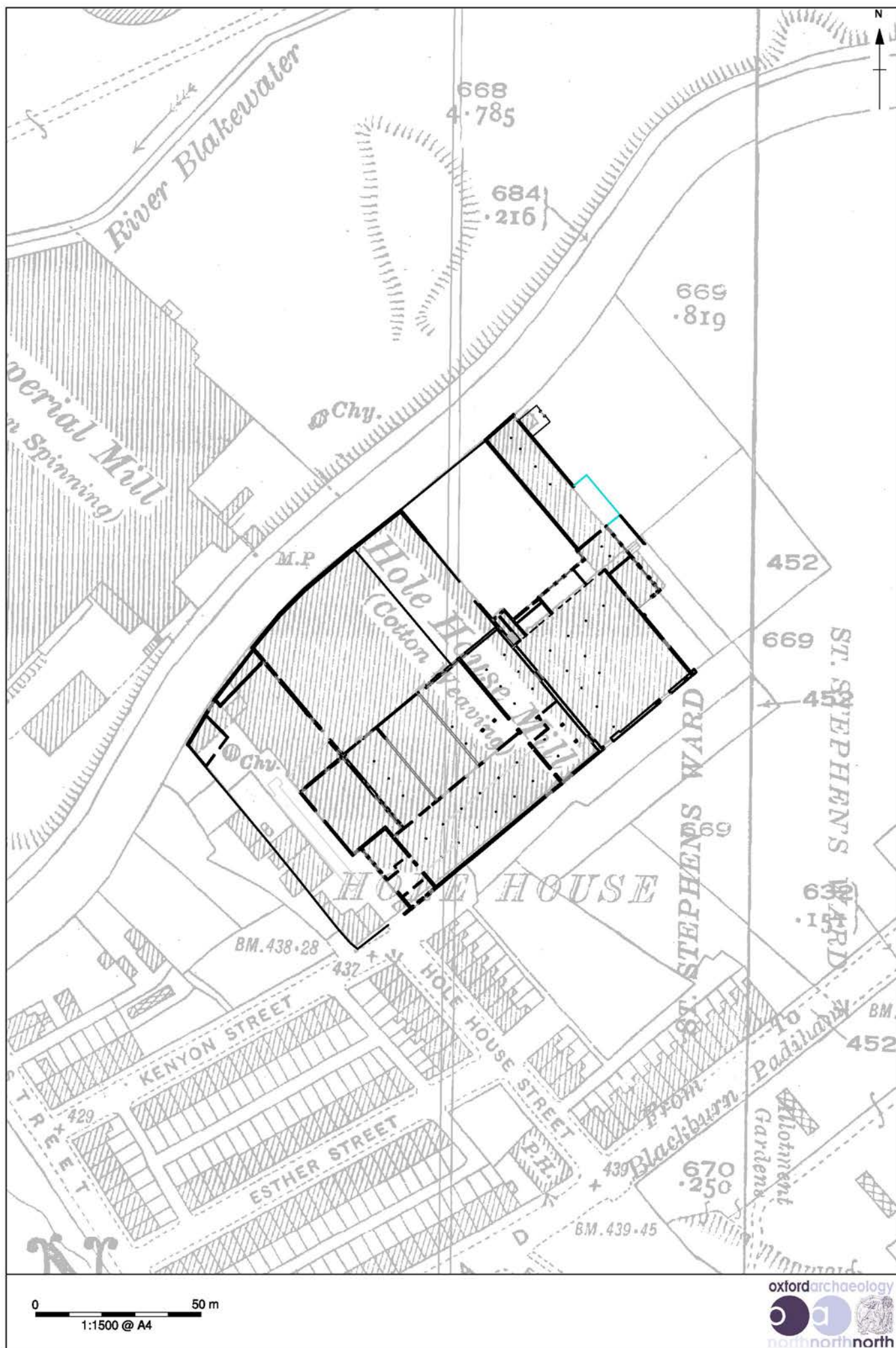


Figure 4: Extract from the Ordnance Survey 25":1 mile map of 1931

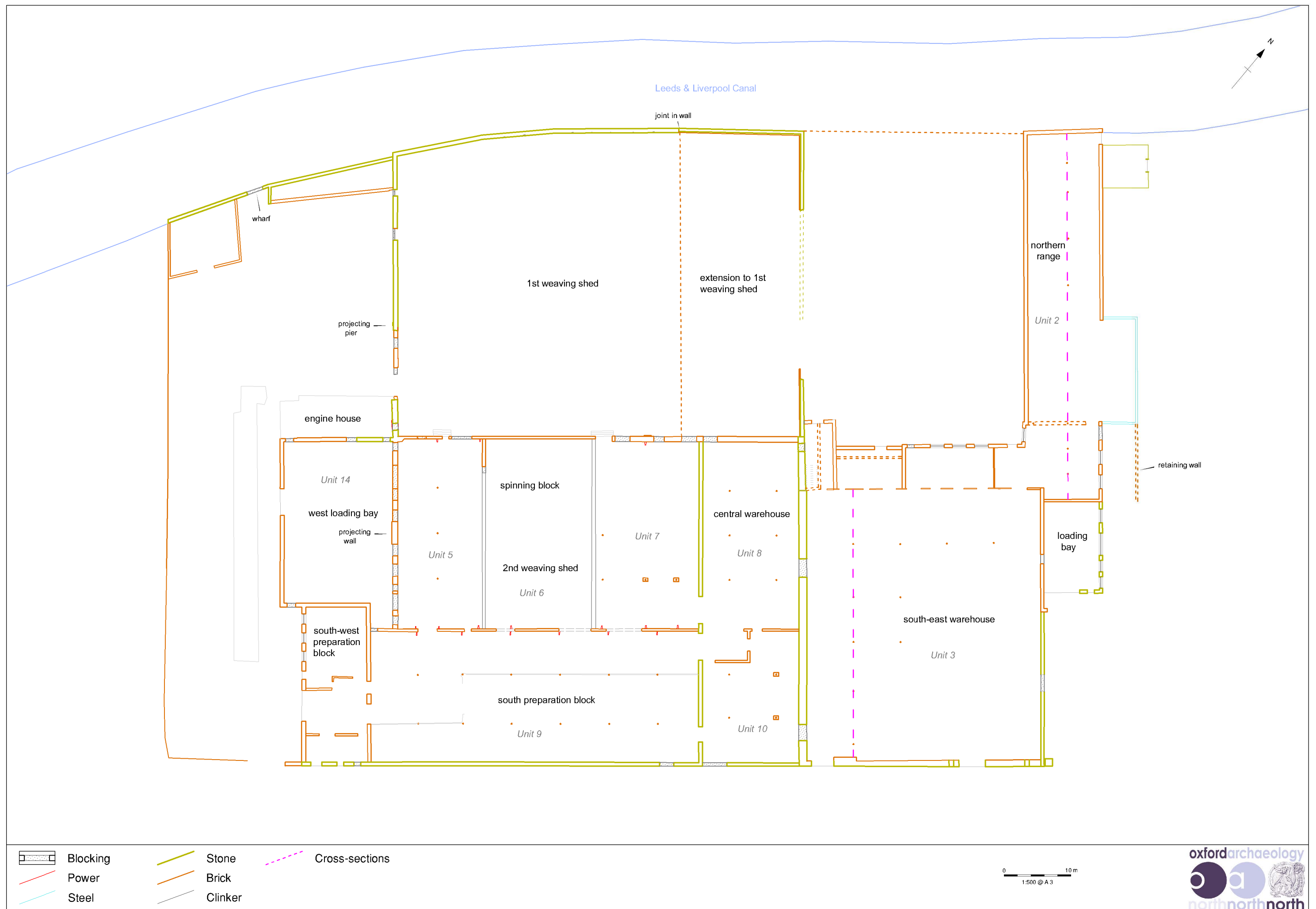
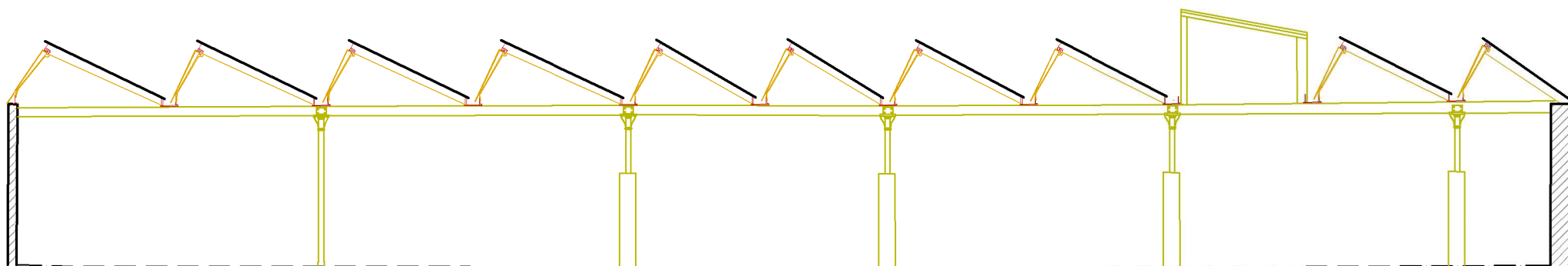
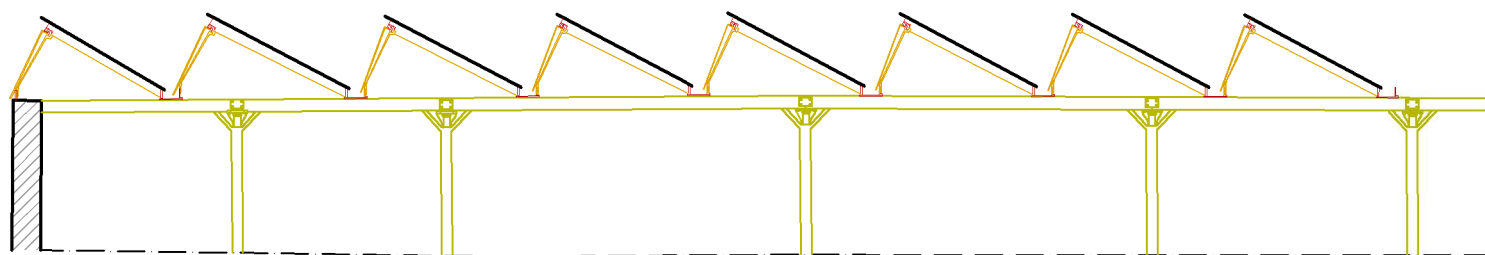


Figure 5: Plan of Hole House Mill



Cross-section through the south-east Warehouse



Cross-section through the Northern Range

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Figure 7: Cross-sections through Hole House Mill

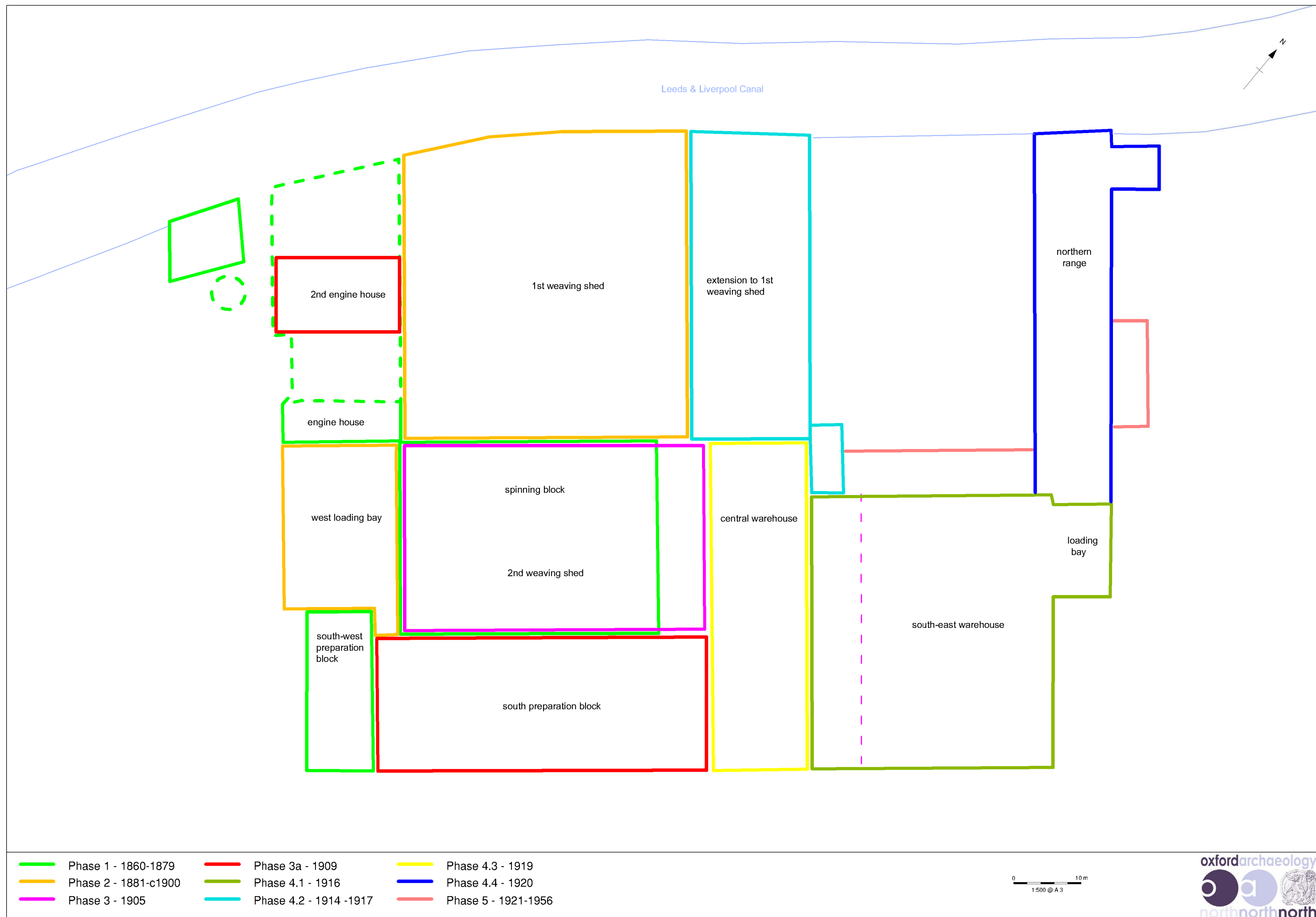


Figure 7: Phased plan of Hole House Mill