



**BENGAL
STREET BLOCK,
BEE HIVE MILLS,**

**ANCOATS,
Manchester**

**Archaeological
Research, Survey
and Assessment**



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SUMMARY

In July 2005 the Bengal Street block of the former Bee Hive Mills complex, situated on Bengal Street, Ancoats (centred on NGR SJ 8504 9875), was subjected to a catastrophic fire, which resulted in the complete loss of the building except for some fragmentary remains of the external walls. These surviving remnants incorporated some unusual design features, and elements of historic fabric that had been obscured by 20th century additions to the building. However, the unstable nature of these remains necessitated their complete demolition prior to any works associated with the future redevelopment of the site. In order to ensure that a record of these remains was compiled prior to their ultimate loss, it was recommended that a programme of archaeological survey was undertaken in advance of demolition.

In response to a request from Mr J Wrigley of Nikal Investments in August 2005, Oxford Archaeology North undertook the recommended survey of the surviving remains. This was coupled with an archaeological watching brief that was maintained during demolition works, and an appropriate level of research that was intended to place the results of the fieldwork into their historical context. Furthermore, acting on the advice of the Greater Manchester Assistant County Archaeologist, an archaeological desk-based assessment of the site and the adjoining property has been undertaken. This aimed to identify the potential for buried remains of archaeological significance within the study area, and was intended to support a future planning application for the redevelopment of the site.

The survey of the mill focused upon the surviving structural elements of the former Bengal Street block, which comprised part of the north and east external elevations and a small stub of the western wall. The survey also incorporated elements of the southern (internal) elevation of what appears to have been a part of the building associated with the steam-power plant. Examination of the surviving fabric yielded evidence for various phases in the developmental sequence of the building, and identified an unusual heating system. The results obtained from the survey were enhanced by observations made during an archaeological watching brief that was maintained during emergency demolition works.

The desk-based research has traced the development of the study area from the late 18th century to the present day, and concluded that the site is likely to contain buried remains of high local significance. These include the remains of the steam-power plant associated with the former Bengal Street block of the Bee Hive Mills complex, a section of a branch canal that served the mill, and court dwellings that provided accommodation for the workers. The proposed redevelopment of the site is likely to have a direct negative impact on these buried remains, and whilst they are not considered to be of sufficient archaeological significance to merit preservation *in-situ*, it is considered likely that a mitigation record will be required in advance of their ultimate destruction.

It is recommended that, in the first instance, a programme of limited archaeological investigation is undertaken to establish the presence or absence of these buried remains, and assess their character and extent. This could be achieved by instigating a programme of targeted trial trenching, or by archaeological monitoring of test pits excavated for geo-technical purposes.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank Jonathan Wrigley and Chris Holden for commissioning and supporting the project on behalf of Nikal Investments, and for facilitating the programme of archaeological fieldwork. Thanks are also due to Norman Redhead, the Assistant County Archaeologist for Greater Manchester, for his support and advice. Thanks are also expressed to the staff of the Local Studies Unit at Manchester Central Library for facilitating access to the sequence of historic maps.

The desk-based assessment was undertaken by Ian Miller, and the fieldwork was completed by Chris Wild, with the assistance of Chris Ridings. The report was compiled by Ian Miller, Chris Wild and Chris Ridings, and the drawings were produced by Chris Wild and Mark Tidmarsh. The report was edited by Ian Miller, who was also responsible for project management. The project was funded entirely by Nikal Investments.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

- 1.1.1 Nikal Investments are proposing a scheme of redevelopment for 45 – 47 Bengal Street, within the Ancoats area of Manchester, for a mixed residential and commercial end-use. Until recently, N^o 45 Bengal Street was occupied by a light industrial unit and associated yard, whilst a disused 19th century textile mill occupied N^o 47 Bengal Street. During July 2005, this mill building was destroyed by a catastrophic fire, which resulted in the collapse of the bulk of the structure. Elements of the building that did survive, however, included some structures of archaeological significance. Whilst the perilous structural nature of these remains necessitated their demolition as a matter of urgency, a rapid programme of archaeological survey was recommended in advance of their ultimate loss.
- 1.1.2 In response to a request from Mr J Wrigley in August 2005, acting on behalf of Nikal Investments, Oxford Archaeology North (OA North) submitted a project design to record the surviving structures (*Appendix 1*). This was devised by OA North and, following consultation with the Greater Manchester Assistant County Archaeologist, was coupled with a programme of historical research and desk-based assessment that was intended to inform the results of the survey and support a future planning application for the site. The work was undertaken during August and September 2005.

2. METHODOLOGY

2.1 DATA CAPTURE

2.1.1 The archaeological investigation comprised three main elements: historical research, a measured survey of the surviving structural remains, and a watching brief during demolition.

2.1.2 **Desk-based research:** several sources of information were consulted as part of the research, which have provided a good understanding of the developmental history of the study area. Sources that have been consulted include:

- *Greater Manchester Sites and Monuments Record (SMR):* the Sites and Monuments Record for Greater Manchester, held in Manchester, was consulted. This consists of a list of known archaeological sites within the county, and is maintained by the Greater Manchester Archaeological Unit (GMAU). The SMR also holds a considerable archive of aerial photographs, and maintains the Greater Manchester Textile Mill Survey.
- *Greater Manchester County Record Office (GMCRO):* the County Record Office in Manchester holds the majority of original documents and maps for the area, and was visited primarily to consult early maps of the area, which can provide details of the development of the landscape, and other documents relevant to the study area.
- *Lancashire County Record Office (LCRO):* the County Record Office in Preston holds printed and manuscript maps and plans of relevance to the present study.
- *Manchester Central Library Local Studies Unit (MCL):* Manchester Central Library holds printed and manuscript maps and plans of relevance to the present study, and an extensive collection of published sources.
- *Manchester City Council, Building Control Department:* this holds an archive of deposited building plans.

2.1.3 **Measured survey:** the structural remains of the building were recorded using a combination of the following survey techniques to produce a ground floor plan and a drawing of the north internal elevation:

- *Reflectorless Electronic Distance Measurer (REDM) survey:* 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 used was a Leica TCR407. This emits a viable laser beam, which can be visually guided around points of detail. The digital survey data was captured within a portable computer running TheoLT software, which allows the survey to be directly inserted into AutoCAD software for the production of final drawings.
- *Photographic Survey Techniques:* large elements of the surviving elevation were captured by a process of rectified photography. These photographs were subsequently tied into the survey data produced by the instrument survey, to produce more a detailed elevational drawing.
- *Manual Survey Techniques:* hand measured survey techniques were utilised to record areas that are not accessible for instrument or photographic

survey. The drawings were tied into the remainder of the survey through the use of a survey control established by the instrument survey.

- *Written description:* a visual inspection of the structural remains was undertaken utilising the OA North buildings *pro-forma* sheets. An outline description will be maintained to RCHME Level II-type survey. This level of recording comprises a descriptive record (RCHME 1996, 4), and will provide a systematic account of the building's origins, development and use.
- *Photographic Archive:* a photographic archive has been produced utilising a 35mm camera to produce both black and white contact prints and colour slides. Photographs were also taken in digital format. The archive will comprise general shots of the building and its surroundings.

2.1.4 **Watching brief:** this programme of field observation accurately recorded the location, extent, and character of all surviving archaeological structures and deposits within the study area during the course of the demolition works. This work comprised observation during the excavation for these works, the systematic examination of any subsoil horizons exposed, and the accurate recording of all archaeological features and structures, and any artefacts, identified during observation.

2.1.5 During this phase of work, recording comprised a full description and preliminary classification of features or materials revealed, and their accurate location (either on plan and/or section, and as grid co-ordinates where appropriate). Features were planned accurately at appropriate scales and a photographic record was compiled.

2.1.6 **Report:** the results obtained from the various elements of the fieldwork programme have been integrated into a single, synthesised report, which formed the basis for an archaeological assessment of the study area. This has allowed outline recommendations for archaeological mitigation to be devised in advance of any future planning application for the redevelopment of the site.

2.2 ARCHIVE

2.2.1 A full professional archive has been compiled in accordance with the project design (*Appendix I*), and in accordance with current IFA and English Heritage guidelines (English Heritage 1991). The paper and digital archive will be deposited with the Greater Manchester Textile Mill Survey on completion of the project, with a synthesis (in the form of an index to the archive and the report) deposited with the Greater Manchester SMR.

3. BACKGROUND

3.1 INTRODUCTION

- 3.1.1 An understanding of the archaeological and historical background of a site provides the local context within which the extant structures and buried remains can be assessed archaeologically. Such an understanding may be derived by collating the relevant information held within the County Record Offices, the County Sites and Monuments Record (SMR), the Local Studies Library, together with available cartographic evidence and published sources.
- 3.1.2 The following section provides an outline of the natural setting of the study area, its location both physically and relative to other key textile sectors within the city, and summarises the development of Ancoats. This section also provides a chronological account of the development of the study area in terms of its occupants and uses, and its evolution based on cartographic regression analysis.
- 3.1.3 It is understood that the eastern part of the area studied during the course of the desk-based research, occupied currently by Bee Hive Mill and a medical centre, will not be effected by the present development proposals. However, this area has been considered in this report as it is linked historically to the area intended for redevelopment.

3.2 LOCATION

- 3.2.1 The study area lies within the Ancoats area of Manchester, which is situated less than 1km to north-east of the city centre (Fig 1). It is centred at NGR SJ 8504 9875, occupying a block of land bounded by Jersey Street, Radium Street, Naval Street, and Bengal Street (Fig 2), forming a rectangular-shaped plot at height of c50m aOD (Plate 1). The site forms part of the Ancoats Conservation Area, but lies just outside the current World Heritage Site proposal boundary.

3.3 TOPOGRAPHY AND GEOLOGY

- 3.3.1 The solid geology of the area comprises Carboniferous sedimentary material and a series of Permo-Triassic rocks, consisting mainly of New Red Sandstone. The overlying drift incorporates Pleistocene boulder clays of glacial origin, and sands, gravels, and clays of fluvial/lacustrine origin (Hall *et al* 1995, 8).
- 3.3.2 Topographically, the Manchester Conurbation as a region is within an undulating lowland basin, which is bounded by the Pennine uplands to the east and to the north. The region comprises the Mersey river valley, which is dominated by its heavily meandering river within a broad flood plain (Countryside Commission 1998, 125). The topography of the study area, however, reflects the shallow valley of Shooters Brook, a rivulet that flows

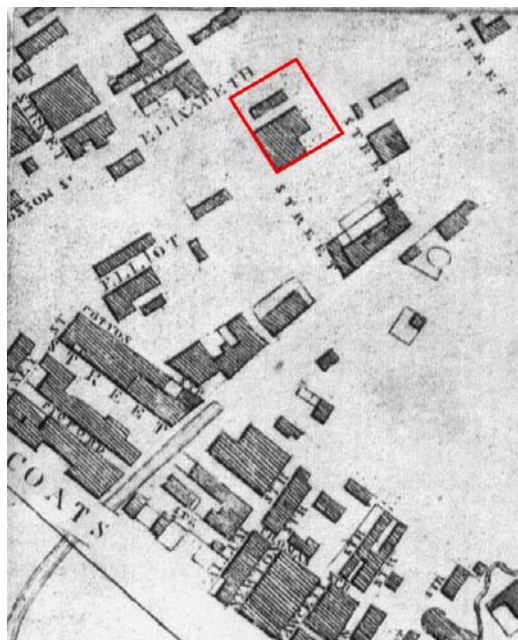
westwards from Newton Heath, through Ancoats and into the river Medlock (Ashworth 1987, 22). Until the early 19th century, the brook flowed through Ancoats at the base of a relatively deep valley, and it was upon the northern berm of this valley that the present study area is situated. However, Shooters Brook had been culverted by 1820 (OA North 2004a), and the topography of the valley has since been masked considerably by urban expansion.

3.4 HISTORICAL BACKGROUND: DEVELOPMENT OF ANCOATS

- 3.4.1 By the beginning of the 13th century, Ancoats was known as *Elnecot*, derived from the Old English *ana cots*, which means ‘lonely cottage’ (Cooper 2002, 13). As this name suggests, Ancoats was a rural area on the eastern periphery of Manchester. It retained a semi-rural aspect until the late 18th century, when the population of Manchester expanded at an unprecedented rate, and resulted in the transformation of Ancoats into a key industrial suburb.
- 3.4.2 This process of industrialisation began in the 1770s, when land owned by the Leigh family was sold to Thomas Bound, a builder, who then sold it on to others for development. The focus for initial development was at the corner of Great Ancoats Street and Oldham Road, and contemporary maps depict the main elements of the existing street plan laid out on former fields of the area. Building speculation then drove further expansion, with plots of land within a grid pattern of streets being sold for development. An early stage in the development of the area is depicted on William Green’s *Map of Manchester and Salford*, which was surveyed between 1787 and 1794, and shows in excess of 60 plots laid out (Fig 3).
- 3.4.3 The earliest factories in the area included several water-powered mills erected along Shooters Brook, to the south of Union (now Redhill) Street. However, in seeking a solution to the inadequate power supplied to their waterwheels from Shooters Brook, several firms experimented with steam power. A notable example was at Salvin’s Factory, when John Kennedy is reputed to have first applied steam power to one of his spinning mules in 1793 (Lee 1972, 9). In order to achieve this, Kennedy utilised a steam-powered pumping engine that delivered water to a waterwheel, which remained the primary source of motive power. Nevertheless, it was on the basis of a breakthrough in the application of steam power that created the explosion of factory building in Ancoats (Little 2004, 31).
- 3.4.4 The completion of the Ashton-under-Lyne Canal in 1796, and a proposal to construct the Rochdale Canal through the area offered the potential of cheap and reliable transport for goods and materials to and from Ancoats. The completion of the Rochdale Canal in 1804 coincided broadly with the efficient application of steam power to cotton-spinning machinery, and a growth in the national demand for textiles. A small number of enterprising firms seized the opportunity presented by this combination of factors, resulting in the evolution of a new breed of mill building in Ancoats, and the creation of ‘the World’s first industrial suburb’ (Williams 2002, 34).

3.5 HISTORICAL BACKGROUND: THE STUDY AREA

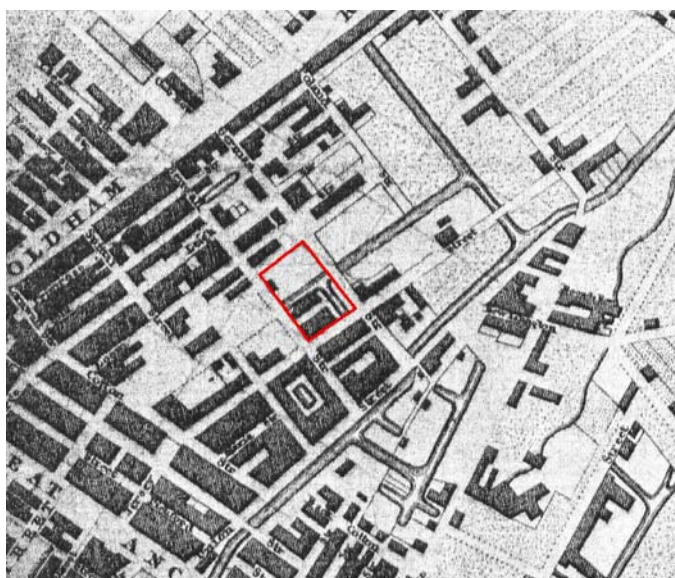
- 3.5.1 The study area was bisected from an early date by an arm of the Rochdale Canal, which formed a crucial transport link for commercial premises along its banks and a water source for steam-power plant in adjacent mills. The route of this branch canal also provides a useful division for the purposes of the present study; the two areas developed independently, and have been put to different uses.
- 3.5.2 One of the earliest cartographic sources to show the study area in detail is William Green's *Map of Manchester and Salford*, published in 1794 (Fig 3). This shows Ancoats at a time when there was a great deal of speculative building going on in the area, and the road layout shown was part of that speculation. Four streets bordered the site: Elliot Street (now Jersey Street), German Street (now Radium Street), Elizabeth Street (now Naval Street), and Bengal Street. The line of the Rochdale Canal had not been laid out at this time, but ran subsequently to the south of Union Street (now Redhill Street), crossing the junction of German Street and Union Street and continuing along a line to the north of Union Street. Heath Street is indicated on the map intersecting the site, but this street was not built as depicted.
- 3.5.3 Green's map indicates buildings to have been erected within the study area by the end of the 18th century. Two groups of buildings are shown, although there is no firm indication as to their precise function. However, it is possible that the larger group, situated within the southern part of the study area, represented dwellings, whilst the smaller group to the north may have been of a commercial nature, as suggested by a boundary wall to the rear. A recent document held by the Greater Manchester Archaeological Unit lists 13 textile mills in Manchester that are considered to have been built before 1800. This document refers to a Bengal Street Mill, situated within the present study area, which is listed as a water-powered factory that was converted to steam power in 1796 by the firm of McConnel and Kennedy. However, the evidence for this is not given, and whilst the building shown on Green's map within the northern part of the present study area may have been an early textile mill, this awaits confirmation.



Extract From Banks and Thornton's Plan of Manchester and Salford, published in 1800. The map shows the Rochdale Canal partially completed, and two ranges of buildings within the study area; a large, L-shaped block fronting onto Elliot (latterly Jersey) Street, with a smaller range to the rear.

3.5.4 The layout of the study area provided by Green's map is reproduced in lesser detail on Bancks and Thornton's *Plan of Manchester and Salford*, which was published in 1800, and Ashton's small-scale map of the area of 1804. The former does show the main line of the Rochdale Canal under construction, whilst the latter depicts it to have been completed. However, the Bengal Street branch canal and a short arm aligned broadly north/south across the study area was not constructed until 1809, when both are depicted on a small-scale map produced by Pigot.

3.5.5 The next available map of the study area is that produced by Johnson in 1819 (Fig 4). Whilst the detail of this map may be unreliable for an analysis of individual buildings, it does provide a good indication as to the extent of development within the present study area. This map shows the Bengal Street branch of the Rochdale Canal to have been constructed, passing underneath German Street, across the study area and terminating at Bengal Street. A short arm extending south from the Bengal Street branch canal is also depicted, taking a route parallel to German Street and across the south-eastern part of the study area. Whether this was intended as a navigable waterway or as a drain/feeder to steam-power plant is uncertain. The remainder of the plot to the south of the Bengal Street branch canal is shown to have been occupied by



two rectangular blocks of buildings of different sizes. The same layout is depicted upon a small-scale map published in association with Pigot's commercial trades' directory for 1819. Whilst the relative sizes of the buildings vary, it would seem probable that they are the same as those shown on Green's map of 1794.

Extract from a small-scale plan produced by Pigot in 1819, showing the study area to comprise two rectangular ranges of buildings, a small structure to the north, the Bengal Street branch canal and an arm parallel to German Street.

3.5.6 The plot of land to the north of the branch canal is shown on the maps produced by Johnson and Pigot to have been largely devoid of buildings, except a single, small structure along the Bengal Street frontage. It is possible that this area served as a coal yard, and that the structure shown is associated with this usage. Entries within a commercial trades' directory published some three years later reinforce this suggestion, as the Duke of Bridgewater's Trustees are listed as coal merchants on Bengal Street (Pigot and Dean 1822, 242). This directory does not contain any other entries for the study area, indicating that Bee Hive Mill had not been constructed by this date.

- 3.5.7 A map of the area produced by Swire in 1824 is the first cartographic source to depict Bee Hive Mill. The original component of the mill complex comprised a multi-storey block of 13 bays erected along the western side of German Street, parallel and adjacent to a short arm from the Bengal Street branch canal. The mill appears to have been served by the short arm, whilst the branch canal took a route across the northern gable end of the building.
- 3.5.8 It is believed that the factory was built as a room-and-power mill (Williams and Farnie 1992, 151), which was let to occupiers connected with the cotton trade (MCL/M9/40/2/100). These occupiers included cotton spinners, cotton manufacturers, and machine makers. The mill was powered by a beam engine that was situated within a transverse engine house of three storeys at the north end of the building, and was separated from the rest of the mill by an internal cross wall (Williams and Farnie 1992, 152). The associated chimney was integral to the internal stone stair tower, which was erected within the north end bay.
- 3.5.9 A six-storey, three-bay extension along Jersey Street was added to the original building in 1824, forming an L-shaped mill complex, as shown on Bancks and Co's map of 1831 (Fig 5). The extension is thought to have been intended for warehousing purposes, as suggested by the double taking-in doors contained originally in the north elevation (Williams and Farnie 1992, 153). It featured a fireproof construction that contained no structural timbers, and an advanced type of roof that comprised cast-iron trusses held under tension by wrought-iron ties (*ibid*). The construction of this wing seems to have required the infilling of the short canal arm, and conversion of its route into the mill yard. The line of this former canal arm is marked by the wide entrance to the mill yard from Jersey Street.
- 3.5.10 Bancks and Co's map also shows the buildings within the south-western part of the study area to have been occupied by back-to-back housing, forming court dwellings. The detached range of buildings to the north may also represent dwellings, although their varying sizes suggest that some may have been used as commercial premises. It is probable that these are essentially the same structures as those depicted by Green (3.5.3 *above*), and are of late 18th century origin. The area to the north of the branch canal is labelled on the map as a 'coal yard', and contains small structures that were probably associated with this usage, such as an office and weighing house.
- 3.5.11 Subsequent to Bancks and Co's map, another block was added to the mill complex, placed across the eastern end of the court dwellings, and butting the northern elevation of the 1824 block. This is likely to have been a narrow, multi-storey block, with its long axis parallel with the original mill. The function of this building is uncertain, although its narrow dimensions suggest that it may have been intended as an extension to the site's warehousing facilities. However, this building, referred to as the Jersey Street block, was destroyed by fire in 1841, which caused damage to a cost of £14,000 (Axon 1886, 215). In 1843, the vacant building was purchased by Joseph Lamb, and restored to a working condition in 1844. A trades' directory for 1845 indicates the rebuilt Jersey Street block to have been occupied by Joseph Lamb, '*spindle and fly manufacturer*' (Slater 1845, 196). The Poor Rate returns for 1846

similarly lists the building as belonging to Joseph Lamb, with an assessment of £146 for the ‘factory’ and £18 for the yard, wharf and smithy (MCL/M9/40/2/146). The relatively high assessment rate suggests that Lamb owned the entire Bee Hive Mills complex at this time. Entries within contemporary trades’ directories also provide details of the use of the wider study area. Pigot and Slater’s *Directory of Manchester and Salford*, published in 1841, for instance, indicate the buildings parallel and to the south of the branch canal to have been Shilling Place. Whilst it is likely that these properties were dwellings, it seems that some of the residents may have been engaged in domestic industries, as shown in Table 1.

House Number	Name	Occupation
2	Mary Massey	Reeler
3	John Parry	Engraver
4	John Hare	Weaver
5	John Woodcock	-
6	Mary McCaine	-
8	James McDowell	Weaver

Table 1: List of residents on Shilling Place (Pigot and Slater 1841)

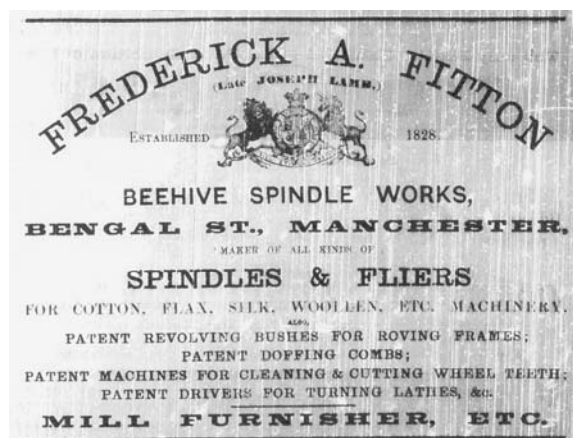
3.5.12 Pigot and Slater’s trades’ directory also provides information on the operators of the coal yard to the north of the branch canal. It seems that the yard incorporated N^{os} 43 and 45 Bengal Street; N^o 43 was occupied by the Dukinfield Coal Company, whilst John Cotton is listed as a coal dealer at N^o 45, Bengal Street. Curiously, John Cotton also acted as a pawnbroker at N^o 51 Bengal Street (Pigot and Slater 1841, 71). N^o 47 Bengal Street is listed as a private residence, occupied by Betty Smith, and the adjacent property, N^o 49 Bengal Street, was William Mackay’s shop (*op cit*, 96).

3.5.13 A detailed plan of the study area during the mid-19th century is provided by the Ordnance Survey First Edition 60”: 1 mile map, which was surveyed in 1848/9 and published in 1851 (Fig 6). This map largely replicates the layout of the study area as shown on Bancks and Co’s map, although does provide some additional details. In particular, a new building along the southern edge of the branch canal, labelled as a spindle works, represent the origins of the Bengal Street block of the mill complex. This had been built by Joseph Lamb in 1848 (*Manchester Guardian* 12/01/1861), who is entered within trades’ directories as a ‘spindle and fly maker’ (Slater 1851, 213). However, it seems that Lamb used only the lower two storeys, whilst the upper three were occupied by Thomas Sykes, a cotton spinner, thread manufacturer and cotton doubler (*Manchester Guardian* 12/01/1861). These processes will almost certainly have required a source of motive power. The only indication of steam-power plant shown on the available mapping is a boiler house, which was connected to the branch canal via a covered entrance, demonstrating a high degree of integration between the canal and the mill’s steam-power plant.

- 3.5.14 Bee Hive Mill appears to have some additions, including a small rectangular projection against the north-western corner. The narrow Jersey Street block, rebuilt in 1844 (3.5.11 above), is shown to have formed the south-western boundary of the mill complex, and incorporates a square-shaped projection close to its north-western corner, perhaps representing an external stair tower or toilet tower.
- 3.5.15 The buildings within the south-western part of the plot are labelled as ‘Shilling Court’ and ‘Holditch’s Court’, confirming their use as dwellings. Two of those along the Jersey Street frontage are shown to have incorporated external flights of steps, although it is not clear whether these represent access to a first storey or a basement. The northern edge of the dwellings is formed by Shilling Place. The plot to the north of the branch canal is still utilised as a coal wharf, although the associated structures are shown to have been enlarged relative to Bancks and Co’s map of 1831.
- 3.5.16 Another detailed plan of the site was produced by Adshead in 1850 (Fig 7). Given the date of this map, it is unsurprising that it largely mirrors the Ordnance Survey 60”: 1 mile map. However, some small, but nevertheless significant differences to the site layout are depicted. Lamb’s ‘spindle manufactory’ is shown as physically linked to the north-eastern corner of Bee Hive Mill and the narrow Jersey Street block, forming a truly enclosed courtyard plan to the mill complex. The north-western corner of Lamb’s manufactory is also shown to have been extended into the end of the branch canal, highlighting the fact that space within the mill complex was at a premium.
- 3.5.17 The next available detailed map of the site is provided by the Ordnance Survey First Edition 10’: 1 mile map, surveyed in 1888 and published in 1891. However, some significant changes to the site were wrought during the intervening period, which may be traced through other primary sources. Most significantly, the Jersey Street and Bengal Street blocks were devastated by fire on January 11th, 1861, with damage estimated at £25,000 (Axon 1886, 282). The fire, described in a newspaper report, was believed to have broken out in a room above the boiler house in the Bengal Street block. It destroyed the upper three storeys of this mill block, which was then occupied by Thomas Sykes, and the top floor and roof of the Jersey Street block (*Manchester Guardian* 12/01/1861). The report also confirms that the entire Bee Hive Mills complex was owned by Joseph Lamb, referred to as ‘Councillor Lamb’, and that the fire left 300 people out of work for a short while (*ibid*).
- 3.5.18 The Bengal Street and Jersey Street blocks were largely rebuilt after the fire. The new Bengal Street block comprised a 13 bay structure erected to a height of five storeys, which was again occupied by Joseph Lamb, as he is listed as a spindle manufacturer on the premises in a trades’ directory for 1863 (Slater 1863, 286). It is of note that no coal merchants are listed on Bengal Street for this year, implying that the plot to the north of the canal branch had changed use. Moreover, St Peter’s national school on Bengal Street is listed, although there are no other entries for this part of the study area.

3.5.19 An advertisement for Frederick A Fitton within Slater's trades' directory for 1869 implies that this firm had taken over Joseph Lamb's business, and a similar advert appears in Slater's directory for 1879. It may be assumed that Fitton only occupied part of the Bengal Street block, as Slater's directories for 1872 and 1874 indicate the firm of McConnel and Kennedy to have been occupying part of the mill.

3.5.20 Other parts of the Bee Hive Mill complex are listed at this time as being occupied by John Emery, a calico printer, and the firms of Barrett Robert Hankinson, and Bazley Brothers, both entered as cotton spinners and manufacturers (Slater 1879). By 1884, the firm of Bennett & Co, cotton doublers, was occupying part of the mill complex (Worrall 1884).



An advertisement for Fitton's spindle works, based at Bee Hive Mills, reproduced from Slater 1879.

3.5.21 The 1891 Ordnance Survey 10': 1 mile map shows the rebuilt Bengal Street block as a single structure, with a narrow extension right across the western end of the branch canal. This remodelling presumably involved the replacement of the original boiler house, and associated modifications to the steam-power plant. No indication is provided as to the layout of any replacement power systems, although it would seem likely that the new mill block contained its own steam engine.

3.5.22 The court dwellings to the south are shown to have been remodelled with the demolition of the central row of properties, presumably reflecting the implementation of housing improvement acts during the later 19th century.

3.5.23 The plot to the north of the branch canal is shown to have been developed by 1888. The western part of the plot was occupied by St Peter's school, with segregated male and female playing grounds adjacent to the canal. The eastern part of the plot contained the 'City File Works', with unlabelled buildings occupying the south-eastern corner. These latter buildings are likely to have been ancillary structures associated with the file works. The same layout, although in lesser detail, is provided by the Ordnance Survey First Edition 25": 1 mile map, published in 1893 (Fig 8).

3.5.24 A trades' directory for 1891 lists the Bee Hive Mill Co, 'raisers of cotton blankets, grey and white twills, lambskins, flannelettes, etc' (Worrall 1891, 115). Worrall also lists the firm of Brotherton & Co, smallware manufacturers, at Bee Hive Mill (*op cit*, 127).

3.5.25 When the next edition of Ordnance Survey mapping was published in 1908, much of the Bee Hive Mill complex had been converted to a corn mill. This conversion included the addition of a full height extension to the rear of the

1824 Jersey Street wing, which itself was converted to contain six, four-storey high grain bins. This conversion was proposed in 1906, and is shown on a deposited building plan of that date, submitted on behalf of Arthur McDougall Esq (Plan 7547, Manchester City Planning Department). The function of the Bengal Street block at this time is unclear from cartographic evidence. A notable addition, however, is the installation of a passageway between the Bengal Street block and the original mill building, suggesting that the buildings were linked physically and commercially. It seems as though there may have been some modifications to the dwellings within the south-western part of the study area, although again detail is unclear.

- 3.5.26 The plot to the north of the canal arm does not appear to have been altered significantly, and was seemingly still being used jointly by a school and commercial premises.
- 3.5.27 The original component of the Bee Hive Mill complex is shown on the Ordnance Survey map of 1931 to have been converted for use as a soap works, although the Bengal Street block is again unlabelled (Fig 9). This map also shows the branch canal to have been partially in-filled, and new buildings erected across the in-filled portion. Another range of buildings is also shown to have been erected at a right angle to the branch canal, within the area occupied formerly by the school playing fields. Details of these buildings are provided by Goad's insurance plan (1943 revision) of the site, which shows these new structures to comprise garages and a dairy (Fig 10).
- 3.5.28 Goad's insurance plan also provides details of Bee Hive Mill complex (Fig 10). The original component was used partly by J Sankey & Son Ltd as a dry soap packing factory, although the second and third floors were occupied by a lithographic printers. The Bengal Street block was occupied by J Rickard & Co for warehousing purposes, with the upper floors being used as an overall factory. Three connections between this building and the original mill are shown: a gangway at second floor level, and passageways at third and fifth floor levels. Most of the dwellings within the south-western part of the study area are shown to have been demolished by this time, with only four houses surviving (85 - 91 Jersey Street). The site of the demolished houses appears to be open land. However, an aerial photograph taken in 1958 (Plate 1) shows the remaining houses to have been demolished, and the entire south-western part of the study area is open land, seemingly used for car-parking purposes.
- 3.5.29 This is confirmed by the detail of the 1969 Ordnance Survey map, which shows the south-western part of the study area as vacant. This map also indicates all of the Bee Hive Mill complex to have been used as a clothing factory (Fig 11). It seems that the Bengal Street branch canal had been in-filled entirely by this date, and that the garages immediately to the north had been demolished. The file factory within the north-eastern part of the study area is shown to have been converted to an engineering works, and most of the associated ancillary structures to the rear demolished.
- 3.5.30 An aerial photograph of the site taken during the 1980s (Plate 2) indicates little change to the study area since 1969, other than the demolition of the school at the junction of Bengal Street and Naval Street. The south-western part of the

study area is shown to have remained undeveloped, and was clearly being used for car-parking purposes. At some point during the late 20th century, a single-storey industrial unit was constructed against the northern elevation of the Bengal Street block. This structure and its associated yard were used subsequently by a building contractor for storage purposes.

- 3.5.31 The site appears to have changed little to 2005 (Plates 4 and 5), until the Bengal Street block caught fire in July (Plate 6), necessitating its demolition (Plate 7). During this period, the mill was vacant.

4. FIELDWORK RESULTS

4.1 INTRODUCTION

- 4.1.1 The archaeological fieldwork comprised three main elements: a survey of the surviving remains of the Bengal Street block subsequent to the catastrophic fire, a watching brief during the demolition of those remains, and an inspection of the other elements of the study area.
- 4.1.2 Very little of the structure survived the fire, and much of what did was subject to immediate demolition to make the site safe. Plate 6 clearly shows the dangerous nature of these remains, and gives a unique view of the interior of the structure, not afforded by earlier photographs. Those elements of the building that did survive the initial demolition, however, included some structures of archaeological significance. Whilst the perilous structural nature of these remains necessitated their eventual demolition, a rapid programme of archaeological survey was recommended in advance of their ultimate loss.

4.2 BUILDING SURVEY

- 4.2.1 The surviving structure comprised part of the ground floor remains of a five-storey mill, which was aligned east to west. Only the north and east elevations survived for their entirety, with only a small stub of the western wall. The southern wall had been completely demolished to ground level, but a small stub of an internal partition towards the southern side of the building survived in the south-eastern corner of the mill (Fig 12).
- 4.2.2 **North elevation:** the elevation (Fig 13) comprised 13 bays (numbered from the west), constructed of mould-thrown, hand-made brick, in English Garden Wall bond, to a thickness of two bricks (28" (0.71m)). The brickwork was bonded with pale grey gritty lime and sand mortar containing charcoal inclusions, characteristics typical of the late 18th to mid-19th century. The bricks measured 9" (0.22m) by 4¼" (0.13m) wide and 2¾ (0.07m) high, typical of the period (Hartley 1974, 76). Observations during the watching brief of the demolition of the north wall strongly suggest that the wall had significant foundations, which would be consistent with the cartographic evidence (*Section 3 above*). This factor implies that the mill had formed the southern wall of the Bengal Street branch canal.
- 4.2.3 With the exception of the two western bays, the elevation was dominated by 11 segmentally-arched openings (Plate 8), positioned centrally within each bay (Fig 13). Each measured 6' (1.83m) wide and 8'6" (2.59m) high, with the crown of the brick arch positioned 18" (0.45m) above the angled brick springers, specifically moulded to allow continuity of the bullnosed edge from the jambs to the arch. The arches were all blocked, with the different materials employed suggesting a chronology for the dates at which they were blocked. Bays 6, 8, 10, 12 and 13 displayed evidence of sandstone sills within the internal wall face (Fig 13), whilst differences in blocking fabric within Bays 3

and 4 suggested a similar arrangement. Examination of the external face of the elevation during the watching brief, revealed that the sandstone sills extended slightly beyond the outer wall face, forming the sills to wide, six-light timber framed windows, with arched lights above (Plate 9).

- 4.2.4 The watching brief also revealed that windows of this type were originally included in Bays 3, 4, 6, and 8-13. Bays 5 and 7 differed, forming full height openings onto the canal-side, presumably for the loading and unloading of goods, with external sandstone thresholds projecting at floor level (Plate 10).
- 4.2.5 The two western bays of the north elevation differed from the remainder; Bay 1 contained a narrow splayed window, and Bay 2 contained an arched aperture, narrower than those to the east (only 4' (1.21m) wide), but of similar style and construction (Plate 11). The window in Bay 1 had splayed reveals up to 28" (0.71m) wide, and appeared to have been blocked to a height of 3'2" (0.96m) above floor level, with a burnt timber sill above. It appears to have originally formed a doorway into the structure immediately to the north of Bay 1, which had a higher floor level, suggesting a timber staircase originally butted the northern elevation within Bay 1. The arched aperture within Bay 2 was a window, narrower than those to the east due to the presence of the structure fronting Bengal Street, located to the immediate north of the mill, and abutting the western end of the Bengal Street branch canal. This is depicted clearly on Adshead's map of 1850 (Fig 7), but is not shown on the Ordnance Survey map of 1851, which was surveyed in 1848/9. Examination of the northern face of the wall during the watching brief revealed that there was no evidence of a keyed joint or wall scar between these two structures, strongly suggesting that the building depicted on Adshead's map survived the fire of 1861 and was butted by the reconstruction of the Bengal Street block
- 4.2.6 The earliest in-filling of the windows in the northern elevation was in Bay 13, where the internal face of the window frame was blocked with a single skin of hand-made, apparently wire-cut, 19th century brick, bonded with a sooty black mortar. This build overlay a chamfered timber sill, which in turn overlay the original 2¼" (0.06m) thick sandstone sill (Plate 12). The apertures within Bays 7 to 12 appear to have been retained until the mid-20th century, when they were blocked with extruded, machine-made brick, most probably at the time of the construction of the lean-to structure to the north of the Bengal Street block, which appears, at its eastern end, to have immediately post-dated the in-filling of the branch canal. Bays 2 to 6 were in-filled with clinker blocks, suggesting a late 20th century date, comparable with the construction of the offices at the western end of the structure to the north of the mill.
- 4.2.7 Given the large width of the window apertures within the north elevation, the remaining fabric of the ground floor wall comprised brick piers (Fig 12). Each, with the exception of that between Bays 1 and 2, contained the basal remains of a flue, positioned just below ceiling level (Fig 13). These comprised a splayed aperture, narrowing to a typically 21" wide (0.53m) vertical flue, recessed by one brick (9" (0.23m)) from the wall-face (Plate 13). Externally, the flues projected by a similar distance from the face of the north elevation, with the projecting brickwork tapering below the base of the flue, and supported by a chamfered sandstone corbel (Plate 14).

- 4.2.8 The internal arrangements of the flues indicated that there had been two typologies within the structure. This difference relates to the cast iron lintels used to support the apertures into the base of each flue. Within Bays 2 to 6, these were in the form of simple, rectangular section members, measuring 2" (0.05m) thick (Plate 15), whilst those to the east comprised short, 33½" (0.85m) long, fish-bellied T-section beams (Plate 16). These were of 1½" (0.03m) section, and were slightly convex along the length of the face, with the fish-bellied, ½" (0.01m) thick rib extending to a maximum depth of 4" (0.10m). Situated approximately 15" (0.38m) below each lintel was a roughly-dressed sandstone block, typically 6" (0.15m) thick and 11" (0.27m) wide. These occupied the east extent of each flue base and formed pads for the transverse ceiling beams, which were observed, prior to the initial post-disaster demolition, to have been metal, most probably cast iron. The space in the flue base to the west of the beam pads appeared to have been the apertures where the exhaust flue from the individual stoves entered the wall, linking into the structural brick flues.
- 4.2.9 At first floor height, approximately 21" (0.53m) above the crowns of the apertures in Bays 2 to 13, the thickness of the wall halved to 14" (0.36m). The piers forming the flues projected one brick from the elevation and had bullnosed edges, as at ground floor level, but the windows within the upper floor bays were significantly narrower, most probably 4' wide, and apparently similar in aperture style (as observed in photographs of the structure prior to its destruction) to those in Murrays' Mills to the south-west. The step in the wall between ground and first floor level was utilised to support the floor structure, which appears to have comprised a 0.10m thickness of coarse 'biscuit' concrete (containing substantial fragments of broken brick), between iron strengthening beams, as observed in Bays 2, 7, 11, 12 and 13 (Fig 13). Within the northern part of Bay 13, the concrete floor structure overlay a one brick thick vaulting, the springing for which was clearly observed in the eastern elevation (*Section 4.2.11 below*).
- 4.2.10 Within Bay 10, the remains of the automatic sprinkler fire-fighting system were observed. These were introduced into textile mills from the late 19th century onwards, mainly by the local company of Mather and Platt. One of the valve capping within Bay 10 was stamped '*Mather & Platt Ltd, Manchester & London*' (Plate 17), and a redundant 'Automatic Sprinkler Gauge' (pressure) by the same manufacturers, and most probably original to the system, was also recovered (Plate 18).
- 4.2.11 **East elevation:** the extant remains of the eastern elevation comprised the return of the north elevation, and was constructed of similar materials, in English Garden Wall bond. The elevation was divided into two bays by a central east/west aligned partition wall, which appears to have related solely to Bay 13 (*Section 4.2.15 below*). South of the partition, the wall was rebuilt, and comprises only two brick thickness (18" (0.45m)), with a 5' (1.52m) wide doorway, and a steel I-section lintel located north of its centre (Plate 19). A blocked, 2' (0.61m) wide doorway at the northern end of the bay, most probably represented the original construction. A vertical riser of the sprinkler

system was observed in the south-east corner of the bay, having an identical sprinkler gauge to that observed in Bay 10.

- 4.2.12 The bay to the north of the partition wall appears to have represented part of the steam-power plant. The most southerly extent of the east elevation within this bay, comprising 7'1" (2.15m), projected one brick (9" (0.23m)) from the wall-face to the north. Within this section was a substantial cast-iron bearing box, measuring 4' (1.21m) in diameter (Plate 20), which was probably associated with the mill's power transmission system. The upper and lower plates were separate castings, the former having a 4" (0.1m) wide, 6" (0.15m) deep semi-circular rebate for a vertical drive shaft. On either side of the bearing box were housings and bolts for a central lateral beam, which would have carried the main horizontal drive shaft. A further two projecting bolts were situated at the rear of the base of the bearing box within the side-walls. Beneath the bearing box was a blocked aperture measuring 25½" (0.63m) wide by 33" (0.83m) deep, which appeared to relate to the bearing box above. Both were infilled with extruded brick of a 20th century date, presumably representing a remodelling of the mill's power system. The wall scar and rough keying of a wall projecting into the bay from the immediate south of this aperture was of similar late brick, and partially obscured the bearing box.
- 4.2.13 To the immediate north of the projecting brickwork housing the bearing box was a 7' (2.13m) wide triple-skin round arch, slightly lower in height than those in the north elevation. It was blocked with a brick thickness of modern brick and pale brown, sandy cement mortar, which appeared to be comparable to that used in the bearing box in-fill.
- 4.2.14 Above the length of the east elevation within the northern bay, the first floor was recessed by one skin, the step comprising the angled springing bricks of a vaulted ceiling within this part of the ground floor.
- 4.2.15 **West elevation:** the remains of this elevation comprised a section measuring only 10'6" (3.20m) in length, surviving to ceiling height only to the north of a 6' (1.83m) wide window aperture, the north jamb of which survived 2' (0.61m) from the north elevation. The wall was of similar material and construction to the north and east elevations, but was only two bricks (0.45m) thick above a plinth, located 4" (0.10m) below the height of the street level, and projected one brick (9" (0.23m)) from the internal wall face. The plinth was capped with an angled brick, suggesting that the floor in this bay was not raised above that to the east.
- 4.2.16 **South internal partition wall:** the east/west aligned partition wall within Bay 13 formed the southern wall of a room in the north-eastern corner of the mill. This appeared to have been associated with the power system of the mill, and probably represented an internal engine house. The wall was keyed into the northern part of the eastern elevation, and was of similar construction at its eastern end, but of reduced thickness (20" (0.51m)), but still wider than would generally be expected for an internal wall. The wall survived for a length of only 2' (0.62m), the western half of which comprised an inserted jamb for an arched opening in the south elevation (Plate 21). This arch appeared to have been of similar height (7') to those in the north elevation, and was constructed

of wire-cut brick, typically measuring $9\frac{3}{4}$ " (0.25m) long, $4\frac{3}{8}$ " (0.12m) wide, and $3\frac{1}{8}$ " (0.07m) high, bonded in pale, lime mortar, and with a rebate to the jamb, presumably for a door, on the northern side of the wall. This door appears to have led to the boiler house, most probably located to the south.

- 4.2.17 To the west of the surviving remains of the south wall of the putative engine house, the basal remains of four cast iron hollow, cylindrical columns were observed on a similar alignment, located centrally within the width of the mill (Fig 12). Each was located at a bay division, perpendicular to the sandstone pads in the north elevation that supported the ceiling beams. The arrangement of the surviving columns indicates that the structure had a column between each bay.

4.3 SITE INSPECTION

- 4.3.1 A site inspection of the study area was undertaken during September 2005. The principal objective of the inspection was to relate the findings of the desk-based research to the existing study area.
- 4.3.2 The southern part of the proposed development area, which was occupied from the late 18th century by workers' housing/domestic workshops, is used currently as a car park (Plate 22). The area to the north of the demolished mill is largely vacant, comprising a concrete surface (Plate 23), with a modern light industrial unit occupying the north-western corner (Plate 24). This single-storey structure is composed largely of machine-pressed bricks and corrugated metal sheeting, although the former Bengal Street block forms the southern wall. The building incorporates two roller-shutter doors within its north-facing elevation (Plate 25). The associated yard surface is concrete/asphalt.
- 4.3.3 The eastern boundary of the proposed development is formed by the six-storey Jersey Street block. The southern portion of this building is occupied currently, although the northern part is vacant. Access to this building was not afforded during the course of the site inspection.
- 4.3.4 The area of the former Bengal Street branch canal has been surfaced with large sandstone sets, which were subsequently asphalt sealed. The mill courtyard to the east of the former Bengal Street block, to the east of the original block of Bee Hive Mill, is also cobbled with similar large sandstone sets.

5. DISCUSSION

5.1 INTRODUCTION

- 5.1.1 The Bengal Street block was the last component of the Bee Hive Mills complex to have been erected, its original build dating to 1848. As with the earlier components, the Bengal Street block appears to have been designed as a ‘room-and-power’ mill, with the owner occupying the two lower floors and renting out factory space in the upper floors. Such enterprises were not uncommon in Manchester during the mid-19th century, although little research has been undertaken to identify differences in the structural engineering inherent in these mills compared to owner-occupied factories. However, it is quite clear that the various elements of the Bee Hive Mill complex incorporated notable design features, not least the distinctive roof trusses within the original mill block, which incorporates curved cast-iron ribs supporting timber principal rafters (Williams and Farnie 1992, 152). Whilst the Bengal Street block was largely rebuilt following a fire in 1861, the replacement structure similarly appears to have been intended as a ‘room-and-power’ mill, and also incorporated some unusual design features.

5.2 BUILDING SURVEY

- 5.2.1 The building survey was restricted to the fabric of the Bengal Street block under threat of imminent demolition, comprising the remains of the north, east and west external elevations. The survey also incorporated elements of the southern (internal) elevation of a part of the building that appeared to have intended for a different use. Whilst this represents a very small percentage survival of the structure, the survey revealed significant archaeological information, regarding both the stratigraphic relationship between various parts of the complex, and of architectural and engineering elements of the structure of the Bengal Street block.
- 5.2.2 The evidence observed within Bays 1 and 2 of the Bengal Street block demonstrated that the small structure on the northern side of the western end of the mill, erected between 1848 and 1850, survived the fire of 1861. This represented the earliest fabric identified during the survey. It was butted by the reconstructed Bengal Street block, erected after a fire in 1861, and was of a depth greater than a single bay width of the new mill, as shown by the narrowed window aperture in Bay 2. The earlier structure, which projected into the western end of the Bengal Street canal branch (Fig 7), was probably approximately 14’ (4.27m) deep.
- 5.2.3 Most of the surviving fabric pertained to the rebuilding of the Bengal Street block following the fire in 1861. The ground floor of the mill appeared to have been open-plan, with the exception of Bay 13, which had an additional fireproof brick vaulting below the concrete and metal-framed fireproof ceiling observed elsewhere within the mill. It is likely that this bay may have housed elements of the steam-power plant, and possibly an engine, although large

beam engines would have required the space equivalent to two or three storeys, which does not appear to have been the case in this instance. Internal engine houses situated transversely across one end of the building were common practice in mills built during the first half of the 19th century. By the 1850s, external engine houses were being built, reflecting the widespread replacement of single-cylinder engines with those of a double beam.

- 5.2.4 Similarly, the double-flue Lancashire boiler was adopted rapidly after its introduction by William Fairbairn and John Hetherington in 1844, and these were frequently installed in detached boiler houses, such as that which served the Bengal Street block. The location of the chimney associated with these boilers is uncertain, as it is not depicted on any of the available cartographic sources. This may suggest that it was internal, again typical of early mill design. Indeed, the brick chimney that served the original Bee Hive mill block was placed internally, and enclosed within the stone stair tower. The Bengal Street block does not appear to have been furnished with an external stair tower, so this may also have been located internally.
- 5.2.5 The arch in the eastern elevation of Bay 13 was blocked with late brick, most probably dating to the removal of the engine. Whilst the position of this arch would have been ideal as a rebate housing the flywheel of the engine, it actually seems to have represented another window; had it been associated with power transmission features, the arch would not have continued to full wall thickness.
- 5.2.6 The function of the remainder of the ground floor remains conjectural, although the provision of oversized windows in the north elevation seem to have been intended to maximise the level of natural light within the mill. This may reflect that the intended function of the ground floor was as a spindle manufactory, rather than for cotton processing. This elevation also incorporated two loading-sized doorways onto the canal, suggesting that the canal was utilised for the transportation of goods to and from the mill, even though the railway and road network was firmly established by this time.
- 5.2.7 The results of the survey also indicate that the mill incorporated a stove vent heating system. Contemporary accounts of cotton spinning repeatedly emphasised the need to maintain a warm atmosphere, somewhere in excess of 60^oF, in order to minimise breakages of the fibres and consequent stoppages to production (Menuge 2001, 48). Artificial heat within the mill would thus have been required for much of each year. Heating systems based on the combustion of solid fuel were first introduced into factories during the 18th century (Tann 1970). By the late 18th century steam was increasingly being used in heating towers, with fine local examples at Murrays' Mills in Ancoats, being amongst the earliest surviving examples in the area (OA North 2004b). In this system, steam from the engine boilers was channelled through pipes set within the heating towers. However, the flues within the Bengal Street block appear to have been fired by solid fuel burned in small stoves located between each bay, with significant quantities of soot observed at the bases of the flues. This suggests that the original system of heating a factory by fire was employed here. The mill was occupied by Joseph Lamb, '*spindle and fly manufacturer*', presumably generating large quantities of timber waste, the

most simple useful function for which would have been heating the mill. Photographs of the interior of the Bengal Street block taken immediately after the fire in July 2005 (Plate 6), appear to show a lack of openings into the floors of the mill from the heating towers (which also housed the ceiling beams). This implies that the heating system took the form of an intra-mural, enclosed system, the reduced efficiency of which was counteracted by the inclusion of a flue between each bay, whereas in the more popular steam heating systems of the period, a floor of similar size would be serviced by one or two heating towers. The lack of a flue between Bays 1 and 2 was due to the pre-existence of the structure depicted on Adshead's map of 1850, restricting access to the northern elevation in this area.

- 5.2.8 The constant threat of fire, even within mills of 'fireproof' construction is highlighted by the observation of elements of an early Mather and Platt Ltd Automated Sprinkler system. The introduction of such systems may be traced to 1883, when Frederick Grinnell produced a sprinkler that achieved outstanding success. This innovation represented immeasurable technical progress, and continuous research and development resulted in the Mather and Platt Ltd Grinnell Automatic Sprinkler becoming by far the most important of all fire protection devices. Such systems were installed within the vast majority of textile mills from the late 19th century onwards.
- 5.2.9 The site inspection revealed physical evidence for the phased development of the Jersey Street block highlighted in the desk-based research (*Section 3*). Clear breaks in the fabric were observed in the eastern elevation of the structure (Plate 7), corresponding to fabric dating from 1824 at the southern end; to between 1831 and 1840 in the central section; and to the 1861 rebuilding of the Bengal Street block at the northern end. A difference of coloration in the brickwork of the upper storey of the central section of the block also shows where the upper storey was rebuilt, following the fire of 1861.

6. SIGNIFICANCE OF THE MILL COMPLEX

6.1 INTRODUCTION

- 6.1.1 Of the numerous studies that have addressed the industrial development of Manchester since the late 18th century, remarkably few have focused on the actual mills. Moreover, as Fletcher (1996, 164) remarked, *‘the threats to the survival of Lancashire’s industrial fabric are both insidious and formidable. Industrial buildings commonly disappear under the constant pressure for redevelopment, or suffer wholesale refurbishment, where evidence for previous use is obliterated without record’*. This holds true despite a surge of interest in our industrial heritage since the 1970s, and that parts of Manchester have recently (November 2001) been placed on UNESCO’s list of candidates for World Heritage status on account of the unique, but rapidly dwindling, range of 19th century mills. In this general respect, the present study area may be considered to be of significance, although this can be refined by assessing the archaeological and historical value of the site through recognised criteria.

6.2 CRITERIA

- 6.2.1 There are a number of different methodologies used to assess the archaeological significance of sites. Whilst no detailed guidelines for the retention for historic fabric within extant structures has been produced by either English Heritage or the Institute of Field Archaeologists, the ‘Secretary of State’s criteria for scheduling ancient monuments’, which is included as Annex 4 of PPG 16 (DoE 1990), has been used to assess the significance of the present study area. In the following section, the known or possible remains within the study area are considered using these criteria.
- 6.2.2 **Period:** known activity within the study area dates to the late 18th century, and includes probable dwelling houses situated adjacent to the Jersey Street and Bengal Street frontages. The branch canal across the centre of the site was constructed during the early 19th century.
- 6.2.3 The Jersey Street block of the Bee Hive Mill complex was constructed originally between 1831 and 1840, and was substantially rebuilt in 1844. The Bengal Street block was erected in 1848 and rebuilt in 1861, with other elements added during the late 19th and early 20th centuries.
- 6.2.4 **Rarity:** in very general terms the mill complex is a fairly typical example of a mid-19th century textile manufacturing site; the county of Greater Manchester contains some 800 individual textile mills, of which only 88 have Listed Building status. Of this total, however, an unknown proportion represent room-and-power mills. Moreover, it seems that the intended primary function of the Bengal Street block was for spindle manufacture rather than cotton spinning, which may have required slightly different design features. Similarly, the Jersey Street block may have been intended for warehousing rather than any form of manufacturing process.

- 6.2.5 Whilst the majority of Manchester's textile mills relied heavily upon the canal system for transporting raw materials and finished goods, and for providing water for the steam plant, few sites incorporate a canal basin. As such, the Bengal Street branch canal and its close relationship with the mill complex may be considered to be of regional rarity.
- 6.2.6 The origins of the housing within the southern part of the study area may date to the late 18th century. As such, they may pertain to the initial phase in the development of Ancoats as an industrial suburb, and represent pioneering housing structures within the area. In particular, the houses to the south of Shilling Place are depicted on several of the available maps as back-to-back houses.
- 6.2.7 **Documentation:** the historical development of the study area can be traced reasonably well from cartographic sources, and the occupants and uses of the mill have been identified from the sequence of available trades' directories and other primary documentation. Similarly, the residents of the houses along Shilling Place have been traced through entries within trades' directories. Further research would undoubtedly furnish additional detail, although this is unlikely to modify the results of this report.
- 6.2.8 **Group Value:** the remains within the study area potentially epitomise Ancoats: multi-storey mill complex associated with the textile trades, a canal branch that provided the transport link and water supply, and dwellings and a school for the workers. The site could potentially contain evidence that would both complement and offer comparison with the standing and buried remains in the wider area, and in this respect the group value can be seen as high.
- 6.2.9 **Survival/Condition:** in the full extent of survival and the condition of buried archaeological remains within the study area is unknown. However, map regression analysis has indicated that the site of the dwellings within the south-western part of the study area has not been redeveloped since the demolition of these structures, and buried remains are therefore likely to survive. It is uncertain whether these houses were built with cellars. Should this have been the case, it is considered likely that substantial buried remains will survive. Similarly, there are likely to be buried remains of the former canal branch and steam-power plant associated with the recently-demolished mill.
- 6.2.10 **Diversity:** the known sites within the study area relate to the industrialisation of the area during the late 18th and 19th centuries. These sites are of a commercial and domestic nature.
- 6.2.11 **Potential:** the remains of the mill's former steam-power plant and the dwellings have the potential to add to the existing body of information on the development of the area during the late 18th and 19th centuries.
- 6.2.12 The potential for the study area containing remains other than those identified in this assessment is considered to be low.

6.3 SIGNIFICANCE

6.3.1 Using the above criteria, and particularly rarity, group value and survival/condition, the study area contains non-statutory remains of a high local significance. These remains include:

- steam-power plant associated with the Bengal Street block
- the Jersey Street mill block
- dwelling houses
- Bengal Street branch canal

7. LIKELY IMPACT OF DEVELOPMENT

7.1 IMPACT

- 7.1.1 In broad terms, the archaeological impact of any future development of the study area can be assessed as being either direct or indirect.
- 7.1.2 *Direct Impact:* this would involve an alteration to the physical condition of the site, which might be either positive or negative. A positive direct impact might include the removal of possible threats to the site, whilst a negative direct impact would involve damage or destruction to the sub-surface archaeological resource. These impacts can be refined by assessing the likely extent of the alteration to the site once a detailed design proposal has been formulated.
- 7.1.3 *Indirect Impact:* this would involve an alteration to the setting of a site, and may again be either positive or negative. Indirect impacts might, for instance, improve or detract from the appearance, understanding or appreciation of a site.

7.2 STANDING REMAINS

- 7.2.1 Redevelopment of the site is likely to have a direct negative impact on two extant structures within the study area: the northern end of the narrow Jersey Street block, and the modern, single-storey industrial unit.

7.3 SUB-SURFACE REMAINS

- 7.3.1 Redevelopment of the site may have a direct negative impact on buried remains in the study area, involving their damage or destruction as a result of earth-moving works or the excavation of service trenches. In particular, such works within the central and south-western parts of the study area may impact upon the remains of the former steam-power plant associated with the Bengal Street block, and the former back-to-back terraced housing. Similarly, structural remains of the Bengal Street branch canal may survive across the central part of the site, and these are likely to sustain a direct negative impact during the course of redevelopment.
- 7.3.2 The proposed development is considered unlikely to have any direct impact on buried remains within the northern part of the study area.

8. RECOMMENDATIONS FOR ARCHAEOLOGICAL MITIGATION

8.1 INTRODUCTION

- 8.1.1 A distinction may be drawn between remains of national importance, which should be preserved *in-situ*, and remains of lesser significance, which may undergo preservation by record. No extant or buried remains within the study area are considered to have a potential for being of national significance, and therefore meriting preservation *in-situ*. However, some extant and buried remains are likely to be of high local importance, and could be considered to be of regional significance. As such, in accordance with current planning policy guidance, these remains would require preservation by record should they be directly affected by redevelopment proposal.
- 8.1.2 The precise archaeological response would be dependent upon the groundworks required for redevelopment, and would be finalised once detailed plans are known for the location, nature and extent of such works. The appropriate response should also take into account the results obtained from any preliminary ground investigation works, such as the excavation of geo-technical pits.
- 8.1.3 The scope and details of any archaeological recording required in advance of redevelopment would be devised by the Assistant County Archaeologist for Greater Manchester once detailed design proposals are known. However, in general terms, it may be anticipated that the following archaeological works will be required.

8.2 ARCHAEOLOGICAL INVESTIGATION

- 8.2.1 It is envisaged that a programme of archaeological investigation will be required in advance of any further demolition or ground-reduction works within the study area. In the first instance, and pending the results of any preliminary ground investigation, this work is likely to comprise the excavation of trial trenches to evaluate the nature and extent of buried remains. In particular, this should be targeted to assess the remains of:
- the steam-power plant associated with the Bengal Street block mill, which is thought to have occupied the north-eastern part of the building
 - the dwellings that formed Shilling Court and Holditch's Court
- 8.2.2 It is possible that an understanding of the nature and extent of any buried remains may be achieved via close archaeological monitoring of preliminary ground investigation works, such as the excavation of geo-technical pits.
- 8.2.3 Should any further demolition of the Jersey Street block be required as part of the proposed development, a rapid survey may be required. An appropriate level of response may be a photographic survey.

- 8.2.4 Should redevelopment have a direct negative impact upon sections of the former Bengal Street canal branch, an archaeological watching brief may be considered to be an appropriate mitigation response.

9. BIBLIOGRAPHY

9.1 CARTOGRAPHIC SOURCES

Map of Manchester and Salford, drawn from a survey by William Green, begun in 1787 and completed in 1794

A Plan of Manchester and Salford, by Bancks and Thornton, 1800

Plan of Manchester and Salford, by Ashton, 1804

Plan of Manchester and Salford, by Pigot, 1809

Plan of Manchester, Johnson, 1819

Map of Manchester and its Environs, by R Thornton, 1824

A Map of Manchester and Salford, Bancks and Co, 1831

Plan of the Township of Manchester, Adshead, 1851

Ordnance Survey 6": 1 mile map, Manchester sheet 24, surveyed 1848-49, published 1851

Ordnance Survey 1:2500 First Edition map, Lancashire sheets CIV.7, surveyed 1888-91, published 1893

Ordnance Survey 1:2500 map, Lancashire sheets CIV.7, 1908 Edition, (surveyed 1905)

Ordnance Survey 1:2500 map, Lancashire sheets CIV.7, 1922 Edition, (surveyed 1915)

Ordnance Survey 1:2500 map, Lancashire sheets CIV.7, Revision of 1931

Ordnance Survey 1:2500 map, Lancashire sheets CIV.7, Revision of 1969

9.2 PRIMARY SOURCES

MCL/M9/40/2/100 Poor Rate Assessments, Manchester District 1, Part 1, 1829

MCL/M9/40/2/146 Poor Rate Assessments, Manchester District 1, Part 1, 1846

Manchester Guardian 12th January, 1861

Plan 7547, Manchester City Planning Department, 1906

Goad's Insurance Plan, Vol II, Sheet 217 (1943 Revision)

9.3 SECONDARY SOURCES

- Ashworth, G, 1987 *The Lost Rivers of Manchester*, Altrincham
- Axon, WEA, 1886 *The Annals of Manchester: A Chronological Record*, Manchester
- Cooper, G, 2002 *Illustrated History of Manchester's Suburbs*, Manchester
- Countryside Commission, 1998 *Countryside Character Volume 2: North West*, Cheltenham
- DoE, 1990 *Planning Policy Guidance 16: Archaeology and Planning*
- English Heritage, 1991 *Management of Archaeological Projects*, 2nd Edn, London
- Fletcher, M, 1996 Industrial Archaeology, in R Newman (ed) *The Archaeology of Lancashire*, 157-69
- Hall, D, Wells, CE, and Huckerby, E, 1995 *The Wetlands of Greater Manchester*, Lancaster Imprints **3**, Lancaster
- Hartley, LS, 1974 *A typology of Brick: with numerical coding of brick characteristics*, Jour Brit Archaeol Assoc 3rd Ser, **37**, 64-87
- Lee, CH, 1972 *A Cotton Enterprise 1795-1840: A History of M'Connel and Kennedy, Fine Cotton Spinners*, Manchester
- Little, S, 2004 Ancoats – The First Industrial Suburb, in R McNeil and JSF Walker (eds), *The Heritage Atlas 4: Manchester – The Archetype City of the Industrial Revolution*, Manchester, 31-33
- Menuge, A, 2001 The Cotton Mills of the Derbyshire Derwent, in Falconer KA (ed) 2001 *Derwent Valley Textile Mills*, p38-61, Belper North Mill Trust
- OA North, 2004a *New Islington Mill, Ancoats: Archaeological Evaluation*, unpubl rep
- OA North, 2004b *Murrays' Mills, Ancoats, Manchester: Old and Decker Mills Archaeological Investigation*, unpubl rep
- Pigot, J, 1819 *Manchester and Salford Directory*, Manchester
- Pigot, J, 1832 *Manchester and Salford Directory*, Manchester
- Pigot, J, 1835 *Manchester and Salford Directory*, Manchester
- Pigot, J, and Dean, R, 1822 *Manchester and Salford Directory*, Manchester
- Pigot, J, and Slater, I, 1841 *Directory of Manchester and Salford*, Manchester
- Slater, I, 1845 *General and Classified Directory and Street Register of Manchester and Salford*, Manchester

- Slater, I, 1851 *Manchester and Salford Directory*, **1**, Manchester
- Slater, I, 1855 *Manchester and Salford Directory*, **1**, Manchester
- Slater, I, 1863 *Manchester and Salford Directory*, **1**, Manchester
- Slater, I, 1869 *The Business Directory of Manchester*, London
- Slater, I, 1874 *Manchester and Salford Directory*, **1**, Manchester
- Slater, I, 1876 *Royal National Commercial Directory of Manchester*, Manchester
- Slater, I, 1877 *Manchester and Salford Directory*, **1**, Manchester
- Slater, I, 1879 *Manchester and Salford Directory*, **1**, Manchester
- Tann, J, 1970 *The History of the Factory*, London
- Williams, M, 2002 Ancoats – Where the Steam-Powered Textile Mill Began, in R McNeil and JSF Walker (eds), *The Heritage Atlas 4: Manchester – Archetype City of the Industrial Revolution*, UMFAC, Manchester, 34-38
- Williams, M, and Farnie, DA, 1992 *Cotton Mills of Greater Manchester*, Preston
- Worrall, J, 1894 *Cotton Spinners & Manufacturers' Directory*, Oldham
- Worrall, J, 1891 *Cotton Spinners & Manufacturers' Directory*, Oldham

APPENDIX 1: PROJECT DESIGN

**Oxford
Archaeology
North**

September 2005

**45 – 47 BENGAL STREET,
ANCOATS,
MANCHESTER**



ARCHAEOLOGICAL INVESTIGATION PROJECT DESIGN

Proposals

The following project design is offered in response to a request from Mr Jonathan Wrigley, of Nikal, for an archaeological investigation of the 45 – 47 Bengal Street, Ancoats, Manchester.

1.1 CIRCUMSTANCES OF PROJECT

- 1.1.1 Nikal Investments are investigating the possibility of redeveloping 45 – 47 Bengal Street, within the Ancoats area of Manchester, for a mixed residential and commercial end-use. Until recently, 45 Bengal Street was occupied by a light industrial unit and associated yard, whilst a disused 19th century textile mill occupied 47 Bengal Street. During July 2005, this mill building was damaged by a catastrophic fire, which resulted in the collapse of the bulk of the structure. Elements of the building that did survive, however, included some structures of archaeological significance. Whilst the perilous structural nature of these remains necessitated their eventual demolition, a rapid programme of archaeological survey was recommended in advance of their ultimate loss. This was to comprise a descriptive and photographic survey of the structural remains, accompanied by measured elevations and a plan of the surviving fabric, broadly consistent with a Royal Commission on the Historical Monuments of England (RCHME) Level II type survey (RCHME 1996, 4).

1.2 OXFORD ARCHAEOLOGY NORTH

- 1.2.1 Oxford Archaeology North (OA North) has considerable experience of the recording of historic buildings together with evaluation and excavation of sites of all periods, having undertaken a great number of small and large scale projects during the past 20 years. Fieldwork has taken place within the planning process and construction programmes, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. OA North has recently undertaken the recording of Murrays' Mills, Ancoats, Gun Street Warehouses, Ancoats, Piercy Street Foundry, Ancoats, as well as many other post-medieval and industrial buildings further afield.
- 1.2.2 OA North has the professional expertise and resource to undertake the project detailed below to a high level of quality and efficiency. OA North and all its members of staff operate subject to the Institute of Field Archaeologists (IFA) Code of Conduct. OA North is an IFA registered organisation, number 17.

2. OBJECTIVES

- 2.1 The principal objective of the archaeological investigation is to provide an understanding of the historical development of the site, identify significant architectural elements within the surviving fabric, and assess the potential of any buried remains across the site.
- 2.2 The project aims may be achieved via the following stages:
- provide an account of the ownership, function and development of the site via historical research;
 - demonstrate the plan, form, fabric, function, age and developmental sequence of 47 Bengal Street from the historical and archaeological evidence available;

- identify key architectural features within the surviving fabric of 47 Bengal Street;
- produce a plan and elevations of the surviving fabric of 47 Bengal Street;
- undertake a comprehensive and detailed photographic survey of the surviving fabric of 47 Bengal Street;
- undertake a watching brief during/following removal of rubble along the southern face of the northern elevation, and during/following the removal of late lean-to structures abutting the northern side of the northern elevation of 47 Bengal Street;
- identify potential buried remains of archaeological interest across the site, assess their significance, and make recommendations for mitigation with regard to any future development proposal.

3. METHODOLOGY

3.1 BUILDING INVESTIGATION OF 47 BENGAL STREET

- 3.1.1 **Photographic Archive:** a photographic archive will be produced utilising a 35mm camera to produce both black and white contact prints and colour slides. Photographs will also be taken in digital format. The archive will comprise general shots of the building and its surroundings.
- 3.1.2 **Written description:** a visual inspection of the building will be undertaken utilising the OA North buildings *pro-forma* sheets. An outline description will be maintained to RCHME Level II-type survey. This level of recording comprises a descriptive record (RCHME 1996, 4), and will provide a systematic account of the building's origins, development and use.
- 3.1.3 **Site Drawings:** The following drawings will be provided for the surviving structure:
- i) A plan at ground floor level;
 - ii) An internal elevation of the north wall of the mill.
- 3.1.4 **Survey:** the following survey techniques will be applied to the building as appropriate:
- 3.1.5 **Reflectorless Electronic Distance Measurer (REDM) survey:** the proposed elevation 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 TCR407. 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, which allows the survey to be directly inserted into AutoCAD software for the production of final drawings.

- 3.1.6 Detail captured by the instrument survey will include such features as window and door openings, quoin stones, outline of decorative detail, an indication of ground and ceiling level, and changes in building material.
- 3.1.7 The drawings will usually be produced at a scale of 1:50. The existing drawings will be scanned or digitised into an industry standard CAD package (AutoCAD Release 14) for the production of the final drawings.
- 3.1.8 **Photographic Survey Techniques:** large elements of the surviving elevation can be captured by a process of rectified photography. These photographs will be tied into the survey data produced by the instrument survey, to produce more a detailed elevational drawing.
- 3.1.9 **Manual Survey Techniques:** hand measured survey techniques will be utilised to record areas that are not accessible for instrument or photographic survey. The drawings will be tied into the remained of the survey through the use of a survey control established by the instrument survey.
- 3.1.10 **CAD System:** the drawings will be manipulated in AutoCAD release 14. 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. Finished drawings can be plotted at the required scale or sheet sizes.

3.2 WATCHING BRIEF DURING DEMOLITION OF 47 BENGAL STREET

- 3.2.1 Much of the surviving fabric is currently obscured. That on the southern side is partially obscured by rubble from the demolition of the upper floors of the mill during safety works by Manchester Building Control Unit, whilst the external northern elevation is entirely obscured by late lean-to sheds, which are to be removed as part of the site clearance programme. Given the structural instability of the structure, it is unfeasible to remove either elements prior to the initial survey, as it may lead to further collapse of the *in-situ* fabric. An archaeological watching brief will therefore be undertaken during the removal of both elements, followed by further building investigation of uncovered elements, should they survive intact.

3.3 DESK-BASED ASSESSMENT OF 45 – 47 BENGAL STREET

- 3.3.1 A desk-based assessment of the entire site will be undertaken to inform the results of the building survey, and to support any future applications for redevelopment.
- 3.3.2 **Documentary and Cartographic Material:** this work will comprise a desk-based assessment of the existing resource. It will include an appraisal of the

data in the Manchester Local Studies Unit, Greater Manchester Records Office, the Greater Manchester Textile Mill Survey (held by GMAU), the Lancashire Record Office (Preston), appropriate sections of County histories, early maps (printed and manuscript), and such primary documentation as may be reasonably available. Nikal Investments also hold a significant data pertaining to 47 Bengal Street, which will be examined during the assessment.

- 3.3.3 Particular attention will be paid to cartographic sources, as these often provide important evidence of archaeological activity and transformation of the historic landscape. These sources will be assessed by undertaking an historic map regression exercise. An examination of the relevant trade directories will also be undertaken, and available published and unpublished documentary sources will be examined and assessed.
- 3.3.4 **Aerial Photography:** any relevant photographic material held by GMAU and Lancashire County Council will also be studied. This may indicate the range and survival of archaeological and structural features in the designated area no longer visible at ground level.

4. REPORT

- 4.1 The results of the archaeological investigation will be submitted in report format, illustrated with the relevant drawings. The report will incorporate the results obtained from the survey and the desk-based assessment, which will place the buildings into their historical and architectural context. A site archive will be produced to English Heritage guidelines (*MAP 2*) and in accordance with the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990). The report will contain the following sections:
- Summary;
 - Introduction;
 - Methodology;
 - Archaeological and historical background;
 - Results obtained from the survey of 47 Bengal Street;
 - Identification of buried remains of potential archaeological interest across the entire site;
 - Recommended archaeological mitigation;
 - Bibliography.
- 4.2 One bound and one unbound copy of the report will be submitted to the Client. The Greater Manchester Sites and Monuments Record and the Assistant County Archaeologist will also be sent a copy of the report, which will be provided both as paper copy and in a suitably digital form. A copy of the report will also be supplied to the Local Planning Authority responsible for

the planning decision. Any subsequent work arising from this survey will be subject to separate consideration in liaison with the Assistant County Archaeologist and the Client.

5. ARCHIVE

- 5.1 The results of the buildings investigation will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*Management of Archaeological Projects*, 2nd edition, 1991). The project archive represents the collation and indexing of all the data and material gathered during the course of the project, in accordance with UKIC guidelines. 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.
- 5.2 It is intended that the archive be deposited with the Greater Manchester County Record Office. An index to the archive will be forwarded to the Greater Manchester Sites and Monuments Record, and a further copy can be made available for deposition in the National Archaeological Record.

ILLUSTRATIONS

FIGURES

Figure 1: Location Map

Figure 2: Extract from modern map, showing the location of the study area

Figure 3: Extract from Green's *Map of Manchester and Salford*, 1794

Figure 4: Extract from Johnson's *Map of Manchester*, 1819

Figure 5: Extract from Bancks and Co's *Plan of Manchester and Salford*, 1831

Figure 6: Extract from the Ordnance Survey 60": 1 mile map, 1851

Figure 7: Extract from Adheads map, 1850

Figure 8: Extract from the Ordnance Survey 25": 1 mile map, 1893

Figure 9: Extract from the Ordnance Survey 1: 25,000 mile map, 1931

Figure 10: Plan of the site in 1943, based on Goad's Insurance map

Figure 11: Extract from the Ordnance Survey 25": 1 mile map, 1969

Figure 12: Plan of the surviving structural remains, superimposed onto the Ordnance Survey 25": 1 mile map of 1893

Figure 13: Surviving north internal elevation of the Bengal Street block

Figure 14: Outline of the proposed development, superimposed upon the 1893 OS map, showing archaeological hazard areas

PLATES

Plate 1: Aerial view of Ancoats taken in 1958, looking north-east, showing the study area

Plate 2: Aerial view of Ancoats taken in the 1980s, looking north, showing the study area

Plate 3: Photograph of the Bengal Street block in 1962, showing Shilling Place in the foreground

Plate 4: The north-west-facing elevation of the Bengal Street block in June 2005

Plate 5: The south-west-facing elevation of the Bengal Street block in June 2005

Plate 6: The smouldering remains of the Bengal Street block after the fire in July 2005

Plate 7: The Jersey Street block and the vestiges of the Bengal Street block

Plate 8: North internal elevation of the Bengal Street block, following emergency demolition

Plate 9: Original windows in north face of Bengal Street block

Plate 10: Full height opening in Bay 7, with external step

Plate 11: Western bays of internal north elevation

Plate 12: Blocking of window in north elevation, Bay 13

Plate 13: Detail of base of heating tower flue, between Bays 11 and 12

Plate 14: External detail of heating tower base, between Bays 11 and 12

Plate 15: Detail of rectangular-section flue lintel

Plate 16: Detail of fish-bellied flue lintel

Plate 17: 'Mather & Platt' stamped valve cap

Plate 18: Pressure gauge from Automatic Sprinkler System

Plate 19: Southern end of east internal elevation

Plate 20: Northern part of east internal elevation

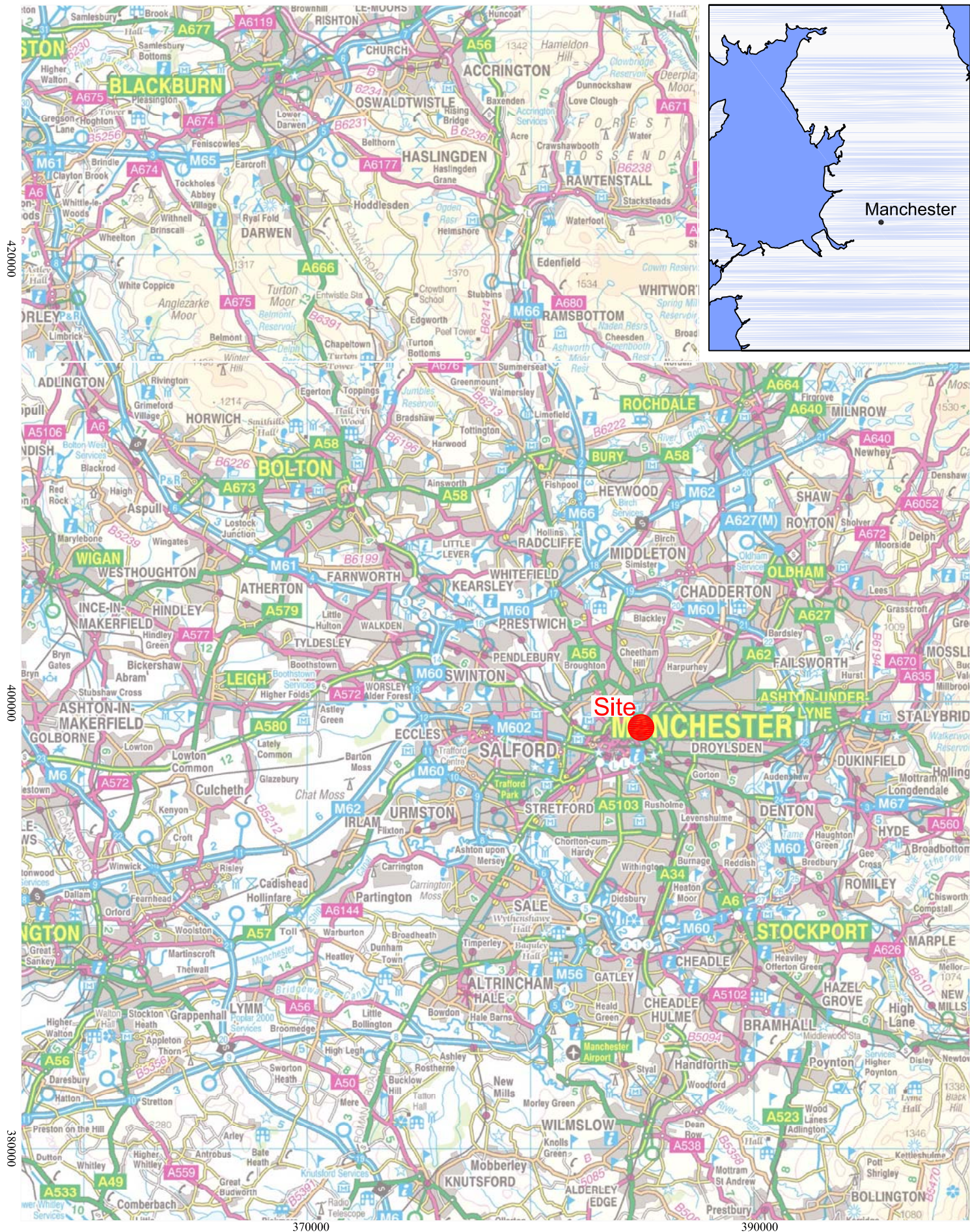
Plate 21: Internal partition wall within Bay 13

Plate 22: View looking south-east across the study area towards Jersey Street

Plate 23: View looking north-east across the study area, showing the former City File Works to the rear

Plate 24: General view looking south across the northern part of the study area

Plate 25: Modern light industrial unit within the northern part of the study area



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metres

Figure 1: Location Map

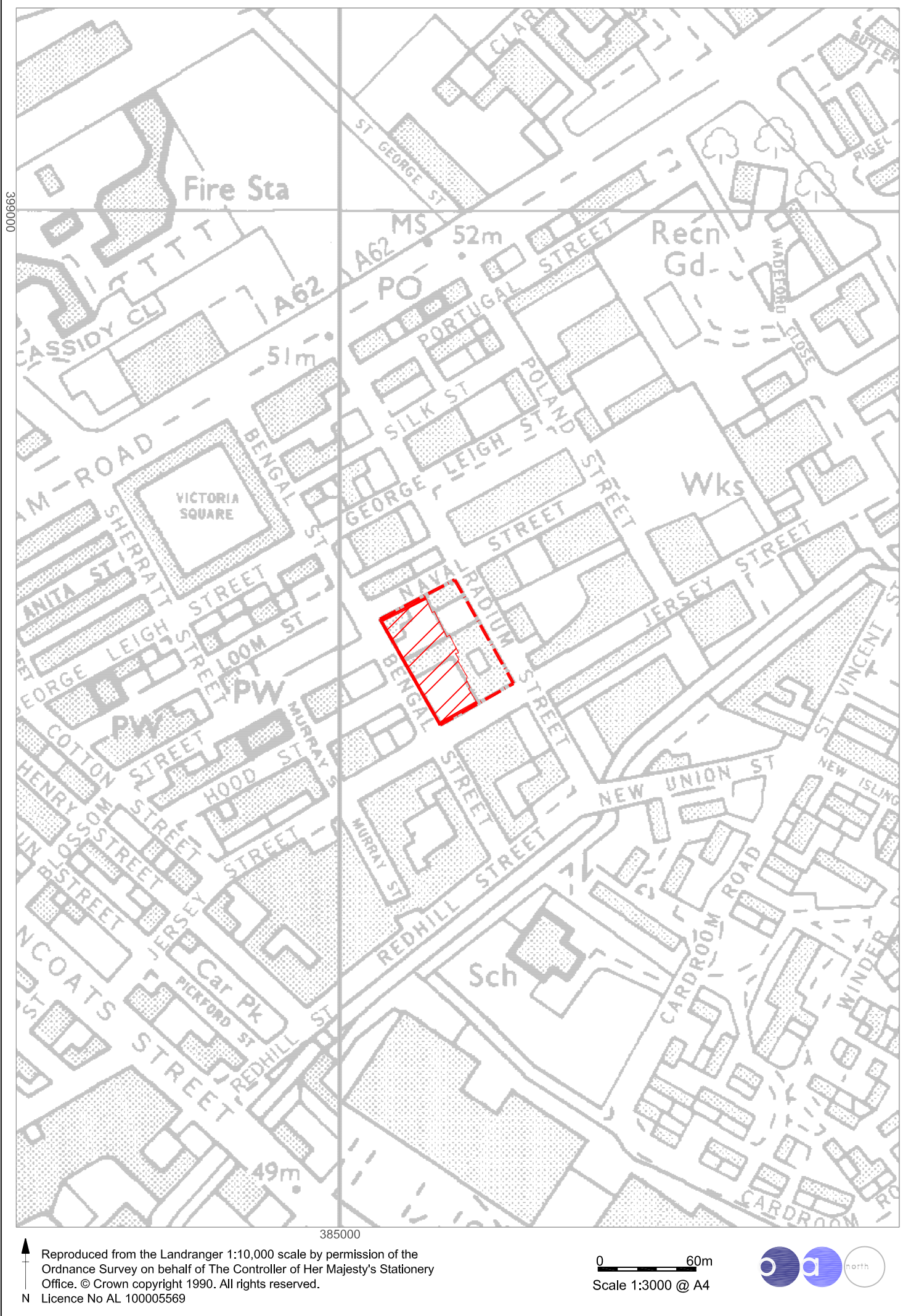


Figure 2: Extract from modern map, showing the location of the study area, and the outline of the proposed development



study area

0 20m
Scale 1:1000 @ A4



Figure 3: Extract from Green's Map of Manchester and Salford, 1794

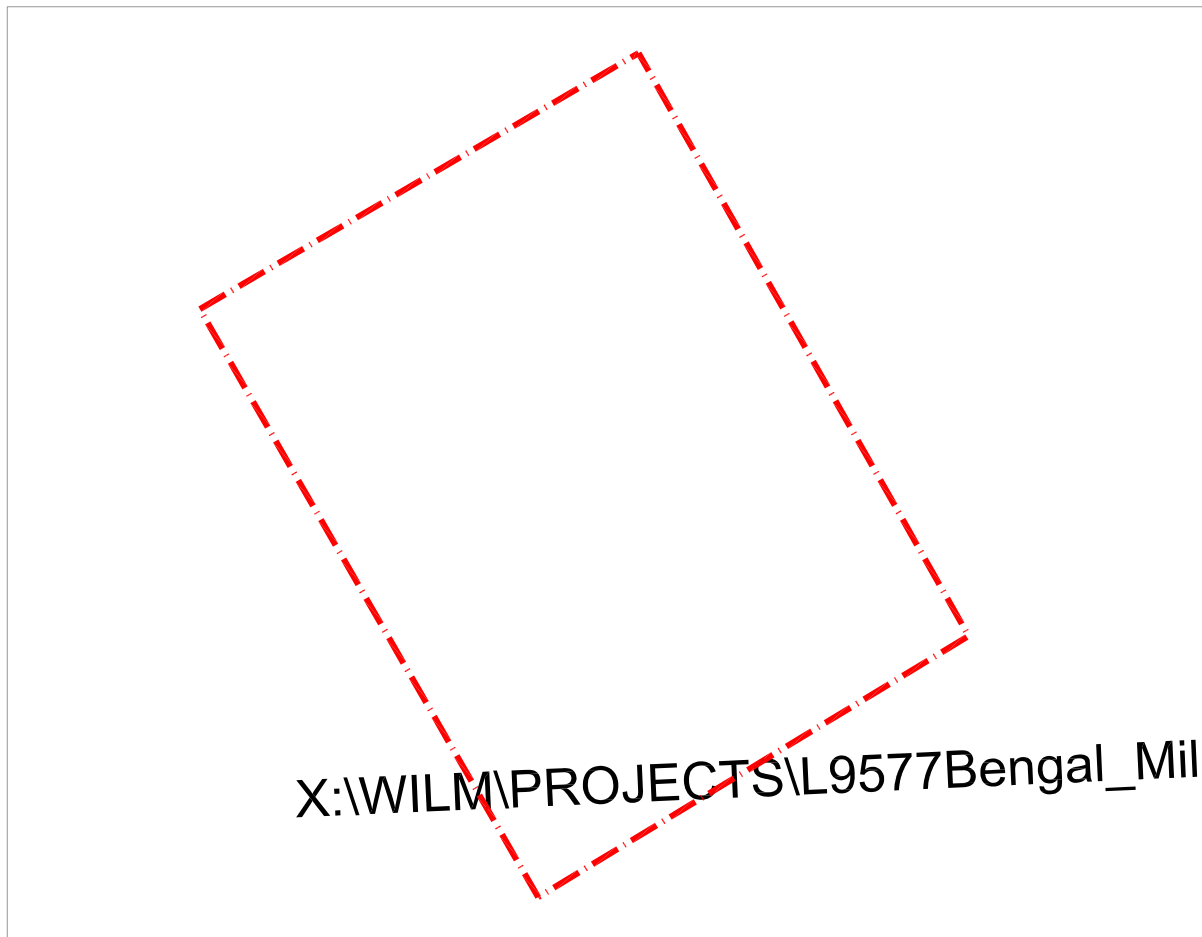


Figure 4: Extract from Johnson's Map of Manchester, 1819

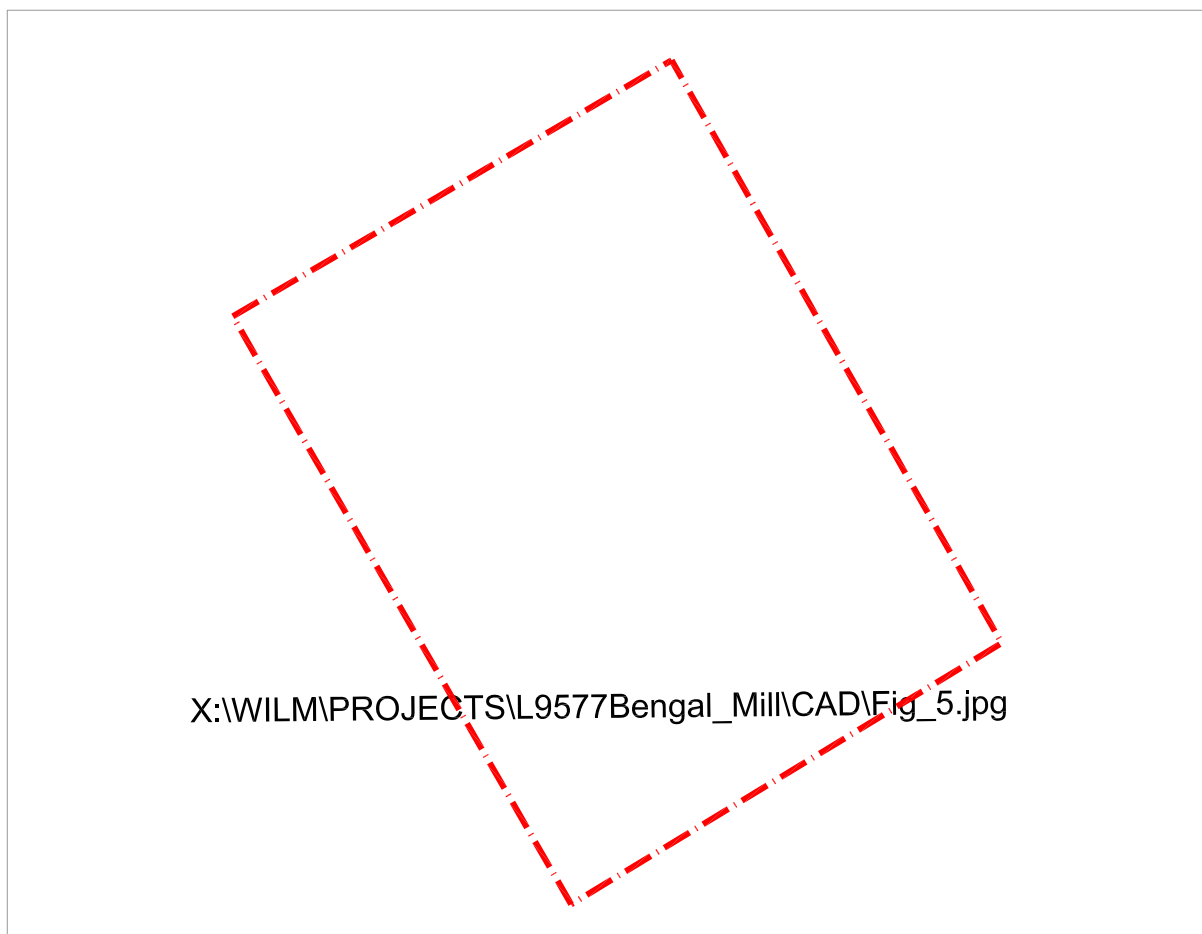


Figure 5: Extract from Bancks and Co's Plan of Manchester and Salford, 1831



study area

0 20m
Scale 1:1000 @ A4





Figure 6: Extract from the Ordnance Survey 60": 1 mile map, 1851

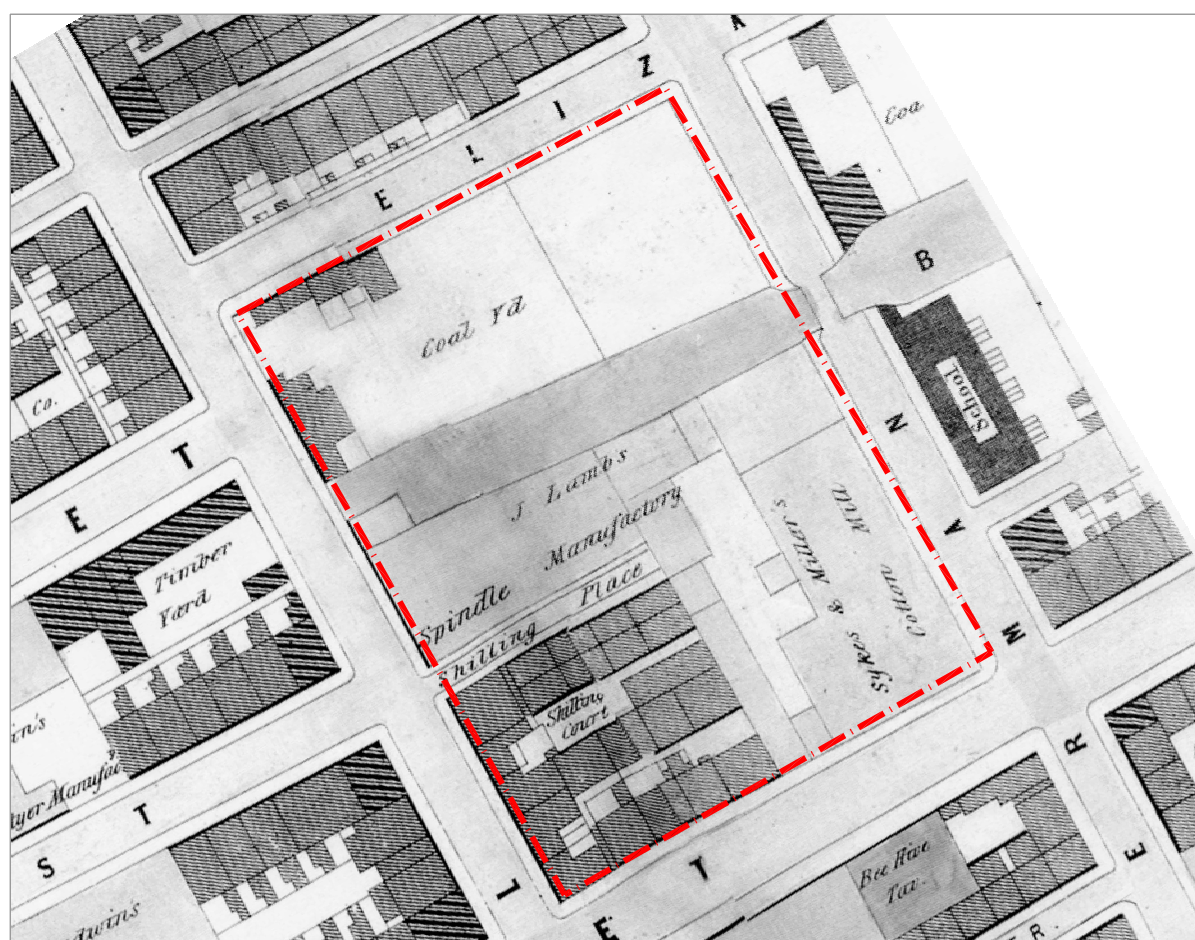


Figure 7: Extract from Adheads map, 1850



study area

0 20m
Scale 1:1000 @ A4





Figure 8: Extract from the Ordnance Survey 25": 1 mile map, 1893



Figure 9: Extract from the Ordnance Survey 1:25000 map, 1931



study area

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Scale 1:1000 @ A4



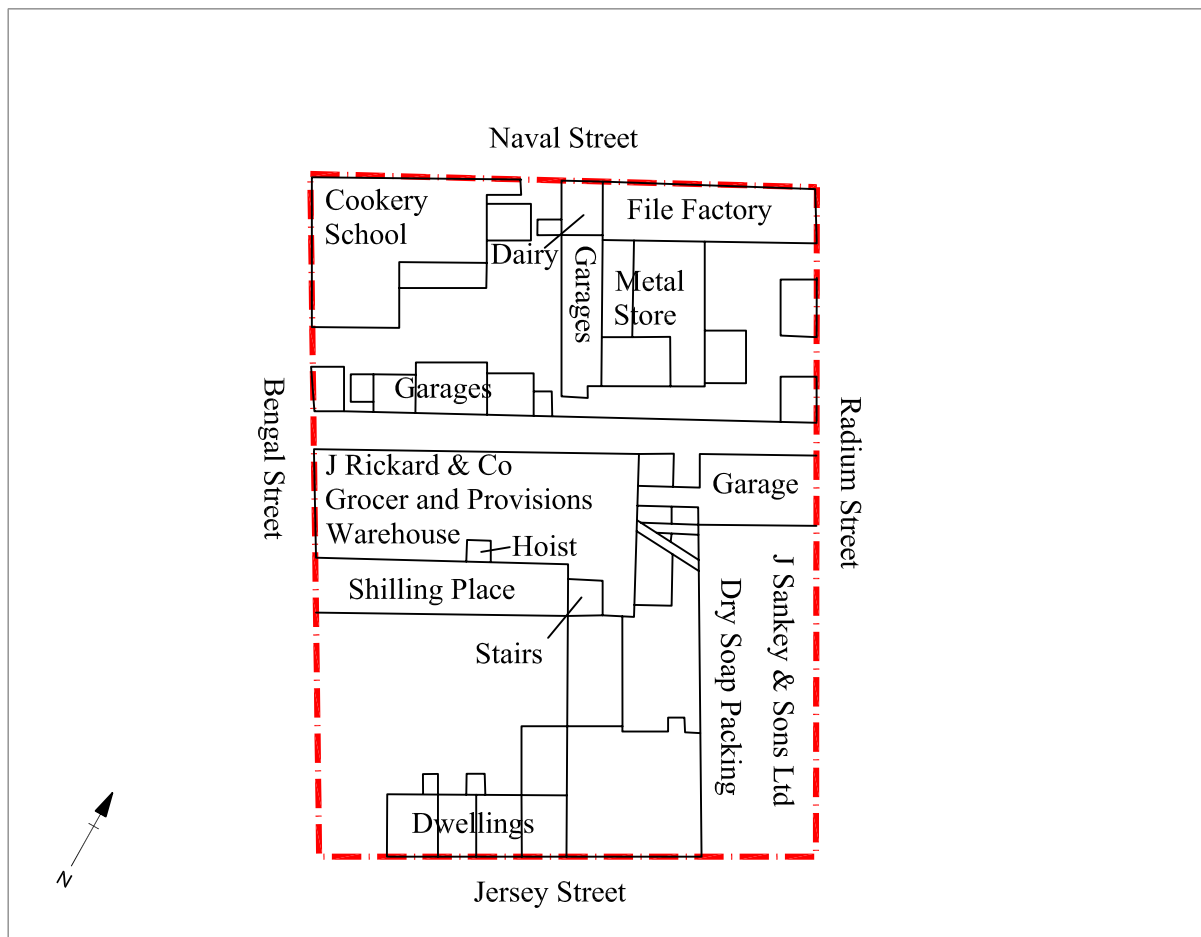


Figure 10: Plan of the site in 1943, based on Goad's Insurance map

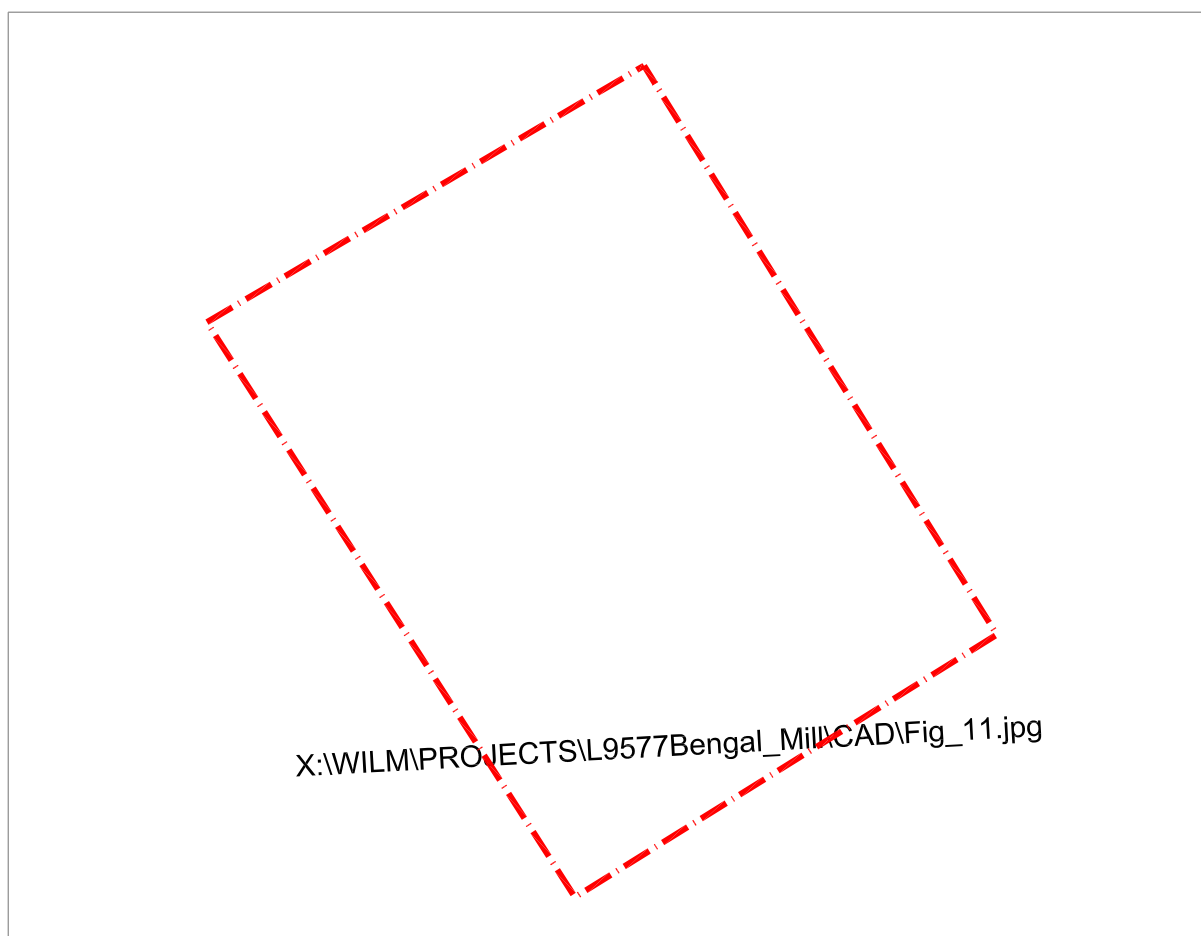
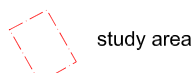
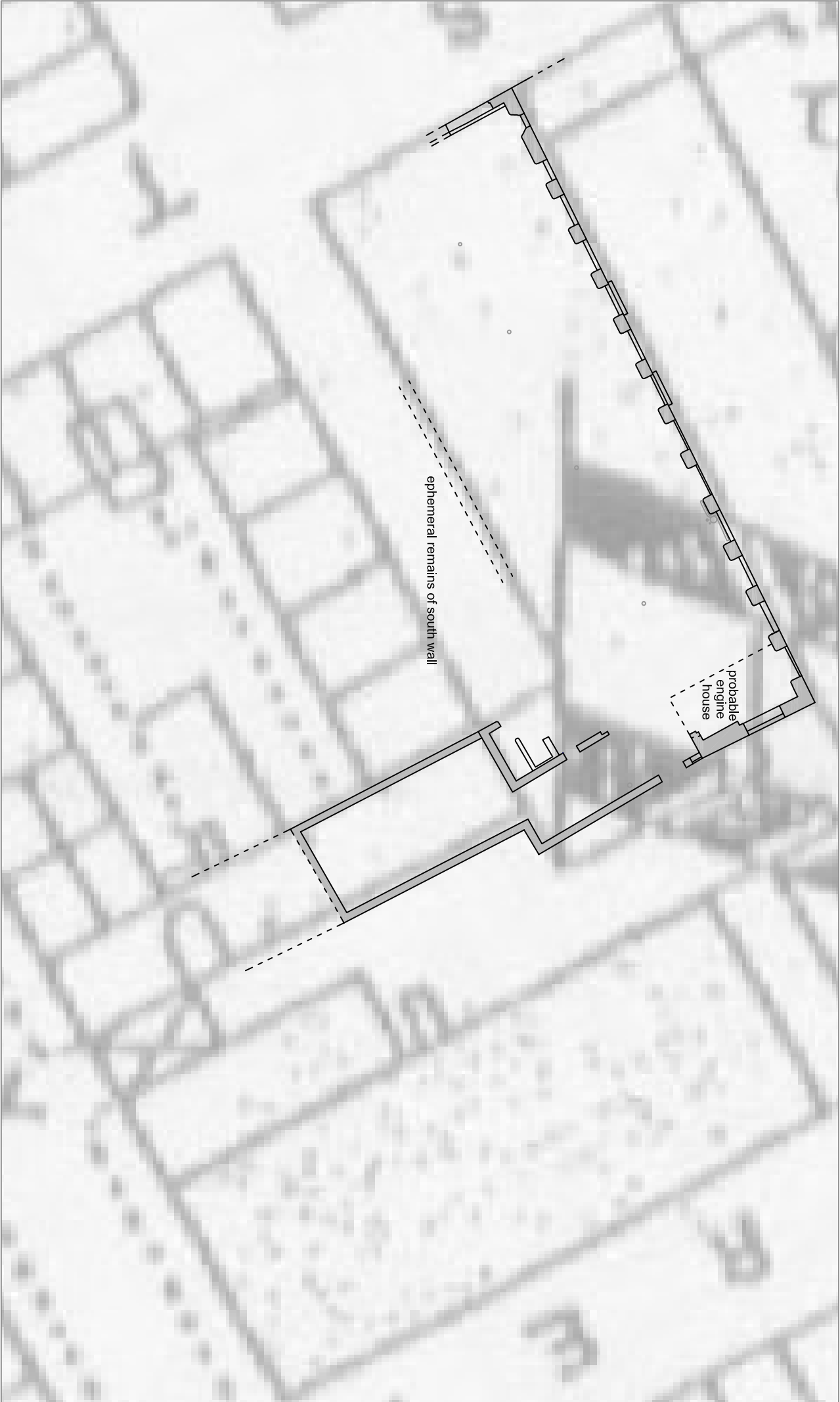


Figure 11: Extract from the Ordnance Survey 25": 1 mile map, 1969



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Figure 12: Plan of the surveyed structural remains, superimposed onto Ordnance Survey 25": 1 mile map of 1893

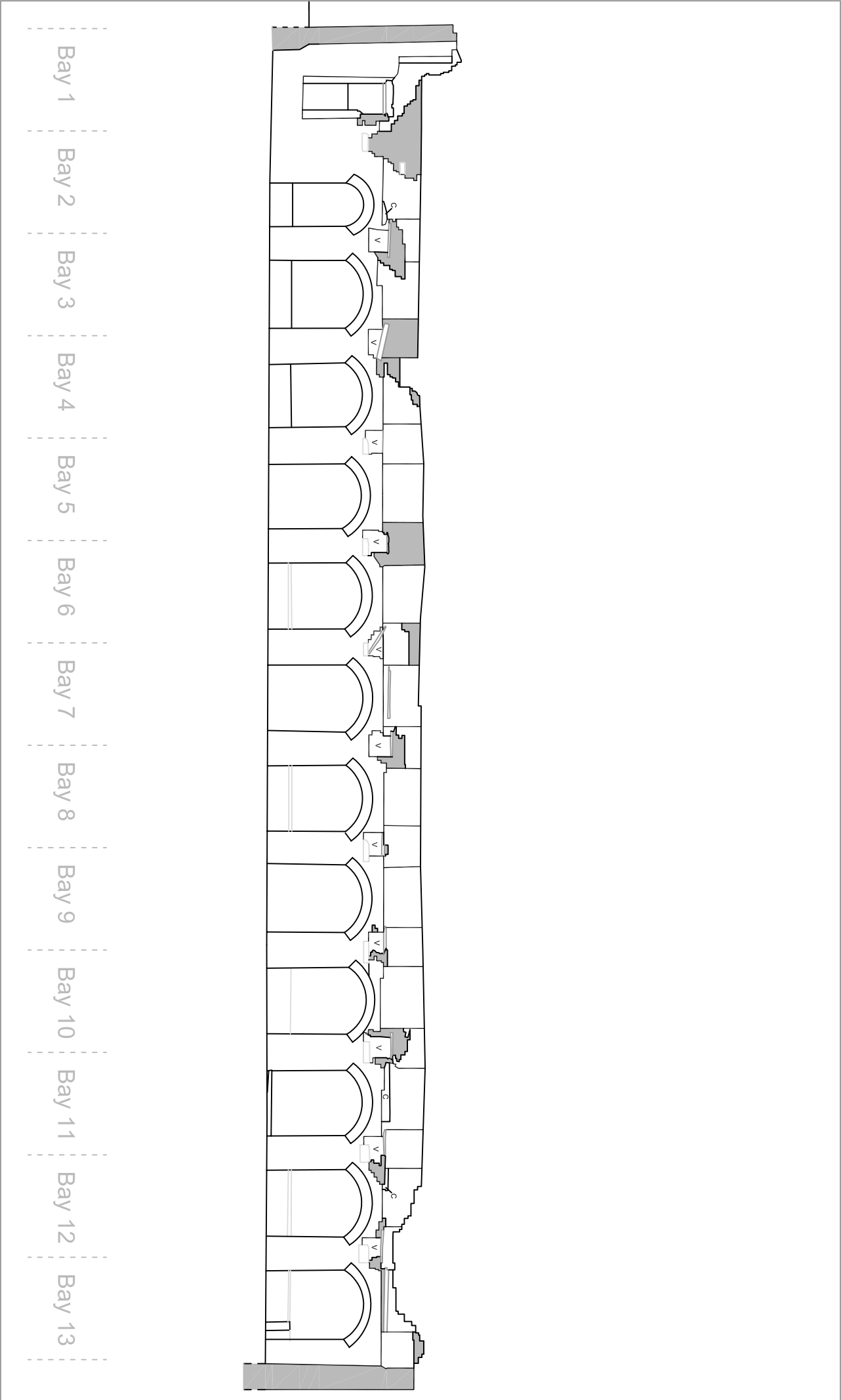
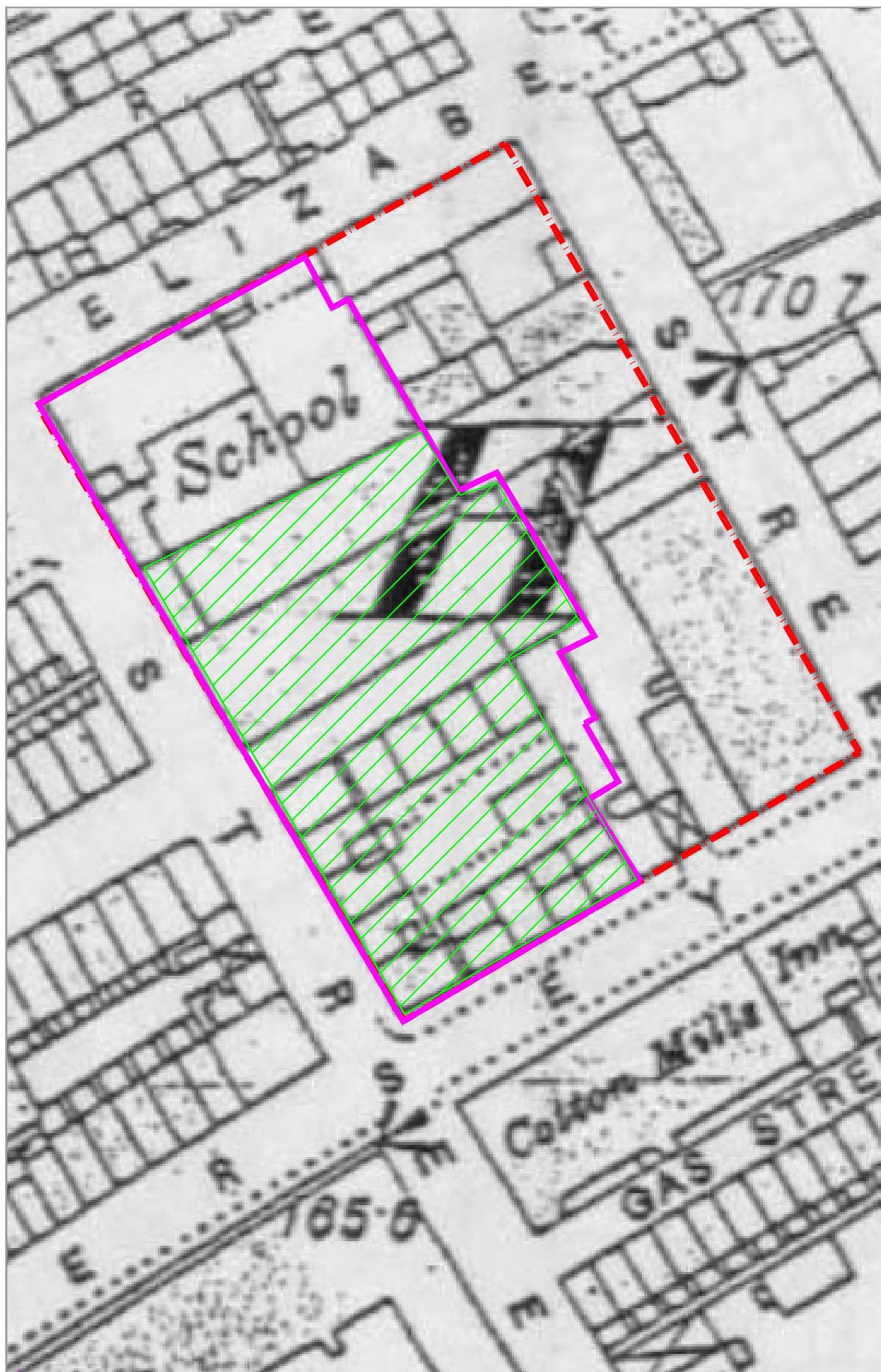


Figure 13: Surviving north internal elevation of Bengal Mill



study area



footprint of
proposed building



hazard area

Not to Scale



Figure 14: Outline of the proposed development, superimposed upon the 1893 OS map, showing archaeological hazard areas



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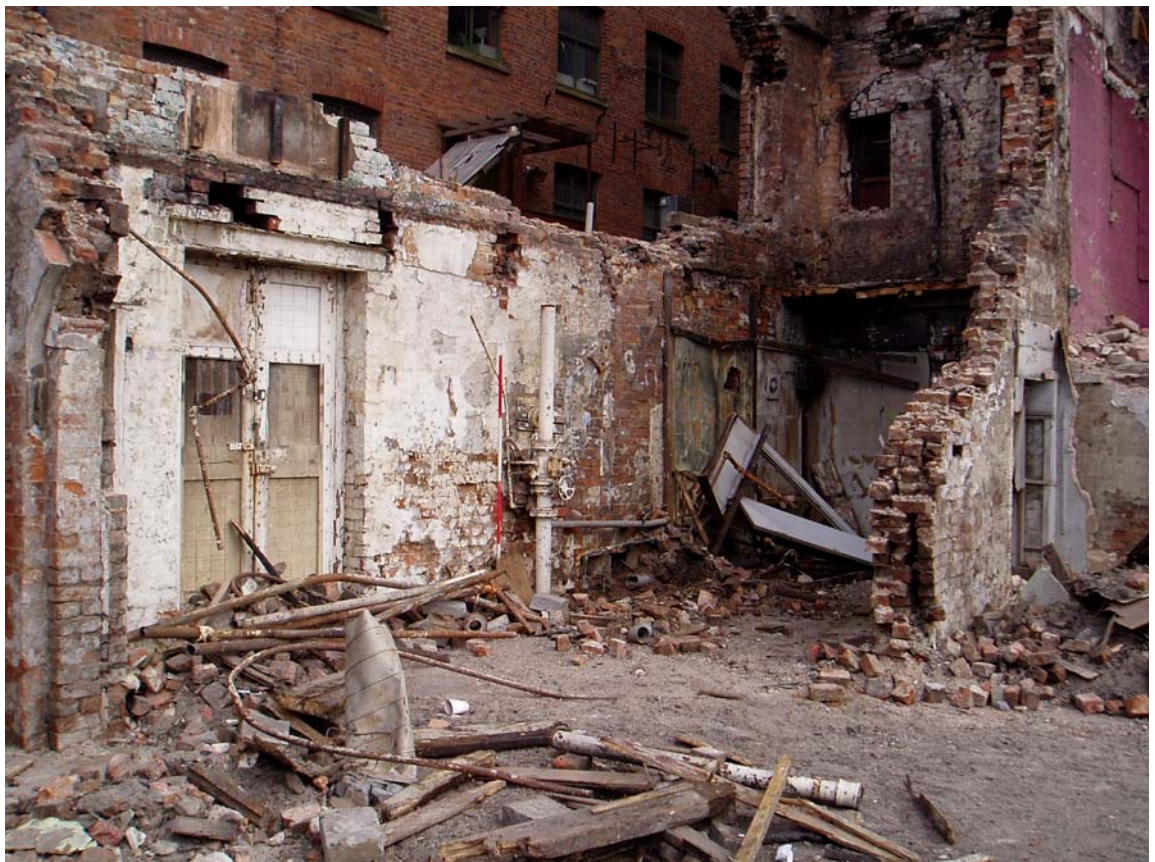


Plate 19: Southern end of east internal elevation



Plate 20: Northern part of east internal elevation



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