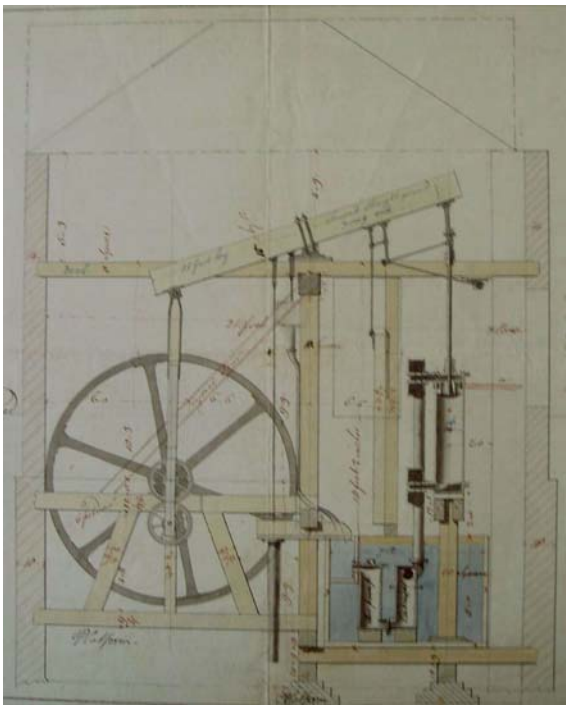

PICCADILLY MILL, PICCADILLY, MANCHESTER

Greater Manchester

Post-Excavation Assessment

Oxford Archaeology North

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City Inn

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SUMMARY

During December 2004, Oxford Archaeology North commenced a programme of archaeological investigation that was focused within the Piccadilly area of Manchester, centred at NGR SJ 8459 9799. The work was commissioned by Gleeds Management Services, acting on behalf of City Inn, who have submitted a proposal to Manchester City Council to redevelop the site.

The study area formed part of a focus for industrial development during the late 18th century, following the application of steam power to textile manufacturing. In particular, the study area was occupied formerly by Piccadilly Mill, also known as Drinkwater's Mill, which was completed in 1789 and represented the first cotton factory in the region to have been designed specifically to accommodate a rotative steam engine.

During the late 18th century, some of the region's most significant pioneers of the textile industry were associated directly with the mill, including Peter Drinkwater, George Lee, Robert Owen and Thomas Lowe. The mill underwent several phases of expansion through the 19th century, and continued to function as a cotton spinning mill until the late years of that century, when it was converted for use as a lithographic printing and engraving works. By 1932, however, the printing works had been demolished, and the site was redeveloped.

In order to secure archaeological interests of this potentially iconic site, Manchester City Council attached an archaeological condition to planning consent for redevelopment. Following on from the results of a desk-based assessment of the site, a programme of archaeological evaluation to assess the nature, extent and significance of buried archaeological remains was devised by the Assistant County Archaeologist for Greater Manchester.

The evaluation was targeted specifically at the site of Drinkwater's Mill within the proposed development area via the excavation of two targeted trenches. These revealed that extensive sub-surface remains of the mill survived, including elements possibly relating to the earliest phases of the structure. As a result, the Greater Manchester Assistant County Archaeologist recommended a programme of further archaeological excavation to provide a mitigation record of the site, as preservation *in situ* was not a practical option.

The targeted excavation, undertaken during February and March 2005, exposed considerable remains of the mill structure, incorporating seven phases of activity, enabling a comprehensive record to be made of the *in-situ* fabric. In particular, the excavation revealed the south wall of the original 1789 construction, along with significant material remains of the lithographic printing processes undertaken within the mill complex during its final phase of usage. The resultant dataset is of regional significance and merits a programme of further analysis.

This report provides a summary and assessment of the dataset, and presents a strategy for further analysis that will culminate in the publication of this important site.

ACKNOWLEDGEMENTS

Oxford Archaeology North would like to express its thanks to Mr Russell Bolton, Bill Swan and Mike Paul of Gleeds Management Services for commissioning and supporting the work on behalf of City Inn, and to Richard Harris and Pauline McFarlane of City Inn for their support. Oxford Archaeology North is also grateful to Norman Redhead, the Assistant County Archaeologist for Greater Manchester, for his support and advice throughout the course of the project. The project was funded entirely by City Inn.

The archaeological evaluation was carried out by Chris Wild, Sean McPhillips and Chris Ridings, with the subsequent excavation undertaken by Chris Wild, Dave McNicol and Chris Ridings. The finds were assessed by Jo Dawson, and the drawings were produced by Chris Wild and Chris Ridings. Documentary research was undertaken by Daniel Elsworth and Ian Miller, and the report was compiled by Chris Wild and Ian Miller, who was also responsible for project management.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

1.1.1 City Inn recently submitted a proposal for redevelopment of the area bounded by London Road, Auburn Street and the Metrolink tramway, within the Piccadilly area of Manchester (centred at NGR SJ 8459 9799; Fig 1). The site was occupied formerly by a cotton spinning mill of considerable archaeological significance, although it was uncertain as to the extent of buried remains pertaining to this building.

1.1.2 In order to secure archaeological interests, Manchester City Council attached an archaeological condition to planning consent for redevelopment of the site, and a brief detailing the required archaeological works was devised by the Assistant County Archaeologist for Greater Manchester. In the first instance, an archaeological evaluation was required to assess the nature, extent and significance of buried archaeological remains.

1.1.3 The evaluation comprised the excavation of two targeted trenches, with a combined total length of 30m, and was undertaken in December 2004. This programme of work revealed the sub-surface remains of the mill to be well-preserved and potentially extensive.

1.1.4 Following on from the results of the evaluation, the Assistant County Archaeologist for Greater Manchester, in conjunction with advice from English Heritage's Regional Inspector of Ancient Monuments, recommended that a programme of further excavation be undertaken, as preservation of the remains *in situ* was not a practical option. This element of the project was undertaken during February and March 2005.

1.2 SITE LOCATION, GEOLOGY, AND TOPOGRAPHY

1.2.1 The study area (centred on NGR SJ 8459 9799) is situated within the Piccadilly area, which forms part of the Township of Manchester, on the southern side of the city centre (Fig 1). The site of the former textile mill occupied an area of *c*1600 square metres, of which *c*1000 square metres is to be affected by the proposed development. The site is bounded by Auburn Street to the north, London Road to the east, Upton Street to the south, with the Metrolink tramway lying to the west (Fig 2).

1.2.2 The solid geology of the area comprises Carboniferous sedimentary material and a series of Permo-Triassic rocks, consisting mainly of New Red Sandstone (Hall *et al* 1995, 8). The overlying drift incorporates Pleistocene boulder clays of glacial origin, and sands, gravels, and clays of fluviatile/lacustrine origin (Ordnance Survey Geological Survey 1970).

1.2.3 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). Other river valleys, including those of the Irwell, Irk, Medlock, Tame, and Goyt, form important tributaries.

2. METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 Further to the Client's request for an archaeological evaluation, a project design (*Appendix 1*) was submitted by Oxford Archaeology North (OA North) in November 2004. Following formal acceptance of this project design, OA North was commissioned to undertake the fieldwork, which commenced in December 2004. The work conducted was consistent with the relevant standards and procedures of the Institute of Field Archaeologists (IFA), and generally accepted best practice.

2.2 AIMS AND OBJECTIVES

2.2.1 The main research aim of the evaluation was to characterise the level of preservation and significance of the archaeological remains relating to the cotton mill, and to provide a good understanding of their potential.

2.2.2 The stated objective of the archaeological evaluation were:

- to expose and determine the presence, character, and level of survival of Drinkwater's Mill;
- to attempt to establish the likelihood of survival of the original engine house associated with the 1789 construction of Drinkwater's Mill.

2.3 EVALUATION

2.3.1 Following on from the removal of the modern concrete surface, two evaluation trenches were excavated across the site (Fig 2). The uppermost levels of overburden/demolition material were removed by a machine fitted with a toothless ditching bucket, to the top of the first significant archaeological level.

2.3.2 Machine excavation was then used to define carefully the extent of any surviving foundations and other remains within each of the trenches. Thereafter, structural remains were cleaned manually to define their extent, nature, form and, where possible, date. All information identified in the course of the site works was recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology of English Heritage, with sufficient pictorial record (plans, sections and both black and white and colour photographs, the latter in 35mm and digital format) to identify and illustrate individual features.

2.3.3 All structures encountered during the course of the excavation were recorded three-dimensionally by EDM tacheometry using a total station linked to a pen computer data logger, the accuracy of detail generation being appropriate for a 1:20 output. The resultant digital plan was enhanced by manual survey on site

using AutoCAD 14 within the pen computer, whilst selected components of the works were hand-drawn at a scale of 1:20. The positions of the evaluation trenches were located with respect to surrounding landscape features (Fig 2), and were also recorded using the total station.

2.4 EXCAVATION

2.4.1 Following on from the evaluation, and the Assistant County Archaeologist's recommendation for further work, an updated project design was submitted in advance of targeted excavation (Figs 2 and 3). The academic objectives of this programme of work were redefined thus:

- to examine in more detail the remains in the western part of the site, which had been occupied by the former mill's earliest steam power plant, and also where most alteration to the structure appeared to have been undertaken, thereby offering a potential to furnish evidence for all phases of the site's development.

2.5 ARCHIVE

2.5.1 A full professional archive has been compiled in accordance with current English Heritage guidelines (1991a) and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (Walker 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IFA in that organisation's code of conduct. The paper and digital archive will be deposited in the Museum of Science and Industry in Manchester upon completion of the project.

3. HISTORICAL AND TECHNOLOGICAL BACKGROUND

3.1 THE DEVELOPMENT OF THE ENGLISH TEXTILE INDUSTRY

3.1.1 At the beginning of the 18th century, the English cotton industry was comparatively small. Most cotton materials were imported from India, but in 1701, and again in 1721, Acts of Parliament were passed which prohibited the wearing of Indian calicoes. These measures were aimed at assisting the English woollen industry, although it was actually cotton manufacturers that benefited. The benefits were, however, slow to be realised because of two limitations: the restricted supply of raw cotton, and the slowness of hand-spinning. The supply of raw cotton did improve during the 18th century, first from Levant, then from the West Indies and, after 1783, from North America (Holland 1976, 39).

3.1.2 Improvements in the spinning process began with the introduction of James Hargreaves' spinning jenny in 1764, whereby a single worker could operate eight spindles simultaneously. Five years later, Richard Arkwright took out a patent for a water-driven spinning machine, called the water frame. The success of this machine enabled Arkwright to establish England's first cotton factory at Cromford, near Derby, in 1771. Arkwright's invention was improved upon by Samuel Crompton, who introduced the spinning mule in 1779. This machine combined the best features of the jenny, which made thin thread, with those of the water frame, which made strong thread. By using the mule, English spinners were able to make thin, strong thread from which fine cotton goods, such as muslin, could be manufactured to compete with those made in India (Catling 1986).

3.1.3 During the second half of the 18th century, the technical revolution in the cotton-spinning industry transformed the economic and social structure of the region. At the beginning of this period, the manufacturing processes of spinning and weaving were still based upon the country cottage. By the end of the century, the industry had expanded to an incredible extent; between 1780 and 1800, imports of raw cotton into Lancashire increased from 5-6,000,000 lb to 50,000,000 lb *per annum* (Deane and Cole 1962, 52), and the number of spindles in operation increased from an estimated 1.7,000,000 in the early 1780s to 4-5,000,000 by 1812 (Baines 1835, 226). By 1815, 90% of Britain's cotton industry was located in Lancashire (Holland 1976, 43). There were numerous reasons for this phenomena: local workers were experienced in textile manufacture; there were few restrictive guild regulations as cotton was a relatively new industry; the favourable climate; the availability of pure water for bleaching and calico printing; abundant coal for steam power; plenty of female and child labour; existing trading links; and a good and easily accessible port in Liverpool.

3.1.4 During 1790, 1791 and most of 1792, the cotton trade was expanding in boom conditions (Edwards 1967, 11). However, the ever-increasing prospect of war with France in 1792 caused a decline in the trade, and the declaration of war in 1793 accentuated difficulties and resulted in a contraction in trade with Europe.

However, the effects were offset quickly by the rapid growth of exports to America, and the cotton trade emerged from the crisis by the end of 1793 (*op cit*, 12). A rapid expansion of exports continued until the Autumn of 1796, when problems occurred as the export markets were well-stocked and merchants became reluctant to give large orders until they knew the outcome of peace negotiations with France. More significantly, there was an increasing scarcity of money, and in February 1797 the Bank of England suspended cash payments (*ibid*). The year came to an end with bitter complaints that trade was dull and '*money exceedingly scarce*' (McConnel Kennedy Papers, letter to W Wood, Carlisle 27/12/1797, quoted in Lee 1972).

3.1.5 The economic difficulties continued into the first half of 1798; in January 1798 mule spinners' wages were reduced in several Lancashire towns, and many firms were selling yarn at great discounts, largely due to surplus capacity (Edwards 1967, 12). By June 1798, however, the trade had made a remarkable recovery and cotton imports increased rapidly and exports soared, particularly to the North American and Caribbean markets. Another set-back in the Autumn of 1799 was initiated with a bad harvest that necessitated large imports of grain. The crisis was over by the beginning of 1800, and imports of cotton reached a new record peak (*op cit*, 14).

3.1.6 In October 1801, the preliminaries of peace with France were signed, and resulted in a period of very rapid expansion; 1802 saw spinners enjoying peak profits. However, the trade over-reached itself, and resumption of war in 1803 halted the burst of factory building (*op cit*, 15). The trade in general continued to be uncertain and fluctuated throughout 1804-05, although yarn exports continued to grow and soared to record levels in 1805, causing the price of yarn to rise. By this time, both spinning and weaving were carried on in almost all of the towns in South Lancashire (Catling 1986, 116).

3.1.7 The growth of the export trade, especially to Europe, continued to grow during the second decade of the 19th century. The export of twist and yarn, for instance, rose from £794,465 in 1812 to £1,119,850 in 1814, and then to £2,022,153 by 1820 (Lee 1972, 57). Switzerland, France and Germany in particular created a large demand for fine yarn, such as that produced by the Murray brothers at Murrays' Mills in Ancoats.

3.1.8 By 1830, the self-acting spinning mule had been developed by Richard Roberts. This machine was to have a significant impact, but it was slow to be adopted and, initially, did not affect the spinning of fine yarns as it was confined largely to the production of coarser yarns (Catling 1986, 115-16). In 1865, it was noted that '*self-acting mules are seldom found in use for finer numbers than 80. The finer yarns are spun on hand mules*' (Neste 1865). However, by 1880, the self-acting mule had '*almost entirely superseded the hand mule*' for the spinning of medium and fine counts (Spencer 1880).

3.1.9 The onset of the American Civil War caused severe problems for the English cotton industry as the blockade of America's southern ports by the Union navy cut off the supply of raw cotton on which Lancashire's mills depended. This resulted in the Lancashire Cotton Famine of 1862-64. During this period, raw

cotton increased in price from 9d per lb in 1861 to over 2s in 1863 (Holland 1976, 142). Mill closure, short time working, and mass unemployment resulted; by November 1862, three fifths of the labour force were idle. From the peak of the famine in 1862/3, unemployment fell, but not until the end of the war, in April 1865, was normal working resumed.

3.1.10 Lancashire dominated the English cotton industry into the 20th century; during the early years of the 20th century, it has been estimated that some 76% of the cotton operatives of the United Kingdom were within Lancashire (Chapman 1905, 37). The cotton industry reached its peak in 1914, with India, the largest single customer, buying 3000 million yards of cotton cloth (Holland 1976, 142). However, Manchester's share of the industry declined; a total of 2,666,000 spindles was operative in Manchester and Salford at the beginning of the 20th century, compared to 11,603,000 in Oldham and 5,035,000 in Bolton (Chapman 1905, 41). Nevertheless, Manchester remained pre-eminent as a centre for the production of fine yarn, whilst Oldham was associated with coarse and Bolton with medium yarn (Walmsley 1893, 79).

3.1.11 Despite cotton remaining as Britain's leading export until 1938, the industry declined rapidly between the First and Second World Wars, largely through a fall in exports. Countries that had formerly provided lucrative markets, and particularly India, developed their own mills. Japan captured many former British markets in China and the Far East, and the imposition of tariffs by America and Brazil caused further damage to the export of British cotton goods. A short boom period began in 1945 as a result of shortages caused by the war, but after 1952 British cotton textiles faced intense competition from manufacturers in the Far East. More seriously, however, was the widespread manufacture of man-made fibres; by 1962, 40% of British cloth production was in man-made fibres (Holland 1976, 278).

3.2 THE DEVELOPMENT OF THE TEXTILE INDUSTRY IN MANCHESTER

3.2.1 Manchester has been an important provincial trade centre for the textile industry since at least the 16th century, initially based mainly on the linen and woollen trade, until the increase of cotton and silk production during the 17th century. By 1750 Manchester's cotton production had taken over from the earlier dominance of wool. Manchester, at that time, was not a great centre of administration, reducing restrictions imposed by Guilds, and being described by Defoe as "*the greatest mere village in England*" (Defoe 1768).

3.2.2 Geographically, the town was well situated for capitalising on the textile industry, both in terms of production and distribution. It is situated at the confluence of several rivers, and has a damp climate, most suitable for cotton spinning. With the introduction of mechanisation in the late 18th century, the local supply of coal also proved an advantage. The opening of the Irwell and Mersey Navigation in 1736 providing a direct navigable link to the port of Liverpool, for both the import of materials and the export of goods. Factory mule spinning became focused upon Manchester in the late 18th century, as the water frame industry had been drawn to the hosiery market that had become

increasingly centred in the North Midlands. The mule, with its capacity for fine yarn production, was much more attuned to the existing cotton and fustian trades of Manchester. This had major implications for the power sources that could be drawn upon. However, Manchester's main geographical disadvantage was a lack of fast-flowing rivers necessary to drive water-powered mills and the best sites had long been occupied (Williams 2004).

3.2.3 In an attempt to solve this lack of power, it was within Manchester that the first combination of steam power with the mechanisation of spinning took place, ahead of other contemporary cotton centres such as Scotland, Ulster, and the East Midlands. At Shudehill Mill, built in 1782, use was made of a waterwheel to drive the preparing machinery but it was supplemented with a steam pumping engine which returned the water over the wheel from the tailrace. This practice had originated at Coalbrookdale in the 1740s (Hills 1970). With the success of these pumping engines, steam grew rapidly as a power source during the late 18th century. With the advent of Watt's double acting, rotative beam engine in 1782, the emphasis of power supply changed (*Section 3.3 below*), and Drinkwater's Mill was the first cotton mill constructed in Manchester specifically for such an engine, in 1789 (*ibid*). By the turn of the 19th century Lancashire had 50 Boulton and Watt engines at work, the majority of which were in Manchester, approaching half of the total installed nationally (Tann 1970).

3.2.4 Cotton lent itself readily to mechanised production. Between 1811 and 1831 Manchester's population more than doubled as the cotton industry took off and the town, along with its satellite towns such as Bolton, Oldham, Rochdale and Stockport, earned its reputation as Cottonopolis (Chapman 1905). The further expansion of the canal network around the turn of the 19th century, and the coming of the railways in the mid-19th century, further strengthened the local economy. Other industries such as machine manufacture, iron foundries and the chemical industry were attracted to serve the cotton industry (Williams 2004). This in itself attracted ambitious engineers and entrepreneurs, merchants and bankers, so fuelling the process of rapid expansion.

3.3 THE DEVELOPMENT OF ROTATIVE STEAM POWER

3.3.1 The earliest recognisable use of steam power within the textile industry made use of a water-wheel to drive the preparing machinery but supplemented it with a steam pumping engine which returned the water over the wheel from the tailrace. This practice had originated at Coalbrookdale in the 1740s, and the Shudehill Mill, built by one of the numerous Arkwright partnerships in 1782, was the first site to implement this practice in a Manchester textile mill (Hills 1970). Following its success the practice was widely followed in the Manchester area over the next 20 years. Garratt Mill, built in 1760 and turned over to cotton spinning with water frames in 1784, had a water-wheel on the Medlock, but again used a steam returning engine (Tann 1970).

3.3.2 The most popular form of steam engine, with its piston and cylinder, the Newcomen engine, had reached a high level of development by 1770 but its

application to producing rotative power suitable for mill driving was not immediately obvious. The Newcomen engine was primarily a pump that made use of a rocking beam to transmit the reciprocating action of the piston in the cylinder to the pump rods and pumps, usually associated with the drainage of mines. Attempts to adapt the Newcomen engine to rotative action ensured a modest degree of regularity in the rotational cycle, but it could not meet the exacting requirements for spinning.

3.3.3 The problem of producing rotary power from a reciprocating steam cylinder was solved by James Watt, in several steps. Firstly, and most significantly, Watt introduced a separate condenser, negating the massive heat loss incurred by successively heating and cooling the steam cylinder. Secondly, the open topped cylinder of the Newcomen engine could now be closed and, with the entirely enclosed cylinder, steam could be admitted to both sides of the piston allowing the vacuum cycle to operate alternately from each end of the cylinder. This in turn led Watt to the concept of applying steam at above atmospheric pressure to drive the piston as a supplement to the force of the vacuum. This constituted a fundamentally important advance in that the heat energy contained in the steam was now the power source rather than being a passive factor in the operating cycle (Dickinson and Jenkins 1989).

3.3.4 By 1783, the double acting steam engine had a much greater potential to produce rotary power, but was still unsatisfactory at translating reciprocating action into rotary motion. Driven by his business partner Boulton, Watt patented five different concepts of rotation in a single application in 1782, the significant one of which was the sun and planet gear (Hills 1970). This made use of two gear wheels, one fastened to the lower end of the connecting rod and the other mounted on the flywheel shaft. The lower gear wheel was fixed and rotated around the other, causing it to revolve and the flywheel shaft to rotate. Although less neat than a crank it had the advantage of producing two revolutions of the flywheel shaft for each working cycle, hence double the shaft speed of the crank-driven engine. This answered part of the problem of using the rocking beam and cylinder configuration but the connection between the power piston and the end of the indoor end of the beam now became a critical issue. Watt's final innovation was the parallel motion of the piston and beam of the engine. This comprised a framed assembly of rigid, pivoted links, anchored outside the limits of the beam, that in its final form acted as a pantograph. By describing a series of opposing arcs the radial path of the beam end was corrected into a straight line motion guiding the tensile and compressive forces through a constrained path.

3.3.5 This double acting rotative beam engine was first put into practice at Bradley forge, early in 1783. Further engines were constructed in the following years, with the most successful installation occurring at Albion Corn Mill, London, in 1786 (Dickinson and Jenkins 1989). After demonstrating that the rotative engine was capable of the highly sensitive task of corn grinding, and adding a govenor to regulate speed in 1788, the rotative steam engine was acknowledged as a viable alternative to the other established sources of power for mills.

3.3.6 The first cotton mill to employ a rotative steam engine was supplied to the Robinson's of Papplewick, Nottinghamshire, but this proved to be an unsuccessful venture (Hills 1970). The second textile mill engine, supplied to a Nottingham hosiery manufacturer, Timothy Harris, was more convincing. His engine began work in September 1786, and was sufficiently successful to allow Boulton and Watt to make use of it as a demonstration for future buyers (Dickinson and Jenkins 1989).

3.3.7 During the late 1780s Peter Drinkwater, a well-established cotton merchant, began to build a large cotton spinning factory at Piccadilly. Following an enquiry to John Smeaton about a water-wheel, he turned to Boulton and Watt who supplied an 8hp engine that was running by the end of 1789, representing the earliest recorded rotary engine in Manchester (Ashmore 1969, 52). His mules of 144 spindles were all hand worked, but the rovings were prepared by steam power. Eighteen months later, in September 1790, the Shudehill Mill abandoned its water-wheel and returning engine in favour of a Boulton and Watt engine (Hills 1970).

3.4 PETER DRINKWATER

3.4.1 During the second half of the 18th century, Peter Drinkwater was a fustian manufacturer and textile merchant, and established a business in Spring Garden, Manchester, in 1781 (Raffald 1781). The following year, Drinkwater decided to diversify into cotton spinning when he saw the profits others had been making in the industry, and purchased a cotton mill in the centre of Northwich, Cheshire (Fitton 1989, 149). This mill was situated on the banks of the river Weaver, and utilised water power to drive the textile machinery; during this period, water was the only source of power that could be used to drive textile machinery. However, Peter Drinkwater was a man of considerable practical ability and knowledge, with a reputation for innovation (Butt 1971, 169), and it would seem that he recognised at an early date the huge potential of applying steam power to textile manufacturing. In particular, he was to install a governor to the steam engine, which reduced the violence and irregularity of the engine's stroke and, by making it more even, facilitated the production of very fine yarn counts.

3.5 DRINKWATER'S MILL

3.5.1 Drinkwater's Mill is first depicted on Lewis' plan of 1788 (Plate 1). However, a letter dated 3rd April 1789, from Peter Drinkwater to Boulton and Watt, states: ' *Of the inclos'd* (sic) *plan I propose to build no more at present than the front part with the two stair Cases*' (Tann 1981, 303). This strongly suggests that erection of the mill had not commenced by this date, and was certainly not as complete as shown on Lewis' plan, which questions the accuracy of the plan.

3.5.2 After initial speculation about using a water-wheel, in an enquiry to John Smeaton, Drinkwater decided that this was to be the first textile mill in

Manchester that was to be specifically steam powered and therefore fully independent of the site requirements of a water power system (Williams and Farnie 1992, 52). As such, the mill incorporated a number of innovative design features, many of which were to remain significant in mill building throughout the 19th century. His correspondence with the firm of Boulton and Watt in Birmingham, for instance, demonstrates Drinkwater's concern that the windows of the mill should give adequate internal lighting, and that the mill should have an external privy tower (Tann 1981, 303). *A Map of Manchester and Salford*, produced by William Green between 1787 and 1794 (Fig 4), illustrates the mill in its original form. This shows the mill as comprising a rectangular range situated on the southern side of Auburn Street, with a rectangular projection against the central part of the south-east-facing elevation. A smaller projection is shown at the south-western end of the same elevation. The detail of the map suggests that a boundary wall along Upton Street enclosed the mill complex, whilst entries in early commercial trades' directories indicate that the main entrance to the site was via Auburn Street (Dean and Dean 1804, 52; Pigot 1813, 6).

3.5.3 It seems that the actual construction of the mill was undertaken by Thomas Lowe (Tann 1970, 121), who Fairbairn considered to be the only person in the country qualified from experience to undertake the construction of the mill gearing during this period (Pole 1877, 121). Lowe had previously been commissioned to construct water-powered mills in Derbyshire and Nottinghamshire, and had gained a reputation as one of the leading early millwrights.

3.5.4 In the first instance, the steam engine was to drive the preparatory machinery only; during April 1789, Drinkwater sent a letter to Boulton and Watt stating that '*I wish you to furnish me [a steam engine] to use in the cotton manufactory for the purposes of preparing and carding (not spinning) cotton in a factory*'. In a subsequent letter, Drinkwater stated his desire for the engine to be situated close to the centre line of the mill, such that '*the axis of the flywheel may pass directly through the middle to give motion to the horizontal wheel placed upon an upright shaft in the centre of the great room*' (quoted in Tann 1981, 303). A following correspondence from Drinkwater (MS 3147/5/44-45) contains a figured plan, with accompanying annotation (Plate 2), the text of which read:

> *A the place of the upright shaft & horizontal wheel in the <u>ground</u> & <u>2nd</u> storey – but I must leave you to determine whether the shaft will be better fitted here or at B – for the power may I think be distributed over the rooms from either place – you will of course say what must be the height width & length - & the material which is to form a back for the pivot of the wheel & stock to rest upon – will not brick set in run mortar do as well as stone*
>
> *D & E The engine and boiler houses – the height-width-place strength of walls etc(?) you will of course give instructions for*

> *F – The 4 necessaries one to each of the 4 stories (NB No cellaring) you will please to say what height you would recommend the 2 first stories to be either from floor to floor or clear – ie so as the quart(?) and mid-gear may move beyond the height of a tall man – 9 foot clear or 10ft from floor to floor will be quite suffc for the 3rd and 4th storey - & hopefully for the 1st and 2nd also.*
>
> *You of course will of course put your plan upon a scale – I should like that the scale was not too small – and that your plan was figured - & also that a scetch (sic) of an elevation was aded (sic) as far as you think necessary – where both the workmen & their employer are totally ignorant*
>
> *Upon a separate or detached corner of the paper – I should like you to give a scetch (sic) of an engine house which would contain 2, 6 horse engines – both to act either separate or in conjunction upon one & the same upright shaft - & supposing the engines not to be put together a hut(?) at distant periods*

3.5.5 The plan appears to represent Drinkwater's proposed layout of the mill, with the main, northern block flanked by two wings on the southern side, creating an upturned U-shaped plan. However, neither the archaeological nor cartographic evidence support this drawing, suggesting that the plan was modified prior to construction. The tone of the letter also highlights the experimental, perhaps ground-breaking, nature of the project, with the client understanding only a little of the processes involved. Indeed, Drinkwater's initial letter of 3rd April, confesses him to be '*almost an entire stranger to the Nature of your, or any other, Engine of that sort*' *room*' (quoted in Tann 1981, 303). It is unclear whether the pencil sketches for power shafting subsequently added to the plan (Plate 2) were made by Drinkwater, in an attempt to envisage the layout, or by Boulton and Watt, attempting to solve the power transfer issues.

3.5.6 Drawings dated 22nd April 1789 (*ibid*) were returned by Boulton and Watt and included three alternative plans (Plates 3, 4 and 5), a cross-section through the engine house (Plate 6), and a reversed elevation (Plate 7) looking towards the mill, as requested in Drinkwater's earlier letter. Of the plan forms, the middle (Plate 4) appears to have been adopted, as it is shown (Plate 8) in the beautiful inked-up drawings dated 13th May 1789 (*ibid*). Also included within this batch of drawings was a section through the engine (Plate 9) and a perpendicular section through the boiler (Plate 10), both showing the position of the engine house walls. Further drawings from Boulton and Watt, dated 21st May 1789 (*ibid*), were of a dimensioned sketch (Plate 11) and inked up final drawing (Plate 12) of the boiler detail.

3.5.7 Drinkwater's Mill was sufficiently complete by (what must have been the end of) May 1789, for the Boulton and Watt engine to be installed, and this had been set to work by December of that year (Tann 1981, 162). The engine was an 8hp model, which was served by a wagon boiler. However, the latter failed in 1793 and had to be replaced. Drinkwater had ensured that his mill contained '*the most perfect system*' of making cotton rovings by using steam power (Hills

1970, 125), but the spinning machines had yet to be adapted for mechanical operation, as they incorporated four different processes. Hence, the spinning mules in Drinkwater's Mill were originally powered by hand, although they were soon adapted to be driven mechanically following the successful application of power to drive a spinning mule by John Kennedy in 1793 (Lee 1972). The mill was fitted with spinning mules of 144 spindles (Ward 1970, 105).

3.5.8 When compared more closely with the Boulton and Watt plan of the engine house (Plate 8), there is a significant disparity with Green's map of around that period (Plate 1). According to the measurements annotated on the Boulton and Watt drawings, the structure would measure approximately 20' wide, and 23' in length (6.10m x 7.01m). The structure shown on Green's map is significantly larger, measuring 16' x 45' (4.85m x 13.76m), almost double the length of the proposed structure. It is certain that this part of Piccadilly was not surveyed by Green (who started the survey in 1787) prior to May 1789, as any included proposed plan of Drinkwater's Mill would have shown the original inverted U-shaped plan (Plate 2). Green's map has been demonstrated elsewhere to be reasonably accurate in its detail, and it is therefore a possibility that the survey of Drinkwater's Mill, which may not have been completed at the time, was based on the outline of Lewis' map.

3.6 THE DEVELOPMENT OF THE MILL

3.6.1 The factory was managed initially by Richard Slack who, after his death in 1791, was replaced by George Lee. However, in April 1792, Lee became a partner with George and John Philips of Salford, forming what was to become the highly successful firm of textile manufacturers Philips and Lee (Fitton 1989, 149). The position of manager at Drinkwater's Mill was then filled by the 21-year old Robert Owen, at a salary of £300 *per annum* (Frangopulo 1962, 139).

3.6.2 In his autobiography, Owen stated that when he took over as manager of Drinkwater's Mill, he had to '*make the machines, for the mill was not nearly filled with machinery*' (Owen 1857, 28). It is most likely that he meant this literally, as many of the region's early textile factory masters started in business as machine-makers. Owen left Drinkwater's Mill in 1794, when his hopes of a partnership were sharply quashed (Butt 1971, 169), and became manager subsequently of the Chorlton Twist Company, situated in Chorlton-on-Medlock. Under Owen's direction, this company became one of the most successful late 18th century cotton spinning enterprises in Manchester. However, Robert Owen's reputation as a fine spinner was gained largely as a result of his experience as manager of Drinkwater's Mill (*ibid*). In 1799, Owen left Manchester to develop the well-known industrial community at New Lanark, Scotland (Chaloner 1954, 92-102).

3.6.3 In 1799, the original steam engine in Drinkwater's Mill was replaced by a 14hp model, which was also manufactured by Boulton and Watt. It seems likely that the installation of the new engine coincided with the application of mechanical power to the spinning mules, which will have an increased demand for power.

The first drawings (MS 3147/5/45) supplied by Boulton and Watt, dated 5th July 1799 (Plate 13), show detail specific to the timber framing of the engine, and also show a larger 12' diameter flywheel, than the 10'3" one shown on the drawings of the original engine (Plate 9). The following month a further batch of drawings was produced (MS 3147/5/182), showing details of the engine, with its enlarged cylinder (Plate 14), and two plans of the engine and boilers (Plates 15 and 16), clearly depicting the change from a wagon boiler to two horizontal boilers, housed in a separate boiler room. A cross-section through the engine and boiler house (Plate 17) was also produced. The final drawings held within the Boulton and Watt archive for the new engine and boilers are dated 12th September 1799 (MS 3147/5/45), and show a plan (Plate 18) and three sections (Plates 18 and 19) of the new engine.

3.6.4 Peter Drinkwater died in 1801, and the mill was appears to have passed to his sons, Thomas and John, who are listed in contemporary trades' directories as cotton spinners at Auburn Street (Dean and Dean 1804, 52). However, the mill was occupied a short time later by the firm of Peter Appleton & Co, who was similarly listed in trades' directories as cotton spinners on Auburn Street (Pigot 1813; Pigot and Dean 1820). Appleton & Co appear to have been responsible for an expansion of the mill, which included the addition of a wing to the eastern end of the mill, extending to Upton Street, and the erection of a separate range to the south-west; this remodelling of the mill complex appears clearly on Bancks and Co's map, which was published in 1831 (Fig 5). By 1825, the Appletons had formed a partnership with Joseph Plant, creating the firm of Appleton and Plant (Baines 1825, 312). However, Piccadilly Mill is listed as being occupied by Joseph Plant & Co in trades' directories published during the 1830s and 1840s (eg Pigot 1832; Pigot 1841), and Adshead's map of Manchester, published in 1850, marks the site as '*Plant and Son, Piccadilly Cotton Mill*'. Curiously, trades' directories from the 1840s onwards give the mill's address as 6 Upton Street, implying this to have superseded Auburn Street as the main entrance.

3.6.5 The Ordnance Survey 10": 1 mile (1:2500) map of Manchester, published in 1849 (Fig 6), marks the site as 'Piccadilly Mill' and identifies the central projection on the south side of the original mill building as housing the steam plant. This implies the beam engine to have continued in use to this date, although the subsequent Ordnance Survey map, surveyed in 1888, depicts considerable remodelling of the mill. This seemingly included the replacement of the engine and boiler house by two narrower ranges that extended almost the full length of the south elevation of the main mill (Fig 7). The Upton Street range is also shown to have been expanded, and a new chimney in this part of the mill complex suggests this to have been the site of the replacement engine and boiler house.

3.7 POST-COTTON SPINNING

3.7.1 The mill appears to have ceased to operate as a dedicated cotton-spinning factory by 1873, when the building appears to have been modified for other uses. A trades' directory published in that year lists Rushworth Brown & Co,

paper merchants, together with William Lewis & Sons, cotton spinners, as occupying 6 Upton Street (Slater 1873, 172). Some eight years later, the premises were occupied by Sparrow, Hardwick & Co, shirt manufacturers (Slater 1881, 230), and in 1886 the mill provided commercial space for Enke Hermann, a 'manufacturer' (Slater 1886). Hermann is also listed at 6 Upton Street in a directory of 1893, although he appears to have been sharing the building with the firm of RH & J Sharp Ltd, engravers and colour printers (Slater 1893, 103). The last entry for Hermann at this address occurs in a directory for 1895, in which he is described as a 'hat trimmings merchant' (Slater 1895), although the building continued to be occupied by RH & J Sharp Ltd, 'engravers and lithographic printers'. The same directory includes a total of 188 firms in the Manchester and Salford area under the heading of engravers and lithographic printers, indicating this to have been a trade of considerable local significance.

3.7.2 A trades' directory for 1902 lists RH & J Sharp Ltd as 'commercial and colour printers, engravers, lithographers and manufacturing stationers' (Slater 1902, 28). This firm also appears at the same address in trades' directories up to, and including, 1926 (Kelly and Co 1926, 34). The site is marked as such on the 1905 Ordnance Survey map, which also shows a large range fronting Upton Street had been built across the south-east-facing elevation of the main block (Fig 8). This new range appears to have replaced the earlier buildings associated with the cotton mill in that part of the site. Photographs from 1908 show Sharp's 'Fine Art Commercial Printers' building on Auburn Street, Manchester (Plate 20), and clearly depict the structure as four storeys above a basement. It appears that the firm was already established elsewhere before it moved to Auburn Street, since the firm of RH & J Sharp, colour printers, is listed at 7 Well Street, Shudehill, in 1879 (Slater 1879, 80), and subsequently at Altrincham Street, Piccadilly (Slater 1890, 98).

3.7.3 Goad's Insurance Plan (Goad 1913) shows details of the Piccadilly Mill site, and indicates a gas engine to have replaced the earlier steam engines. This plan also depicts a button factory occupying the south-eastern corner of the mill. Annotations on the plan show that the upper three floors were occupied by a separate enterprise, listed as a baby linen factory. This business does not appear in contemporary trades' directories, although an edition for 1925 does list Heywood, Holt, Bowden & Co Ltd, who are described as 'manufacturers' (Kelly and Co 1925, 33).

3.7.4 By 1927, the site had ceased to be occupied by RH & J Sharp Ltd, who appear to have moved premises to Stockport Road (Kelly and Co 1930, 1444). By 1932, the mill had been demolished. New buildings were erected within the eastern part of the site, whilst Aytoun Street was extended across the western part.

3.7.5 Most recently, the site has been used by Hertz vehicle leasing as a service compound, which incorporated a single storey office, and associated petrol tanks over the site of the former cotton mill. The original engine and boiler

house of Drinkwater's Mill was overlain by the Metrolink tramway in the late 20th century.

4. RESULTS OF THE ARCHAEOLOGICAL INVESTIGATION

4.1 INTRODUCTION

4.1.1 An area of 26m by up to 15m, comprising approximately 300 square metres was exposed and recorded (Fig 3). Six of the seven broad phases of archaeological activity identified from documentary and cartographic sources could be defined within the site boundary; the other main phase of structural activity relating to Drinkwater's Mill occurred to the south-west, under the modern Metrolink tramway and road (Plate 21). Summary results of the investigation are presented below; the evidence obtained from both the evaluation and excavation elements of work has been combined to form a single narrative.

4.1.2 Broad phasing has been ascribed to the deposits and structures encountered during the investigation, and the results are presented below in chronological order. This phasing is provisional as is appropriate for an assessment of the site, and may be refined in the light of evidence produced from detailed analysis of the dataset.

4.2 PHASE 1 (1789)

4.2.1 The earliest recognised activity pertaining to the recorded occupancy of the site relates to the construction of Drinkwater's cotton mill in 1789. The site is first reliably shown on *A Map of Manchester and Salford*, produced by William Green, in 1787-94, showing the mill as comprising a rectangular range situated on the southern side of Auburn Street, with a rectangular projection against the central part of the south-east-facing elevation. A smaller projection is shown at the south-western end of the same elevation (Fig 4).

4.2.2 Excavation revealed the original south wall of the 1789 structure, ***105***, located within the central part of the excavation trench (Fig 3). It was 2½ bricks (2' (0.61m)) thick, bonded in a pale grey lime and sand mortar, and comprised hand-made, mould-thrown brick, typically 9" x 4¼" x 3" (229mm x 108mm x 76mm), and surviving up to 13 courses in height, laid in English Garden Wall bond (Plate 22).

4.2.3 To the north of this wall, two brick-built drains (***112*** and ***113***) appear to represent remains of original under-floor drainage associated with the mill. Each was cut into the natural clay deposits (***104***) and comprised a single row of bricks forming the base, partially overlain by two perpendicular rows of bricks, forming the sides of the drain, with a further row of bricks, aligned parallel to the base, forming the capping (Plate 23). All bricks were of similar size and style to those in the wall (***105***) to the south, but were unbonded, being pressed into the natural, plastic, clay instead. The southern drain (***112***) was aligned perpendicular to the mill wall (***105***), intersecting it at its southern end, where a built aperture was observed in the lower courses of the wall. No evidence for a soakaway, or drain, was observed to the south of the wall, suggesting that the

drain emptied through the natural slope of the ground to the south. The northern drain (***113***) was aligned longitudinally within the mill, and appeared to represent the central drain, into which other drains fed, exiting via drains to the south, such as ***112***. A similar method of drainage within clay, although formed of more substantial fabric, was observed in the slightly later construction of a mill block at Murrays' Mills, Ancoats, *c* 1806 (OA North forthcoming).

4.2.4 In the central part of the excavation trench, an area of re-deposited natural clay, ***135***, was observed, containing fragments of broken brick. This possibly relates to material excavated during the initial construction of the mill, when levelling of the slope, from north to south, was required, and several pits would have been required to be cut into the natural clay, especially in the area of the engine and boiler house, where the deposit was observed.

4.3 PHASE 2 (LATE 18TH - EARLY 19TH CENTURIES)

4.3.1 Whilst there is some misalignment in the size and position of Drinkwater's mill between Green's map of *c* 1794 and the Bancks' and Co map of 1831, it is improbable that the maps depict separate structures. The discrepancies in length and width of the main mill structure appear to represent inaccuracies in the mapping. What is surprising is that the engine house projecting from the southern elevation is shown to be the same size on both plans, whereas the documentary and cartographic evidence from the Boulton and Watt archive (MS 3147/5/44-45; MS3147/5/182), demonstrates that an additional boiler house was erected for the 1799 engine (Plates 15, 16 and 17).

4.3.2 The major structural activity during this phase was the construction of an approximately 45' (13.7m) square extension on the southern side of the eastern end of the mill. This extension formed a frontage along the length of the newly laid-out Plant Street, and was bounded by Upton Street at its southern end (Fig 5). Cobbles (***152***) observed along Upton Street may possibly date from this phase, although they would possibly have been relaid several times through all phases of usage of the site.

4.3.3 Evidence for this phase of activity was observed within the evaluation stage of the project, within Trench 2. It comprised a brick wall (***701***), aligned perpendicular to Upton Street, and in the position of the west wall of the pre-1831 extension to the mill. Like the first phase wall (***105***), it was constructed in hand-made, mould-thrown brick bonded in a pale grey lime mortar. It was three bricks (26" (0.66m)) thick, and survived to a height of up to 1.1m, but the constructional bonding was not visible, due to a render covering associated with the Phase 5 conversion of the mill into use as a printworks (Plate 24).

4.3.4 A brick pier (***704***) observed to the west of wall ***701***, partially within the northern section of Trench 2, was constructed of similar fabric. This would appear to be a contemporary feature, although its relationship with ***701*** was obscured by later, Phase 5, remodelling of the wall. It may possibly have been associated with a small rectangular projection shown on the Bancks and Co map of 1831 (Fig 5).

4.4 PHASE 3 (MID 19TH CENTURY)

4.4.1 Phase 3 involved the construction of a secondary structure, in the south-west corner of the site, fronting onto both Upton Street and Minshull Street. This is first shown on the Ordnance Survey mapping of 1849 (Fig 6), and was therefore constructed after the creation of the Bancks' and Co map of 1831, prior to the Ordnance Survey map of 1849. This area lies outwith the evaluation and excavation areas, mainly underlying the re-aligned Aytoun Street and the late 20th century Metrolink tramway (Fig 2).

4.5 PHASE 4 (LATE 19TH CENTURY)

4.5.1 The site at this period was little altered in terms of the overall site plan, except the expansion of the southern block along Upton Street before the late 19th century, as depicted in the Ordnance Survey First Edition 1:2500 map, surveyed in 1888 (Fig 7). However, this apparent lack of change is misleading, as closer inspection reveals subtle, but important changes to the complex. The central projecting structure on the southern side of the original mill is shown as a longer, narrower, range, which represents the cartographic evidence for the replacement of the engine and boiler houses during this period. The inclusion of a chimney in the new range along Upton Street suggests that this was the position of the new engine and boilers.

4.5.2 The truncated remains of the southern wall of the new structure along the southern side of the main mill building were observed within the excavation trench. They comprised a short length of wall, ***106*** (Plate 25), built parallel to the Phase 1 wall, ***105***, and located 8'9" (2.68m) to the south (Fig 3), with a possible continuation of the wall (***107***) and associated floor, ***114*** (Plate 26), at a similar distance from the Phase 1 wall, 2.70m to the east, beyond a Phase 5 machine base. The better preserved wall, ***106***, was set into the natural clay, and was constructed of hand-made, mould-thrown brick, typically 9" x 4¼" x 3" (229mm x 108mm x 76mm), in English Garden Wall bond, to a thickness of 2½ bricks (2' (0.61m)), bonded in a pale grey lime and sand mortar. It survived below later flooring to a height of only three courses, and was truncated at either end, remaining for a length of only 2.27m. Wall ***107***, to the east, survived to only two courses in height, but was of similar fabric. It overlay what appears to be a contemporary, badly damaged and truncated, area of external flooring, which comprised edge-set, hand-made bricks bonded with a similar mortar to the Phase 4 walls, and surviving for an area of *c* 0.75m². Evidence for the internal arrangement of the new structure was observed to the north of wall ***106***, in the form of an internal brick floor, ***129***. This comprised a single thickness of stretchers, laid parallel to wall ***106***, for a width of 3'6" (1.07m), where it was bounded by a single skin brick wall, ***128***. This appears to have been a longitudinal internal partition, positioned slightly south of centre within the new structure, but it survived only at its bottom course, for a length of 0.85m.

4.5.3 The similarity in brick type to the Phase 1 wall (***105***) might suggest that bricks from the original structure on the south face of the mill were re-used in the

construction of the new build, but the similarity in mortar would suggest that the construction of the new build took place early in Phase 4, and that materials probably changed little since the late 18th century.

4.5.4 The Ordnance Survey First Edition 1:2500 map, also shows ephemeral evidence of infilling between the Phase 2 extension at the eastern end of the mill, and the central projection in the southern elevation of the original, Phase 1, mill. Evidence for this was observed in the form of an L-shaped wall (***108/109***) in the eastern part of the excavation trench (Fig 3). The north/south aligned section of this wall (***108***) was two bricks (2' (0.61m)) thick, with a ½-brick wider plinth at the base, and was constructed of hand-made, mould-thrown brick, bonded in a dark grey cement mortar in English Garden Wall bond. Towards the southern end of the exposed wall-top, a sandstone block was incorporated into the eastern face of the wall, probably representing a sill, or possibly a door threshold. The latter would appear more likely, given the survival of an horizontal section of cast iron rainwater pipe laid across the wall immediately to the south, presumably transferring an internal down-spout into an external drain at ground level. Evidence for this probable drainage channel was observed to the immediate west of wall ***108***, in the form of a possible culvert (***117***), aligned north-east/south-west and apparently constructed contemporarily with wall ***108***, having an opening into its western face (Plate 27), forming a chamber *c* 2' x 1' (0.61m x 0.30m) within the base of the wall. The culvert to the south-east was constructed of brick, a single brick in thickness, similar in style and mortar to those in wall ***108***, filled in the base by a concrete channel, which may have had a later origin. Broken brickwork (***116***), beyond the western end of surviving concrete in the base of the culvert, may represent the damaged remains of its original flooring (Plate 28). Further to the west, the concrete survived *in-situ*, and housed a 4" (102mm) deep, 21" (0.53m) diameter circular feature, possibly relating to a Phase 5 machine base, ***118***. The side-walls of culvert ***117*** survived to six courses in height, probably similar to the original height, but no evidence of the original capping, most probably sandstone flags, was observed. The untrimmed bed joints on the external face of the wall (Plate 29) demonstrate that it was trench-dug, cutting the natural clay (***104***). The concrete at the western end of the culvert was bounded by a single-skin rectangular structure (***119***) *c* 4' x 3' (1.22m x 0.91m), which extended to the east along its southern side (Fig 3). This wall, which was bonded in a dark grey mortar, probably relates to Phase 5 printwork activity, but the alignment of the eastern end of its southern elevation suggests that it may have originally been associated with drain ***117***.

4.5.5 At its northern end, wall ***108*** returned to the east, for a distance of 9'9" (2.97m). This section of the wall (***109***) survived to a much greater height (13 courses) and was constructed to only 1½ bricks (13½" (0.34m)) thick, for the height above that of ***108***. This strongly suggests that wall ***108*** survived only at foundation level, and that the Phase 4 floor (presumably lower ground floor/basement level) was located at the level of the step on the southern side of wall ***109***. The observation of the plinth (Plate 30) also demonstrates that the area to the south of ***109***, and to the east of ***108***, was inside the new structure, with the internal flooring being partially supported on the brick plinth.

4.5.6 At its southern end, wall ***108*** had an unclear relationship with a similarly aligned L-shaped wall (***110***). The relationship was obscured by the later Phase 5 re-facing of wall ***110*** (Plate 31), and the eastern and southern faces of the wall were only observed in plan, both within the excavation and evaluation trenches (where only a short section of the plan of the surviving wall-top, ***602***, was revealed (Plate 32)). It also had a slight projection to the east of its southern return, possibly suggesting a wider return to the east as well as that *in-situ* to the west. A cut (***153/603***) was observed for the wall, only 80mm from its eastern face, demonstrating that the wall was trench-built from the western side, and, therefore, predated the wall bonded to its western face (the Phase 5 re-facing ***111***). It was 1½ bricks (14" (0.36m)) thick, suggesting a similar construction method to wall ***108***, but was offset to the east, suggesting it was not part of a continuous build with walls ***108*** and ***109***. Instead, it probably represents continued expansion through Phase 4, relating to an extension to the south of the structure formed by walls ***108*** and ***109***. Wall ***108*** appears to have originally continued beyond the northern end of wall ***110***, surviving as a plinth at the base of the wall for a distance of 2.4m.

4.5.7 Immediately to the east of wall ***110***, separated from it by only 18" (0.45m), the ephemeral remains of a further wall was observed (***138***). This comprised a short T-shaped section of wall, one brick thick along its southern edge, with a single-skin projection on the northern side (Fig 3). Its southern face was flush with that of wall ***110*** to the west, with the northern return possibly representing an internal partition wall, or more likely a true reflection of the original wall thickness of 2' (0.61m), similar to the stub projecting from the eastern side of the return at the southern end of wall ***110***. A cut, ***139***, was observed along the line of this probable east/west aligned wall, filled with mortary demolition material (***140***). An east/west aligned section of wall (***142***), 1.3m to the north, may also represent a contemporary feature. It was 1½ bricks thick and was observed for a length of 1.3m beyond the eastern section of the excavation trench. It was constructed of similar materials to wall ***110***, in English Garden Wall bond.

4.6 PHASE 5 (LATE 19TH - EARLY 20TH CENTURIES)

4.6.1 Phase 5 relates to the conversion of the cotton spinning mill into a printworks around the turn of the 20th century, prior to the production of the Ordnance Survey map of 1905 (Fig 8) Much of the structural elements observed during the excavation relate to this phase, which involved large-scale structural remodelling of the mill. The courtyard previously formed in the centre of the mill complex was also infilled during this phase, most probably associated with the conversion to a printworks.

4.6.2 Although major remodelling was undertaken, the main structural elements observed for Phases 1-4 appear to have been retained. Phase 1 wall ***105*** was remodelled slightly, with the insertion of a 2'10" (0.87m) wide doorway (Plate 33), affording access into a new structure formed with the infilling of the courtyard. The foundation level of the wall continued beneath the doorway, the

wide threshold of which was covered with an iron sheet. Phase 4 walls ***108***, ***109*** and ***110*** appeared to have been retained, although the latter was re-faced on the western and northern sides (***111***). This comprised the addition of a one brick (9" (0.23m)) thick face on the outer (western and northern) faces of wall ***110*** (Plate 31). It was constructed using what appeared to be wire-cut bricks, bonded in a pale grey (?)cement mortar, in English Garden Wall bond, aligned to within a half-brick of the wall face of the Phase 4 wall, ***108***, which appears to have formed a wider-set foundation for at least the northern 2.3m. The Phase 2 extension in the south-west of the site was also remodelled, with the insertion of a cellar light, ***702***. The rebuild was 4'9" (1.14m) wide, and incorporated a splayed window, internally furnished with white-glazed tiles (Plate 24).

4.6.3 New floors appear to have been laid throughout the structure at this time, and, where excavated, comprised 3½" thick concrete overlying natural clay (Plate 33). Such floors were observed within the original Phase 1 structure (***133***), within the Phase 2, eastern, extension (***705***), within the Phase 4 extension on the southern side of the mill (***134***), and with the newly enclosed areas of Phase 5 (***123***, ***134*** and ***136***), where it sealed the earlier deposits.

4.6.4 Several areas of activity were identified within the remodelled structure, with those in the central and south-western part of the excavation trench comprising pits/tanks set into the new floors, whilst those in the south-east and north-east parts of the excavation trench appear to relate to upstanding structures within the expanded mill. The former areas lay within the newly enclosed courtyard (although partially within the Phase 4 structure at its northern side), and possibly represent a single 'room' or processing area. A group of three features at the northern extent of this area comprised a large rectangular concrete machine base, ***124***, approximately 11' x 5' (3.35m x 1.52m) and 10" (0.25m) thick (Plate 34). Four tie-down bolts were observed near each corner, suggesting that the block formed a machine base, with the steel channel-section beam connecting the southern pair exposed at the southern edge of the block. The concrete itself contained large fragments of broken red brick, typical of the period. To the north and east of the base were two connected pits/tanks (***125*** and ***126***). Both were of similar construction, comprising a one-brick thick wall of wire-cut brick, bonded in English Garden wall bond with a mid-grey cement mortar with charcoal inclusions. Each wall was constructed to six courses in height, capped by 4½" (114mm) thick yellowish sandstone dressed blocks. These each had 1" x 1" (25 mm x 25mm) squared rebates along the internal faces of the tank, presumably for metal plate covers, above the 2' (0.61m) deep tanks, which each measured 5' (1.52m) in internal length and 3' (0.3m) in total width. The northern tank was aligned parallel to the Phase 1 structure (wall ***105***), whilst the eastern tank was perpendicular, connected by a short length of similarly constructed walling, effectively creating one larger L-shaped tank (Fig 3). A similarly constructed wall to the east of tank ***125*** formed the southern edge of a 1' (0.30m) wide 'channel' (***127***) between wall ***108*** and the tank. It was bounded on its northern side by the concrete floor ***134***, which stopped flush with the eastern end of the channel.

4.6.5 Both tanks were filled with a mixture of clinker and demolition debris, but also contained large quantities of lithographic printing blocks, strongly suggesting that the associated machine base, ***124***, housed a printing press.

4.6.6 A further machine base and associated tank were observed to the south, probably within the same 'room', but located 3' (0.2m) higher, and set in a separate concrete floor, ***123***. The base, ***121***, was partly concealed beyond the western limit of excavation, and measured 9' x 3' (2.74m x 0.92m). Tie-down bolts were observed near each corner of the base, the eastern side of which formed the west wall of the associated tank, ***122***, offset slightly to the south (Fig 3). It measured 6' x 3'8" (1.83m x 1.12m) and was brick lined on the other three sides, to a depth of 2' (0.61m). The western, rendered, face housed a central semi-circular flywheel scar (Plate 35), approximately 4' (1.22m) in diameter, which presumably defined the purpose of the tank.

4.6.7 In the north-eastern part of the excavation trench, in the area where two large petrol tanks were removed from site immediately prior to the excavation, two concrete machine bases (***130*** and ***131***) were observed (Plate 36). Both bases were constructed of concrete similar to that in base ***124***, and excavation down the side of the larger, eastern base, ***130***, revealed that it was constructed using timber shuttering to form a mould, a very cheap method of shaping concrete. In its centre it had a 2' (0.61m) squared rebate, 5" (127mm) deep, which housed a 20½" (521mm) diameter cast iron plate. This had a central 2" (51mm) diameter shaft, with a smaller 1½" (38mm) diameter hole located to the west. Remains of probable vertical pipe attachments were also observed to both north and south of the central shaft. A one brick thick wall located along the western edge of the plate extended north beyond the limit of excavation. It was bonded in a black sooty mortar, typical of the late 19th/early 20th century, and may represent the remains of a support for a machine. Towards the southern end of the smaller concrete base, ***131***, a similarly constructed wall formed a rectangular box 4' (1.22m) wide and housing a further, rectangular, cast iron cover. This also had a central hole, 2¼" (57mm) in diameter, with wider 2½" (64mm) diameter pipes to the north and south.

4.6.8 In the eastern part of the excavation trench several features appeared to have related to the use of the area for the early 20th century gas engine, shown on the Goad plan of 1913. An L-shaped wall, ***147***, one brick thick, and partially underlying the eastern section of the trench, appears to have formed a surround to a 2'4" x 1'8" (0.71m x 0.51m) brick pier, ***148*** (Fig 3), which presumably formed part of the base supporting the engine. A cut, ***149***, 1' (0.30m) wide, led from the north-western corner of the pier to wall ***110*** to the west, where a timber post, ***151***, 9" squared (0.23m²) had been cut into the eastern face of the wall. All these features were probably related, but their function remains unclear.

4.7 PHASE 6 (EARLY/MID 20TH CENTURY)

4.7.1 Prior to the Ordnance Survey map of 1932 (Fig 9), the printworks was abandoned and demolished, and a new structure erected on the eastern side of the newly re-routed Aytoun Street. Demolition would appear to have incorporated the removal of anything of salvage value, followed by destruction of the building to ground floor level. Although the lower remains sustained significant damage during demolition, the main structural elements of the earlier phases were preserved. The demolition material, ***103***, appears reasonably typical for the period, comprising mainly clinker/boiler residues, combined with broken brick, mortar and plaster, with an array of metalwork, glass and ceramic debris. This was sealed by a 6" (0.15m) thick layer of low-grade 'biscuit' concrete, ***601***, similar in nature to that used in the Phase 5 machine bases, ***124***, ***130*** and ***131***. This most probably formed the floor of the new structure erected on the site.

4.8 PHASE 7 (MID/LATE 20TH CENTURY)

4.8.1 Between the Ordnance Survey maps of 1932 and 1969, the new structure was again demolished and rebuilt. Evidence for this new building was observed in the excavation trench, in the form of the south-west/north-east aligned external wall, ***115***, which formed the new site boundary onto Aytoun and Auburn Streets (Fig 10). It was 1½ bricks thick, above a stepped, two course plinth, and was constructed of extruded brick in alternate header and stretcher bond, with hard black mortar. It sat on demolition rubble ***103***, its base set roughly at present ground level.

4.8.2 In the south-eastern corner of the excavation trench, a group of features relating to drainage also appeared to relate to this early part of Phase 7. The main component was a rectangular brick chamber, ***144***, 4' x 3'6" (1.22m x 1.07m) comprising extruded brick walls, one brick thick, below a sandstone flag cover. An iron bar angled across the north-eastern corner of the chamber appeared to be the upper rung of an internal ladder, suggesting that the feature was a relatively deep inspection hatch into a drain. A ceramic drain pipe, ***146***, led from the eastern edge of wall ***110*** through the western side of the chamber. A cut, ***143***, was observed around the chamber, infilled with gravel and pebbles (***145***), further suggesting use as a modern drainage feature.

4.8.3 Further to the south, a late 20th-century ceramic drain pipe, ***141***, also observed in evaluation Trench 6, cut through walls ***110*** and ***111*** (Plate 32) and appears to have superseded the features to the north. It related to a series of land-drains at the southern edge of a concrete slope associated with the Hertz building and its petrol tanks. Elements of the concrete ring-beam (***132***) were also observed within the excavation trench, cutting wall ***115***, but rafted over floor ***601*** and all the deposits sealed below.

5. RESULTS OF THE ASSESSMENT

5.1 ASSESSMENT AIMS AND OBJECTIVES

5.1.1 The aim of this assessment was to evaluate all classes of data from the archaeological investigation undertaken, in order to determine the potential of the assemblage for further analysis. Should the case for analysis be proven, it would lead to the formulation of a project design for a programme of further analysis appropriate to the potential demonstrated by the site archive. A statement of the significance of the results from each element of the archive is given below. These statements are based on the assessment work undertaken, related to the original academic themes expressed in the project design.

5.1.2 The objectives of this assessment correspond to, and are prescribed by, *Appendix 4* of *Management of Archaeological Projects 2nd edition* (English Heritage 1991a). They are to:

- assess the quantity, provenance and condition of all classes of material: stratigraphical, artefactual and environmental;
- comment on the range and variety of that material;
- assess the potential of the material to address questions raised in the course of this project design;
- formulate any further questions arising from the assessment of this material.

5.1.3 This assessment will present:

- a factual summary, characterising the quantity and perceived quality of the data contained within the site archive;
- a statement of the academic potential of the data;
- recommendations on the storage and curation of the data.

5.2 MATERIAL ASSESSED

5.2.1 The entire paper, digital and material archive was examined for the purposes of this assessment. Quantifications are incorporated within the individual assessments.

5.3 PROCEDURES FOR ASSESSMENT

5.3.1 The method of assessment used varied with the class of information examined, although in each case it was undertaken in accordance with guidance provided by English Heritage in *Management of Archaeological Projects* (English

Heritage 1991a). All classes of finds were examined in full, with observations supplemented by the finds' records generated during the course of the fieldwork; full details of all the recovered finds reside within the project archive.

5.4 STRUCTURAL AND STRATIGRAPHICAL DATA

5.4.1 Provisional broad phasing has been ascribed to all contexts, and the results are described in *Section 4* above, and summarised in *Appendix 2*.

5.4.2 ***Quantification:*** there is a total of 62 context records, which may be broadly divided between phases as follows:

Natural origin	1
Phase 1	4
Phase 2	3
Phase 3	0
Phase 4	20
Phase 5	23
Phase 6	2
Phase 7	9

5.4.3 The archive comprises the following:

Plans	3
Digital survey file (AutoCAD)	2
Colour slides	4 films, totalling 120 slides
Monochrome prints	4 films, totalling 120 photographs
Digital photographs	100 images

5.4.4 ***Potential:*** the stratigraphic and structural data will provide the framework within which all other analyses will take place. The archaeological investigation has allowed as full as possible a stratigraphic record to be made of the development of the site. The key to understanding the chronology of the different types of activity, and the development of the site, resides within the layout and organisation of the site, which can be interpreted through a study of the artefactual and stratigraphic records. Individual contexts, moreover, offer a potential for understanding the manufacturing processes that were active on the site.

5.4.5 Preliminary assessment of the available documentary material has indicated a considerable potential for further research. This is particularly the case when combined with cartographic evidence, which together form a powerful tool for analysis.

5.5 INTRODUCTION TO THE ARTEFACTS

5.5.1 The artefactual assemblage recovered during the course of the investigation comprised finds from various material categories, including glass vessels, industrial residues (mainly boiler residues), lithographic printing blocks, post-medieval pottery, clay tobacco pipes, metalwork (the majority iron but some copper alloy and lead), animal bone, and leather.

5.5.2 In total, 260 artefacts and ecofacts were recovered from the evaluation and excavation, relating mainly to Phase 5, and possibly also to Phase 6. The finds were retrieved from demolition deposits, and their location, if known, was recorded relative to other structures. For instance, many of the finds were recovered close to wall ***105***, which represented the south wall of the original mill structure. The majority of the finds were fragments of ceramic and glass, and the remainder comprised aluminium, copper alloy, iron, lead, plastic, rubber, slag, stone, paster and mortar, paper, leather, mollusc and bone (see Table 1, below). The finds have been catalogued in *Appendix 3*, and they are discussed by function below. The lithographic plates and associated tools, and the glass and ceramic bottles and jars, are of most relevance to the site, and are also of most use in dating the deposits. The other categories of finds are discussed more briefly.

Material type	**Quantity**		**Material type**	**Quantity**
Aluminium	1		Leather	5
Bone	5		Mollusc	1
Ceramic	112		Paper	2
Composite	4		Plaster/mortar	5
Copper alloy	4		Plastic	1
Glass	75		Rubber	1
Iron	15		Slag	1
Lead	4		Stone	24
			Total	***260***

Table 1: Finds by material type

5.6 LITHOGRAPHIC PRINTING

5.6.1 ***Lithographic printing process:*** lithographic printing comes from the word 'lithography', which literally means 'writing on stone', and the process was invented by the German Alois Senefelder in *c*1798 (Dobson nd, 1). The process works using the principle that grease and water repel each other, and the first stage involves drawing the design onto the stone with greasy crayon or greasy ink in a pen (*op cit*, 3). The surface of the stone is then 'etched' with a solution of gum arabic, water, and a few drops of nitric acid (*ibid*). Etching causes the crayon-drawn areas to be permanently receptive to grease, whilst the undrawn areas are made permanently resistant to grease (*ibid*). The stone is then dampened with water and greasy ink is applied, the moist, uncrayoned areas repel the ink and the ink sticks to the crayoned areas (*ibid*). The paper is then placed over the stone and it is pressed down, resulting in the greasy ink areas creating an image on the paper, and the wet areas of stone leave white, unprinted areas (*ibid*). Clearly, the stone image is the reverse of the final

printed version (*ibid*). In 1818 Charles Hullmandel established the first lithographic press in London, and developed the technique of colour lithographic printing (*op cit*, 4). The process used one stone per colour, overprinting colours onto the same piece of paper to produces mixes and areas of different colour, and up to 20 stones might be used per illustration (*ibid*).

5.6.2 By 1851, lithographic printing processes had developed further, with the invention of the flat-bed cylinder press, which allowed much faster paper feed and printing, with rates of 800 sheets per hour (*ibid*). Lithographic printing, then, had certain advantages over copperplate printing - it prevented smudging during printing, it was far cheaper, and it made it more easily possible to print illustrations, music, maps, and charts (*op cit*, 3). However, there was one problem with it, and that was typesetting - it was not easy to have good quality lettering in bulk, which was a particular problem for books and music (*op cit*, 5). This could be overcome by transferring letters by hot metal letterpress printing onto paper with greasy ink and pressing the paper onto the stone while the ink was still wet; however, this produced poor-quality results (*ibid*).

5.6.3 The problem was solved by the invention of photography in the late 1830s, which led to experimental use in printing during the mid-19th century (*ibid*). The printing plate was covered in photosensitive gelatin, and a printed form of the image was photographed by a process camera (*ibid*). The negative from the camera was placed over the gelatin on the plate, and the gelatin was exposed to light (*ibid*). Gelatin hardens in proportion to the amount of light, so white areas of negative (black in final printed form) produce the hardest gelatin (*ibid*). Unexposed or poorly exposed areas of gelatin remain soft and absorb water, and hence the plate can be coated with greasy ink, which only adheres to hard, dry parts of gelatin, and a printable image results (*ibid*). By this process the image can be easily transferred to the plate (*ibid*).

5.6.4 Lithographic printing still had one awkward aspect, however - the stone plates were impractical (*op cit*, 6). They were heavy to handle, the surface needed careful preparation, and they required large amounts of storage space (*ibid*). It was not until the late 19th century that an alternative was found, in the form of zinc and aluminium plates (*ibid*). The metal plates were not only cheaper, but the light weight meant printing of larger sizes of paper became practical (*ibid*).

5.6.5 ***Lithographic stone plates:*** fragments of 21 individual lithographic stone plates were recovered. All the images on the upper surfaces of the plates were reversed, and most of them appeared black in colour. Three appeared in other colours, however, with one red, one pinkish-red, and one orangey-red. It seems likely that those images that appeared black would not all have been printed in black, since there were several text-less labels (Plate 37), and several with very broad lines, suggesting a fill colour to go inside a thinner black outline. In order to produce coloured labels, each colour would have to have been engraved separately on a different plate, and the different coloured images would then have been lined up using the T-shaped guide lines which can be seen on opposite sides of some of the images. One of the plates appeared to have both an outline (presumably black) image, and a fill colour of the same image (also

appearing black), which seemed unusual given the processes involved in the colour printing.

5.6.6 Several plate edges had numbers painted on, their height covering the full thickness of the plate, and these were presumably pattern numbers. This would have been an essential form of labelling, especially since some of the early stages of the preparation of the lithographic plates would not have produced a visible image on the plate's surface.

5.6.7 ***Items printed:*** Table 2, below, lists the different printed items with the company or brand name, type, and location, where it was possible to discern this information from the individual plates. It can be seen that the printers had client companies not only within Manchester but also in London, and that they were involved in printing labels for containers of soap, sweets and cakes, beer and ginger beer, and for printing possible price list posters, and possible billheads for gas engine manufacturers.

Item	Company or brand name	Company type	Company location
Soap box label?	Plantekoa	Medicated skin soap manufacturer	-
Box or jar label for sweets?	Frederick Charles Battlebury	Wholesale Confectioner	Hackney, London
Beer bottle labels	Handley's Brewery Limited	Brewer	Manchester
Company billhead?	Crossley Brothers Limited	Gas engine manufacturer	Openshaw, Manchester
Oxford lunch cake box or packet labels	W & R Jacob & Co	Biscuit manufacturer	Dublin (and Manchester)
Pub ginger beer tap label?	Robert White & Sons Limited	Ginger beer manufacturer	Stepney, East London
Bottle, jar, box, or tin label	Dominion Brand	-	-
Cake box or packet label	… & Co	Biscuit or cake manufacturer	-
Bottle, jar, box, or tin label	Mason's Crown Brand	-	-
Price list poster	-	-	-

Table 2: Partially identifiable plates

5.6.8 ***Dating of the plate fragments:*** no information could be found regarding 'Mason's Crown Brand' or 'Dominion Brand'. Many different companies supplying different items had crown brands or dominion brands, and since there appeared to be no clues as to the item being packaged it proved impossible to identify the companies responsible. 'Plantekoa' (Plate 38), which is presumably also a brand name, could not be matched to a company, even though additional information was available - it was a brand of medicated skin soap.

5.6.9 Handley's Brewery Limited (Plate 39) does not appear in the sections on brewers or lager beer brewers in the Manchester directory for 1895 (Slater 1895, 36, 144) or 1903 (Slater 1903, 1399, 1525), but is listed on Clarence

Street (and?) Chester Road in 1909 (Slater 1909, 1562) and 1911 (Slater 1911, 1795). The company name of W & R Jacob & Co dates from 1851, and the firm was listed on 21 Fennel Street, Manchester, in 1903 (Slater 1903, 210), so a tight date range for the printed packaging cannot be established. Robert White & Sons Limited, a ginger beer manfucturer based in Stepney in East London, is listed with their main factories in Camberwell in 1896 (Kelly and Co 1896, 843) and in 1899, when the company advertised themselves as the '*largest brewers of ginger beer in the world, ginger ale, lemonade & mineral water manufacturers*' (Kelly and Co 1899a, 2069). The company is also listed in London in 1908 (Kelly's Directories Limited 1908, 773) and 1915 (Kelly and Co 1915, 1736). Frederick Charles Battlebury, a wholesale confectioner, is listed on Queen Anne Road, Hackney in 1896 (Kelly and Co 1896, 529), at 313A Mare Street, Hackney in 1899 (Kelly and Co 1899a, 1950), and at 5 and 7 Sylvester Road, Hackney in 1914 (Kelly and Co 1914a, 1554).

5.6.10 The possible billhead from 'The "Otto" Gas Engine Works' in Openshaw, Manchester (Plate 40), was identified as belonging to Crossley Brothers Limited, based on correspondence from 1895 addressed to 'Crossley Bros, Otto Gas Engine Works, Openshaw, Manchester' (Preston 1895, letter 26). The billhead listed addresses for Crossley Brothers Limited in many different towns, and so gave the best possibility of a narrow date range out of all the plates. The addresses listed on the billhead are given in Table 3, followed by directory entries with addresses corresponding to or different from those listed for that particular town, where available. Where another company is listed at the same address, and Crossley Brothers are not listed, this is included as evidence that Crossley Brothers were not yet, or no longer, at this address. Overall, this suggests that the plate dates to sometime between 1900 and 1913.

Address on billhead	**Confirmed or contradicted in directories where available**
Openshaw, Manchester	Crossley Brothers, Great Marlborough Street, Manchester, and 119 Queen Victoria Street, (?), Makers of the patent atmospheric and Otto silent gas engines, hoists, lifts, &c (Kelly and Co 1881, 1865); Crossley Brothers moved to Pottery Lane, Openshaw, in 1882 (University of Nottingham nd); Crossley Brothers Limited, gas engine manufacturers, Openshaw, Manchester, Makers of Crossley's Otto gas engine, vertical, horizontal, 2 man to 100 HP engines combined with pumps, dynamos, fans, &c &c (Kelly and Co 1890, 647); Crossley Brothers Limited, Openshaw, Manchester, Makers of Crossley's Otto gas engine, vertical, horizontal, 2 man to 100 HP engines combined with pumps, dynamos, fans, &c &c (Kelly and Co Limited 1893a, 658); Crossley Brothers Limited, gas engine makers, Openshaw, Manchester, makers of Crossley's Otto gas engine, vertical, horizontal, 2 man to 100 HP engines combined with pumps, dynamos, fans, &c &c (Kelly and Co 1898a, 208) (**1882 - present**)
112 Victoria Street, Bristol	Crossley Bros Limited, gas engine makers, 142 Victoria Street, Bristol (Kelly and Co 1902a, 387) (**? - 1902+**)
217 St Vincent Street, Glasgow	
11 Saville Row, Newcastle Upon Tyne	Millard and Tyrrell, dressmakers, 11 Saville Row, Newcastle (Ward and Sons 1898, 242); Crossley Bros Ltd,

Address on billhead	Confirmed or contradicted in directories where available
	engineers, 11 Saville Row, Newcastle (Ward and Sons 1910, 278); Crossley Brothers Limited, gas engine manufacturers, A Milburn House, Dean Street, Newcastle (Kelly and Co 1914b, 382) (**1899 (?) - 1913 (?)**)
… Street, Southampton	Edward H Bacon, tailor, and James William Garner, beer retailer, 61 High Street, Southampton (Kelly and Co 1898a, 454); Crossley Brothers Ltd, gas engine makers, 61 High Street, Southampton (Kelly and Co 1911, 527) (**1899 (?) - 1911+**)
Chapel Street, Hull	Crossley Bros Limited, gas engine makers, 24 and 25 Chariot Street, Hull (Kelly and Co 1899b, 450); Crossley Bros Ltd, gas engine manufacturers, Chapel Street, Hull (Kelly and Co 1913, 253) (**1900 (?) - 1913+**)
Carrington Street, Nottingham	Crossley Bros Ltd, gas engine manufacturers, 5 Hounds Gate, Nottingham, and at Manchester (Wright 1895, 190); Crossley Bros Ltd, gas engine manufacturers, Carrington Street bridge, Nottingham, and at Manchester (Wright 1898-99, 195); Crossley Brothers Lim., gas and oil engine manufacturers, City buildings, Carrington Street bridge, Nottingham, and at Manchester (Kelly and Co 1904, 343); 'Crossley Bros. Lim.', gas engine manufacturers, City buildings, Carrington Street, Nottingham (Kelly and Co 1910-11, 464); Crossley Brothers Limited, gas engine manufacturers, City buildings, Carrington Street, Nottingham (Kelly and Co 1913-14, 253); Crossley Brothers Limited, gas engine manufacturers, Carrington Street, Nottingham (Kelly and Co 1915-16, 35) (**1896 (?) - 1916+**)
200 Gt Brunswick St, Dublin	
Guildhall (?) Road, Northampton	Crossley Brothers Limited, gas and oil engine manufacturers, Guildhall Road, Northampton (Kelly and Co 1903, 200); Crossley Bros Ltd, gas and oil engine manufacturers, Guildhall Road, Northampton (Kelly and Co 1906, 178); Crossley Brothers Limited, gas engineers, Guildhall Road, Northampton (Kelly and Co 1914c, 182) (**1899 (?) - 1914+**) (listed 1890-1898, but with no address given for Northamptonshire)
1 Quebec Street, Leeds	Not on Quebec Street in 1894 (White Limited 1894, 844), (**1895 (?) +**)
15 K…sbury Street, Plymouth	Henry Lawry, Ironmonger &c, Devonshire Knitting Co, hosiery manufacturers, Boy's Brigade, 15 Kinterbury Street, Plymouth (Kelly and Co 1893b, 437); Crossley Bros, gas engineers, Frankfort Lane, Plymouth (not listed on Kinterbury Street; Eyre 1895, 94); Crossley Brothers Limited, gas engineers, 15 Kinterbury Street, Plymouth (Kelly and Co 1902b, 503) (not listed under gas engineers in 1914, and there does not appear to be a street directory to check for that year, not listed in Plymouth trades in 1919) (**1896 (?) - 1913 (?)**)

Table 3: Addresses for Crossley Brothers Limited from the lithographic plate of one of their possible billheads, with entries from trade directories

5.6.11 ***Lithographic tools and inks:*** in addition to the stone plates, parts of two tools were recovered, which may have been involved in the printing process. One was made of stone and was in two parts, and may have been been used in a

similar fashion to a blackboard duster. The lower half may have had leather or a similar material wrapped around it, with the edges trapped between the two stones, and the notches in the top stone allowing attachement or some form of handle. The tool may then have been used to spread ink onto the plates. The second tool was iron, notched along both sides, with a screw thread at one end. It had greasy black ink on the other end, and may have been a bolt screwed into the floor to hold the lithographic plates in place.

5.6.12 One of the Frank Cooper marmalade jars appeared to have a lump of greasy brown ink in it, and a saucer rim had an inky substance sitting in it. A squat iron tin was also recovered filled with greasy black ink These inks are likely to have been associated with the lithographic printing process.

5.7 BOTTLES, JARS, AND CANS

5.7.1 ***Introduction:*** in total, 100 fragments from glass and ceramic bottles and jars were recovered during the evaluation and excavation, including one rubber internal screw top, and one plastic external screw top. Forty-four of these fragments were from ceramic jars, and the remaining 56 were from glass bottles and jars. One aluminium drinks can was also recovered. The bottles and jars were labelled using a variety of different processes. The white earthenware jars were transfer-printed in black beneath the glaze, whilst many of the glass bottles and jars were embossed. Some of the glass bottles and jars, and the some of the stoneware jars, had the remains of printed paper labels adhering to them. The vessels are discussed below by manufacturer and by contents.

5.7.2 ***Manufacturers:*** it was possible to identify the manufacturers of 22 of the ceramic jars and 18 of the glass bottle and jar fragments, with the remainder unattributed. The manufacturers of the glass bottles and jars were identified using the punt marks (see Table 4, below). Three of the companies were based in Yorkshire: Bagley and Co Ltd in Knottingley (*c*1899+ (?); Toulouse 1971, 77), Beckbarn Brothers in Barnsley, and Redfearn Brothers Ltd, also in Barnsley (1862+; *op cit*, 438). The remainder were based in Merseyside: Cannington, Shaw and Co Ltd in St Helens (*c*1875-1913; *op cit*, 147), Forster's Glass Co Ltd, also in St Helens (1902-1939; *op cit*, 205), Garston Bottle Co in Garston, Liverpool (no date; *op cit*, 210, GBC mark not listed), JWS (unidentified company) in Liverpool (?), and Nuttall and Co in St Helens (1872-1913; *op cit*, 380). If the bottles are assumed to be roughly contemporary, then they date to the period of *c*1902 to *c*1913.

5.7.3 Only one of the ceramic jar manufacturers was identified - Maling of Newcastle upon Tyne - but this accounted for most of all the attributed white earthenware marmalade jars recovered. The jars manufactured by Maling for Frank Cooper of Oxford are relatively well documented, with production continuing until 1936 (Bell 1995, 16).

Company name	**Items and who manufactured for**
Bagley & Co Ltd, glass bottle manufacturer, Knottingley, Yorkshire	Very light turquoise jar with embossed text on base 'B & Co Ld / K / 367'
Beckbarn Bros, glass bottle manufacturer, Barnsley, Yorkshire	Light turquoise Codd bottle made for John Lang, mineral and aerated water manufacturers in Manchester (Slater 1895, 174), with embossed text near base 'Beckbarn (?) Bros / Bottle Makers / Barnsley'
Cannington, Shaw & Co Ltd, glass bottle manufacturer, St Helens	Very light turquoise bottle with embossed text on base 'C.S & Co / 194 (?)'
	Very light turquoise Codd bottle made for R & J Nuttall, mineral and aerated water manufacturers in Manchester (Slater 1895, 174 (Robert Nuttall)), with embossed text near base 'Cannington Shaw & Co / Makers / St Helens', and on base '1201'
	Green bottle made for Henry George Crews, ale and porter merchants and agents in Manchester and Liverpool (Slater 1895, 8), with embossed text on base '3004 / C.S & Co Ld'
	Green bottle made for W & A Gilbey, distillers and rectifiers in Manchester (Slater 1895, 84), with embossed text on base '6529 / C.S & Co Ltd'
Forster's Glass Co Ltd, glass bottle manufacturer, St Helens	Colourless bottle made for Lancashire Hygienic Dairies Ltd, dairy in Manchester, with embossed text on base 'A557 / 20 / FGC'
	Brown bottle with crown closure made for JG Swales & Co, brewers in Manchester and Wigan (Slater 1895, 36), with embossed text on base 'B216 / 10 / FGC'
Garston Bottle Co, glass bottle manufacturer, Garston, Liverpool	Brown bottle with crown closure and embossed text on base 'GBC / 14 / 4 SD'
	Colourless bottle with crown closure made for Pepsi Cola, with base embossed 'GBC / 8 / 112'
	Colourless bottle with crown closure made for Jewsbury and Brown Limited, dispensing chemist and druggist in Manchester (Slater 1895, 51), and embossed text on base 'GBC / J&B / 110'
JWS, glass bottle manufacturer, Liverpool?	Colourless milk bottle (?) with embossed text 'JWS / L / 6'
Maling, pottery manufacturer, Newcastle-upon-Tyne	Marmalade jars made for The Albion Hotel in Manchester (Slater 1895, 132), with impressed text on base 'S / Maling / K / Newcastle'
	Marmalade jars made for Frank Cooper Limited, marmalade manufacturer in Oxford, with impressed text on base 'S / Maling / K / Newcastle'
Nuttall & Co, glass bottle manufacturer, St Helens	Dark green bottle made for TW Hampson, bottler in Manchester (Slater 1895, 8), with embossed text on base 'N & Co / 1058 (?)'
	Green bottle with internal screw top made for Bretts Country, with embossed text on base 'N & Co / 1177'

Company name	Items and who manufactured for
	Green bottle with cork or glass stopper made for The Hop Beverage Company, mineral and aerated water manufacturers in Manchester (Slater 1895, 174), with embossed text on base 'N & Co / 1402'
Redfearn Brothers Ltd, glass bottle manufacturer, Barnsley, Yorkshire	Very light turquoise flat-bottomed Hamilton (?) bottle made for Slack & Cox Ltd of Manchester, with embossed text on base 'R.B.B 294'

Table 4: Bottle and jar manufacturers with the items they manufactured (one fragment listed per entry)

5.7.4 ***Contents:*** the contents of 18 ceramic jars, and one aluminium can, and 16 glass bottle and jar fragments could be identified, with the rest remaining unidentified. The vessels comprised drinks bottles, marmalade jars, and medicine bottles, where the contents could be identified from the company names embossed or printed on them. These are shown in Table 5, below.

Drink, food, or medicine	Manufacturer
Beer	Bass Brewers Limited, brewers, Burton on Trent - aluminium drinks can
	JG Swales & Co, brewers, Manchester and Wigan (Slater 1895, 36) - glass bottle made by Forster's Glass Company Limited
	John Smith, brewers, Tadcaster (Kelly and Co 1881, 1671) - glass bottle
	Henry Charles Wilson and Co, brewers, Manchester (Slater 1895, 36) - glass bottles
Other alcaholic drinks	Henry George Crews, ale and porter merchants and agents, Manchester and Liverpool (Slater 1895, 8) - glass bottle made by Cannington, Shaw and Co
	W & A Gilbey, distillers and rectifiers, Manchester (Slater 1895, 84) - glass bottle made by Cannington, Shaw and Co
	The Hop Beverage Co, Mack's hop bitters and stout, Manchester (Slater 1895, 174) - glass bottle made by Nuttall and Co
Mineral and aerated water	John Lang, mineral and aerated water manufacturer, Manchester (Slater 1895, 174) - glass bottle made by Beckbarn Bros
	Manoah Davies, mineral and aerated water manufacturer, Manchester (Slater 1895, 174) - glass bottle
	R & J Nuttall, mineral and aerated water manufacturer, Manchester (Slater 1895, 174 (Robert Nuttall)) - glass bottle made by Cannington, Shaw and Co
	Lancashire Hygienic Dairies Ltd, dairy, Manchester - glass bottle made by Forster's Glass Company Limited
Soft drinks	Pepsi Cola, soft drinks brand, USA - glass bottle made by Garston Bottle Co
	Coca Cola, soft drinks brand, USA - glass bottle
Marmalade	Frank Cooper Limited, marmalade manufacturer, Oxford - white earthenware jars made by Maling
	The Albion Hotel, hotel and marmalade manufacturer (?), Manchester (Slater's Directory Limited 1895, 132) - white earthenware jars made by Maling
Medicine	Jewsbury and Brown Limited, dispensing chemist and druggist, Manchester (Slater 1895, 51) - glass bottle made by Garston Bottle Co

Table 5: Drink, food, and medicine containers represented in the finds assemblage

5.8 BUILDING STRUCTURE AND SERVICES

5.8.1 Many large fragments of red earthenware and firebrick chimney pots were recovered, that of firebrick being square cross-sectioned at the base, with a round cross-section higher up. Other fragments relating to building exteriors were also recovered, comprising a fragment of Cumbrian slate, possibly from a roof tile, a double bull-nosed brick, window panes (both plain and ridged), and possible down-pipe brackets. Fragments relating to building interiors included plaster cornices, iron nails, brown- and green-glazed earthenware wall or floor tiles (one manufactured by the Campbell Tile Co, Stoke-on-Trent, 1875 to early 20th century; Anon 1996-8), decorated red earthenware floor (?) tile, milk glass (?) floor or wall tiles adhering to cement or concrete, a possible iron pipe clip, and a fragment of cast wall plaster with rod-shaped holes through it. White earthenware toilet and possible other sanitary ware fragments were also recovered, relating to the water supply to a building or buildings. Table 6, below, quantifies the fragments relating to building structure and services by material type.

Material type	**Quantity**		**Material type**	**Quantity**
Ceramic	17		Iron	7
Composite	2		Plaster/mortar	5
Glass	21		Stone	1
			Total	***53***

Table 6: Finds relating to building structure and services by material type

5.9 TABLEWARE AND KITCHENWARE

5.9.1 In total, 35 fragments of ceramic tableware were recovered, with the vessels identified comprising cups, saucers, plates, ashets, tureens, jugs, and bowls. All of these were of white earthenware, decorated with banded factory-made slipware designs, sponge printing, relief-moulded scrolls and aratral ridges, painted gilding, and transfer printing (navy flow blue geometric pattern, grey floral pattern, and 'Asiatic Pheasants'). A copper alloy table fork was also recovered. The six fragments of kitchenware comprised a self-glazed red earthenware jar fragment, and hollow-ware stoneware vessels, one of which was rouletted. Although the kitchenware is not closely datable, the style of decoration on the tableware is consistent with a late 19th- to early 20th-century date.

5.10 CLOTHING

5.10.1 A shell button was recovered, which is likely to have been from inner clothing. A boot or shoe heel from adult footwear was also found, as were two ladies'

shoes with elaborately decorated leather uppers and medium heels, which seem, stylistically, to date to the 1920s.

5.11 DIET

5.11.1 Several fragments of sheep bones and medium mammal bones were recovered, some with butchery marks, and one which had been gnawed by a rodent, and were interpreted as food remains. The contents of bottles and jars, including beer and other alcoholic drinks, mineral and aerated water, milk, soft drinks, and marmalade, has already been discussed (*see Section 5.7, above*).

5.12 POTENTIAL FOR FINDS ASSEMBLAGE

5.12.1 The lithographic stone plate fragments are believed to be a rare survival, and they are complemented by the assemblage of bottle and jars, which display a range of different labelling methods.

5.12.2 These artefacts represent the physical remains of an industry that was evidently of some local significance, given the number of firms engaged in the business during the late 19th and early 20th centuries. However, there is little published material pertaining to this industry, reflecting a lack of academic research into its development, thereby highlighting the significance of the material recovered from the excavation of Drinkwater's Mill.

6. CURATION AND CONSERVATION

6.1 RECIPIENT MUSEUM

6.1.1 It is anticipated that The Museum of Science and Industry in Manchester will be the ultimate place of deposition for the paper and material archive, as this is the nearest museum which meets the Museums' and Galleries' Commission criteria for the long-term storage of archaeological material:-

Address: The Museum of Science and Industry in Manchester
Liverpool Road
Castlefield
Manchester M3 4FP

Contact details: Pauline Webb (Collections Manager), Tel: 0161 606 0114

6.1.2 Arrangements have been made with the museum for the deposition of the complete site archive from the 2004/05 investigations.

6.2 CONSERVATION

6.2.1 Most of the assemblage is well-preserved and in good condition and thus the conservation requirement is low.

6.3 STORAGE

6.3.1 The complete project archive, which will include records, plans, both black and white and colour photographs, artefacts, and digital data, will be prepared following the guidelines set out in *Guidelines for the preparation of excavation archive for long-term storage* (Walker 1990).

6.3.2 All finds will be packaged according to the museum's specifications, in either acid-free cardboard boxes, or in airtight plastic boxes for unstable material. Metalwork constitutes the only category which is potentially unstable and although the items will be packaged in airtight plastic boxes, they will need to be stored in controlled conditions.

6.4 PACKAGING

6.4.1 The assemblage is currently well-packed and will require no further packaging. Box lists are prepared and will be updated from the database when the identification of objects is complete.

7. STATEMENT OF POTENTIAL

7.1 INTRODUCTION

7.1.1 In a recent overview of the region's industrial heritage, Fletcher (1996, 164) remarked that '*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 the Industrial Period during the last 30 years.

7.1.2 Whilst archaeological investigation of textile mill sites has increased in recent years, this has mainly been concerned with recording of upstanding fabric, the archaeological excavation of such structures being a very new discipline in the north-west of England. The dataset generated by this project adds significant information, not only with regards to the development of Drinkwater's Mill itself, but also to the growing body of evidence indicating that remains of some of the earliest textile mills within the Manchester area are still preserved within the urban stratigraphy. Recent excavations undertaken in the New Islington area of east Manchester (OA North 2004), for instance, also found well-preserved remains of the early phases of late 18th century textile mills. The site of Drinkwater's Mill, moreover, incorporates physical evidence for a little-studied industry that adapted and reused the former cotton spinning factory.

7.2 PRINCIPAL POTENTIAL

7.2.1 The greatest potential for analysis lies in the confirmation of the phasing and dating of the sequence of structures and archaeological deposits revealed by the investigation. The stratigraphic data will also provide the framework within which other analysis will take place. Two distinct uses of the mill have been established, both of some archaeological merit. Stratigraphic information, when linked to cartographic sources in particular, will elucidate the development of the textile industry in this part of Manchester, whilst stratigraphic, artefactual, cartographic and documentary evidence will inform the conversion of the building to lithographic printing processes.

7.2.2 ***Stratigraphic data:*** further analytical study of the stratigraphic record may elucidate a detailed, chronological sequence of events pertaining to the development of the site. In particular, this may inform an understanding of the implementation and development of technical innovations represented by the surviving structures on the site.

7.2.3 ***Documentary study:*** the significance of the excavation results is increased by the supporting primary documentary evidence available within the various county record offices and archives. An appraisal of these sources has been undertaken as part of this assessment (*Section 3 above*), although this has by no means been exhaustive. Further detailed examination of the primary

documentary evidence, and particularly that relating to the development and operation of the engraving and lithographic printing processes, could provide significant additional information.

7.2.4 ***Finds data:*** the lithographic printing blocks represent the rare survival of such artefacts, and are worthy of further detailed study. In particular, attention should be focused upon furnishing a more precise date for the stone blocks, which could be achieved through further documentary research. Significant information may also be obtained from more detailed analysis of the tools associated with the printing process that were recovered from the archaeological investigation.

7.3 NATIONAL PRIORITIES ADDRESSED BY THE SITE'S POTENTIAL

7.3.1 In 1991 English Heritage produced a document, *Exploring Our Past*, which included a strategy for dealing with the problems and opportunities which would be encountered during the following decade (English Heritage 1991b). Many of the ideas first raised in *Exploring our Past* were developed further in a draft document, *Research Agenda*, circulated to the archaeological profession in 1997. Section 7 of *Exploring our Past*, *The Way Forward*, and Section 3 of *Research Agenda*, *Archaeological Research Priorities*, outlined a series of broad academic objectives. Those of relevance to the present site are as follows:

Processes of Change

- to enable archaeology to contribute to important debates and controversies which hitherto have been largely the preserve of economic historians (PC7);
- to examine the relationship between traditional and new industries during the period of industrialisation (PC8).

Themes

- to improve our understanding of single monument forms via site-specific study (T6);
- to contribute to an exposition of the remains of industrial archaeological sites (T6);
- to inform the development of new research frameworks for the management of the industrial archaeological resource (T6);
- to investigate a documented industrial site to compare the application of new technologies with the historical records of innovation and contemporary technical literature (T7);
- to assist analysis of the contrast between urban and rural industrial sites (T7);

- to study waste and process material from industrial sites to determine craft procedures (T7);

- to examine aspects of craftmanship and manufacture deduced from a study of the finished object (T7).

Methodological and Technical Development

- to inform the development and effective implementation of scientific techniques for analysis, which is considered to be a vital area of research (MTD6).

7.3.2 Whilst it is debatable whether the complete dataset from the investigated elements of the Drinkwater's textile mill could fully address all of these, they should nevertheless be borne in mind when addressing more local issues.

7.4 LOCAL AND REGIONAL PRIORITIES

7.4.1 A research agenda for the North West has yet to be fully established, but it is clear that data gathering is still the most urgent necessity for many periods, including the industrial and modern periods (Newman and McNeil 2005). The textile industry played a pivotal role in the growth of, not only the city of Manchester, but also the region as a whole. It would not be an exaggeration to suggest that the industrial might of Britain in the 19th century was based on the textile industry, both in terms of production, and also in terms of the associated innovations in engineering (both mechanical and structural) and growth of associated industries. As such, the textile industry is of vital importance to the industrial period, both locally and nationally, and Drinkwater's Mill is of especial significance, as it marks a watershed in power supply technology within one of the foremost centres of the industry during the late 18th century.

7.4.2 The decline of the textile industry within both the locality and the region as a whole is also of significance, having a drastic and lasting effect on the local community. The re-use of structures built for textile manufacture for the purposes of a separate industry is an important phase, and is far too often overlooked. The fact that textile mills can be converted to entirely different industrial uses has not only led to the increased survival of their structural fabric, but may also, in part, explain the rapid expansion of industry in general in the region during the 19th century. A fine example of this adaptability of function was observed at Macintosh Mill, Manchester (OA North 2003), where experimental premises for rubber manufacture were built to the design of a weaving shed, so that, in the event that the enterprise failed, the premises could easily be converted to textile usage, minimising the loss to the entrepreneur. The dataset generated from the archaeological investigations at Drinkwater's Mill has a good potential to inform an understanding of how an early textile mill was converted for use as a lithographic printing works.

7.4.3 An overview of the documentary evidence pertaining to the Drinkwater's Mill site has indicated that the printing industry was of some local and regional

significance. This would appear to be corroborated by the surviving stamps present on the lithographic blocks recovered from the excavation, which include addresses for businesses across Britain. However, very little research has been undertaken into the development and operation of this industry, and it is therefore little understood. As noted in the current draft archaeological research agenda for the industrial and modern periods, '*there is a need to study technological development and production in their own rights as part of a bottom-up approach that allows the significance of industrial production to be confidently and rigorously placed in context*' (Newman and McNeil 2005, 17). The research agenda document goes on to note that '*industry specific studies are needed for those industries that have received little archaeological attention. This is especially needed for those industries that grew in importance in the early 20th century*' (*op cit*, 19). It is within this context that the local and regional significance of the lithographic printing factory needs to be placed.

7.4.4 The issue of the publication of archaeological reports and public accessibility to data has been stressed in the draft North West Region Archaeological Research Strategy (Brennand 2005). Whilst this is a problem for the entire archaeological community the visual nature of industrial period remains, and its link to the present population, increases the significance of prompt publication of studies of this nature.

8. UPDATED PROJECT DESIGN

8.1 AIMS AND OBJECTIVES OF PROGRAMME OF ANALYSIS

8.1.1 ***Overall aims:*** the overall aims are:

1. to analyse the dataset generated from the archaeological investigations;

2. to present the results of analysis and research to the wider public by publication;

3. to deposit the project archive into the public domain.

8.1.2 ***Specific objectives:*** the specific objectives which the data can address are:

1. to characterise and date the sequence of the archaeological structures and deposits revealed during the course of the investigation;

2. to collate all the available archive sources pertaining to the site;

3. to present an integrated narrative of the development of Manchester's earliest purpose-built steam-powered textile mill, based on information provided by documentary research, archaeological excavation, and artefact analysis;

4. to articulate a better understanding of the development and operation of Manchester's lithographic printing industry in order to place the results of the archaeological investigation into a local and regional context.

8.2 PRESENTATION OF RESULTS

8.2.1 In accordance with the guideline outlined in the English Heritage document *Management of Archaeological Projects 2nd edn* (English Heritage 1991a), it is proposed that the results of the project placed in the public domain in the following stages:

1 **Publication:** a summarised account of the archaeological work should be compiled and submitted for publication in an appropriate academic journal. Given the historical and archaeological significance of the site, however, the production of a popular publication should also be considered. This would be aimed at presenting the history of the industrial development and expansion of Piccadilly, focusing upon the pivotal role played by Drinkwater's Mill, and the associated worker's housing in the immediate vicinity.

2 **Project archive:** the completion of the project will result in an integrated archive, which will be deposited with The Museum of Science and Industry in Manchester.

8.3 PROGRAMME STRUCTURE

8.3.1 The post-excavation programme will be divided into the following stages:

- Further detailed documentary research;
- Analysis and compilation of text;
- Publication;
- Deposition of archive.

9. METHOD STATEMENT

9.1 INTRODUCTION

9.1.1 This statement relates the tasks outlined in the task list to the aims and objectives. The programme of works is tailored to address the specific objectives, which, when achieved, will secure the general objectives outlined in *Section 8.1* above.

9.2 START-UP

9.2.1 ***Task 1:*** to facilitate all objectives.

9.2.2 All members of the project team will be fully briefed by means of a project meeting, and a timetable will be established.

9.3 STRATIGRAPHIC ANALYSIS

9.3.1 ***Tasks 2-8:*** to address Objective 1, and contribute to all other objectives.

9.3.2 The stratigraphic sequence will form the contextual framework for an integrated report which, following the incorporation of artefactual data, will form the framework for the interpretation of the site. The interpretative framework will be based on the refinement of broad chronological phases into sub-phases reflecting changes in the organisation of the cotton spinning mill and the lithographic printing works.

9.3.3 Detailed structural analysis will be undertaken on those features identified as being of major interpretative importance to the site.

9.4 DOCUMENTARY RESEARCH

9.4.1 ***Task 9:*** to address Objective 2.

9.4.2 Further documentary research will be undertaken to enhance the fieldwork results, as a firm link between straigraphic analysis and primary documentary data would prove invaluable in interpreting the remains of both the textile mill and the lithographic printing factory. Further documentary study would be focused upon eliciting information pertaining to the lithographic printing process and the development of the industry in Manchester. Research will also be undertaken to identify comparable structures elsewhere, from either historical or archaeological sources.

9.5 FINDS ANALYSIS

9.5.1 ***Task 10:*** to address Objective 3.

9.5.2 A full catalogue would be compiled for each material category, accompanied with illustrations where necessary. This would lead to the production of a text for each material category, with comparators where possible. This data would

form the basis of a link between documentary and physical remains, forming a framework for a discussion of the technical processes and everyday life within the textile mill and printing works.

9.6 PRODUCTION OF TEXT

9.6.1 ***Task 11:*** a draft text and illustrative material will be produced and edited.

9.6.2 During each part of the analytical programme, a selection will be made of appropriate material for illustration. This will cover general plans, phase plans, and artefacts. Experienced illustrators, using standard conventions, will compile these illustrations, either digitally for the plans, or manually as appropriate. A number of artefacts will be photocopied for the publication.

9.6.3 Following the completion of the full analysis of all the stratigraphic and artefactual evidence, a text suitable for publication will be drawn up. This could be in the format described in *Section 10*, and would incorporate as necessary any information from comparable excavations. This text will be submitted to internal revision, and will be submitted to all specialists after editing, for their comments. The edited text will be submitted to an external referee for formal academic review, after which it will be copy edited, ready for publication.

9.6.4 The format of the final publication requires further discussions, although it would seem that the following option would be an appropriate course of action:

- Produce a dedicated popular publication that would present the results of the archaeological work in an easily-accessible format, outlining the development of the site, the significance of the industries that occupied the site, and the expansion of that part of Manchester during the late 18th and early 19th centuries;

- Present the results of the excavation in an appropriate academic journal, such as the *Industrial Archaeology Review.*

9.7 ARCHIVE

9.7.1 ***Task 12:*** on completion of the publication text, the research archive will be finalised, and the finds archive deposited with the Museum of Science and Industry in Manchester.

10. PUBLICATION SYNOPSIS

10.1 INTRODUCTION

10.1.1 A text will be prepared suitable for publication, accompanied with suitable illustrations. Elements of this could then be extract for a short technical publication in an appropriate national journal.

10.2 THE STRUCTURE OF THE REPORT

10.2.1 The following section represents a likely breakdown of the proposed publications. It should be noted, however, that this synopsis can only be regarded as a draft, based on the current understanding of the publication.

10.2.2 The text will be supported by a number of graphics, comprising drawings and photographs to illustrate the evidence, tables to summarise data and, where appropriate, interpretative phase drawings. The finished article will aim to present a high degree of integration between the structural/stratigraphical history of the site, the documentary evidence, and the finds categories.

10.3 OUTLINE SYNOPSIS

1. INTRODUCTION

1.1 Site location

1.2 Circumstances of project

2. BACKGROUND

2.1 Summarised development of Manchester's textile industry, and the resultant growth of industrial areas and associated housing in the Piccadilly area

2.2 Summarised development of the printing industry

2.3 Documentary evidence for Drinkwater's Mill and subsequent occupation of the site

3. THE ARCHAEOLOGICAL INVESTIGATION

3.1 Phased description of the structures encountered during the archaeological investigation

4. FINDS OVERVIEW

4.1 Summary of the artefacts recovered from the excavation, principally the fragments of lithographic printing blocks

5. DISCUSSION

5.1 Chronological and technological discussion

5.2 Thematic context

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Acknowledgements

11. RESOURCES AND PROGRAMMING

11.1 NAMED PROJECT TEAM

11.1.1 The team consists of a combination of internal OA North staff and input from external consultants. The project will be managed by Ian Miller.

Name	Organisation	Tasks
Chris Wild	OA North	Stratigraphic analysis and publication report
Ian Miller	OA North	Project management, and publication report
Rachel Newman	OA North	Internal quality control
Emma Carter	OA North	Illustrator
Jo Dawson	OA North	Finds analysis
Joanne Levey	OA North	Archive preparation

11.2 MANAGEMENT STRUCTURE

11.2.1 OA North operates a project management system. The team is headed by the Project Manager, who assumes ultimate responsibility for the implementation and execution of this Project Design, and the achievement of performance targets, be they academic, budgetary, or scheduled. The Project Manager may delegate specific aspects of the project to other key staff, who both supervise others and have a direct input into the compilation of the report. They may also undertake direct liaison with external consultants and specialists who are contributing to the publication report. The Project Manager will define and control the scope of the post-excavation programme.

11.2.2 Communication between all concerned in the post-excavation programme is of paramount importance, and it is essential that the specialists involved liaise closely in order that comparable data are obtained. To this end, regular meetings and reviews are envisaged between all project staff and between particular groups of specialists. All information will be disseminated at regular intervals, thus ensuring that all concerned are aware of current progress.

11.3 LIST OF TASKS

11.3.1 The project has been broken down into a series of summary tasks, which are set out in *Appendix 4*. In addition to the tasks outlined there is some time allocated to general project monitoring and management, which do not appear on the task sheet as they are not allocated to any specific days.

11.3.2 ***Management tasks:*** the management and monitoring allocations include project monitoring, advice and co-ordination, and problem solving.

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APPENDIX 1: PROJECT DESIGN

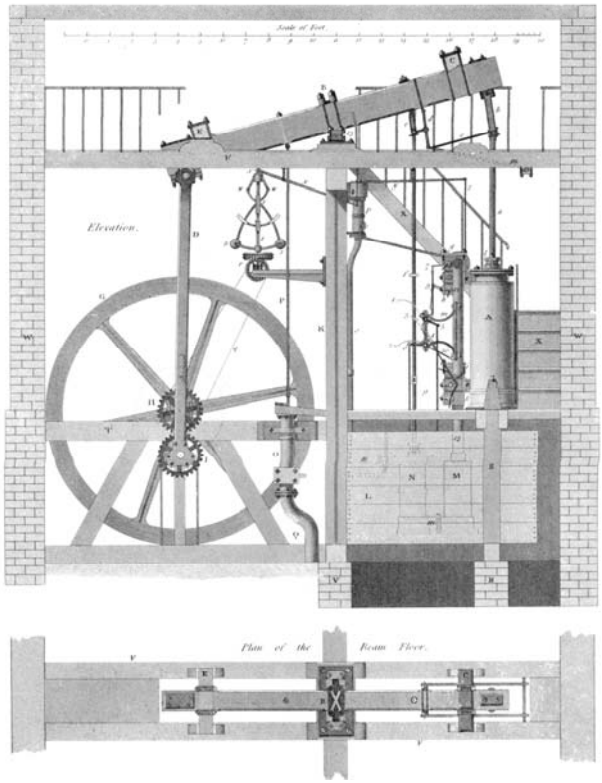
Oxford Archaeology

November 2004 **North**

THE CITY INN,

PICCADILLY,

MANCHESTER



Late C18th Boulton and Watt Rotative Beam Engine

ARCHAEOLOGICAL EVALUATION PROJECT DESIGN

Proposals

The following project design is offered in response to a request from Mr Russell Bolton, of Gleeds Management Services, for an archaeological evaluation in advance of the proposed development of land to the west of Piccadilly Railway Station, Piccadilly, Manchester.

1 BACKGROUND

1.1 CIRCUMSTANCES OF PROJECT

1.1.1 Planning permission has been granted recently for a development known as The City Inn, which lies within the Piccadilly area of Manchester (centred at NGR SJ 8459 9799). The design proposal includes the construction of a basement across the site, which will necessitate considerable earth-moving works. In order to secure archaeological interests, Manchester City Council has attached an archaeological condition to planning consent for redevelopment of the site, and a brief detailing the required archaeological works has been devised by the Assistant County Archaeologist for Greater Manchester. In the first instance, this allows for an archaeological evaluation of the site, which will be aimed at establishing the extent of survival of the sub-surface archaeological resource. This will be focused on the buried remains of an early textile mill and, in particular, its associated steam plant.

1.1.2 This project design is for the required programme of archaeological works, and is offered in response to a request from Mr Russell Bolton, of Gleeds Management Services. It has been formulated to meet the requirements of the specification produced by the Assistant County Archaeologist for Greater Manchester, and allows for the excavation and recording of two evaluation trenches.

1.2 HISTORICAL BACKGROUND

1.2.1 The study area formed the focus for several of Manchester's early textile mills, and notably Peter Drinkwater's Piccadilly Mill. This mill was under construction in 1789 and, in 1790, became the first cotton mill in Manchester to be driven by a steam-powered rotary beam engine, and therefore fully independent of the site requirements of a water-power system (Williams and Farnie 1992, 52). The original building comprised five storeys, including a basement, and incorporated an engine and boiler house attached mid-way along the south elevation. The original engine was an eight horsepower rotary beam engine, manufactured by the Birmingham firm of Boulton and Watt. This engine was replaced in *c*1800 by a more powerful model, which was also built by Boulton and Watt.

1.2.2 The mill was occupied during the early 1820s by Peter Appleton, who is listed in commercial trades directories as a 'cotton spinner'. Appleton appears to have been responsible for the expansion of the mill during this period, which included the addition of a wing to the south-eastern end of the mill, extending to Upton Street, and the erection of a separate range to the south-west.

1.2.3 The Ordnance Survey 60": 1 mile map of Manchester, published in 1849, marks the site as 'Piccadilly Mill' and identifies the central projection on the south side of the original mill building as housing the steam plant. This implies the beam engine to have continued in use to this date, although the subsequent Ordnance Survey map, published in 1888, depicts considerable remodelling of the mill. This seemingly included the replacement of the engine and boiler

house by two narrower ranges that extended almost the full length of the south elevation of the main mill. The Upton Street range is also shown to have been expanded, and a new chimney in this part of the mill complex suggests this to have been the site of the replacement engine and boiler house.

1.2.4 The mill had ceased to operate as a cotton-spinning factory by the early years of the 20th century, when the building was modified for use as a printing works. By 1932, the building had been demolished, and Ayton Street extended across the western half of the site.

1.3 OXFORD ARCHAEOLOGY

1.3.1 Oxford Archaeology has over 30 years of experience in professional archaeology, and can provide a professional and cost effective service. We are the largest employer of archaeologists in the country (we currently have more than 200 members of staff) and can thus deploy considerable resources with extensive experience to deal with any archaeological obligations you or your clients may have. We have offices in Lancaster and Oxford, trading as Oxford Archaeology North (OA North), and Oxford Archaeology (OA) respectively, enabling us to provide a truly nationwide service. Watching briefs, evaluations and excavations have taken place within the planning process, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. OA is an Institute of Field Archaeologists Registered Organisation (No 17), and is thus bound by the IFA's Code of Conduct and required to apply the IFA's quality standards.

1.3.2 Given the geographical location of Manchester, it is intended to co-ordinate the project from our northern office in Lancaster, though the project team will use the most appropriate resources from both offices. Between our two offices our company has unrivalled experience of working on post-medieval sites, and is recognised as one of the leading archaeological units in the country with regard to dealing with Industrial Period archaeological projects.

1.3.3 OA North has considerable experience of the assessment, survey, evaluation and excavation of sites of all periods, and has particular experience of Industrial Archaeology in the North West having undertaken in recent years excavation, survey, building recording and post-excavation projects in both urban and rural environments; two major projects undertaken *inter alia* (locally to Manchester) include the on-going programme of survey, excavation, recording, and analysis of the Murrays' Mills in Ancoats, and the evaluation and excavation of the Jersey Street Flint Glass Works, also in Ancoats. OA North also undertook an evaluation of Macintosh Mill in the Chorlton-on-Medlock area of Manchester, and an evaluation and excavation of Samuel Oldknow's Hillgate Mill, which was the first factory in Stockport to have been fitted with a Boulton and Watt engine. Of particular relevance, OA North has recently undertaken a series of archaeological evaluations associated with the New Islington development in Manchester on behalf of English Partnerships and Urban Splash Ltd. This has included the evaluations of New Islington Mill, Waller's Mill, and Salvin's Factory, all of which

originated during the late 18th century and were amongst the initial wave of steam-powered cotton mills to have been erected in Manchester.

1.3.4 OA North thus has the demonstrable specialist expertise to undertake the evaluation of The City Inn site in the most cost-effective manner, whilst being able to maintain high academic and professional standards.

2 AIMS AND OBJECTIVES

2.1 ACADEMIC AIMS

2.1.1 The main research aim of the investigation, given the commercial nature of the development, will be to characterise the level of preservation and significance of the buried remains relating to Peter Drinkwater's Piccadilly Mill, and to provide a good understanding of their potential.

2.2 OBJECTIVES

2.2.1 The objectives of the project may be summarised as follows:

- to expose and determine the presence, character, and extent of the external walls pertaining to the former engine house;
- to expose and determine the presence, character, and extent of internal details of the former engine house, and establish any evidence for phasing;
- to determine the presence, character, and extent of the structures shown to the east of the engine house on historic mapping;
- to inform a decision as to whether further archaeological investigation will be required in advance of development ground works.

3 METHOD STATEMENT

3.1 The following work programme is submitted in line with the aims and objectives summarised above, and in accordance with the project brief devised by the Greater Manchester Assistant County Archaeologist.

3.2 EVALUATION

3.2.2 ***General Methodology:*** it is proposed that the site be investigated via the excavation of two trenches, one of 15m length and one of 10m length. The 15m trench will be placed to investigate the survival of the eastern part of the former Piccadilly Mill engine house, and structures to the east. The 10m trench will be placed at a right angle to Trench 1, and will aim to investigate the

external north and south walls of the engine house, and any internal features. The proposed positions of the trenches are shown in Figure 1.

3.2.3 A machine of appropriate power fitted with a toothed bucket will undertake excavation of the modern ground surface. The uppermost levels of overburden/demolition material will then be removed using the same machine, but fitted with a toothless ditching bucket, to the top of the first significant archaeological level. The work will be supervised closely by a suitably experienced archaeologist. Spoil from the excavation will stored adjacent to the trench, and will be backfilled upon completion of the archaeological works.

3.2.4 Machine excavation will then be used to define carefully the extent of any surviving foundations, floors, and other remains. Thereafter, structural remains will be cleaned manually to define their extent, nature, form and, where possible, date. It should be noted that no archaeological deposits will be entirely removed from the site. If the excavation is to proceed below a depth of 1.2m, then the trenches will be widened sufficiently to allow the sides to be stepped in.

3.2.5 All information identified in the course of the site works will be recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of the evaluation will be recorded on *pro-forma* context sheets, and will be accompanied with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.

3.2.6 ***Context Recording:*** all contexts will be recorded using *pro-forma* sheets, and details will be incorporated into a Harris matrix. Similar object record and photographic record *pro-formas* will be used. All written recording of survey data, contexts, photographs, artefacts and ecofacts will be cross-referenced from *pro-forma* record sheets using sequential numbering.

3.2.7 ***Photography:*** a full and detailed photographic record of individual contexts will be maintained and similarly general views from standard view points of the overall site at all stages of the evaluation will be generated. Photography will be undertaken using 35mm cameras on archivable black and white print film as well as colour transparency, and all frames will include a visible, graduated metric scale. Extensive use of digital photography will also be undertaken throughout the course of the fieldwork for presentation purposes. Photographs records will be maintained on special photographic *pro-forma* sheets.

3.2.8 ***Planning:*** the precise location of the evaluation trenches, and the position of all archaeological structures encountered, will be surveyed by EDM tacheometry using a total station linked to a pen computer data logger. This process will generate scaled plans within AutoCAD, which will then be subject to manual survey enhancement. The drawings will be generated at an accuracy appropriate for 1:20 scale, but can be output at any scale required. Sections will be manually drafted as appropriate at a scale of 1:10. All information will be tied in to Ordnance Datum.

3.2.9 Human remains are not expected to be present, but if they are found they will, if possible, be left *in situ* covered and protected. If removal is necessary, then the relevant Home Office permission will be sought, and the removal of such remains will be carried out with due care and sensitivity as required by the *Burials Act 1857*.

3.2.10 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996.

3.2.11 ***Finds policy:*** finds recovery and sampling programmes will be in accordance with best practice (following current Institute of Field Archaeologists guidelines) and subject to expert advice in order to minimise deterioration. OA North employs in-house artefact and palaeoecology specialists, with considerable expertise in the investigation, excavation, and finds management of sites of all periods and types, who are readily available for consultation. Finds storage during fieldwork and any site archive preparation will follow professional guidelines (UKIC). Emergency access to conservation facilities is maintained by OA North with the Department of Archaeology, the University of Durham. Samples will also be collected for technological, pedological and chronological analysis as appropriate. OA North employs palaeoecology and soil micromorphology specialists with considerable expertise in the investigation, excavation and analysis of sites of all periods and types, who are readily available for consultation.

3.3 HEALTH AND SAFETY

3.3.1 Full regard will, of course, be given to all constraints during the course of the project. OA provides a Health and Safety Statement for all projects and maintains a Safety Policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (3rd Edition, 1997). A risk assessment will be completed in advance of any on-site works. Details of the Safety Policy are presented in *Appendix 1*.

3.3.2 OA North has professional indemnity to a value of £2,000,000, employer's liability cover to a value of £10,000,000 and public liability to a value of £15,000,000. Written details of insurance cover can be provided if required.

3.3.3 Normal OA North working hours are between 9.00 am and 5.00 pm, Monday to Friday, though adjustments to hours may be made to maximise daylight working time in winter and to meet travel requirements. It is not normal practice for OA North staff to be asked to work weekends or bank holidays and should the Client require such time to be worked during the course of a project a contract variation to cover additional costs will be necessary.

3.4 OTHER MATTERS

3.4.1 Access to the site will be arranged via the Client/main contractor.

3.4.2 The cost of hiring and erection of Herras fencing has been allowed for within the costings presented below. Should this not be required, the sum may be deducted from the fee proposal.

3.4.3 The trenches will be backfilled upon completion of the archaeological works. However, paved areas and tarmac surfaces removed during the course of the evaluation will not be reinstated to their current standard.

3.4.4 The Client/main contractor is asked to provide OA North with information relating to the position of live services on the site. OA North will use a cable detecting tool in advance of any machine excavation.

3.5 POST-EXCAVATION AND REPORT PRODUCTION

3.5.1 ***Archive:*** the results of the fieldwork will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*The Management of Archaeological Projects, 2nd edition, 1991*) and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IFA in that organisation's code of conduct.

3.5.2 The paper and finds archive generated from the archaeological work undertaken at the site will be deposited with the Science and Industry Museum at Manchester, as this is the nearest museum which meets Museums' and Galleries' Commission criteria for the long term storage of archaeological material (MGC 1992). This archive can be provided in the English Heritage Centre for Archaeology format, both as a printed document and on computer disks as ASCii files (as appropriate). The archive will be deposited with the museum within six months of the completion of the fieldwork. Except for items subject to the Treasure Act, all artefacts found during the course of the project will be donated to the receiving museum.

3.5.3 A synthesis (in the form of the index to the archive and a copy of the publication report) will be deposited with the Greater Manchester Sites and Monuments Record. A copy of the index to the archive will also be available for deposition in the National Archaeological Record in London.

3.5.4 ***Report:*** four copies of a bound and collated final report will be submitted to the Client within six weeks of the completion of the fieldwork. Further copies will be sent to the Manchester Planning Department, the Assistant County Archaeologist, the Greater Manchester Sites and Monuments Record, and the Museum of Science and Industry at Manchester. The final report will include a copy of this project design, and indications of any agreed departure from that design. It will include an historical and archaeological background to the study area, an outline methodology of the investigation, and present, summarise,

assess, and interpret the results of the programme of archaeological works detailed above. It will also include an assessment of the finds, which will be accompanied by relevant proposals for detailed finds analysis and conservation with costs. In addition, recommendations for any further mitigation works and details of the final deposition of the project archive will also be made.

3.5.5 A summary of the results produced from the archaeological investigation will be published in the CBA North West magazine, although a more detailed article will be provided should the results be of sufficient merit.

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

4 WORK TIMETABLE

4.1 A one week period should be allowed to excavate, record and backfill the evaluation trenches.

4.2 A report will be submitted within six weeks of the completion of the fieldwork.

4.3 OA North can execute projects at very short notice once an agreement has been signed with the Client.

5 STAFFING PROPOSALS

5.1 The project will be under the overall charge of **Ian Miller BA** (OA North Project Manager) to whom all correspondence should be addressed. Ian has considerable experience and particular research interests in Industrial Archaeology and, amongst numerous other projects, was involved in the excavation recording, analysis and publication of the Netherhall blast furnace site in Maryport, Cumbria, the excavation, recording and publication of work at Carlton Bank alum works in North Yorkshire, and the excavation of Macintosh Mill in Manchester. Ian also managed the archaeological work at Murrays' Mills and the Jersey Street Flint Glass Works, both in Manchester, and the evaluation and excavation of Samuel Oldknow's Hillgate Mill in Stockport. He is currently managing the analysis of data generated from the archaeological investigations of a series of former cotton-spinning mills in Ancoats, Manchester.

5.2 His role will be to ensure that the project design is implemented within the framework of the Project Objectives. He will be responsible for all aspects of staff and resource logistics, ensuring the smooth running of the project programme. He will liaise with the Client and County Archaeologist with regard to progress, and will maintain relationships with other contractors.

5.3 The evaluation will be undertaken by **Sean McPhillips BA** (OA North Project Supervisor). Sean is an highly experienced field archaeologist, who has a particular interest in Industrial Archaeology, and especially that of Manchester. He recently directed the archaeological investigation of a complex of textile mills at the Torrs in New Mills, and the recent excavation of New Islington Mill in Manchester. Sean also directed the archaeological work at Hillgate Mill, Stockport, and played a key role in the excavations at Calprina Works, Stalybridge, and Macintosh Mill, Manchester.

5.4 It is not possible to provide details of specific technicians that will be involved with the fieldwork at this stage, but all shall be suitably qualified archaeologists with proven relevant experience. It is anticipated that up to two technicians will be required during the course of the fieldwork.

5.5 Assessment of any finds recovered from the evaluation will be undertaken by OA North's in-house finds specialist **Christine Howard-Davis BA** (OA North Finds Manager). Christine has extensive knowledge of all finds of all periods from archaeological sites in northern England, and is a recognised expert in the analysis of post-medieval artefacts.

6 MONITORING

6.1 Monitoring meetings will be established with the Client and the archaeological curator at the outset of the project. Monitoring of the project will be undertaken by the Greater Manchester Assistant County Archaeologist, who will be afforded access to the site at all times.

APPENDIX 2: SUMMARY CONTEXT LIST

Context	Description	Phase
101	Concrete and MOT make-up layer (same as ***601***)	7
102	'Biscuit' concrete (same as ***602***)	7
103	Demolition backfill	6
104	Natural clay subsoil	-
105	South wall of Drinkwater's Mill	1
106	Early wall south of ***105***	4
107	Stub of wall probably associated with ***106***	4
108	North/south aligned wall east of ***107***	4
109	Eastern return of ***108***	4
110	S-shaped wall south of ***108***	4
111	Re-facing of ***110***	5
112	North/south aligned drain, north of ***105***	1
113	East/west aligned drain, north of ***112***	1
114	Area of floor east of ***124***	4
115	Late north-east/south-west aligned wall	7
116	Bricks below base of ***117***	4
117	South-west/north-east aligned culvert	4
118	Circular ?machine base west of ***117***	?5
119	Wall around ***118***	?4
120	Short stub of wall at south end of ***108***	5
121	Machine base, west of tank ***122***	5
122	Tank associated with machine base ***121***	5
123	Concrete floor level associated with tank ***122***	5
124	Concrete machine base truncating wall ***106***	5
125	Eastern tank associated with base ***124***	5

126	Western tank associated with base ***124***	5
127	Short channel east of ***125***	5
128	Single skin wall north of ***106***	4
129	Brick floor between ***106*** and ***128***	4
130	Large machine base in north-east corner of site	5
131	Smaller machine base in north-east corner of site	5
132	Concrete raft of 'Hertz' building	7
133	Concrete floor within original mill area	5
134	Concrete floor south of ***133***	5
135	Redeposited natural material south of ***106***	?1
136	Concrete floor south of culvert ***117***	5
137	Brick base above ***136***	5
138	T-shaped wall east of ***110***	4
139	Cut of ***138***	4
140	Fill of ***139***	4
141	Plastic drain	7
142	East/west aligned wall north of ***141***	?4
143	Cut for construction of drain ***144***	7
144	Brick drain	7
145	Fill of ***143***	7
146	Drain on east side of ***110***	7
147	L-shaped wall north of ***144***	5
148	Brick pier butting west face of ***147***	5
149	East/west aligned cut east of ***151***	5
150	Fill of ***149***	5
151	Timber post cut into wall ***110***	5
152	Cobbled surface of Upton Street	?2
153	Foundation cut of wall ***110***	4

601	Concrete surface throughout Evaluation Trench 1	6
602	North/south aligned wall (see ***110*** and ***111***)	4/5
603	Cut for ***602***	4
604	Fill of ***603***	4
701	Early north/south aligned wall, Evaluation Trench 2	2
702	Remodelling of ***701***	5
703	Late brick pier	5
704	Earlier brick pier	2
705	Concrete floor in base of Evaluation Trench 2	5

APPENDIX 3: SUMMARY FINDS CATALOGUE

Context Number	Object Record	Material	Count	Description	Date range
105	004	Ceramic	2	Refitting heavily-potted white earthenware jug base (cylindrical), with relief-moulded pattern of C-scrolls etc	Late 19th-early 20th century
105	004	Ceramic	1	White earthenware tureen(?) rim with lip for lid to sit on, with navy flow blue transfer-printed	Late 19th - early 20th century
105	004	Ceramic	7	Bone china with multi-coloured overglaze transfer print of garlands of orange- and lilac-coloured flowers, with areas of deep turquoise with painted gilded garlands over the top, and some of the greens for the leaves painted onto the transfer	Early 20th century?
105	007	Lead	1	Folded up strip of sheeting 61mm wide, *c*400mm long	Not closely datable
105	007	Lead	2	Refitting rectangular nut (?) fragments with circular hole through centre, split along the flat plane, with part protruding from one side	19th - early 20th century
105	010	Ceramic	1	Dark green-glazed buff-coloured earthenware tile end, 26mm wide (total unbroken width), 11mm	Late 19th - early 20th century
105	010	Plaster	2	Cornice fragments	19th - early 20th century
105	013	Ceramic	1	Thick red earthenware chimney pot(?) fragment	19th - early 20th century
105	021	Ceramic	1	Light brown-glazed creamish-coloured unidentified object - bottle opener?	19th - early 20th century
105	021	Ceramic	1	Brown-glazed grey stoneware bottle(?) fragment, cylindrical with carination at shoulder, interior mottled olive and light brown	Late 18th - early 20th century
105	021	Ceramic	1	Thick white earthenware sanitary ware? Partly unglazed, part of toilet u-bend?	Late 19th - 20th century
105	021	Ceramic	1	White earthenware ashet(?) base	Late 18th - 20th century
105	021	Ceramic	1	White earthenware jam or marmalade jar rim with groove for tie-on lid	Mid 19th - early 20th century
105	021	Ceramic	2	Rim to base of white earthenware saucer, possibly refitting, with maker's mark 'Royal Iron[stone] / [lion on a scroll etc] / Alb…'	Late 19th - 20th century
105	022	Glass	1	Very light turquoise small bottle mouth and neck, would have had cork or glass stopper	19th - early 20th century
105	024	Copper	1	Pipe segment, with male and female	19th - early

				ends	20th century

Context Number	Object Record	Material	Count	Description	Date range
105	027	Leather	3	Refitting fragments of lady's heeled pointed-toe shoe, with woven woollen(?) patterned lining under leather upper, at least for front part of toe	1920s?
105	070	Composite	1	Complete (but battered) lady's left shoe with two-part leather upper, strap and black button and small heel	1920s
105	070	Iron	1	Masonry(?) nail with one end bent at right angles, missing head	Not closely datable
105	071	Plaster	1	Cornice fragment with mortar attached	19th - early 20th century
106	075	Paper	2	Fragments of several layers of thick paper or card stuck together with one straight edge	19th - early 20th century
106	076	Ceramic	2	White earthenware gilded lined saucer rim with relief-moulded aratral lines and inky substance in it, and saucer or plate base with gilded stylised three-petalled design	Late 19th - early 20th century
109	008	Plaster	1	Cement wrapped in newspaper	Late 19th - early 20th century
109	019	Glass	1	Light turquoise complete mushroom-shaped bottle stopper	19th - early 20th century
109	030	Ceramic	2	White earthenware refitting sanitary ware, toilet u-bend rim?	Late 19th - 20th century
109	030	Ceramic	1	White earthenware marmalade jar base impressed 'S / Maling / K / Newcastle', with the bottom of black transfer-printed text 'Marmalade'	Late 19th - early 20th century
109	030	Ceramic	1	White earthenware marmalade jar base impressed 'S / Maling / K / Newcastle', with black transfer-printed text on side 'Highest …', 'Registered trade mark' on the left-hand side and bottom, respectively of a double-lined rectangle or square with 'S[eville] …' in large letters inside text	1874 - early 20th century
109	031A	Ceramic	1	Rim of white earthenware weighing plate from scales? 11mm thick	19th - early 20th century
109	077	Ceramic	1	Complete white earthenware marmalade jar with groove for tie-on lid and black transfer-printed text on side 'The Albion Hotel / Manchester / Home Made Marmalade' with a picture of Britannia, and base impressed 'S / Maling / K / Newcastle'	Late 19th - early 20th century
109	078	Glass	5	Flat panes, various thicknesses	19th - early

					20th century
109	079	Ceramic	1	Self-glazed red earthenware floor(?) tile, with black and yellow pattern	Late 19th - early 20th century

Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
109	080	Ceramic	4	White earthenware marmalade jar fragments, comprising two base (one impressed 'S / Maling / [K / Newcastle]'), one rim, and one body fragment	Late 19th - early 20th century
109	080	Ceramic	1	White earthenware marmalade jar body fragment with black transfer-printed '[The Albion Hotel] / Manchester' and a picture of Britannia	Late 19th - early 20th century
109	080	Ceramic	2	White earthenware marmalade jar rim with black transfer-printed square or rectangle with 'By Royal appointment to …' along the top, and first line inside 'Fra[nk Cooper's]'; body fragment with '…[mar]malade / [Warrant]ed pure / [Prepare]d only by / [Frank] Cooper Limited / [Oxf]ord', and below the double-lined square or rectangle '[Registered] trade mark', and on the right hand side [Establishe(?)]d 1874'	Late 19th - early 20th century
109	081	Ceramic	1	White earthenware sanitary ware fragment	Late 19th - 20th century
109	082	Iron	2	Masonry wall spike with pipe clip? (Down-pipe-sized?), and corroded rod	19th - early 20th century
109	083	Lead	1	Scrap of cut sheet, slightly bent	19th - early 20th century?
109	005	Ceramic	2	Identical complete marmalade jars, with 'The Albion Hotel / Manchester / Home made marmalade' transfer-printed in black on the side with a Britannia logo on white earthenware, base impressed 'Maling / K / Newcastle'	Mid-19th - early 20th century
114	009	Ceramic	1	Half of a 110mm x 110mm brown-glazed buff-coloured earthenware tile, 13mm thick, with impressed geometric pattern, with embossed text on reverse '[Camp]bell / Tile Co /	1875 - early 20th century
115	012	Glass	2	Refitting cylindrical bottle base fragments, with 'B' embossed as a fairly large capital letter in the centre	19th - early 20th century
115	012	Glass	1	Green bottle mouth with internal screw top of black rubber with embossed text on top 'F.E. Gilder/	1872 - early 20th century

				Manchester'	
115	012	Glass	2	Refitting green bottle neck fragments, with mould lines continuing over mouth	20th century
115	012	Glass	1	Green bottle mouth and neck, mouth applied separately	19th - early 20th century
115	012	Glass	1	Green bottle fragment	19th - early 20th century
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
117	001	Glass	1	Cylindrical brown bottle base to shoulder, with two mould lines down sides and one around the base	Late 19th - early 20th century
117	017	Bone	1	Medium mammal cervical vertebra, butchered, with knife marks	Not closely datable
117	017	Bone	2	Sheep ribs	Not closely datable
117	018	Glass	4	Flat, fairly thick panes	19th - early 20th century
117	029	Ceramic	1	Rim to base of white earthenware saucer with relief-moulded aratral ridges	Late 19th - 20th century
117	084	Ceramic	1	White earthenware marmalade jar base with black transfer-printed double lined square or rectangle 'Sevi[lle Marmalade] / War[ranted] pure / Prepared only by / Frank Cooper Limited / Oxford / Registered trade mark' (this last below the double lines), base impressed 'S / Maling / K / Newcastle' with lump of associated brown ink(?)	Late 19th - early 20th century
125	020	Ceramic	1	White earthenware hollow-ware fragment with blue all-over sponge-printing	19th - early 20th century
125	025	Bone	1	Sheep rib gnawed by a rodent	Not closely datable
125	026	Stone	1	Lithographic stone plate fragment with reversed black image with text '…ne / … medals / …. [aw]arded for / … & excellence', with large text below	Late 19th - early 20th century
125	026	Stone	1	Lithographic stone plate fragment with reversed black image with text '…gan' on a banner, and clover below	Late 19th - early 20th century
125	028	Glass	1	Flat obscured ridged pane	19th - early 20th century
125	028	Glass	2	Flat panes	19th - early 20th century
131	085	Iron	1	Heavily corroded iron rod	19th - early 20th century
136	002	Glass	1	Rectangular cross-sectioned bottle base with chamfered corners, light turquoise, with '32oz' embossed on base	19th - early 20th century

136	016	Ceramic	1	Self-glazed buff-coloured stoneware bottle rim with pouring lip - large cylindrical bottle with carination at shoulder and convex neck	19th - early 20th century
136	016	Ceramic	1	Greyish-white slip-coated buff-coloured stoneware jam jar rim with groove below rim for tie-on lid and vertical grooves *c*20mm apart	Mid-19th - early 20th century
136	023	Rubber	1	Black screw top for bottle, 'Y.C.B Ltd / 22 / Manchester'	Late 19th - 20th century
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
137	003	Ceramic	2	Refitting rim to base from greyish-white slip-coated buff-coloured stoneware jam jar, with groove below rim from tie-on lid, and vertical grooves *c*20mm apart. Base unglazed	Mid-19th - early 20th century
137	014	Copper	1	Almost complete but corroded fork (one of the prongs missing).	end of 19th - early 20th century
145	086	Glass	2	Refitting very light turquoise Codd bottle fragments, from base to near mouth, with embossed text on side 'R & J. Nuttall / Registered / R & J N / trade mark / Manchester' and on the other side near the base 'Cannington Shaw & Co / Makers / St Helens', and on the base '1201'	1875 - 1913
145	087	Ceramic	1	White earthenware plate rim with 'Asiatic Pheasants' transfer-printed pattern	Mid-19th - early 20th century
145	088	Ceramic	4	White earthenware factory-made slipware fragments with blue slip stripes and turquoise slip band: carinated bowl rim and body, and jug rim and body	Late 19th - early 20th century
145	089	Ceramic	4	White earthenware marmalade jar base and rims, with groove for tie-on lid	Mid-19th - early 20th century
145	090	Ceramic	1	White earthenware saucer base	Late 19th – early 20th century
145	091	Ceramic	1	Brown salt-glazed grey stoneware rim to base of small pot/jar with groove for tie-on lid	19th - early 20th century
145	092	Ceramic	1	Brown-glazed grey stoneware cylindrical bottle fragment with carination at shoulder	19th - early 20th century
145	093	Glass	1	Square cross-sectioned very light turquoise bottle base, with embossed text on base 'C.S & Co / 194(?)'	Late 19th century - 1913
145	094	Glass	1	Circular cross-sectioned very light turquoise bottle base with both sides embossed with a shield and the masonic emblem inside, and 'Manchester' below, and 'Trade	Late 19th - early 20th century

				mark' around the shield - identified as M Davies, Manchester	
145	095	Glass	1	Circular cross-sectioned very light turquoise bottle base	19th - early 20th century
145	096	Glass	2	Flat, thin pane fragments	19th - early 20th century
145	097	Ceramic	1	White stoneware complete bottle top(?) with iron attached to one side	19th - early 20th century
145	098	Iron	1	Squat tin with black ink in it	Late 19th - 20th century
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
145	099	Ceramic	2	Refitting complete clay tobacco pipe with impressed mould number 47, and text 'Football Pipe' on both sides, and bowl decorated with two people kicking a football between them, with foliage up the front bowl	Late 19th - early 20th century
145	100	Mollusc	1	Button with two holes in centre	19th - early 20th century
145	101	Stone	1	Cumbrian slate roof tile(?) fragment	Probably before mid 19th century
145	102	Ceramic	2	Brown-glazed grey stoneware blacking bottle mouths	19th - early 20th century
145	103	Ceramic	1	Self-glazed red earthenware large jar fragment	Late 17th - early 20th century
145	104	Ceramic	1	Self-glazed buff-coloured earthenware jar/bottle fragment	19th - early 20th century
145	105	Glass	1	Very light turquoise bottle	19th - early 20th century
145	106	Composite	1	Milk glass(?) thin tiles set into cement?	Late 19th - early 20th century
145	107	Iron	1	Drawer handle	19th - early 20th century
145	108	Copper	1	Wire tent-peg-like hook/loop	19th - early 20th century
145	109	Iron	1	Refitting corroded together fragments (possibly nothing to do with each other) - wire and sheet strap with rolled edges	19th - early 20th century
Trench 1	037	Leather	2	Adult boot or shoe heel with corroded iron lump adhering to it	19th - 20th century?
Trench 1	038	Glass	1	Colourless milk bottle(?) base with embossed text 'JWS, L, 6'	Late 19th - early 20th century
Trench 1	038	Glass	2	Dark green bottle mouths with necks, identical multi-part mould products	20th century
Trench 1	039	Slag	1	Vesicular, very heavy, iron (?)slag (metallic lustrous grey colour on one surface, dark grey with iron staining elsewhere)	Not closely datable

Trench 1	040	Ceramic	2	Light-olive-green-glazed grey stoneware: hollow-ware glazed inside and out, and hollow-ware base glazed inside only	19th - 20th century
Trench 1	041	Ceramic	1	Light-olive-green-glazed buff-coloured stoneware base	19th - 20th century
Trench 2	031	Glass	3	Very light turquoise thick, flat panes (thick and very thick)	19th - 20th century
Trench 2	031	Glass	2	Colourless flat pane with ridges	19th - 20th century
Trench 2	031	Glass	1	Very light blue bottle fragment, oval cross-sectioned?	19th - 20th century
Trench 2	032	Copper	1	Slightly squashed unidentified object	19th - 20th century
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
Trench 2	034	Ceramic	4	Refitting white earthenware cup fragments, including two rims, with red painted stripes and dark green sponge-printed lozenges	19th - 20th century
Trench 2	035	Composite	1	Concrete slab with white glass/plastic tiles cemented on	Late 19th - 20th century
Trench 2	036	Glass	1	Dark green bottle, complete, beer bottle(?), with embossed text on side 'T.W. Hampson Ltd, Manchester, TWH', and on the base 'N & Co, 1058(?)'	Late 19th century - 1913
U/S	006	Glass	1	Complete green cylindrical bottle with internal screw top in black rubber(?) with embossed text on the top '[Br]etts Country / B.C.B.C. / Trade Mark', and embossed text on the side of the bottle 'B.C.B.C. / Trade Mark / Bretts Country', and on the base 'N & Co / 1177'	1872 - 1913
U/S	006	Glass	2	Refitting very light turquoise complete Codd bottle, broken to remove spherical glass stopper? With embossed text on side 'J Lang / Trade Mark [JL monogram in shield] / Manchester', and on the base of the other side 'Beckbarn(?) Bros / Bottle Makers / Barnsley', and on the base 'H B / A9 / B'	Late 19th - early 20th century
U/S	011	Ceramic	2	Refitting brown salt-glazed grey stoneware hollow-ware rim and body fragment, rouletted, with bulbous rim	19th - early 20th century
U/S	011	Ceramic	3	White earthenware factory-made slipware fragments with blue slip bands and lines, including rim (three different vessels)	Late 19th - early 20th century
U/S	011	Ceramic	2	Refitting self-glazed buff-coloured stoneware huge jar(?) body fragment	19th - early 20th century
U/S	011	Ceramic	1	White earthenware cylindrical vessel base, from mug or jar?	19th - early 20th century

U/S	011	Ceramic	1	Brown-glazed grey stoneware blacking(?) bottle base (unglazed interior), with impressed text on side '…ulme…'	19th - early 20th century
U/S	015	Stone	2	Refitting fragments from slate(?) block, 155mm long, 36mm thick, and 44mm wide at widest point, with notches at opposite ends of top surface	19th - early 20th century
U/S	045	Glass	1	Green bottle, missing much of mouth, with embossed text on side 'H.G. Crews / Manchester / & Liverpool', and on base '3004 / C.S & Co Ld'	1875 - 1913
U/S	046	Glass	1	Green bottle, with embossed text 'W & A Gilbey / Manchester'	1875 - 1913
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
U/S	047	Glass	1	Complete green bottle with embossed text on side 'Hop Beverage Co / Trade "Macks" Mark / Manchester', with cork or glass stopper closure, and embossed text on base 'N & Co / 1402'	Late 19th century - 1913
U/S	048	Glass	1	Complete brown bottle, would have had crown closure, with embossed text around shoulder 'Wilsons Manchester' and on base '69E'	1892 - early 20th century
U/S	049	Glass	1	Complete brown bottle, would have had crown closure, with embossed text around shoulder 'Wilsons Manchester' and on base 'L / 69B'	1892 - early 20th century
U/S	050	Glass	1	Complete brown bottle, would have had crown closure, with embossed text around shoulder 'John Smith's / Tadcaster', with remains of paper label on the side '[John Sm]ith's' incorporating a small circle with tiny text around the top and a woman sitting on a globe? Base with concentric circles of embossed dots	1892 - early 20th century
U/S	051	Glass	1	Complete brown bottle, would have had crown closure, with embossed text on base 'S / 1303E'	1892 - early 20th century
U/S	052	Glass	1	Complete brown bottle, would have had crown closure, with embossed text on base 'GBC / 14 / 4 SD'	1892 - early 20th century
U/S	053	Glass	1	Complete brown bottle, would have had crown closure, with embossed text around shoulder 'J.G Swales & Co Manchester & Wigan', and on base 'B216 / 10 / FGC'	1902 - 1982
U/S	054	Glass	1	Complete very light turquoise jar with embossed text on base 'B & Co Ld / K / 367'	Late 19th - early 20th century

U/S	055	Glass	1	Base to shoulder of very light turquoise jar, with remains of coloured paper label in red, yellow, green and dark green / black ' …red"…/ …de' - looks like a marmalade label	Late 19th - early 20th century
U/S	056	Glass	1	Very light turquoise Hamilton(?) (flat bottomed) bottle missing neck and mouth, with embossed text down side 'Slack & Cox Ltd / Manchester' and on base 'R.B.B 294'	Late 19th - early 20th century
U/S	057	Glass	1	Burst lip complete very light turquoise ink bottle	19th - early 20th century
U/S	058	Glass	1	Very light turquoise(?) roughly rectangular cross-section bottle base	19th - early 20th century
U/S	059	Glass	1	Complete colourless bottle, rectangular cross-section, and external screw top closure	20th century

Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
U/S	060	Glass	1	Complete colourless bottle, rectangular cross-section, external screw top closure, with '8 4' embossed on base	20th century
U/S	061	Glass	1	Complete colourless bottle, external screw top closure with clear plastic insert in top with central hole - shaker for vinegar or similar? Base embossed 'B 34'	20th century?
U/S	062	Glass	1	Complete colourless bottle, would have had crown closure, shoulder embossed with 'Pepsicola' alternating with strips of basket weave, with remains of small oval label above 'Pepsi Cola' in red on a white background surrounded by a black oval, and a rectangular label on the side of the bottle, printed in red on white, with areas of white on blue ' Sparkling / Pepsi-Cola / Trade Mark Regd / Quality' and base embossed 'GBC / 8 / 112'	1892 - early 20th century
U/S	063	Glass	1	Complete colourless bottle with corroded iron crown closure, embossed around the bottom of the sides 'Jewsbury & Brown Ltd Manchester' and on base 'GBC / J & B / 110'	1892 - early 20th century
U/S	064	Glass	1	Complete colourless bottle with embossed text on shoulder 'L.H.D. / L.H.D. / Lancashire Hygienic Dairies Ltd / Manchester' and on base 'A557'	1902-1982
U/S	065	Glass	1	Complete colourless bottle with	1892 - early

				crown closure, embossed 'Coca Cola / Trade mark registered' on both sides at shoulder, on fluted body, base embossed '8' or 'B'?	20th century
U/S	066	Glass	1	Complete very light turquoise bottle with internal screw top closure	1872 - early 20th century
U/S	067	Plastic	1	Yellow external screw top fragment from bottle	20th century
U/S	068	Ceramic	1	Self-glazed white stoneware(?) enormous bottle with external screw top, with four holes equally spaced around the rim to hold wires(?); these holes are only *c*5mm deep, ie not right through. Hole right through top to take iron wire handle, two corked holes at opposite sides of the top, angled down, one to let air in and the other to let liquid out? Inside are two screw-threaded holes, suggesting there may have been another part screwed inside	Late 19th - early 20th century
U/S	068	Ceramic	1	Refitting self-glazed buff-coloured stoneware jar rim	Mid-19th - 20th century
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
U/S	069	Iron	1	Bent rod with loops on the end	19th - early 20th century
U/S	072	Aluminium	1	Drinks can with text 'Hemeling / lite / lager / average analysis per 100ml: / total carbohydrate (glucose equivalent) 0.55g / calorie value 26.4kcals / serve cool' and along the side 'Brewed in the United K[ingdom] … / 440ml 15… fl oz Bass Charrington Limited, … / Brewed from the … ingredients to give a full traditional …', 'Keep Britain Tidy' symbol and text	1967-1979
U/S	073	Ceramic	1	Firebrick chimney pot (?)	19th - early 20th century
U/S	074	Iron	1	Part of printing tool(?) with black ink on the end? Very heavy	19th - early 20th century
U/S	110	Stone	1	Corner of lithographic stoneplate, with a pattern(?) number painted on in large black numbers along the side '…53' and most of the reversed label in black ink on the top surface for 'Plantekoa / medicated / [S]kin Soap / Regd. /' with a decorative border and quarter circles in each corner	Late 19th - early 20th century
U/S	111	Stone	1	Corner of lithographic stone plate with two different prints for the same label, presumably different colours but both appear black. The labels are not quite aligned, but both	Late 19th - early 20th century

				have guide marks at the side to allow this to happen. Three of the banners are blank and would have been printed in another colour, but reversed text 'Battlebury's / … / … / … / See initial F.C.B. on each tab… / Hackney' with pictures of fruits: pineapple, strawberries, apple, lemon, plum, raspberries(?) and gooseberries(?)	
U/S	112	Stone	1	Corner(?) of lithographic stone plate with many black bands and lines - presumably a colour other than black for a label?	Late 19th - early 20th century
U/S	113	Stone	1	Part of lithographic stone plate with black painted pattern(?) number on side '…08… ' with two different coloured prints of the same label (both appear black but neither have text so probably for another colour), not quite lined up relative to each other but with guide marks along the side to allow them to be lined up	Late 19th - early 20th century
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
U/S	114	Stone	1	Corner of lithographic stone plate with circular black label with text 'W[hite']s / Home / brewed / Ginger beer / Stepney, / E. / On draught'	Late 19th - early 20th century
U/S	115	Stone	1	End(?) of a lithographic stone plate with a black painted pattern(?) number on the side 'I.052', and different labels for the same bottle printed in black on the top. Narrow label says 'Handley's Brewery Limited. Manchester' round an 'HBLd' monogram in the centre (circular) with strips on either side saying 'Bottles sent out by us must not / be used for any other liquors, and when empty / must be returned to us. / See that this label is unbroken.' and large circular label 'Extra … / B… / Handle[y's Brewery Limited] / Ma[nchester]' and a small label saying 'SD' (all text reversed)	Late 19th - early 20th century
U/S	116	Stone	1	Edge of lithographic stone plate, possibly for billhead? All text reversed and black in appearance. Upper text is very worn but it appears to say '…nts / … / …000 …p old / …d.rim I last 4 years' and below it is clearer 'The "Otto" gas	Late 19th - early 20th century

				engine works / Openshaw Manchester / Bristol / 112 Victoria Street / Glasgow / 217 St Vincent Street / Newcastle-on-Tyne / 11 Saville Row / Southampton / … Street / Hull / Chapel Street / Nottingham / Carrington Street / Dublin / 200 Gt Brunswick St / Northampton / Guildhall [?] Road / Leeds / 1 Quebec Street / Plymouth / 15 K….bury Street / … / …/'	
U/S	117	Stone	1	Lithographic stone plate fragment with red ink printed on '…no… / …ome… / St…. / …hee…' (text reversed)	Late 19th - early 20th century
U/S	118	Stone	1	Part of lithographic stone plate with orangey-red ink - apparently part of a price list poster: '1/8… / 1/… / 1/… / 1/2… / 1… / … tea / 2d. / 2 1/2d. / 2 1/2d. / 1/- / 1/- / 10d. / 6d. / 6d. / 6d. / 4d.' (text reversed)	Late 19th - early 20th century
U/S	119	Stone	1	Corner of lithographic stone plate with parts of four identical circular labels in pinkish red with reversed text: 'Jacob & Co's / Oxford Lunch / Cake'	Late 19th - early 20th century
U/S	121	Stone	1	Fragment of lithographic stone plate with thick black print	Late 19th - early 20th century
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
U/S	120	Stone	1	Edge of lithographic stone plate with rectangular black printed label edge with reversed black text '… & Co's / … Cake' and further down on the block the lone reversed word 'coffee' printed upside down relative to the cake label	Late 19th - early 20th century
U/S	122	Stone	1	Edge of lithographic stone plate, with black text-less print covered in blobs of light blue and white ink(?), difficult to make out	Late 19th - early 20th century
U/S	123	Stone	1	Edge of lithographic stone plate with strip labels(?) printed in black with reversed text 'Dominion / Brand' with a figure of a person (Britannia?) sitting in the middle. A rabbit and another animal - a cat or rabbit? - are shown on the panel to the right. Above is a larger / different shaped '[Dominion Bra]nd' label	Late 19th - early 20th century
U/S	124	Stone	1	Corner of lithographic stone plate with a picture of a cow on and reversed text '…on'	Late 19th - early 20th century
U/S	125	Stone	1	Edge of lithographic stone plate with edge of text-less label	Late 19th - early 20th

					century
U/S	126	Stone	1	Corner of lithographic stone plate with parts of three labels printed in black (white on black) with reversed text (two identical, one similar) 'Mason's Crown'	Late 19th - early 20th century
U/S	127	Stone	1	Edge of lithographic print(?) block covered in layers of black paint or ink? Dry and partly flaking off	Late 19th - early 20th century
U/S	128	Stone	1	Corner of lithographic stone plate with an array of 11 black text-less labels, all identical, no guide marks visible for lining up different colours	Late 19th - early 20th century
U/S	129	Ceramic	7	White earthenware marmalade jars, mainly bases and one rim to base, with black transfer-printed text 'The Albion Hotel / Manchester / Home Made Marmalade' with a picture of Britannia, and 'S / Maling / K / Newcastle' impressed underneath, and a groove for a tie-on lid, from five or six different jars	Late 19th - early 20th century
U/S	130	Ceramic	4	Three rim and one body sherd from white earthenware marmalade jars with groove below rim for tie-on lid, probably 'Albion Hotel' jars	Late 19th - early 20th century
U/S	131	Ceramic	2	Rim to base and body from white earthenware marmalade jars	Late 19th - early 20th century
Context Number	**Object Record**	**Material**	**Count**	**Description**	**Date range**
U/S	132	Glass	3	Refitting green bottle shoulder fragments with embossed text '…mpson'	Late 19th - early 20th century
U/S	133	Ceramic	4	White earthenware cup rim to base fragments, refitting pairs with aratral ridges, complete handle, and gilded line on rim and along handle	Late 19th - early 20th century
U/S	134	Ceramic	1	White earthenware cup rim to base with relief-moulded scrolls at base and grey transfer-printed floral pattern	Late 19th - early 20th century
U/S	135	Ceramic	1	Self-glazed buff-coloured stoneware jar fragment	19th - early 20th century
U/S	136	Glass	1	Flat, ridged obscured pane fragment	19th - early 20th century
U/S	137	Glass	1	Fairly thin, flat pane	19th - early 20th century
U/S	138	Glass	2	Refitting complete globular bottle with cork or glass stopper	19th - early 20th century
U/S	139	Composite	1	Unidentified object - ceramic with copper alloy attachments, possibly some kind of switch?	Late 19th - 20th century
U/S	140	Iron	2	Nail(?) with right-angled bend and rectangular cross-section, and nail shank?	19th - 20th century

U/S	141	Ceramic	1	Tiny cast tile end, 13mm wide, 6mm thick, >13mm long, with relief-moulded 'HS' (?) pattern on reverse	Late 19th - early 20th century
U/S	142	Ceramic	7	Firebrick chimney pot fragments, 330mm by 330mm at base, refitting almost complete base	19th - early 20th century
U/S	143	Iron	2	Down-pipe brackets? Very corroded	19th - 20th century
U/S	144	Iron	2	Straps/bars	19th - early 20th century
U/S	145	Bone	1	Sheep rib	Not closely datable
U/S	146	Plaster	1	Edge of wall or floor, cast with rod-shaped holes through, with green coating, 100mm thick	Late 19th - early 20th century
U/S	147	Ceramic	1	Double bull-nosed brick	19th - early 20th century

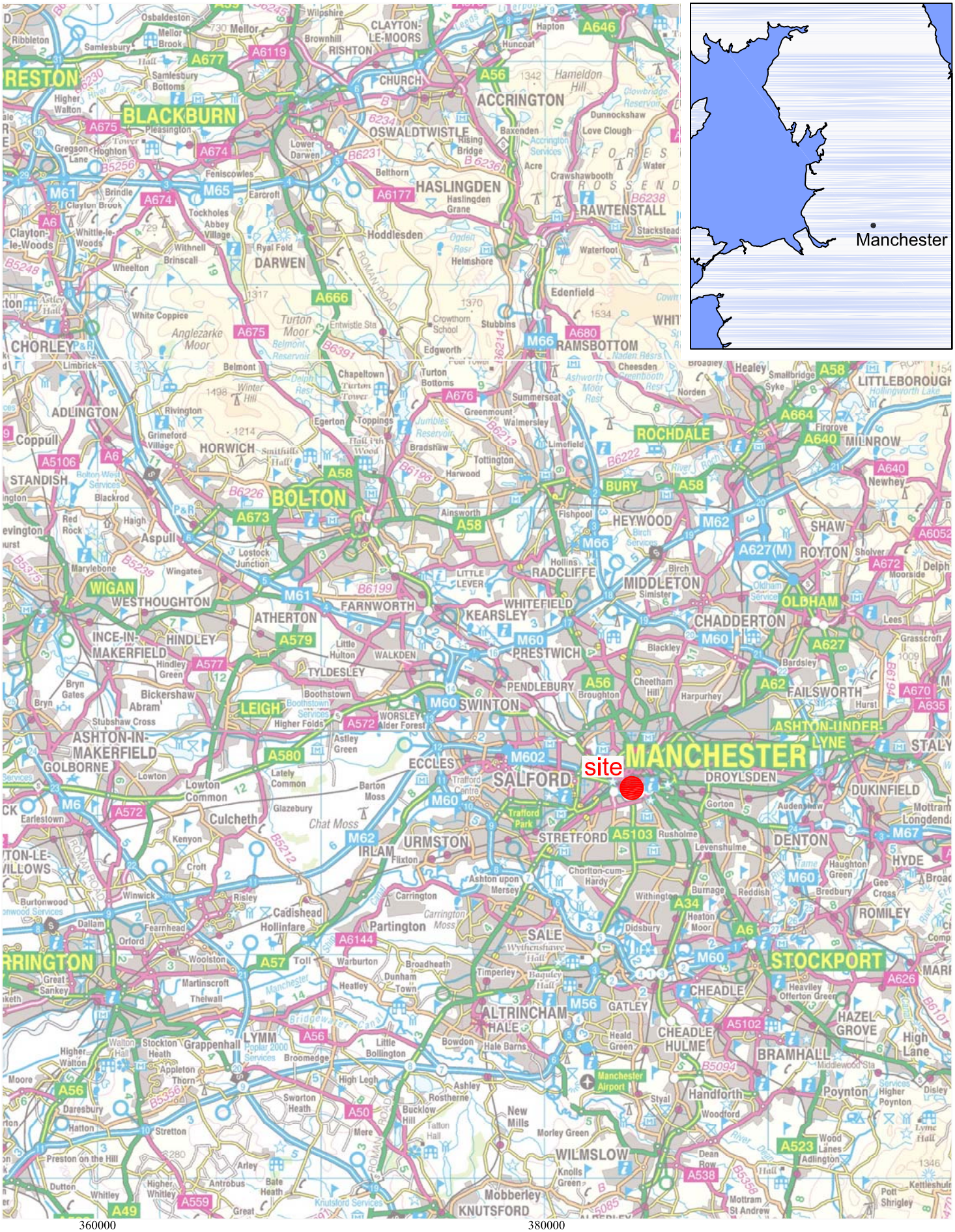
APPENDIX 4: TASK LIST

Task No	**Task**	**Days**	**Resources**
Task 1:	Project Set up	0.5	IM
Contact / Liaise with Project Team		0.5	IM / CW / JD / EC / JL
Task 2:	Upgrading of context database	1	CW
Task 3:	Refine Phasing	3	CW
Task 4:	Edit site matrix	1	CW
Task 5:	Compilation of phased illustrations	1	EC
Task 6:	Stratigraphic Analysis	5	CW
Task 7:	Update site narrative	5	CW
Task 8:	Upgrading of finds database	1	JD
Task 9:	Documentary Research	3	IM
Task 10:	Finds Analysis	2	JD
Task 11:	Production of draft publication text	10	CW / IM
Task 12:	Production of illustrations	2	EC
Task 13:	Submission of draft publication to externals	0.25	IM
Task 14:	Editing of Publication	1	IM
Task 15:	Quality assessment or check of Publication	1	RMN
Task 16:	Prepare Archive for Deposition	1	JL

ILLUSTRATIONS

Figures

Plates



0 1000 2000
metres

Figure 1: Location Map

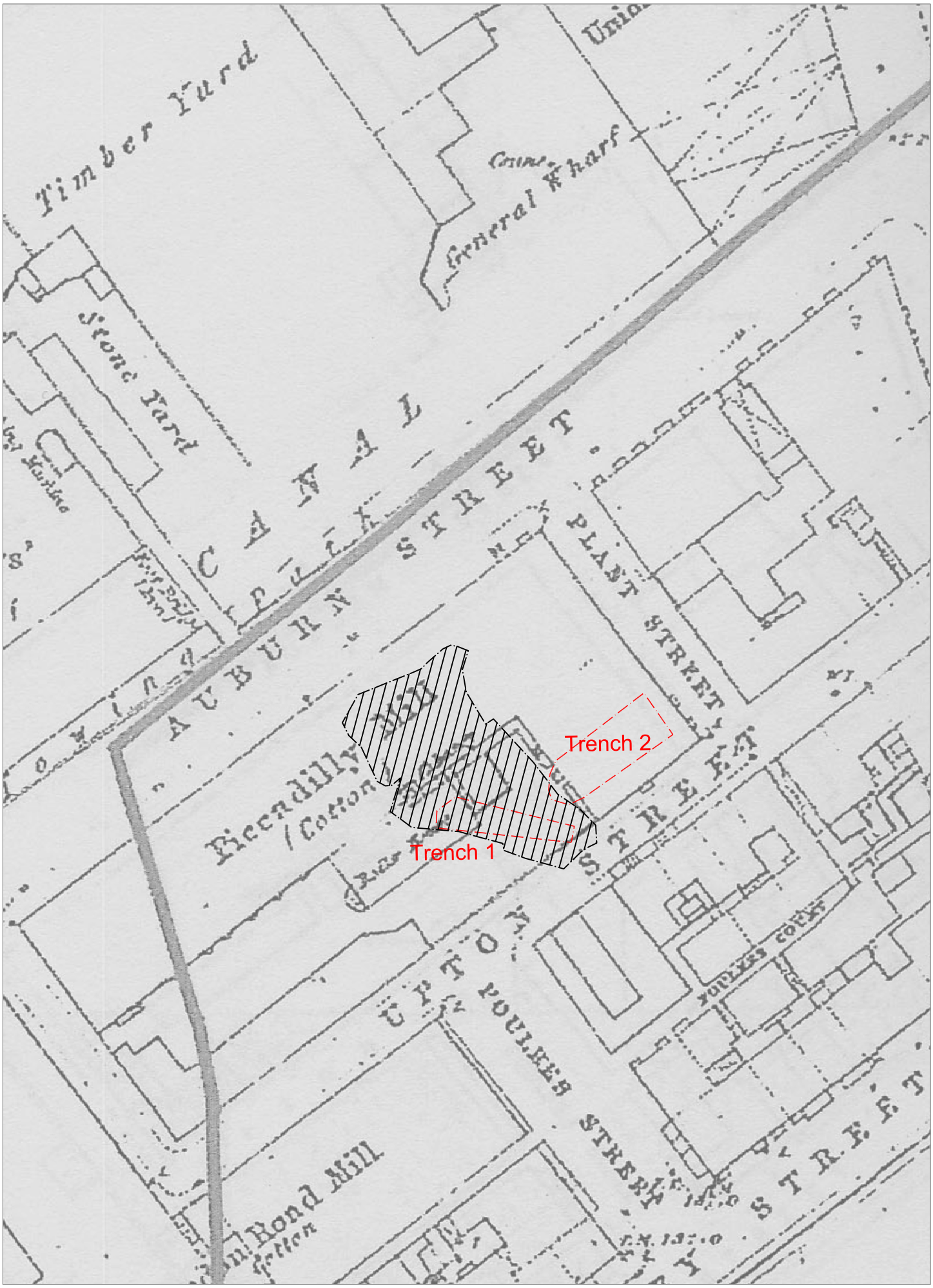


Figure 2: Position of evaluation and excavation trenches superimposed on OS 1849 map

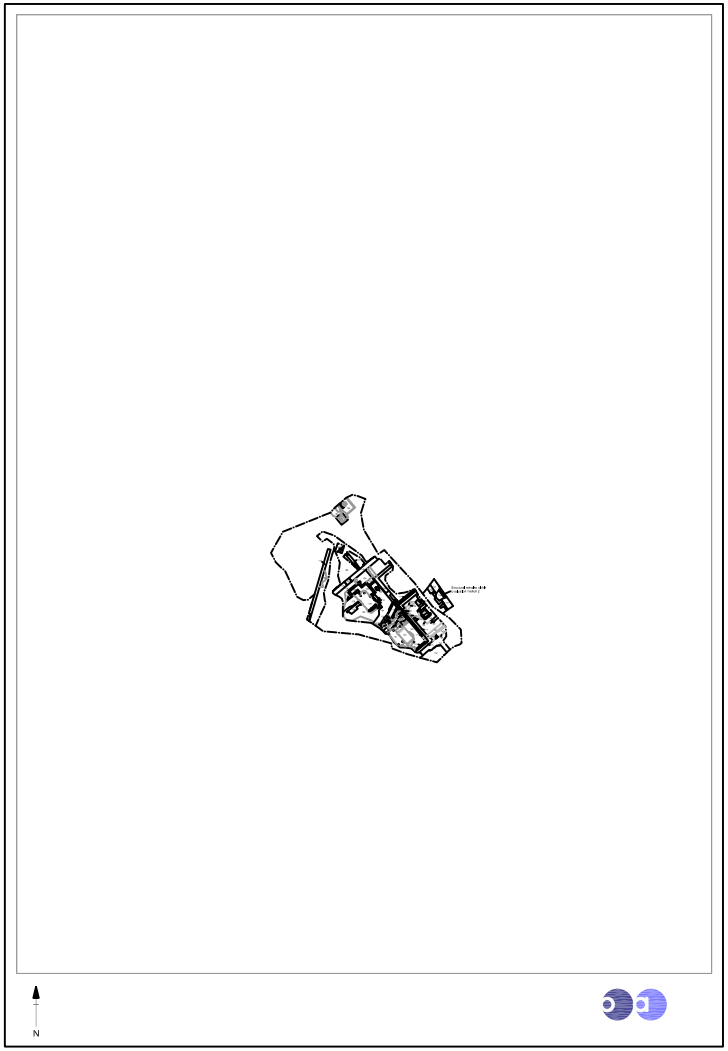


Figure 2: Position of evaluation and excavation trenches superimposed on OS 1849 map

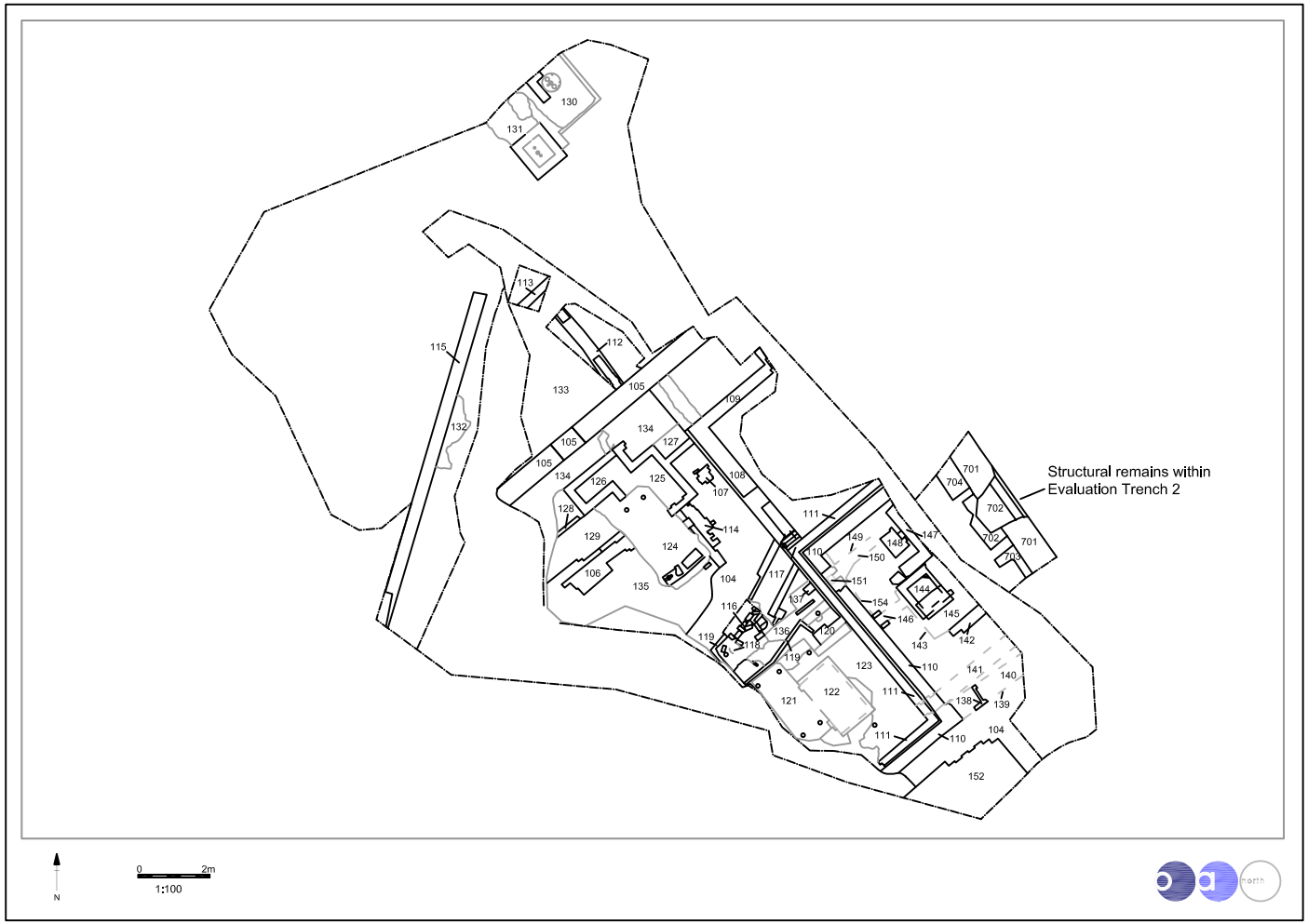


Figure 3: Detailed plan of excavation trench showing contexts of all phases

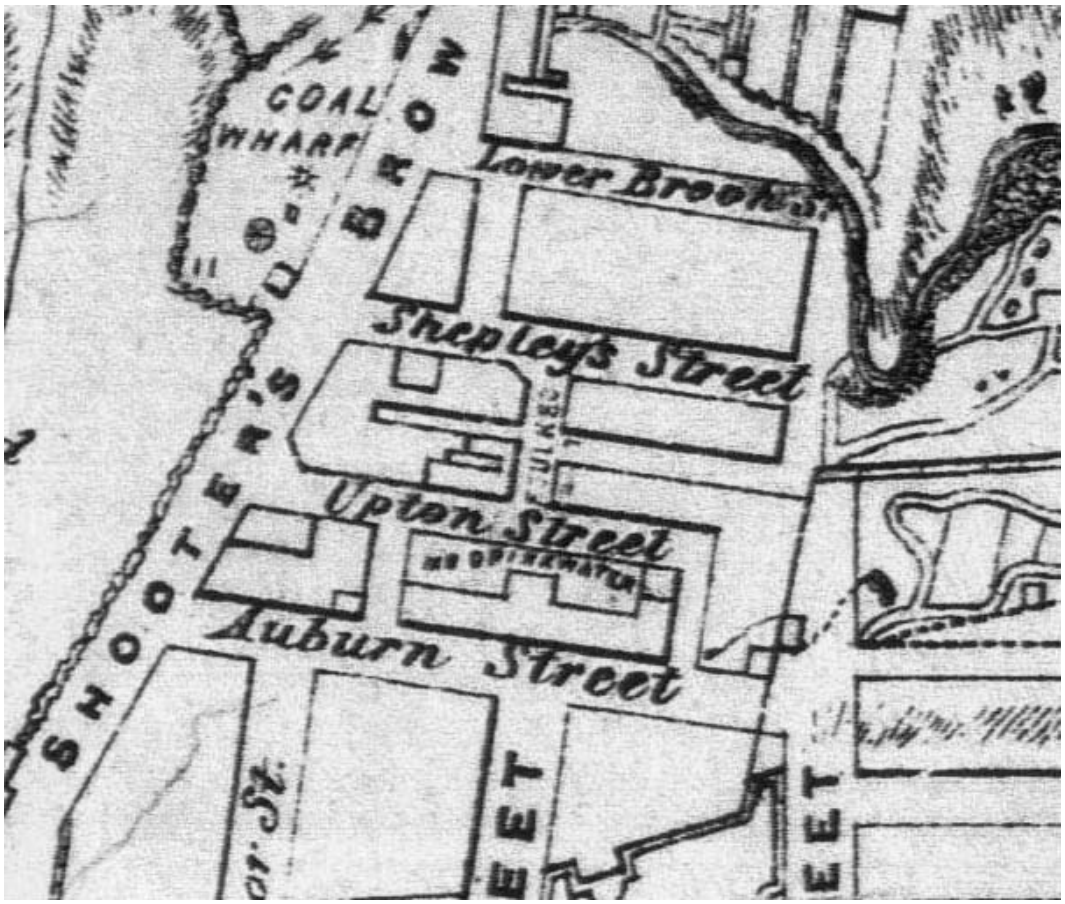
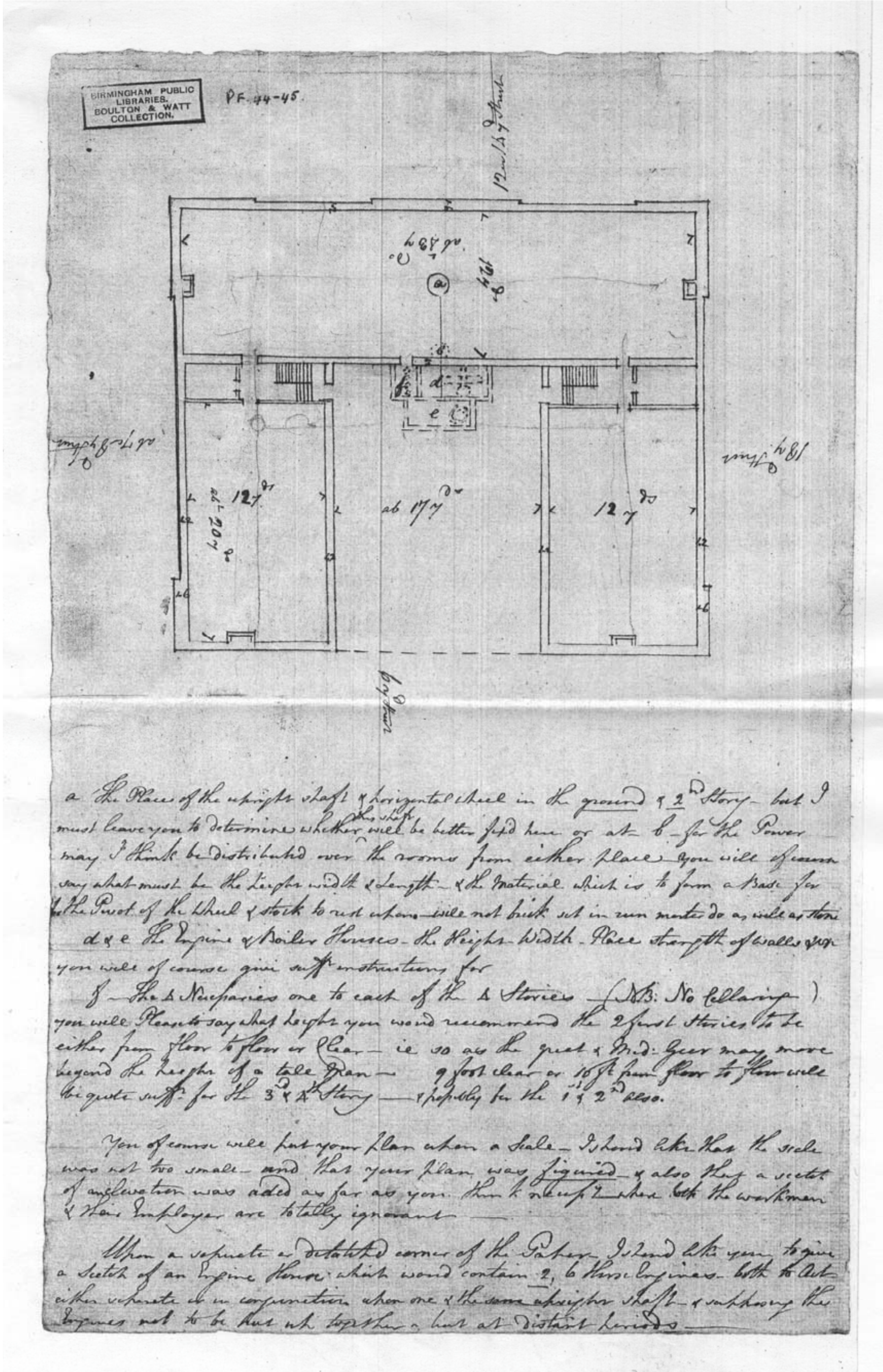


Plate 1 Extract of Lewis' plan of Manchester, 1788



PF-44-45.

a The Place of the upright shaft & horizontal wheel in the ground & 2nd Story – but I must leave you to determine whether the shaft will be better fixed here or at b – for the Power may I think be distributed over the rooms from either place – you will of course say what must be the height width & length – & the material which is to form a Base for the Pivot of the Wheel & stock to rest upon – will not brick set in ... mortar do as well as stone

d & e The Engine & Boiler Houses – the Height – Width – Place strength of walls &c you will of course give suff^t instructions for

f – The 4 Necessaries one to each of the 4 Stories – (N.B: No Cellaring)
you will please to say what height you would recommend the 2 first stories to be either from floor to floor or clear – ie so as the great & Mid: Geer may move beyond the height of a tall man – 9 foot clear or 10 ft from floor to floor will be quite suff^t for the 3^d & 4^th Story – & possibly for the 1^st & 2^nd also.

You of course will put your plan upon a scale – I should like that the scale was not too small – and that your plan was figured – & also that a section of an elevation was added as far as you think necessary where both the workmen & their employer are totally ignorant —

Upon a separate or detached corner of the Paper – I should like you to give a Sketch of an Engine House which would contain 2, 6 Horse Engines – both to act either separate or in conjunction upon one & the same upright shaft – & supposing the Engines not to be put up together – but at distant periods —

Plate 2 Plan and enclosed notations sent by Peter Drinkwater to Messrs Boulton and Watt, 1789

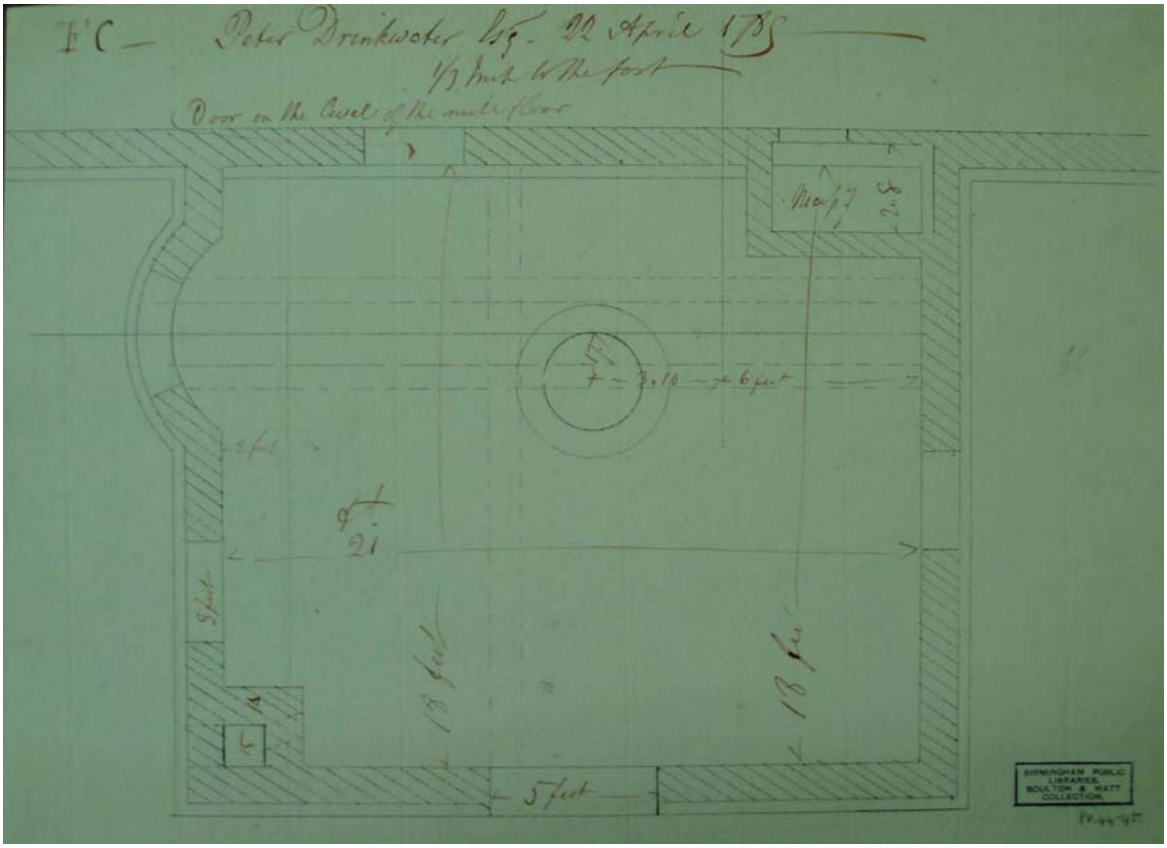


Plate 3 Sketch plan of proposed engine house by Boulton and Watt, 1789

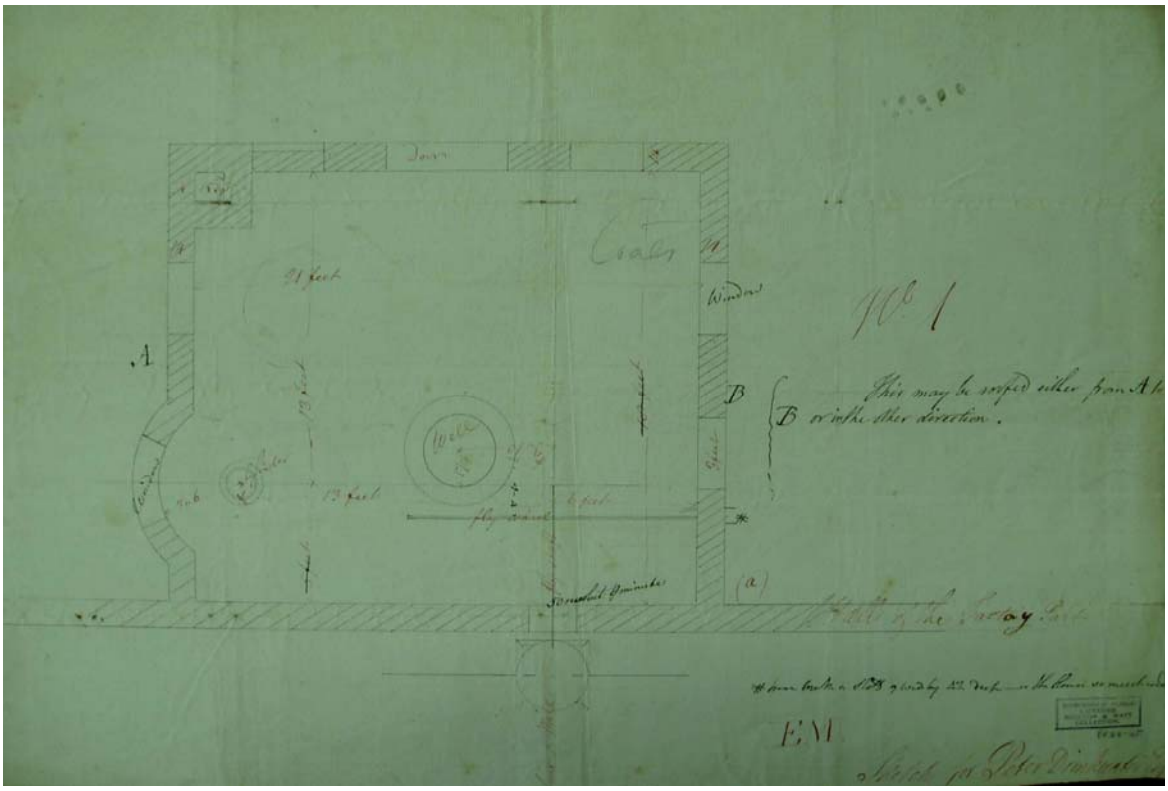


Plate 4 Sketch plan of proposal No 1 for engine house by Boulton and Watt, 1789

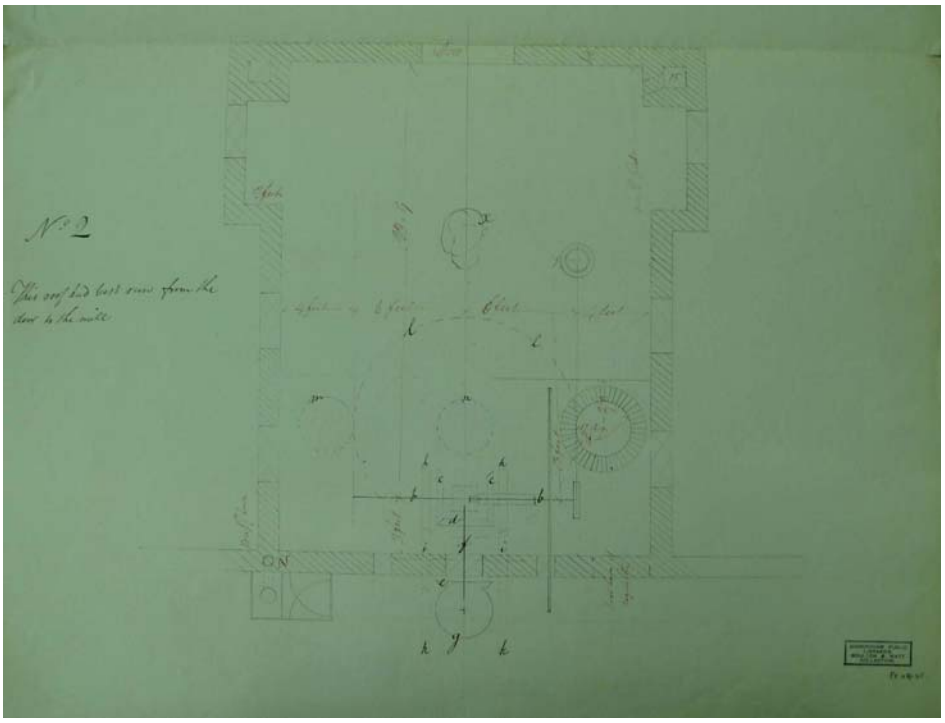


Plate 5 Sketch plan of proposal No 2 for engine house by Boulton and Watt, 1789

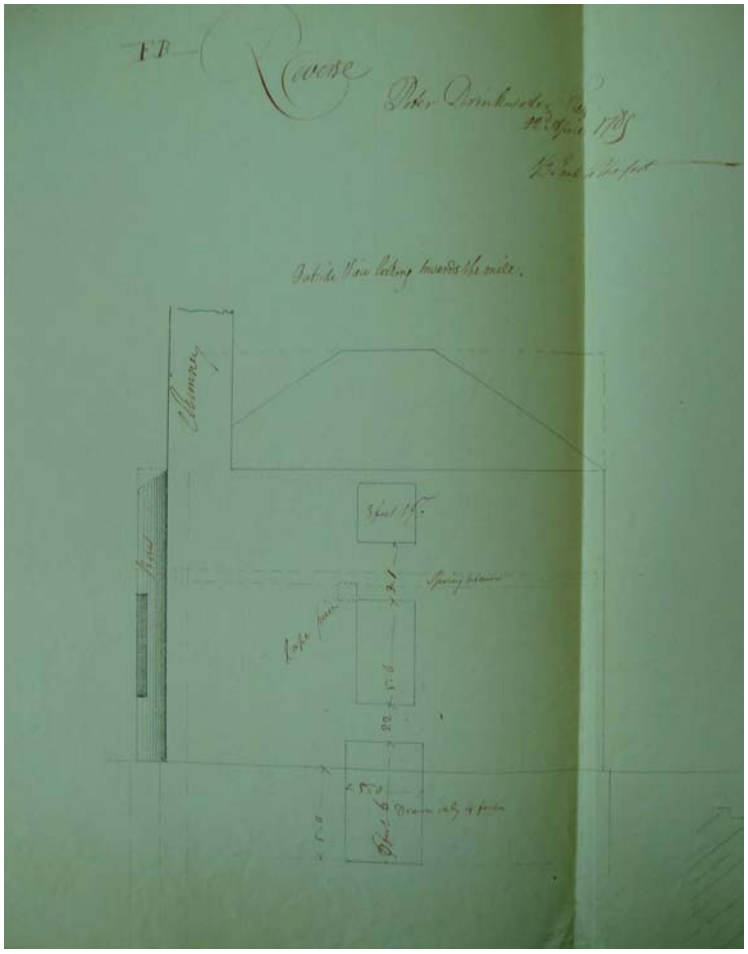


Plate 6 Reversed section through proposed 1789 engine house

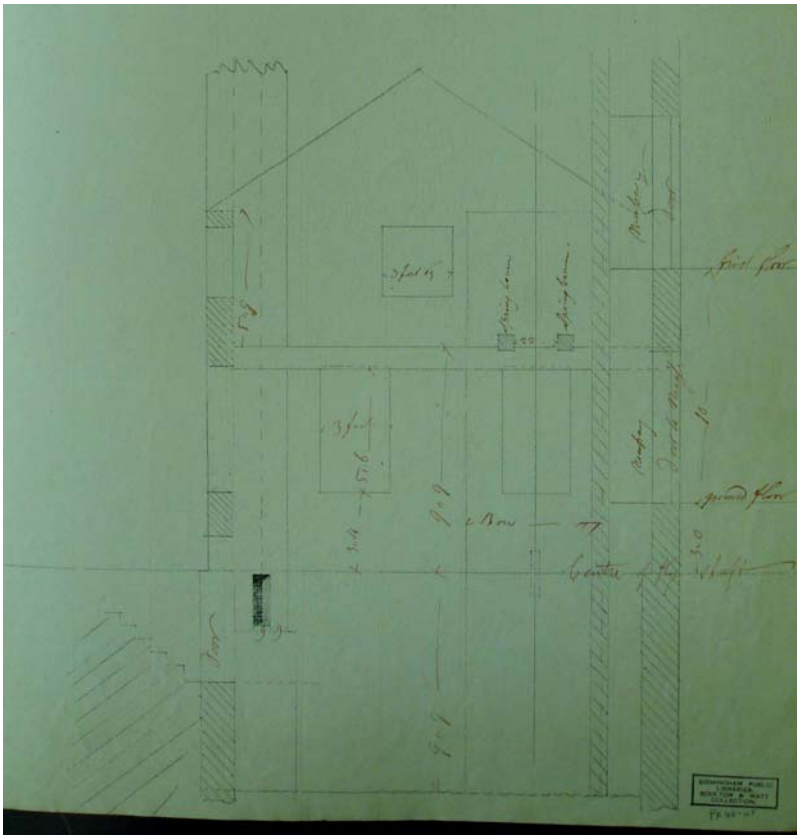


Plate 7 Cross-section through proposed 1789 engine house

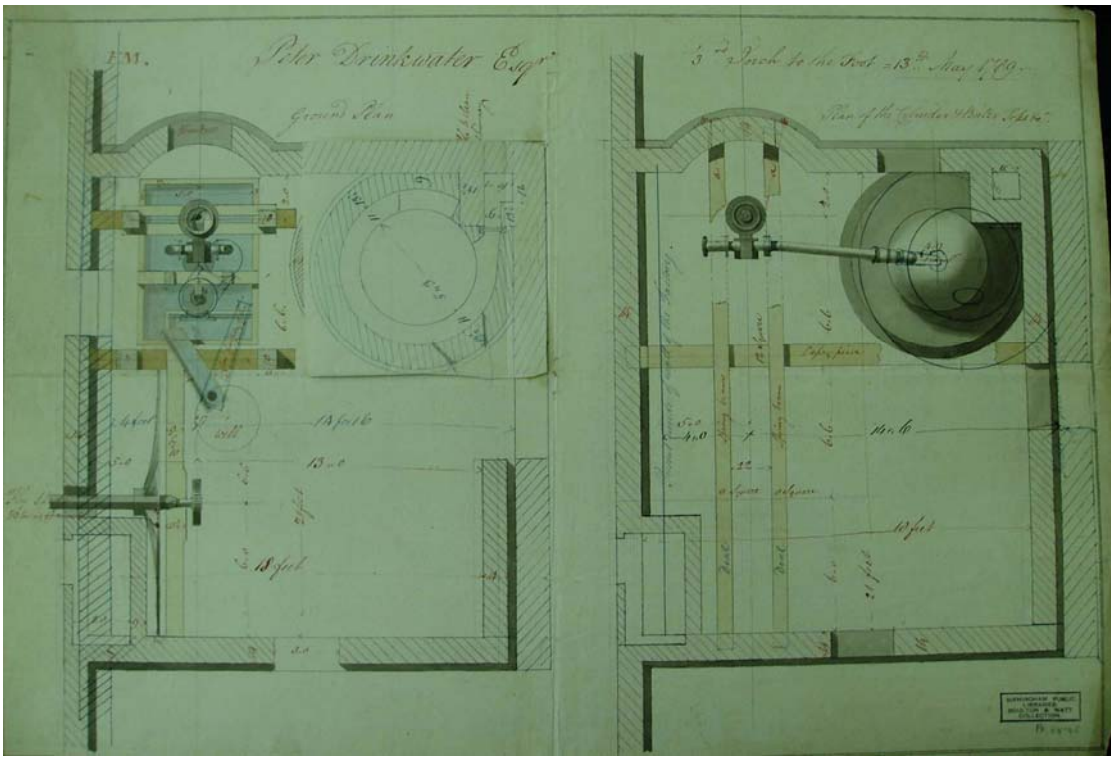


Plate 8 Final plans of 1789 engine house by Boulton and Watt

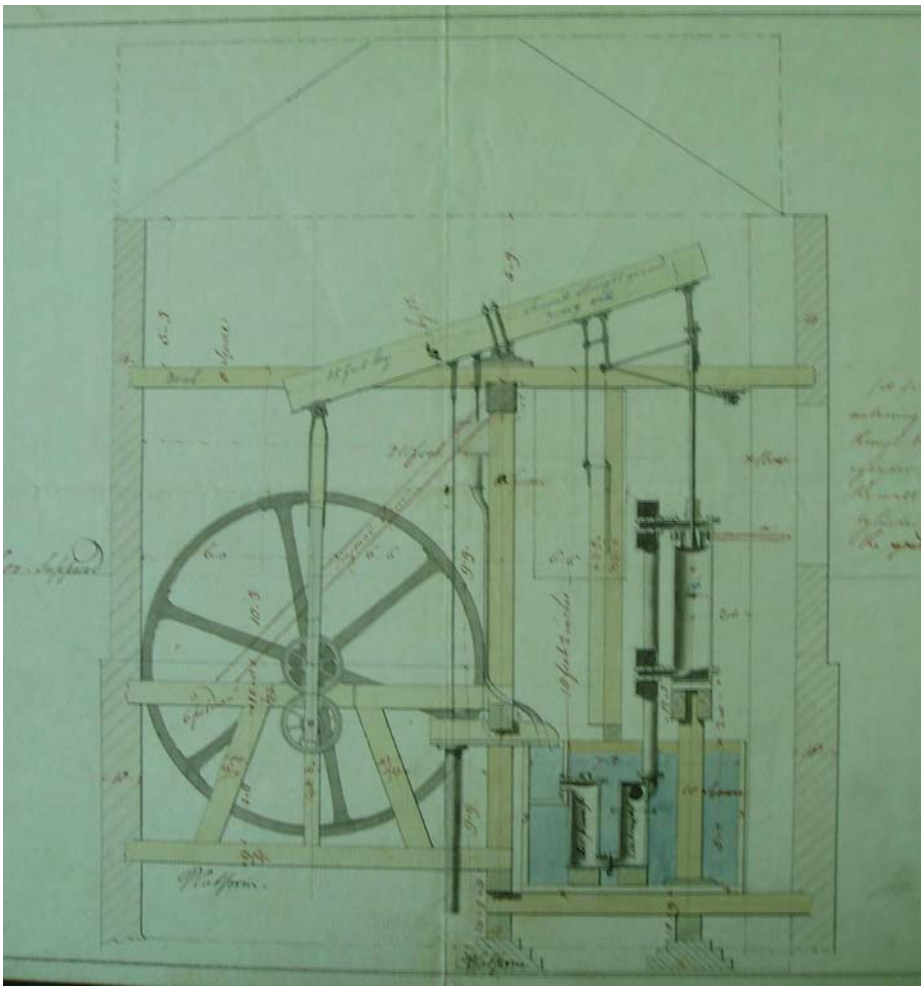


Plate 9 Final section of 1789 engine house by Boulton and Watt

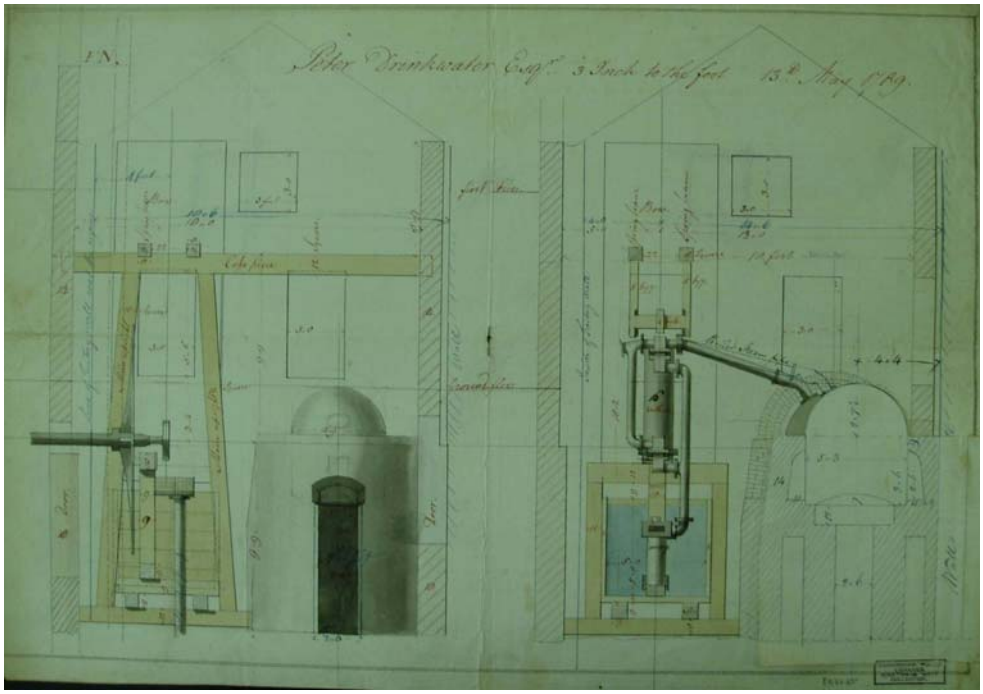


Plate 10 Final cross-sections of 1789 engine house by Boulton and Watt

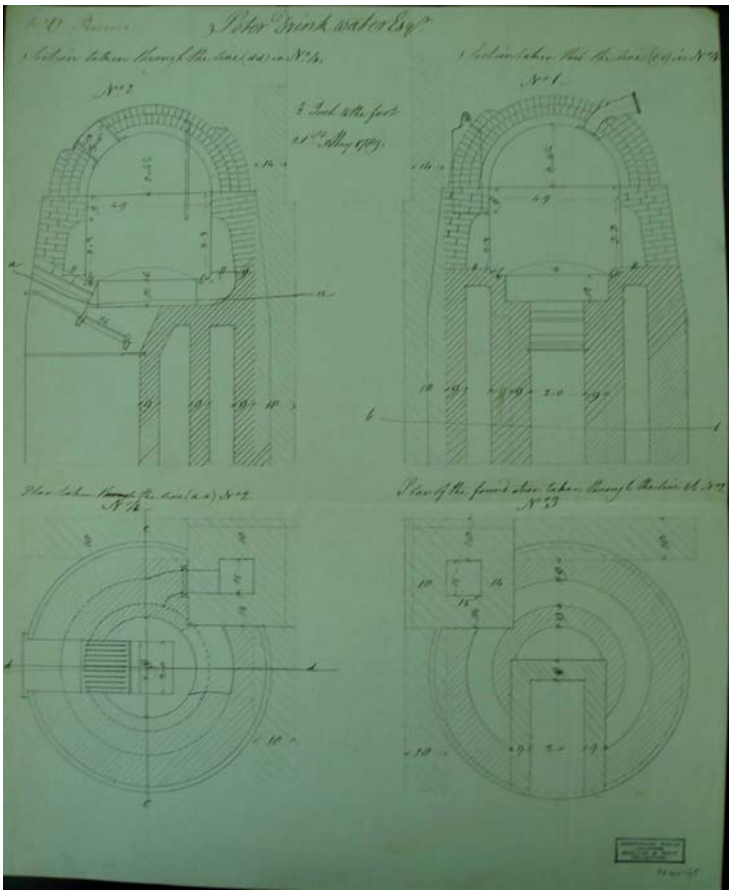


Plate 11 Sketch sections and plans of the 1789 vertical boiler

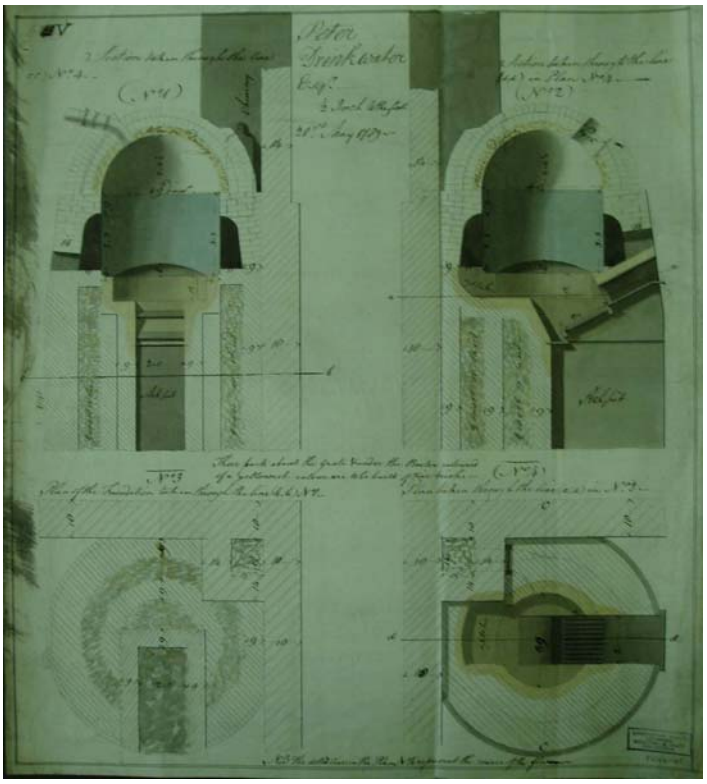


Plate 12 Final sections and plans of the 1789 vertical boiler

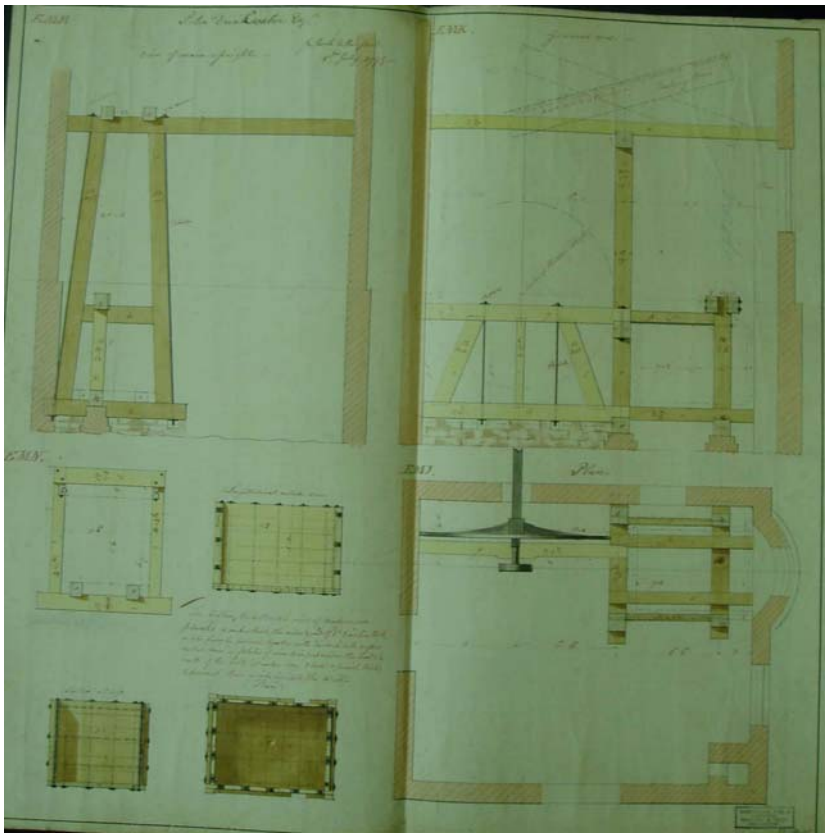


Plate 13 Details of the timber framing of the 1799 engine

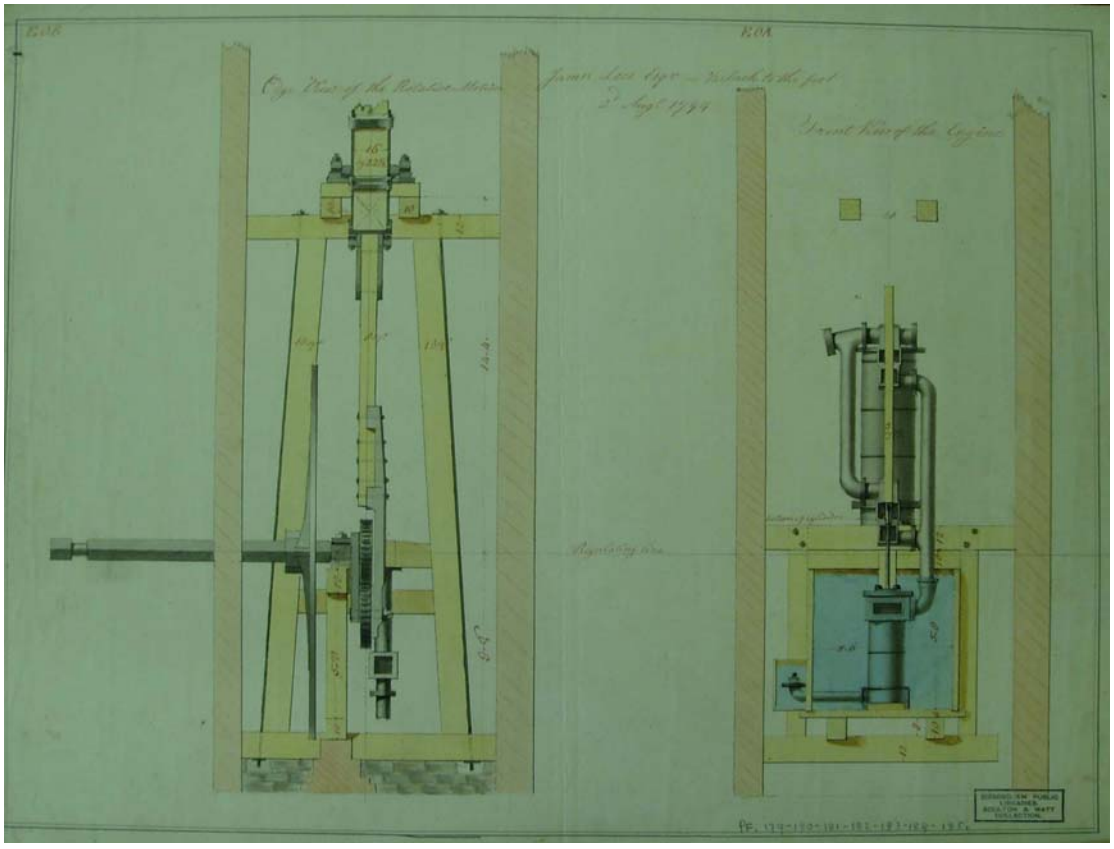


Plate 14 Sections of the 1799 engine

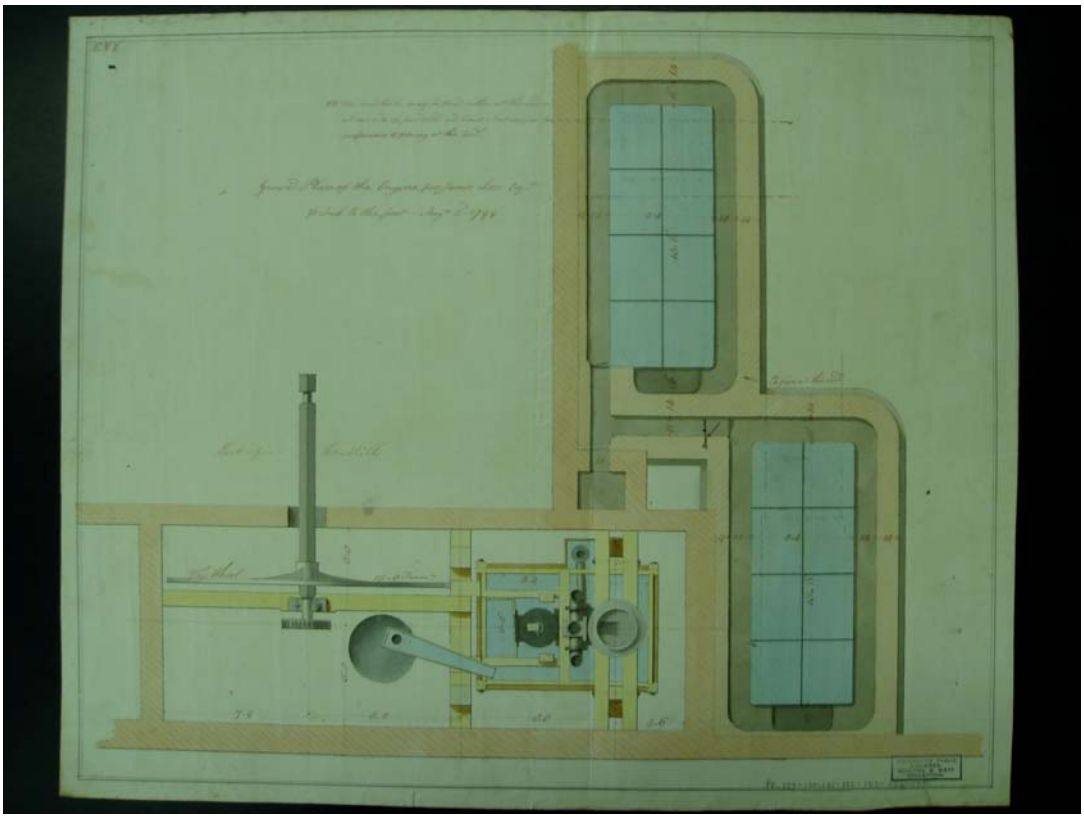


Plate 15 Plan of 1799 engine and boiler houses

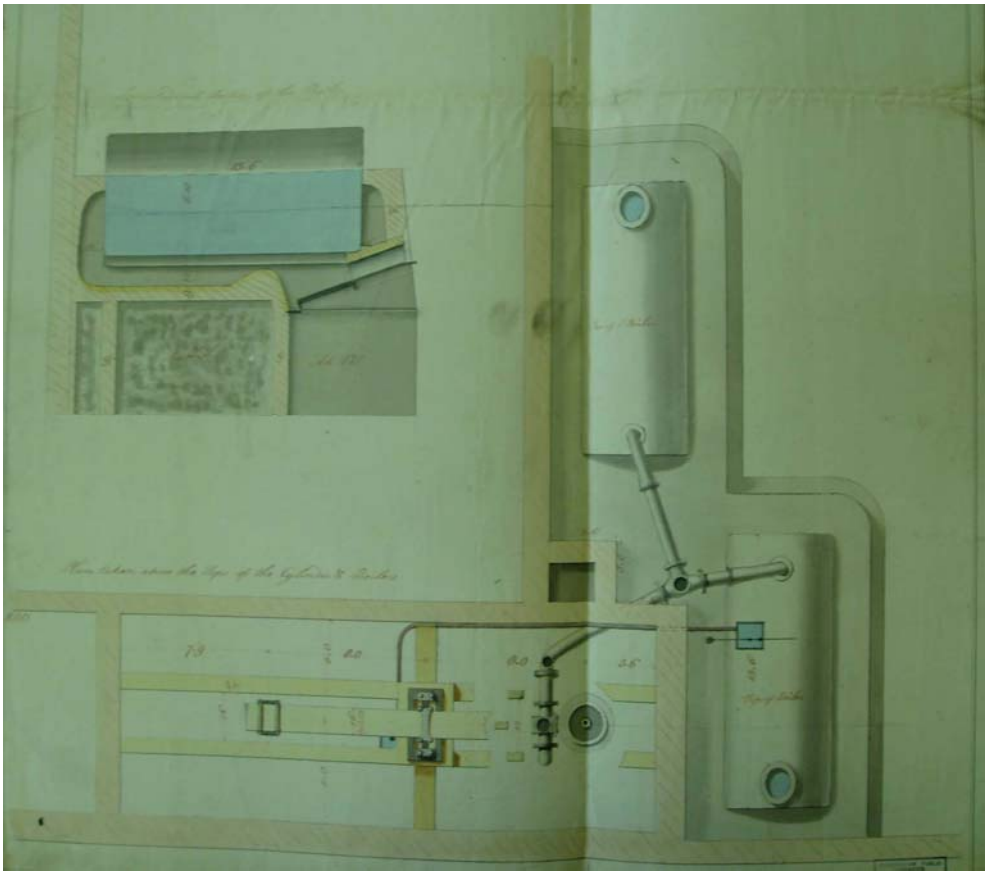


Plate 16 Plan of 1799 engine and boiler houses, showing detail of boiler

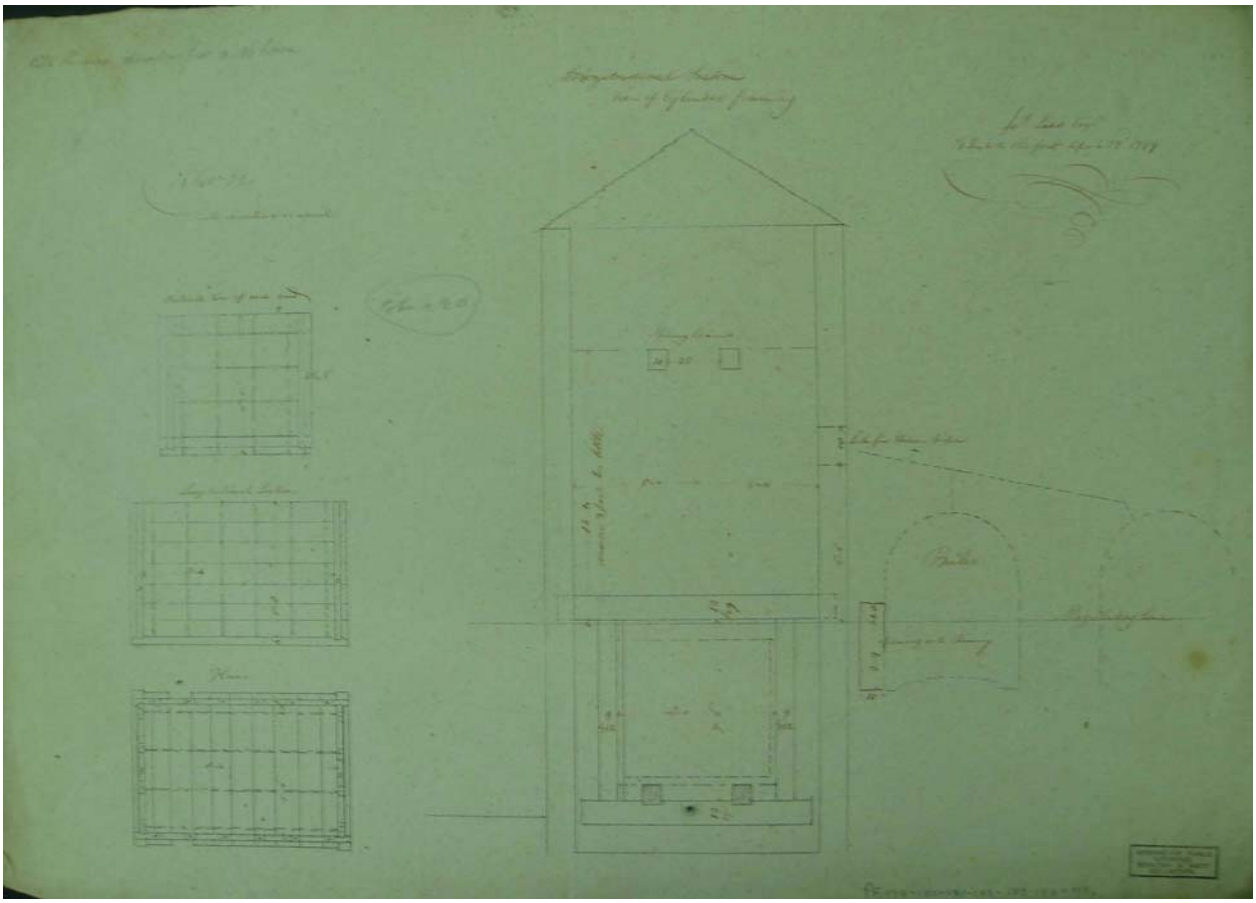


Plate 17 Cross-section of 1799 engine and boiler houses

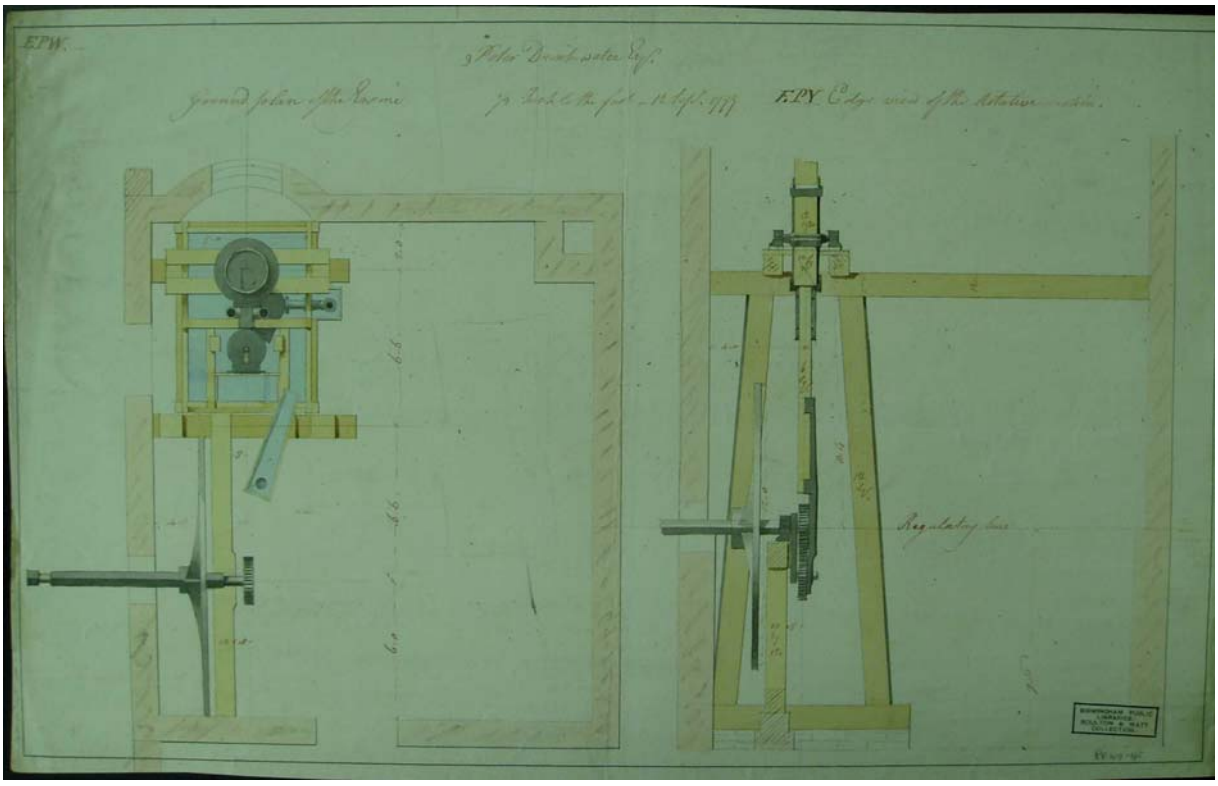


Plate 18 Plan and section of the 1799 engine

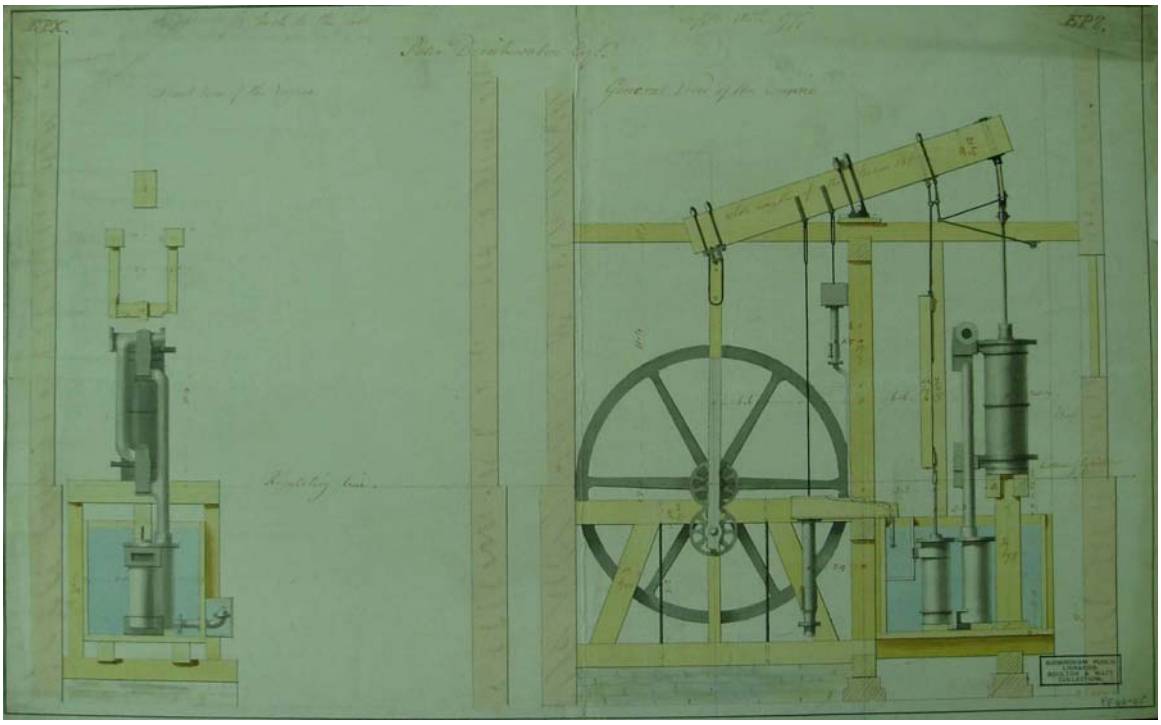


Plate 19: Section of the 1799 engine

Plate 20: Photograph of Sharp's Printworks, taken 1908, from the north-west

Plate 21: General view of the excavation trench

Plate 22: Phase 1 wall ***105***

Plate 23: Phase 1 drain ***112***

Plate 24: Elevation of Phase 2 east wing

Plate 25: South face of Phase 4 wall ***106***

Plate 26: Phase 4 brick floor ***114*** and wall ***107***

Plate 27: Phase 4 culvert ***117*** and wall ***108***

Plate 28: Brick fill ***116*** and Phase 5 machine base ***118***

Plate 29: External wall of Phase 4 culvert ***117***

Plate 30: Southern face of Phase 4 wall ***109***, with Phase 1 wall ***105*** behind

Plate 31: Phase 5 wall ***111*** with butt joint to Phase 4 wall ***110*** visible in return

Plate 32: Walls ***110*** and ***111*** within evaluation Trench 6

Plate 33: View of north part of site, with Phase 5 doorway cut in wall ***105*** visible in centre

Plate 34: Phase 5 concrete machine base ***124***, and associated tanks ***125*** and ***126***

Plate 35: Phase 5 tank ***122*** with flywheel scar

Plate 36: Phase 5 machine bases ***130*** and ***131*** showing associated pipework

Plate 37: Reversed lithographic block for ‘Battlebury’s’, with text-less label

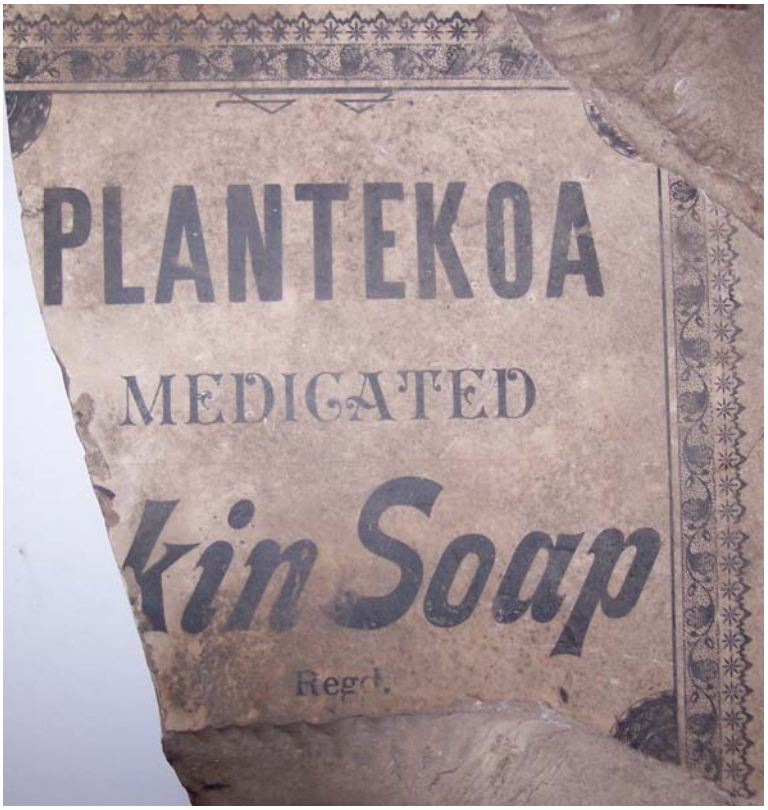


Plate 38: Reversed lithographic block for ‘Plantekoa medicated skin soap’

Plate 39: Reversed lithographic block for 'Handley's Brewery Limited, Manchester'

Plate 40: Reversed lithographic block for 'The "Otto" Gas Engine Works, Openshaw, Manchester'