WOST23

Worrall Street, Ordsall

Archaeological Excavation

PLANNING REF. 20/76684/FUL

Headland Archaeology North West
RSK Group Ltd | Fourways House | 57 Hilton Street | Manchester M1 2EJ

for Bridgestone Construction Ltd

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04/07/2023

HEADLAND ARCHAEOLOGY

PROJECT INFORMATION:

PROJECT NAME	Worrall Street, Ordsall
TYPE OF WORK	Archaeological Excavation
PLANNING REF.	20/76684/FUL
CLIENT	Bridgestone Construction Ltd
PROJECT CODE	WOST23
NGR	382275,397340
PARISH	Ordsall
LOCAL AUTHORITY	Salford City Council
FIELDWORK DATES	30th January 2023 to 13th March 2023
OASIS REF.	headland1-517040
ARCHIVE REPOSITORY	Selected finds to Salford Museum and Art Gallery and Rochdale Museum, digital archive ADS

PROJECT TEAM:

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ENVIRONMENTAL	N/A
TECHNICAL REVIEW	Jen Richards
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PROJECT SUMMARY

This report describes the results of an archaeological excavation carried out in advance of construction works at Worrall Street, Ordsall, Salford, Greater Manchester M5 4TB (NGR 382275,397340). The work was undertaken by Headland Archaeology on behalf of Bridgestone Construction Ltd between 30th January 2023 to 13th March 2023

The site is located approximately 2 km southwest of Salford City centre, central Manchester lies c. 0.8 km to the east of the site which is situated on the north bank of the River Irwell, to the immediate east of the river's canalisation for the Manchester Ship Canal. The site covers approximately 0.31 hectares and is set with a wider landscape of domestic housing consisting of 19th century terraced housing and 21st century apartment blocks. Prior to the site works it was occupied by 20th century light industrial units.

The excavation was targeted at buildings shown on historic mapping which relate to a dye works owned and operated by J. & J.M. Worrall who in the late 19th and early 20th centuries were the world's largest dyers of velvet and corduroy. Established in the late 1700's, their Ordsall dye-works was established in 1792 and operated until the company went out of business in 1964.

The excavation was targeted at an engine house, boiler room and back-to-back housing shown on historic mapping.

The first definite depiction of the engine house is on a map of c. 1850. The excavation found the foundations for a single cylinder beam engine and associated fittings similar to those produced by Boulton and Watt in the first decades of the 19th century. Additional documentary evidence found during the writing of this report suggests that it was a 40-horsepower engine sold for scrap in 1924.

The boiler house lay to the immediate east of the engine house. It is first shown on the same 1850 map as the engine house, but the excavation found that it had been totally rebuilt in the late 1800s. The excavated remains showed that the rebuild was for two 30-foot Lancashire boilers of a type common in the late 19th century. Their capacity far exceeded that needed for the adjacent steam engine and it is likely that they supplied steam and hot water across the dyeworks.

The back-to-back and blind back houses at the northern end of the site were constructed in 1850-1. The most significant evidence from these structures was the provision of blocks of toilets. These were probably among the first provided in working class houses of this type in Salford and a perhaps a reflection of changing social attitudes to housing at that period.

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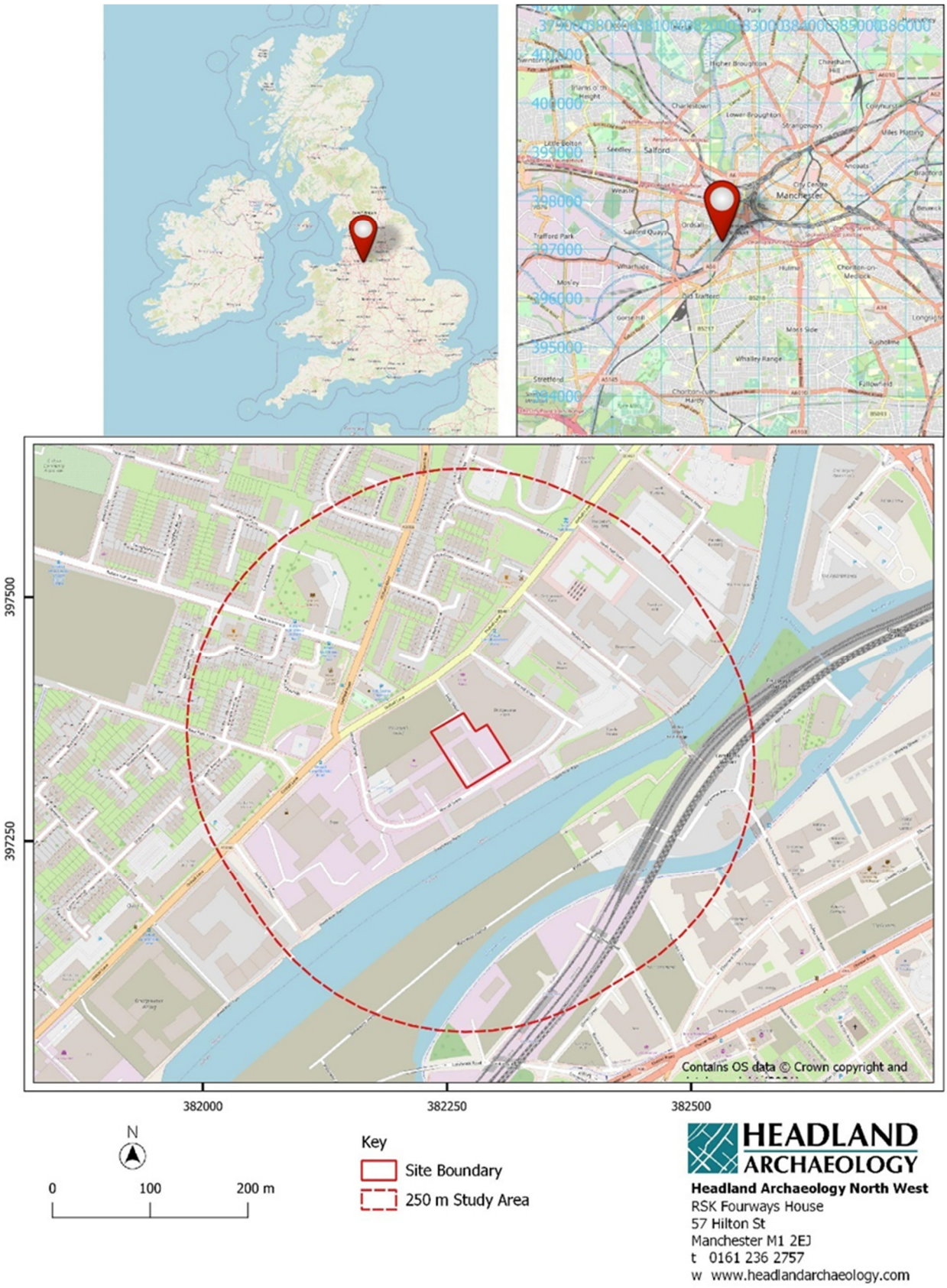


Illus 1. Site location

Worrall Street, Ordsall

Archaeological Excavation

INTRODUCTION

Headland Archaeology was commissioned by Bridgestone Construction Ltd (the Client) to undertake an archaeological excavation in advance of construction at Worrall Street, Salford, Greater Manchester M5 4TB (NGR 382275,397340). The works were undertaken in response to a condition placed on Planning Permission (Planning Reference 20/76684/FUL) for the development as set by Salford City Council.

1.2.2. Condition 3 attached to the decision notice dated 18th February 2020 states:

'No development, except for works of demolition, shall take place until the applicant or their agents or successors in title has secured the implementation of a programme of archaeological works. The works are to be undertaken in accordance with a Written Scheme of Investigation (WSI) submitted to and approved in writing by the local planning authority.

The WSI shall cover the following:

a) A phased programme and methodology of investigation and recording to include:

(i) an archaeological desk-based assessment

(ii) informed by the above, a watching brief during the removal of any foundations or hardstanding over areas of potential archaeological significance

(iii) targeted archaeological evaluation through trial trenching

(iv)informed by the above, more detailed targeted excavation (subject of a new WSI)

b) A programme for post investigation assessment to include:

(i) production of a final report on the investigation results.

c) Deposition of the final report with the Greater Manchester Historic Environment Record.

d) Dissemination of the results commensurate with their significance.

e) Provision for archive deposition of the report and records of the site investigation.

f) Nomination of a competent person or persons/organisation to undertake the works set out within the approved WSI.

Reason: In the interests of recording and advancing understanding of heritage assets impacted by the development and to make information about the heritage interest publicly accessible in accordance with Policy CH5 of the City of Salford Unitary Development Plan and the National Planning Policy Framework.

Reason for pre-commencement condition: It is necessary to ensure that the WSI is approved in advance of commencement of works to ensure that all development activity is undertaken in accordance with the necessary phasing, protection and recording measures.

The excavation described in this report followed the methodology in a Written Scheme of Investigation (WSI) (Headland Archaeology 2022) prepared on behalf of the Client that set out the

strategy for an archaeological watching brief and archaeological trial trenching, though during the watching brief it was agreed with Salford's archaeological advisors (Greater Manchester Archaeological Advisory Service (GMAAS)) that the project could proceed directly to targeted open area excavation without the requirement for trial trenching.

This report details the results of the work Headland Archaeology undertook during the excavation between 30th January 2023 to 13th March 2023.

1.1. SITE LOCATION AND DESCRIPTION

The site is located to the north of Worrall Street, Salford (Postcode M5 4TB, NGR 382275,397340), approximately 2 km southwest of Salford City centre, in what is now part of Greater Manchester. Central Manchester lies c. 0.8 km to the east (Illus 1). The site is situated on the north bank of the River Irwell, to the immediate east of the river's canalisation for the Manchester Ship Canal, and covers approximately 0.31 hectares.

Prior to the excavation the site was in industrial use with two warehouses situated towards the western boundary of the site. A warehouse and office on the south of the site comprised a brick and concrete two storey building probably constructed in the mid-20th century. The warehouse in the north of the site was a brick single storey building with adjoining temporary cabins. A brick wall divided the site between the two warehouses. The remainder of the site held concrete parking and loading areas. The south of the site was occupied by a haulage company and the warehouse was utilised for maintenance of the vehicles.

Two 2,500L self-bunded diesel tanks were present on the southern side of the warehouse along with five 1,000L IBCs containing red diesel, waste oil and SCR. The external areas of the southern warehouse were utilised for the storage of vehicles.

The adjacent plots to the north were being redeveloped for housing.

The bedrock geology consists of Chester Pebble Beds (sandstone) which are overlain by drift deposits of Alluvium (sand, clay and gravel) which had been confirmed by borehole data from within the site (E3P 2022).

1.2. ARCHAEOLOGICAL BACKGROUND

The summary below is derived from the desk-based assessment of the site included with the Written Scheme of Investigation (Headland 2022) updated with additional detailed obtained in the research for this report.

The site lies outside the known areas of Prehistoric and Roman settlement in Manchester and the use of the site as a dye works in the 19th and 20th centuries would have almost certainly have destroyed any evidence for those periods which may once have been present.

During the Early Medieval, Medieval and Post-medieval periods the site is likely to have formed part of the estates of Ordsall Hall. Although the Greater Manchester Historic Environment Record lists two medieval sites within 200 m of the site, it was probably in use as agricultural land and was therefore of low or negligible potential for remains of this date.

The site's greatest potential was in remains relating to the Georgian, Victorian and 20th century periods.

By the 1780s the national demand for textiles, particularly cotton, began to rise resulting in a dramatic increase in mill building that transformed Manchester into an international centre of the factory-based cotton manufacturing industry.

Salford grew more slowly than Manchester, but still underwent a degree of industrialisation in the later 18th century, this included cloth making, silk weaving and dyeing, as well as fulling and bleaching. By the end of the 18th century the population had risen to around 7,000.

Until the mid-20th century the site formed part of the works of James and John M. Worrall. At company's peak in the late 19th to early 20th century Worrall's employed up to 3,000 workers at its Ordsall works and in 1890 J. and J. M. Worrall became a private limited company until April 1899, when it combined with similar firms to form the English Velvet and Cord Dyers Association which by 1931 comprised 22 associated companies, though the Worrall family were the major shareholders and members frequently served as company chair. The Association shortened its name to English Velvets in October 1948.

The company records of Worrall's do not appear to survive though some of the papers of the English Velvet and Cord Dyers' Association Ltd for the period 1899-1956 are held by University of Salford Archives & Special Collections (USASC Ref EVA). These consist of the minutes of various meetings and trust deeds and include some references to J & J.M. Worral for the period. These are cited as appropriate below, though they are limited in extent and are largely concerned with considerations of wider company strategy; they contain little with respect to the day-to-day operations of individual factories.

According to Graces Guide (https://www.gracesguide.co.uk/James_and_John_M._Worrall#cite_note-3) Worrall's was founded in 1786 in Dyer's Lane, Alport Town, Deansgate, though Bergin (1975) dates the company's foundation to 1768. One of these dates is perhaps a transcription error, though the date of 1768 is also given in a short article on the company which appeared in the Manchester Courier of 7th July 1908 and that may therefore be the correct version.

Otherwise the earliest contemporary mention of the company seems to be an advert in the Manchester Mercury of 25th September 1781 which describes a break-in on 28th-29th August at the works of Tomlinson & Worrall's '*...BLEACHING CROFT...near Ancotes (sic) Lane*' where '*... one half ell of round Top Cord marked A. M. and co. No. 756, ready Bleached for Dying*' was stolen. Another break-in at the same works where '*About Nine Yards and a Half of Genoa Back and FACE CORD, cut from a Piece marked N.R. in a square, No. 598*' was stolen, was reported in the Manchester Mercury on 1st July 1788.

Unusually for the late 18th century one of the partners was a woman. An insurance policy dated 4 November 1788 names the owners as Jane Tomlinson and James Worrall of Ancoat (sic) Lane and describes them as fustian dyers (London Metropolitan Archives Ref MS 11936/358/550214). Tomlinson (described as a widow) renewed the insurance policy on Ancoats Road on 18 January 1790, though there is no mention of James Worrall which may indicate that that their partnership had broken up by that date (London Metropolitan Archives Ref MS 11936/365/565073). However, it seems that Tomlinson wasn't forgotten by the company, one of the streets constructed north of the works in the 1850s (see below) was named 'Tomlinson's Place' and it is likely that this was some form of recognition of her contribution to the company.

According to Graces Guide the company remained at Ancoats Lane until 1791 when it moved to larger premises at Shooter's Brook, Ancoats, though no source is given for this and the evidence above may suggest that it was only Worrall who moved, though on 30th January 1792 James Worrall of Ancoats Lane, fustian dyer took out an insurance policy, so the date in Graces Guide may be incorrect (London Metropolitan Archives Ref MS 11936/384/595662).

Few other details of the company survive from the period prior to 1890, the early company records seem to have been lost or destroyed, though some elements can be pieced together from newspaper reports and advertisements.

The News (London) of 19th May 1833 carried a short note of dissolution of the partnership of 'J & J. Worrall, Ordsall, Lancashire, dyers, though this is likely to relate to some form of refinancing of the company which was still active in 1834. The Leicester Chronicle of 25th January 1834 carried a report of an accident at the works of J & J Worrall in Ordsall in which a boy of 13-14 years old '*... was crossing a wooden stage from one room to another of the dye-works....he slipped off at the side and fell into a boiler of hot water, in which some pieces of goods were boiling. The steam from the boiler was so great that no one saw the accident; but a workman who heard the plunge, and the screams of the unfortunate lad, ran to the place and pulled him out. He was conveyed to the infirmary , where he died on Monday from the injuries he had received.*'

In 1837 James Worrell and John Mayo Worrall were the business's third generation owners, and the company adopted the business name of J. & J. M. Worrall when their father stepped down a very wealthy man. They soon began a programme of take-overs and acquired several companies in Lancashire & Yorkshire (Graces Guide). However, little is known about the family.

James Worrall died on 13th July 1890 aged 80, a brief obituary confirms the details in Graces Guide and also that he was mayor of Salford in 1861-2 and became a Justice of the Peace in 1864 (Manchester Evening News 14th July 1890). A painting of James made in 1865 is held by Salford Museum and Art Gallery https://artuk.org/discover/artworks/james-

worrall-jp-165402. There is also a short biography of James here https://chorltonhistory.blogspot.com/2021/01/the-worralls-of-whalley-range.html .

Worrall's had a reputation for being at the forefront of dye technology in the 19th and early 20th century, and as such are likely to have been involved in the early development and application of synthetic dyes in which Manchester was a world leader, at least in part because of the work of immigrant German chemists. The first synthetic dye to be developed was mauviene, manufactured from coal tar and discovered by Perkin in 1856 and aniline yellow, manufactured from the 1860s by R. Dale and co of Hulme (Ashmore 1969, 135). However, there is no indication that Worrall's were involved in the manufacture of dyes.

The Manchester Courier of 9th July 1885 contained an advert for the sale of red sandstone derived from '*Works at Worrall's new reservoir, Ordsal lane (sic), Salford'* which will be the reservoirs shown on Illus 6. Another advert in the Manchester Courier 16th September 1889 publicised the establishment of the '*Velvet Cutting Machine Syndicate Ltd*' with capital of £10000 in £500 shares. In addition to Worralls the syndicate included the manufacturers J. Halsworth of St. Peter's Square, R. Middleton of Charlton Street, F.J. Haworth of High Street, J. Moseley of Levenshulme, J.J. Mann of Salford who were fustian cutters and H. Whitehead of Bury, bleachers.

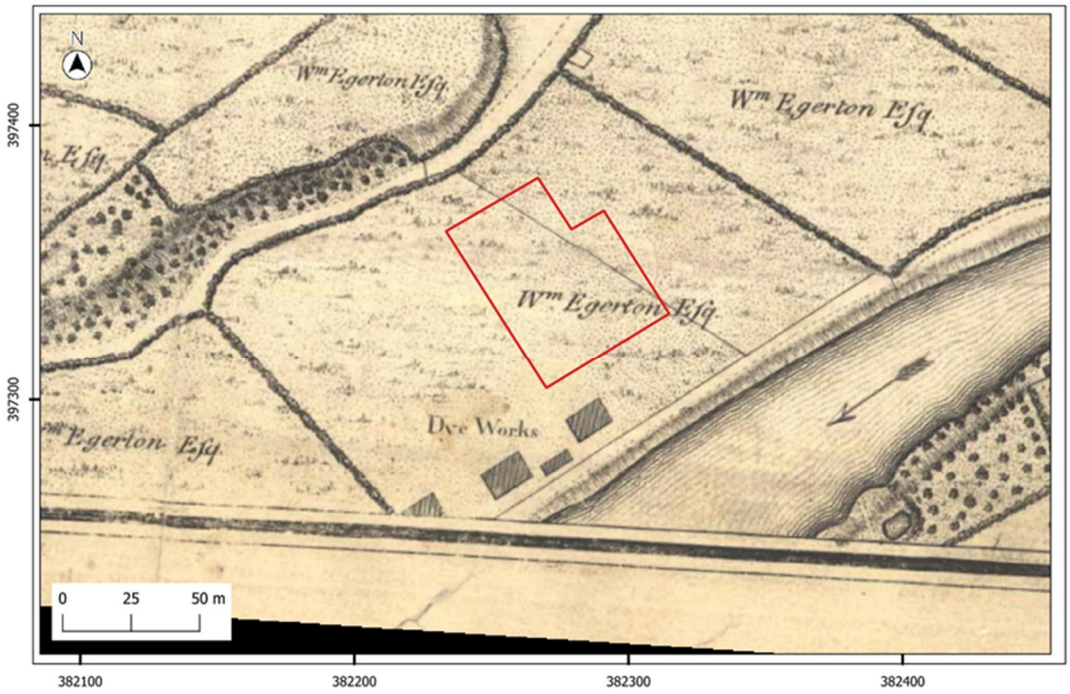
A subsequent article in the same paper of Saturday 14th June 1890 described how this had resulted in the production of the first machine which could cut velvet to the same quality as 'hand-work'. Each machine was capable of '*cutting four pieces of 24 inches velvet 110 yards long, per week, as against one piece by hand which is the utmost that a hand cutter on a short frame can cut in a week.*' It was claimed that the quality of the cutting was also improved, and eleven machines had been installed at the Ordsall Lane works, though it is not clear which of the buildings shown on contemporary mapping (i.e. Illus 6) they were placed in. The Directors expected to make a return of 20% on their investment.

Fire seems to have been a significant hazard at the dyeworks, the company maintained its own fire brigade which is mentioned in several 19th and 20th century newspaper articles along with more than one instance of significant damage. For example, on 14th November 1913 the Manchester Courier reported '*… a large quantity of velvet (found) ablaze in the drying room of a six storey building*' on the site. The cause of the blaze was uncertain.

The company minute books for the post-war period contain frequent references to the difficult trading conditions of the time which were aggravated by a lack of investment in buildings, plant and machinery during the 1930s and 40s, difficulties in obtaining adequate supplies of coal and competition from velvet dyers abroad, particularly Canada where the company considered buying out a competitor.

Various attempts were made to overcome these issues including closing or selling dyeworks no longer considered viable and investing in a new rayon dyeing plant at Ordsall in 1954, though the latter measure seems to have been unpopular with shareholders who expressed discontent at the 1956 AGM. The problems at Worrall's continued and in September 1956 it was proposed to reduce the size of the site by half and move machinery to other parts of the company. A minute of 13th November 1956 suggests that the move was being considered at least in part because some of the buildings on site were structurally unsound.

The minutes for the period after 1956 do not survive, though the company seems to have continued to struggle and in 1964 English Velvets closed its Ordsall Works and the site was redeveloped with the warehouses and yards which occupied the area until the early 21st century.

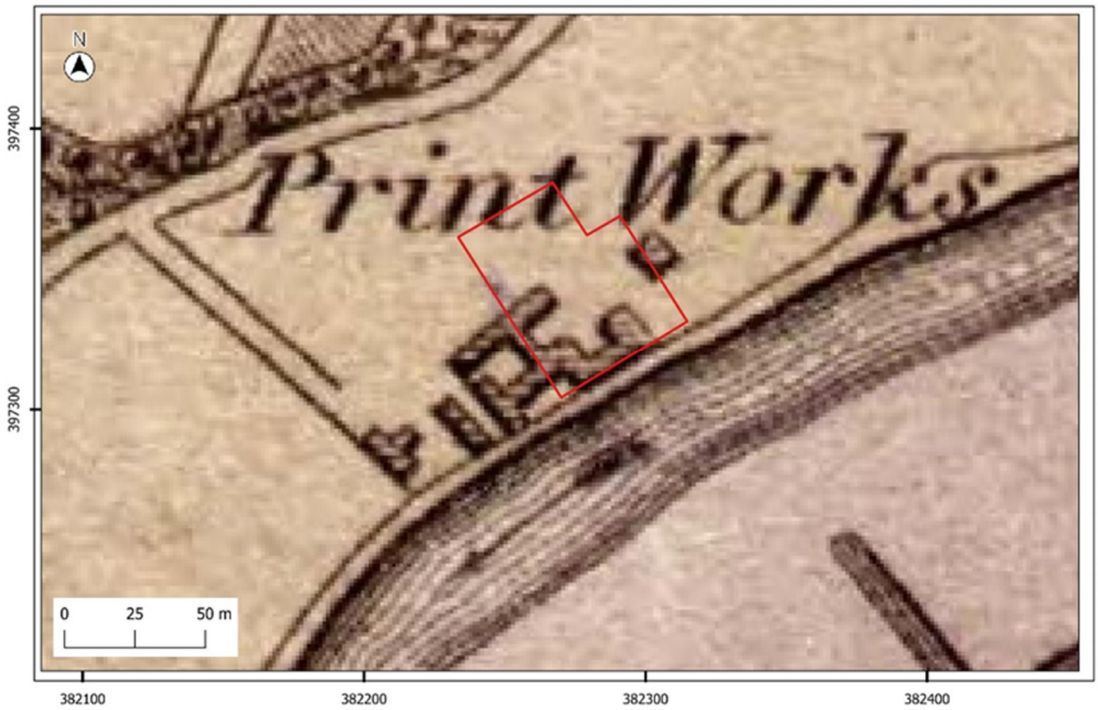


Illus 2. Part of William Green's Plan of Manchester and Salford, 1794.

The earliest map to show the works is Green's map of 1794 (Illus 2Illus 2. Part of William Green's Plan of Manchester and Salford, 1794.), Yates' Map of Lancashire of 1786 shows the site empty and other early maps of Manchester do not extend as far as the site. The Green map shows a small cluster of four buildings labelled 'Dye Works' to the immediate south-west of the site boundary, with the landowner given as 'William Egerton Esq', at the time MP for Cheshire and a member of the aristocratic Egerton family who were significant landowners in the region. Egerton is unlikely to have had any direct links to the dye works, it is more probable that the Worrall's were merely leasing the land from him, as confirmed by a summary of indentures in a 1939 Trust Deed held with company records.

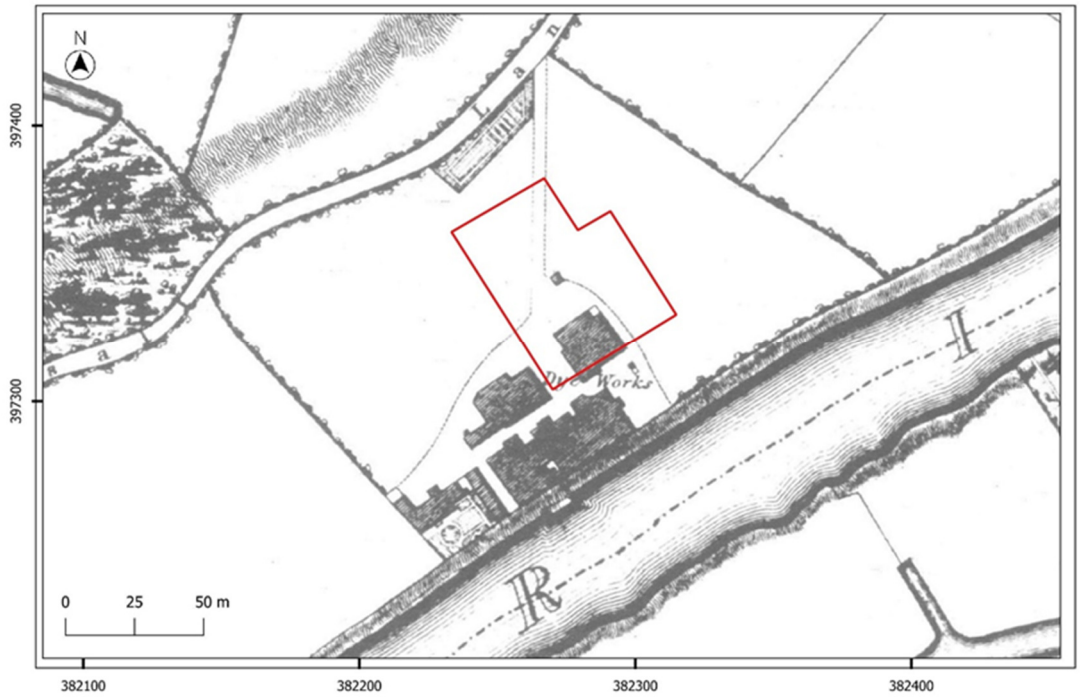
Johnson's 1819 Plan of Manchester (Illus 3) shows the works as a 'Print Works'. It is significantly expanded from 1794 and buildings are shown within the site boundary for the first time, though their individual functions remain unclear.

Johnson shows the site boundary significantly closer to the north bank of the river than it is today which may, in part, be caused by the difficulty in georeferencing the map to the modern landscape. However, there is evidence from the centre of Salford to the north-east of significant reclamation of land from the river of up to 10 m (Nevell 2017a) so it is possible that this too offers at least a partial explanation of this discrepancy, though the Green map described above shows the site boundary further from the river.



Illus 3. Part of William Johnson's Plan of Manchester 1819. This map does not georeference accurately in this area and it is unlikely that the site boundary coincided with the waterfront in 1819.

The Bancks Survey of 1831 (Illus 4) is more detailed and shows a different layout to the Johnson plan with a single square structure on the southern half of the site, it is not obvious whether the works was

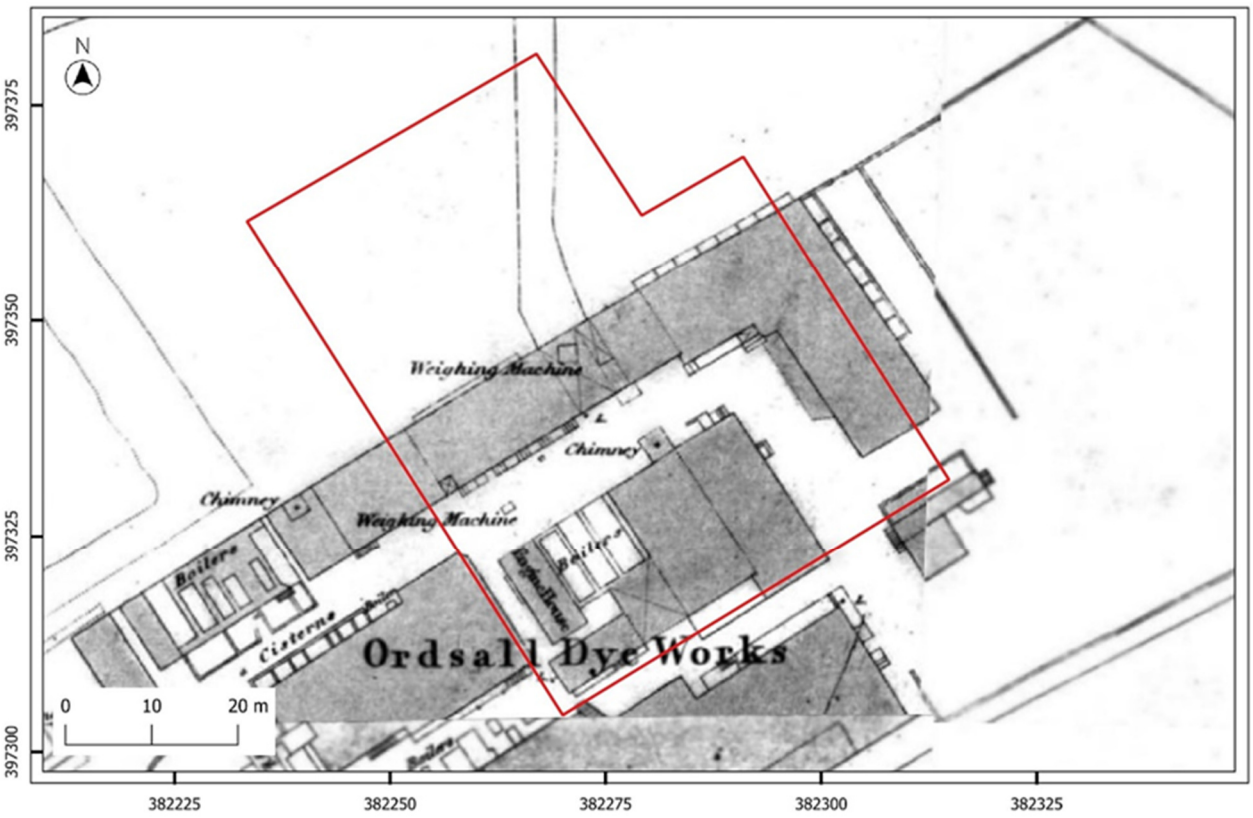


Illus 4. Part of Bancks and Co's Map of Manchester 1831.

rebuilt, or the Bancks' survey is simply more detailed and accurate. The site is labelled as a 'Dye Works'. The northern half of the is shown as vacant, the square building on the southern edge of the site may be the Engine House and Boilers shown on later mapping.

The 1845 six inch to the mile survey shows an apparently identical layout to the 1850 OS map described below, but in much less detail, and is not reproduced or discussed further here.

The 1850 OS survey (Illus 5) shows the works as consisting of a complex of five buildings and smaller ancillary structures named as the 'Ordsall Dye Works'. These included a substantial house and gardens to the south-east of the site, presumably occupied by a member of the Worrall family or by the work's manager. The northern half of the site remained unoccupied, the southern half contained parts of two large structures described below.



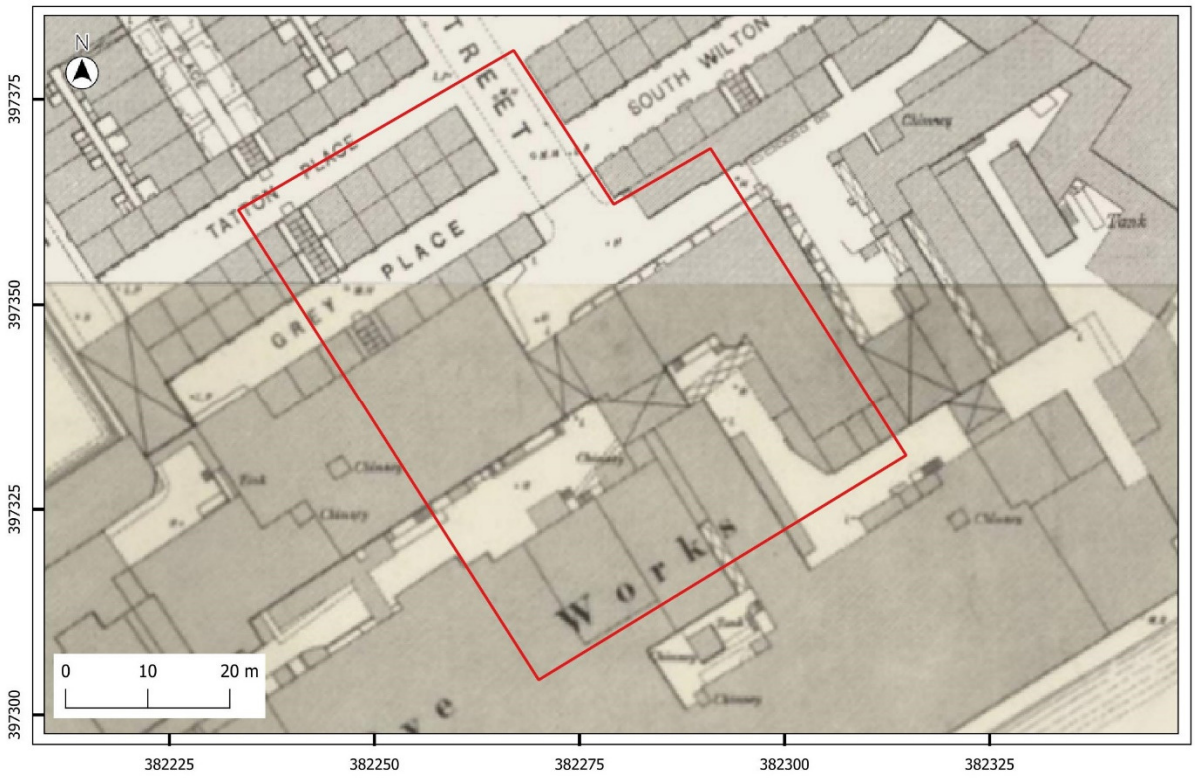
Illus 5. Part of the 1850 OS Town Plan.

The northern building had an L-shaped plan and was approached by a road or track from Ordsall Lane, a weighing machine was marked at the building's entrance. The 1902 Goad map and later photographic evidence (see below) suggest that the eastern part of this building was a four-storey warehouse.

The southern building contained an engine house and boilers, with a chimney on the north-facing elevation. The location of the engine house suggests that it was used to power machinery in the building to its south-east which is shown with external cisterns to its north and it is therefore likely that that building was central to the dyeing process.

A second weighing machine was shown in the courtyard between these structures.

The 1896 OS Town Plan (Illus 6) shows the works significantly expanded from the 1850 OS.



Illus 6. Part of the 1896 OS Town Plan.

To the north of the site is a small area of courts, terraced and back-to-back housing to the south of Ordsall Lane. The streets are recorded in the 1851, census returns, which with the map evidence shows that they were built in about 1850, though Nevell (2017b, 8) dates the ban on construction of new back-to-backs in Manchester and Salford to c. 1850 which in the WSI for this project (Headland 2022) suggested that they may have been constructed illegally. Further documentary research conducted for this report showed that the construction of back-to-backs in Salford was not banned until 1862 at the earliest, probably as late as the 1870s.

Narrow blocks with internal sub-divisions between the houses on Grey Place and Tatton Place were shown by this excavation to be either toilets or washrooms. Interestingly this layout is broadly similar to that suggested by Dr Robert Baker, an important contributor to the Leeds Improvement Act of 1842, in a Leeds bylaw of 1866. Though Baker suggested eight houses per block of toilets rather than the twenty along Tatton and Grey Place (Harrison 2018).

The Leeds Act stipulated that each new house should have a proper privy, that house drainage must run into a public sewer, and that streets and foot-passages should be a minimum width of 30ft (9.45m) and 20ft (6.10m) respectively, partly in response to concerns about fire safety.

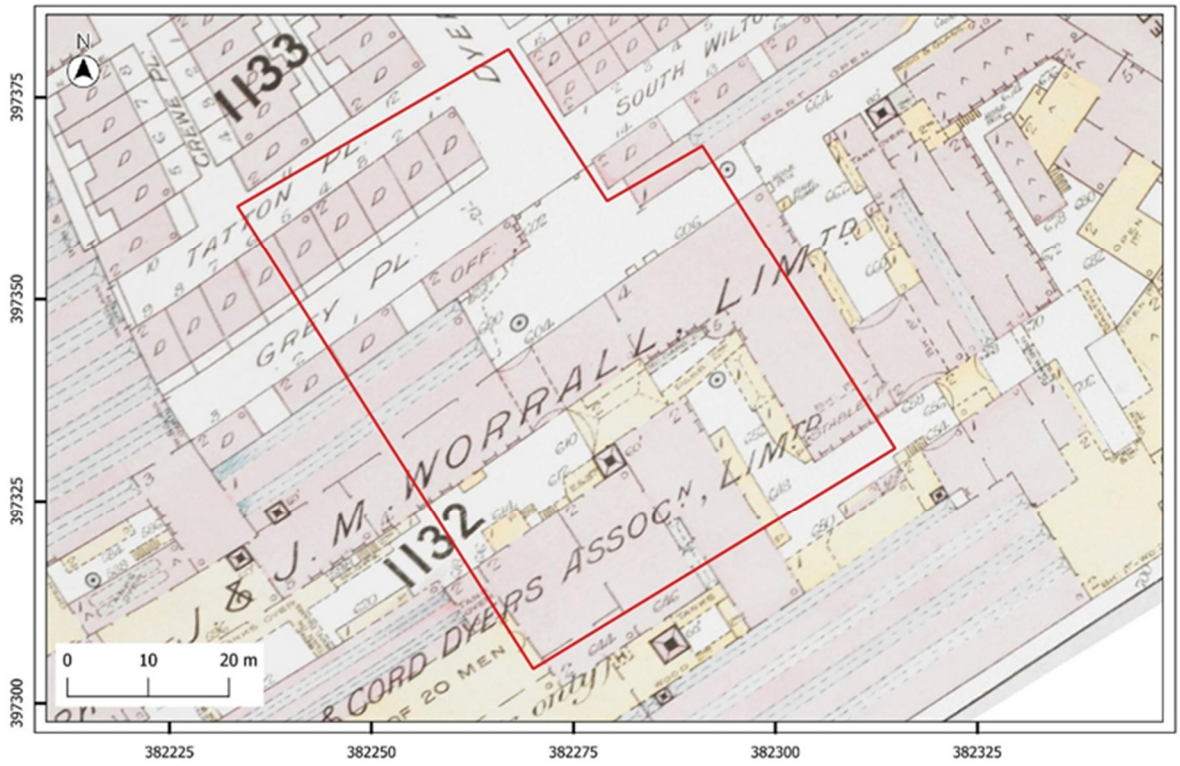
Later mapping, for example the 1902 Goad plan and the 1949 OS, shows the dwellings along Alport Place, Grey Place and Tatton Place as terraced houses with backyards, and analysis of census returns (see below) shows that this rebuilding or conversion took place in 1901-2. The Goad map also shows that the houses along Radcliffe Street and four houses at the western end of Grey Place/Tatton Place have been demolished and new factory space built over their sites and the former reservoirs to their west.

Most of the occupations listed in the 19th century census returns for these houses show that that most of the occupants worked at Worrall's works. Trades such as 'Dyer of Cotton', 'Fustian Bleacher', 'Fustian Dyer', 'Cloth Dresser' and 'Dye House Labourer' are the dominant occupations, though the 1851 return also includes a 'Police Constable', cotton spinners and weavers, whilst an 18 year old

'House Servant' is listed at 31 Tatton Place in 1851. The entry is specific that he was employed by the head of the household which seems unusual in housing generally occupied by the relatively poor, though it may be significant that all of the occupants were immigrants from Ireland and the relationship more complex. This is perhaps illustrated by another servant, Martha Robb aged 11 years, who is listed at No 36, though the head of the household, Margaret Dawson is described as a 'Housekeeper' and her son John was a School Master, so it is possible that she worked for a third party, rather than directly for the Dawsons. Alternatively, Martha may have been indirectly related to the Dawsons, in the mid-19th century many 'servants', were actually related by kinship to the heads of the households in which they lived (Higgs 1986).

All of the dwellings are occupied by single families, generally 2 adults and 3-4 children, with no clear instances of multiple occupation, though occasional lodgers are listed. Although most birth places are recorded as Manchester or Salford, there are many who were born in Lancashire, Cheshire and further afield, including Ireland and the 1891 census includes at least one person on Tomlinson's Place born in India.

The 1902 Goad Fire Insurance Plan is perhaps the most detailed plan of the works available (Illus 7).



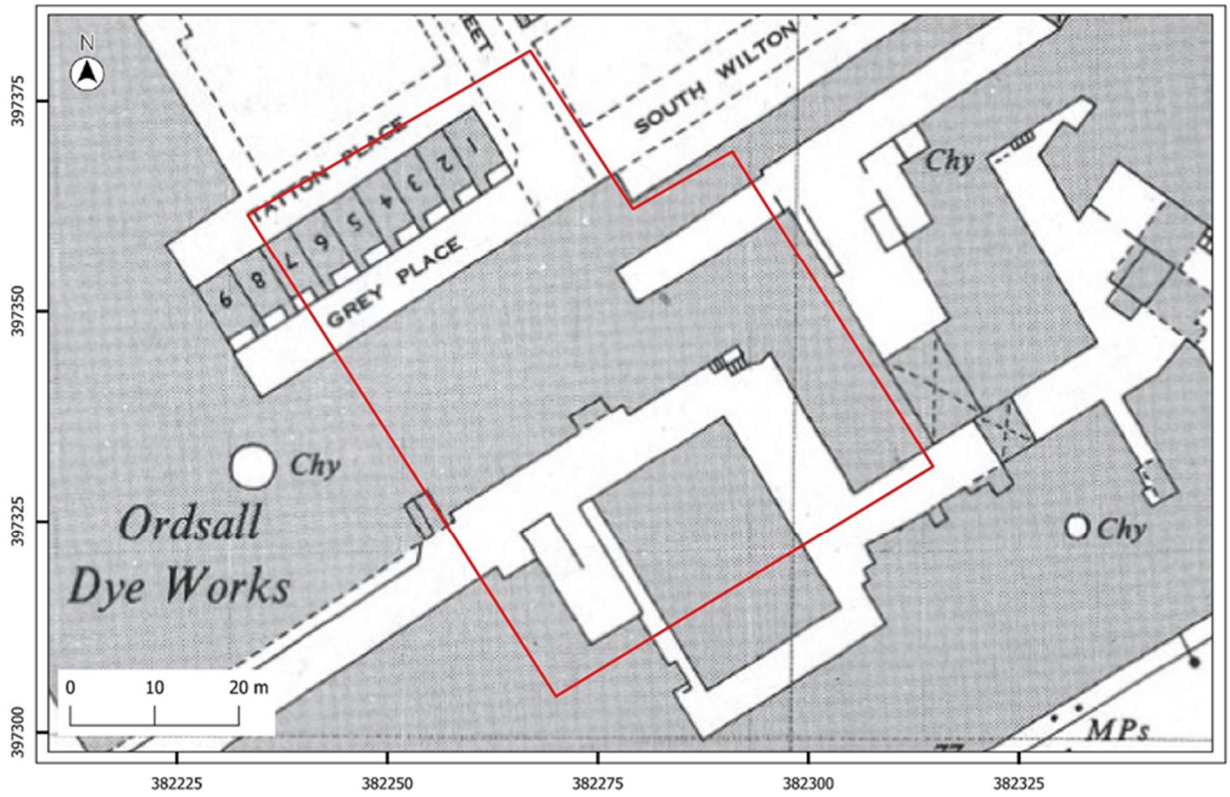
Illus 7. Part of the 1902 Goad Fire Insurance Plan.

The overall layout of the housing to the north was largely unchanged since the 1890s, though the houses within the site boundary along Tatton Place and Grey Place are now shown as a single terrace with yards to the south which shows that that they had either been converted from back-to-backs or demolished and rebuilt (the evidence from excavation suggests the former). This is supported by evidence from census returns which in 1891 and 1901 list houses 1-20 along Tatton Place and 1-20 along Grey Place, though several of the houses along Grey Place were either not listed at all or listed as unoccupied which suggests that their redevelopment was well underway in 1901. The 1911 census only lists 1-11 Tatton Place and 1-3 Grey Place which shows that the number of dwellings along both streets had been significantly reduced. The toilet /washhouse structures shown on earlier mapping and identified on the excavation are not depicted and the significance of this is discussed below.

The overall layout of the works was similar to that on the 1896 map, although there were buildings on

the site of the engine house and boilers, these were not marked as such. The desk-based assessment considered it possible that they had been rebuilt or repurposed, though the chimney is still present and the company minutes show that the engine was not scrapped until the 1920s. The L-shaped building was marked as 4-storey, though there is no indication of a basement. The other buildings within the site were 2-storey. Most structures were in brick or stone (pink) though there are some in wood (yellow).

The 1908-1934 OS editions (not reproduced) show minor alterations to the layout of the works, though the excavation area appears unchanged. The yard to the south-west of the excavation area on the Goad map is not shown on the OS maps, though this is possibly a consequence of the different drawing conventions used.



Illus 8. Part of the 1949 OS map.

The 1949 OS map (Illus 8) shows some changes since the 1920s, a rectangular structure had been constructed in the south-eastern corner of the PDA, replacing the structures shown on earlier maps, this is the arched structure visible on aerial images of the site (below) and it is possible that it was constructed as a temporary measure following bomb damage in WWII. Evidence from the excavation (see below) shows that the apparent yard to the immediate west of the new building is probably the site of the Boiler House and this therefore shows that the Boilers were decommissioned in the period 1932 (the survey date of the 1934 OS map) and 1949. The houses along South Wilton Place had been demolished and given the date of this map it is possible that this was also due to WWII bomb damage, two fatalities are recorded at Bigland Street/Everard Street to the immediate east of the PDA .

The 1963 OS map (not reproduced) shows some modifications to the areas east and west of the site, though the layout within the site was unchanged since 1949, apart from the demolition of the houses along Grey Place.

The 1977 OS map (not reproduced) shows the site in its present layout.

A search of the National Archives found few useful documents relating to the company, most relate to

designs for cloth patterns registered by the company. Greater Manchester County Record Office holds a photograph (Ref Negative Sheet Number H9/21) of Ordsall Lane '...looking up towards Worralls Dye Works' dated to the 1960s though this is considered unlikely to provide significant useful information beyond that already obtained from other documents.

Few images of the works appear to survive. An advert of 1896 (https://www.atticpaper.com/proddetail.php?prod=1896-ordsall-crimsworth-dye-works-ad&cat=7 Consulted 13/06/23) contains a painting of the works taken from the opposite bank of the Irwell to the south-east. The four storey L-shaped structure shown with the PDA on the 1902 Goad map is present in the centre of the view and appears to be a warehouse or similar (this was confirmed by the excavation). The waterfront is shown with an apparent palimpsest of 1-2 storey buildings difficult to reconcile with the mapping which shows a single large structure in that area.

A vertical aerial photograph taken on August 10th 1945 (https://historicengland.org.uk/images-books/archive/collections/aerial-photos/record/raf_106g_uk_622_rs_4376 consulted 13/0623) shows the works largely unchanged since the 1930s, though some of the houses north of Tatton Place had been demolished. The arch roofed building described below is not present and was therefore constructed 1945-9 and the Boiler House building appears to be still standing.

The warehouse shown on the 1896 painting is also shown on an oblique aerial view of the Pomona Docks taken in 1951 (https://www.britainfromabove.org.uk/en/image/EAW038400 consulted 13/06/23) . Worrall's works occupy the bottom right-hand corner of the frame, the rectangular building which first appears on the 1949 OS map has an arched roof in what appears to be corrugated iron or asbestos and was therefore probably a relatively recent addition. The view seems to confirm the scale and size of the possible warehouse depicted on the 1896 painting. The back-to-back houses along Tatton Place, Alport Place and the Ordsall Hotel are also clearly visible. The building along the waterfront contains several north-south aligned structures of uncertain function. The large structures to the west of the PDA seem to be in a mix of brick and concrete and appear to be the core of the manufacturing process.

Vertical aerial photographs taken by the RAF on May 16th 1948 (https://historicengland.org.uk/images-books/archive/collections/aerial-photos/record/raf_541_25_rs_4196 consulted 13/6/230) seem to show an identical layout to the 1949 OS and the 1951 oblique view, though it was obtained from a much greater height and there is less detail.

A vertical photograph taken on July 4th 1969 shows the present site layout (https://historicengland.org.uk/images-books/archive/collections/aerial-photos/record/raf_543_4782_v2_0002 consulted 13/6/23).

Prior to the commencement of works most of the site was occupied by a road haulage depot with two storey brick and concrete offices fronting onto Worrall Street. The architectural style combined with the map evidence detailed above was consistent with a construction date of c. 1965-70. According to the occupier there were no basements.

To the rear of the offices was a large workshop/garage with a concrete floor, to either side of the offices and workshop were yards surfaced in concrete. That to the east was the largest and the concrete surface there was in poor condition with extensive evidence of cracking and a large area of apparent subsidence in its northern half which suggested the presence of infilled basements.

1.3. AIMS AND OBJECTIVES

The primary aim of the programme of the archaeological work described in this report was to ensure that any impact from the development was appropriately mitigated in a manner relevant to the significance of the known and potential remains at the site.

This was achieved through the implementation of an archaeological watching brief during demolition sought to minimise disturbance to any below ground archaeological deposits and provide evidence to refine the trial trench locations presented in the WSI.

The archaeological evaluation by trial trenching proposed in the original WSI was abandoned, following consultation with GMASS when it became clear during the watching brief that extensive remains of the back-to-back housing, engine house and boiler room survived whereas other areas of the site contained only infilled mid-19th century cellars.

It was agreed that the project could progress to targeted excavation of the back-to-back housing, engine house and boiler room otherwise using the methodology in the WSI.

The objectives of the excavation and recording works were therefore to:

- Ensure compliance with the relevant planning conditions for the development and secure their discharge;
- Make a competent record of the location and character of any archaeological remains encountered in the excavation area;
- Recover any archaeologically significant artefacts disturbed during the works for specialist examination and reporting;
- Recover samples of any material which has potential for the survival of paleoenvironmental or dating evidence from secure archaeological contexts;
- Prepare a report on the findings of the archaeological investigations, any material recovered, and their significance;
- Deposit the archive with an appropriate repository, submit the completed report to the online OASIS archaeological report library, and submit the digital archive to the Archaeology Data Service.

2. METHODOLOGY

The full project methodology is described in the WSI for the project (Headland 2022) but is summarised briefly here.

2.1. SITE WORKS

Deposits of 20th century concrete/tarmac and rubble fill were removed using a mechanical excavator operated under constant archaeological supervision.

Use of a hydraulic breaker was required to break through the concrete though this was achieved with minimal disturbance to the archaeological structures present.

Exposed structural evidence was then cleaned by hand and recorded before being removed by machine under archaeological supervision.

Map evidence, excavation in areas to the north and west and observation during the watching brief showed that the south-eastern corner of the site had been extensively truncated by basements constructed in the mid-19th century and that area was not excavated further.

2.2. RECORDING

All recording followed CIfA Standards and Guidance for conducting archaeological evaluations (2020a and b) for the Archaeological Investigation and Recording of Standing Buildings or Structures.

All contexts were given unique numbers and recorded on pro forma sheets. Digital photographs with a graduated metric scale clearly visible were taken. Sample sections were cleaned by hand, drawn and photographed.

3. RESULTS

The results of the excavation are described below in broad chronological sequence starting with the earliest deposits.

Context numbers are in square brackets

All of the deposits and structures described below were sealed by layers of concrete [01] and [91] 0.2-0.3 m thick laid over a layer of cinders and ash 100-150 mm thick which were used to form the floors and yards of the workshops constructed following demolition of the dye works in 1964.

A single context number [02] was used for the rubble fill of the cellars resulting from demolition in the 1960s.

Geological deposits [20] consisted of loose mid-brown gravels and sands consistent with the evidence from geological mapping.

Excavated deposits are shown on Illus 10-16. All other illustrations are in Appendix 1.

Structures such as the steam engine and boilers would have been designed in feet and inches so imperial measurements are given where appropriate.

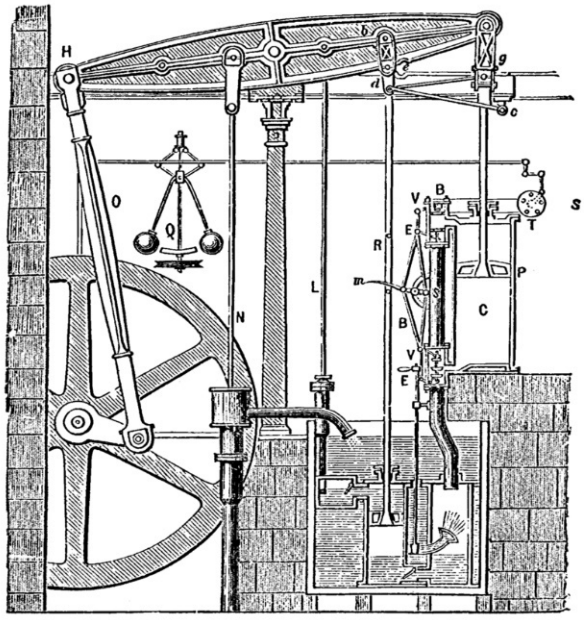
3.1. PHASE 1: THE ENGINE HOUSE AND FACTORY WALLS DEPICTED ON THE 1850 OS

The Engine House

The substantial brick and sandstone foundations of the engine house survived (Illus 24) and show that it housed a single cylinder beam engine. Although all metal items had been stripped when the engine was decommissioned (probably in 1924; see below) sufficient evidence survived within the structure to allow a broad reconstruction of its components and layout.

Illus 9 has been included to aid the description of component parts.

The flywheel pit and other areas had been filled with loose deposits of black ash and cinders [95] (omitted from plans) which contained no other materials. The source of this material is uncertain, though it may have been especially imported to the site to use as fill. The total absence of brick, stone and mortar from this fill may suggest that the engine house was a standing building when the engine was removed and the resulting voids infilled. Unfortunately, the absence of finds from this material makes it impossible to use archaeological evidence to date its decommissioning and corroborate the documentary evidence that the engine was scrapped in 1924.



Illus 9. 19th century depiction of Boulton and Watt's double acting engine (from Thurston R.H. 1886 'A history of the growth of the steam-engine'). Labelling: B steam valves (input), C steam-cylinder, E exhaust steam valves, H Connecting rod link to beam N cold water pump, O connecting rod, P piston, Q regulator/governor, R rod of the air-pump, T steam input flap (controlled by governor (Q). g link connecting piston (P) and beam via parallel motion g-d-c, m steam inflow lever worked by the air-pump rod (R). The flywheel is on the left.

The only external wall of the engine house within the excavated area which can be positively identified as original was the western wall [96], the northern and southern walls were not confidently identified and the southern wall may have lain just outside the excavated area. The western wall was constructed using a mixture of hand-made brick laid in common bond, and large squared blocks of fine-grained yellow sandstone up to 1.5 m across, all bonded with fine grained cream coloured lime mortar. Some of the brickwork may be later blocking, such as that opposite the mounting for the flywheel axle on [94] to the east, which probably masked the opposing mount for that axle.

The northern wall was formed by [98] which was also the southern wall of a flue connecting to the boiler house to the east. This was largely constructed in hand-made brick similar to those in the eastern wall, though the presence of Cindrills firebricks in the lining suggest that it may have been at least partly rebuilt at the same time as the boiler house (see below).The eastern wall [90] was 0.43 m wide and also constructed in hand-made brick laid in common bond. It butted internal elements such as [97] and this, with the use of a paler greyish white mortar slightly different to that used elsewhere in this structure, suggests that it too may have been rebuilt, perhaps about the same time as the boiler house reconstruction in Phase 3. However, the butting relationship with [97] and [92] may simply be the result of the latter's construction using large stone blocks, rather than a meaningful chronological gap.

These walls give an approximate external size for the engine house of 12 x 4.75 m which corresponds well with the dimensions of the building as depicted on the 1850 OS map (Illus 5).

There was a mounting for a single cylinder at the southern end of the building which was housed within a large mass of sandstone masonry [92] (Illus 25). The cylinder mounting was single block of sandstone which measured 1.8 x 1.6 m in plan and was c. 0.35 m thick. The recess cut for the cylinder

Illus 10. Plan of Phase 1 structures

mount was a maximum of 1.37 m (2 feet) across, though the inner circle is 1 m across and is the likely external diameter of the cylinder, allowing for a mounting plinth. This suggests a piston diameter of about 0.8-0.9 m (30-35 inches). A stone mounting to the immediate east of the cylinder mount contained a cut recess 0.15 m (6 inches) across which may have housed the pipe supplying steam from the boiler.

The beam was supported on a single post mounted on a large mass of sandstone masonry with a rusticated finish [97] in the centre of the engine house which, together with [92], defined a space measuring c. 3.5 x 1.83 m and 3 m deep to the immediate front (north) of the cylinder mounting. This would have housed the cold-water tank, vacuum pump and condenser and was connected at a depth of c. 3 m via a horizontal passage in the stonework to the void to the north. This passage was presumably for the feed from the pump described below to the cold-water tank.

A north-south aligned wall [94] constructed entirely in squared yellow sandstone blocks identical to those used in [97] would have carried the flywheel axle (Illus 27). The recess for the crank, or alternatively a sun and planet gear, to transfer the vertical motion of the beam rod to the flywheel had been partially obscured by 20th century brick blocking but suggests a radius of rotation of c. 1 m (c. 3 feet) which in turns suggests a stroke length of c. 2 m (c. 6 feet) (Illus 28).

A vertical semi-circular profiled recess c. 0. 3 m across cut into [94]'s eastern side south of the gear recess (Illus 28), also largely obscured by the later brick blocking, may have housed the pump (N on Illus 5) that the engine drove for the water feed to the condenser tank (John Phillps, NMES, pers. comm.).

The flywheel pit (Illus 29) was located to the north-west in a housing 0.8 m (2 feet 6 inches) across defined by external walls [96] and [94]. The location of the bearing and depth of the housing would allow for a flywheel radius of up to c. 3.25 m (10 feet 6 inches).

Mountings at the northern end of [94] may have been for a so called "second motion" wheel/shaft which would have transferred power from teeth on the periphery of the flywheel to a drive shaft to the mill; a similar arrangement is visible on the Crossfield Mill Beam Engine housed at the Bolton Steam Museum (John Phillps NMES pers. comm.). If this arrangement was in use the flywheel would have been considerably smaller at a radius of c. 1.2 m (4 feet).

Warehouse Basements and Associated Structures

The centre of the site contained infilled basements of the buildings depicted on the 1850 OS map (Illus 5) together with the surfacing for associated roads and yards. All the basement walls were constructed in hand-made, unfrogged brick bonded using coarse grained off-white lime mortar. They divide into two elements separated by a road surfaced using squared stone setts [18], each up to 0.38 m across, which extended south to the Engine House and Boiler House. Although exposed piecemeal these were in fact a single contiguous surface, laid in a single phase around the warehouses.

The historic mapping indicates that the gap between the two sets of basements was crossed overhead by an upper storey connecting the two sections of the building.

Both basements would have been used for the storage of goods and/or materials and provided little useful information on the operation of the dye works so are only described in brief here.

The basement to the east of road surface [18] was defined by walls [03] and [16] and floored in large sandstone flags up to 1.3 m across and 0.1 m thick [04] (omitted from drawings). The walls were 0.75 m thick and constructed in common bond (Illus 17 and Illus 18).

Wall [03] contained evidence for three external light wells at its western end and an internal door connecting to the cellar to the south and/or to the exterior, though that area was not investigated further.

There were six identical lightwells in the northern wall [16] which connected to a gully (not excavated) to the south of road surface [18]. The road was surfaced in sandstone setts up to 0.38 m across whilst a sandstone kerb bounded the northern edge of the lightwells (Illus 19).

During demolition large cubic sandstone blocks up to 1.5 m across were recovered from the geological deposits underlying the walls and would have provided support for them in the soft deposits.

The centre of this basement was crossed from north to south by a flagstone capped brick-lined drain [17] with an internal width of 1.05 m and a depth of c. 0.7 m (an accurate depth could not be obtained because of flooding). The capping flagstones had collapsed during demolition in the 1960s (Illus 20, Illus 21). This connected to an east-west aligned drain incorporated into wall [03] which in turn connected to others to the west (not recorded in detail) beneath the roads and yards in that area. It was fed by a drain incorporated into wall [16] (Illus 22) and seems to have formed part of the general drainage of the site, probably carrying both surface water and waste water from production.

It was bounded to the immediate east by another infilled basement defined by wall [102] which was not excavated.

This part of the building corresponds with the multi-storey building visible on historic images of the site and the evidence described here confirms that it was probably constructed and used as a warehouse.

To the west of road surface [18] was another basement bounded by wall [05]. This too was lit by lightwells on the northern and southern elevations, though these had been blocked in brick at some point, probably in the 20th century.

It was divided into two rooms by an east-west aligned wall [06] which had been constructed around two cast iron shafts set on large sandstone blocks [15] (omitted from plans) which presumably provided additional support for the levels above. The northern room had an alcove or cupboard defined by wall [13].

The western end was defined by internal walls [07] and [08], the cellars to the west [09] were partially excavated to confirm their interpretation but not recorded in detail.

The cellars were entered from the north via a flight of steps [10] constructed in a mix of brick and sandstone. They appeared to have been constructed in Phase 1 but may have been a Phase 2 addition. They were floored in sandstone flags up to 1.15 m across and 100 mm thick [14] (omitted from plans) and the internal walls used them as foundations.

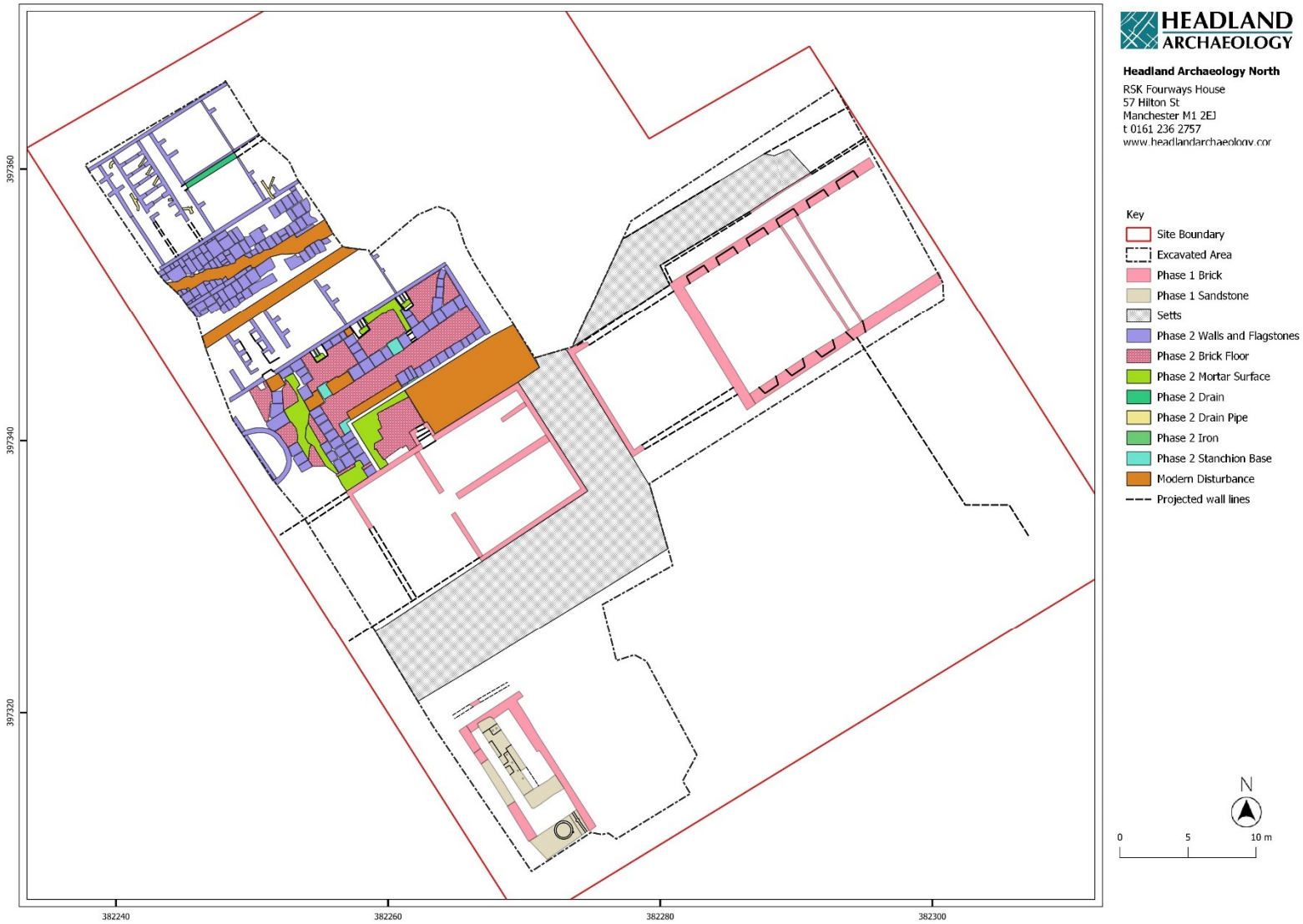
3.2. PHASE 2 BACK-TO-BACK HOUSES AND THE FACTORY EXTENSION

Phase 2 consists of the back-to-back houses which map and documentary evidence shows were built 1850-51, though no finds evidence was recovered for the construction date. They are likely to have been constructed at the same time as an addition to the eastern range of Phase 1 basements, though the wall between them, which would have provided the stratigraphic evidence, had been destroyed by construction of a Phase 5 wall.

Map and structural evidence shows that the blind-back housing to the south of Grey Place was constructed with a northwards extension to the northern range of factory buildings to their south.

The Back-to-Back and Blind Back Houses of Grey Place

The road surface of Grey Place [20] survived well but was disturbed along its centre by a late 20th century service trench. It was paved with sandstone flags up to 1.25 m across which had been intentionally laid to give the street a V-shaped profile c. 0.2 m deep to allow surface water to drain into a stone gully at the base of the profile (Illus 31). No evidence was found for a central sewer, the drainage from the houses feeding directly into the factory drains to the south.



Illus 11. Overview of Structures in Phase 2. See Illus 12 & Illus 13 for context numbers.

Illus 12. Detail plan of the back-to-back houses in Phase 2.

Each dwelling consisted of a single downstairs room measuring 4.2x4.2 m (13ft 6in x 13ft 6 in), a typical size for a mid-19th century back-to-back house.

Little evidence of the internal floor surfaces survived apart from occasional fragments of flagstone in the corners of some rooms, though it was hard to be certain that these were in situ. The foundations were unusually deep at up to c. 1.0 to 1.2 m (Illus 30, Illus 32). They had been constructed off geological deposits and the spaces between the walls infilled with compacted yellow and reddish brown sands and clays with occasional small fragments of brick [40] (Illus 32), possibly derived from excavation for the construction of the factory space to the south which was at a lower level. Sample excavation of four of these spaces found no evidence of floors above geological deposits and it is very unlikely that they were ever intended as cellars.

The walls were constructed using poor quality hand-made brick bonded with a greyish white sandy mortar. External walls ([24] and [39]) were double skin construction, though most internal walls were single skin apart from the main walls of the toilet block ([25], [26], [27] and [28]).

Buttresses projecting from the north south aligned walls probably formed the foundations of fireplaces and chimney stacks.

Internal cross wall [32] was bounded on its southern side at the base by an east-west aligned flagstone capped brick-lined drain [41] (Illus 33) which ran through gaps between walls [33] and [37] and [34] and [36]. The drain had been buried beneath c. 1 m of infill and appeared to be an original feature of the back-to-backs with no evidence observed for a cut through [40]. This suggests that it was part of this phase and not a later, Phase 4, addition. Furthermore, walls [37] and [36] were constructed to the same depth and pattern, used the same mortar type as the walls to the north, and the northern terminals of [36] and [37] were neatly constructed so it seems likely that the gap used by the drain was an original feature of these houses.

The function of [41] is not clear. It seems not to have connected to the toilets to its west and is unlikely to relate to those. There was no parallel example to the north of wall [32] and no obvious means of access for cleaning and/or repairing it, it would have been inaccessible through the floors of the house. It may relate to land drainage but seems unlikely to have carried rainwater from the roof.

It is not clear why such deep foundations were used for what were relatively flimsy walls, but it may relate at least in part to drainage, the houses' drains fed into the factory building to the south which was at a significantly lower level than ground floor level in the back-to-backs.

The toilets are depicted on historic mapping (Illus 6) and were constructed using double skin brick walls with an apparently random mix of headers and stretchers. At 4.2 m wide the block was an identical width to the houses and the toilets may be a later insertion created by adapting a former house because a pair of eastward projecting buttresses in north-south wall [25] were identical to the fireplace foundations found to the east. However, it is possible that this change was made during construction, so the toilets are shown as part of Phase 2 on Illus 11 and Illus 12.

The foundations of the main north-south aligned walls [25], [27], [28] and [33] were built to a similar depth to the foundations of the houses, though the space had been filled with a loose deposit of ash and clinker [23]. This was initially interpreted as debris from demolition, but it seems more likely to have been from construction because it was packed around the drainpipes described below. The presence of glass vials (see finds report) may indicate that it was derived from the dye works. The difference between this fill and [40] may be further evidence for remodelling in this area.

Projecting internally from the internal north-south walls were a series of short buttresses, each 0.45 m long, spaced at 0.6-0.7 m intervals which defined a set of eight cubicles (more will have been present in the unexcavated area to the south) which correspond with similarly sized structures shown on historic OS mapping (Illus 6). Some pairs of buttresses were connected by a shallow arched foundation ([29], [30] and [31]) which rested on fill [23] (Illus 35).

Each cubicle was fitted with a salt-glazed stoneware drainpipe which fed into a network draining to the south. Although not stamped, the pipes used were probably the products of Henry Doulton's works in St. Helens which were producing salt-glazed stoneware 'sanitary wares' from c. 1849 (Barker & Harris 1993, 319) and it is

possible that these are therefore amongst the first of this type to be used in Salford and Manchester. A possible fragment of toilet bowl found within [23] may confirm this interpretation. However, the toilet block to the south [51] was not provided with drainage in this manner, so it is more likely that the provision of drainage was a later modification, though that must have occurred before the block's conversion to terraced housing in c. 1901-2. The toilet bowl fragment seems to be part of a 'soil-pan' bowl, a cheap form of toilet produced from the early 19th century (see finds report) and flushed from a high-level cistern or, in places without an adequate piped water supply to the privy, by simply throwing a bucket of water down the pan.

The range of dwellings to the south of Grey Place were blind-back houses whose rear wall was shared with the factory extension to the south (Illus 36) indicating that they had been constructed together. Historic mapping and census data indicates that the north-eastern end of the range was demolished in 1901-2 and that by the late 1940s the rest had either been demolished or incorporated into the factory buildings.

The style of construction was identical to that of the back-to-backs to the north, with double skin internal brick walls ([44], [45], [46] and [49]) each of which included buttresses to support a fireplace/chimney. The foundations were c. 1 m deep and had been packed with a sand and clay deposit [43] identical to that used to the north. The northern wall of the terrace had been truncated by a wall constructed in the 1960s for the Phase 5 works.

The rear wall [48/50] was shared with the factory building to the south.

The toilets in this terrace [51] were constructed to a pattern broadly similar to those to the north, consisting of a range of 5 cubicles to each side (Illus 37), but differed in the details of their construction and the associated deposits. The foundations were much shallower than those to the north and there was a brick base not present in the northern range. There was no evidence for the drainage pipes seen to the north and the fill [52] around the brickwork was a loose brown coarse sandy silt with frequent brick and stone fragments markedly different to [23] and more in keeping with a demolition deposit. Fill [52] was also very similar to [53], the demolition deposit overlying the range of factory buildings to its south which suggest that they were demolished at the same time. Small quantities of finds were recovered from [52] and were typical of late 19th century domestic assemblages.

It is not clear what the arrangements for drainage were, but waste may have been carried by a truncated down pipe to the south which connected to stone capped drain [59], or alternatively an 'earth closet' was used and emptied as required (https://www.toilet-timeline.org/ Consulted 20/06/23)

The gap for a door between walls [48] and [51] (Illus 40) suggests that this block was accessible from the factory space described below and could also be used by the workers there.

The Factory Extension

This range of buildings (Illus 36, Illus 38) is first shown on the 1896 town plan and is presumed to have been constructed at about the same time as the housing to the north because it shares a wall ([48]) with the bind back houses and the drains from the houses fed into the drains for this building.

It was a rectangular structure appended to the northern elevation of the Phase 1 basements to its south and was 10 m wide. It was at least 20 m long, though its western end lay beyond the limit of excavation and the south-eastern corner was masked by a large mass of Phase 5 concrete. Its function is uncertain, though there is evidence that

Illus 13. Plan of the Phase 2 Factory Extension and blind back houses.

it was involved in some aspect of production and that it was not an additional storage area.

A D-shaped (or possibly oval if it projected beyond the edge of the excavation) structure at the western end [54] was of uncertain function. It measured 4.60 m north to south and was at least 2.3 m wide and projected 0.70 m above the floor surface. Constructed in hand-made unfrogged brick it was lined with unfrogged firebrick, it was not clear whether it had been cut through floor surfaces [56], [60] and [66] and therefore a later structure, possibly part of another building, or if they had been butted against it and it was an upstanding part of this building. The neat finish to the external face of the brickworks suggests that it was the latter. Brick wall [55] which ran north-south across it may be a later addition.

Although the use of firebrick suggests an association with high temperature processes it is unlikely to be a chimney base. There was no evidence for a connection to a flue system and the foundations were only c. 0.75 m deep. It did not connect with the drains to its east.

The most likely function is probably a mount for a small boiler.

The rest of the space was largely occupied by stone capped drains [59], [60], [66], [67] and [80] (a putative drain capped by flags [77] may have connected with another to the south masked by Phase 5 structures) interspersed with areas of brick flooring in unfrogged hand-made bricks laid on edge ([56], [57], [61], [63], [65], [68], [72], [73]) which in places had been obscured by a thin repair of cement render (e.g. [62], [64], [69], [71]).

Set into the floor were four yellow sandstone stanchion bases ([74], [78], [100], [101] Illus 41) with square recesses for cast-iron pillars cut into their tops, the base of one pillar was recovered in the demolition fill.

They were arranged in a rectangle with their centres spaced at 6 m along the structures long axis and 3.1 m across it. They presumably supported a pair of roof trusses.

The only indications of a mount were a stone block [104] with four bolt fixings and it is not clear what the building was used for. Three settings composed of wrought iron or steel beams ([85], [86], [87] Illus 40, Illus 42 & Illus 43) mounted into concrete pads were arranged equidistantly along the northern wall. Their function was uncertain, perhaps a mounting for a rail or racking, but they appear to have been a later addition to the structure.

3.3. PHASE 3: THE MODIFIED BOILER HOUSE

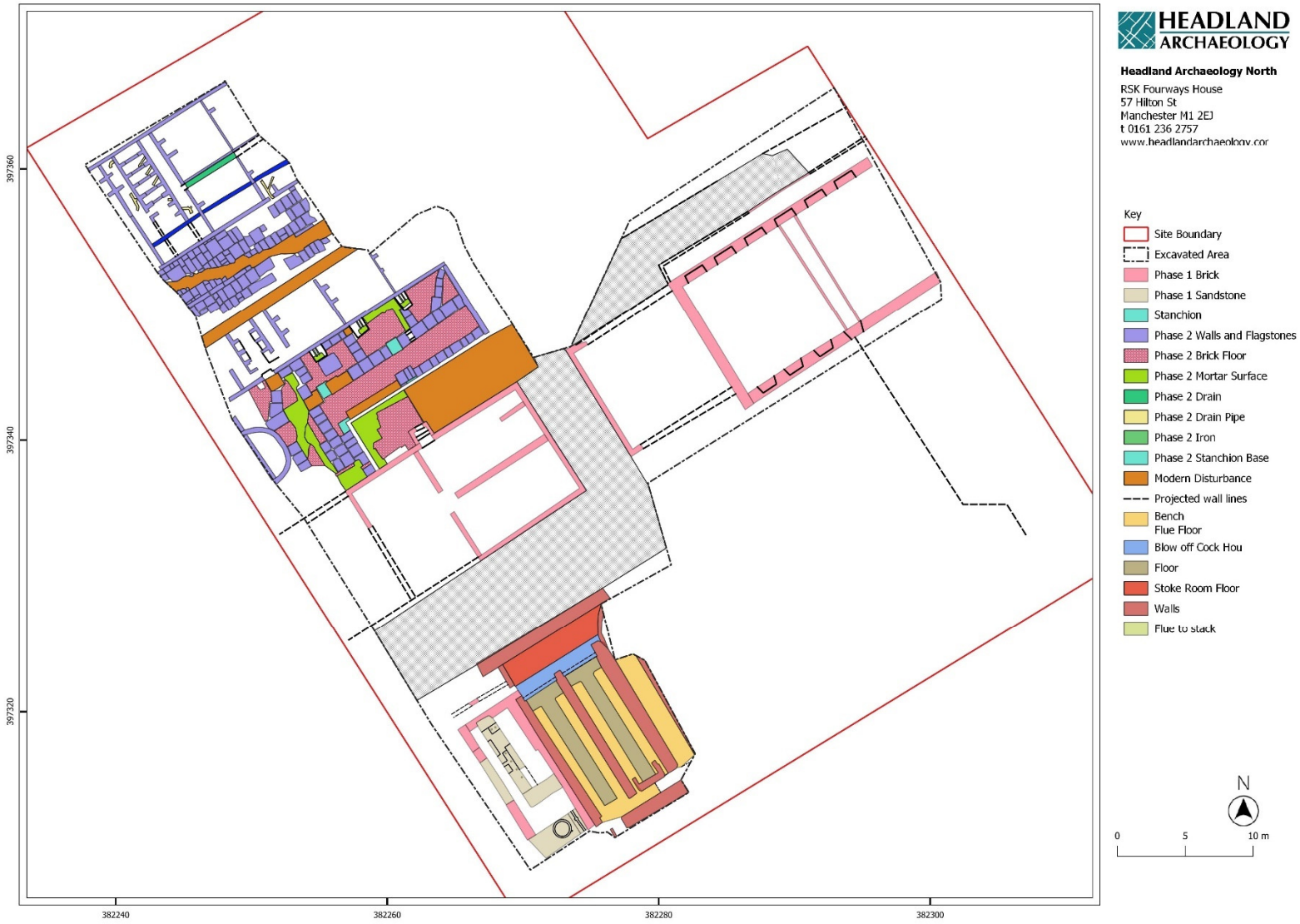
The Boiler House was situated to the east of the Engine House and measured a total of c. 15 m x8.5 m internally, though the southern end lay beyond the southern limit of excavation. The excavated evidence shows that it was a total rebuild of the boiler house shown on the 1850 Town Plan (Illus 5), the date of rebuilding is uncertain, but is tentatively dated to 1870-90.

It was filled with a loose deposit of brick rubble, mortar roofing slate and other materials largely derived from its demolition ([88], omitted from drawings), though the presence of domestic bottles (see finds report) implies that some of this material was imported to the site.

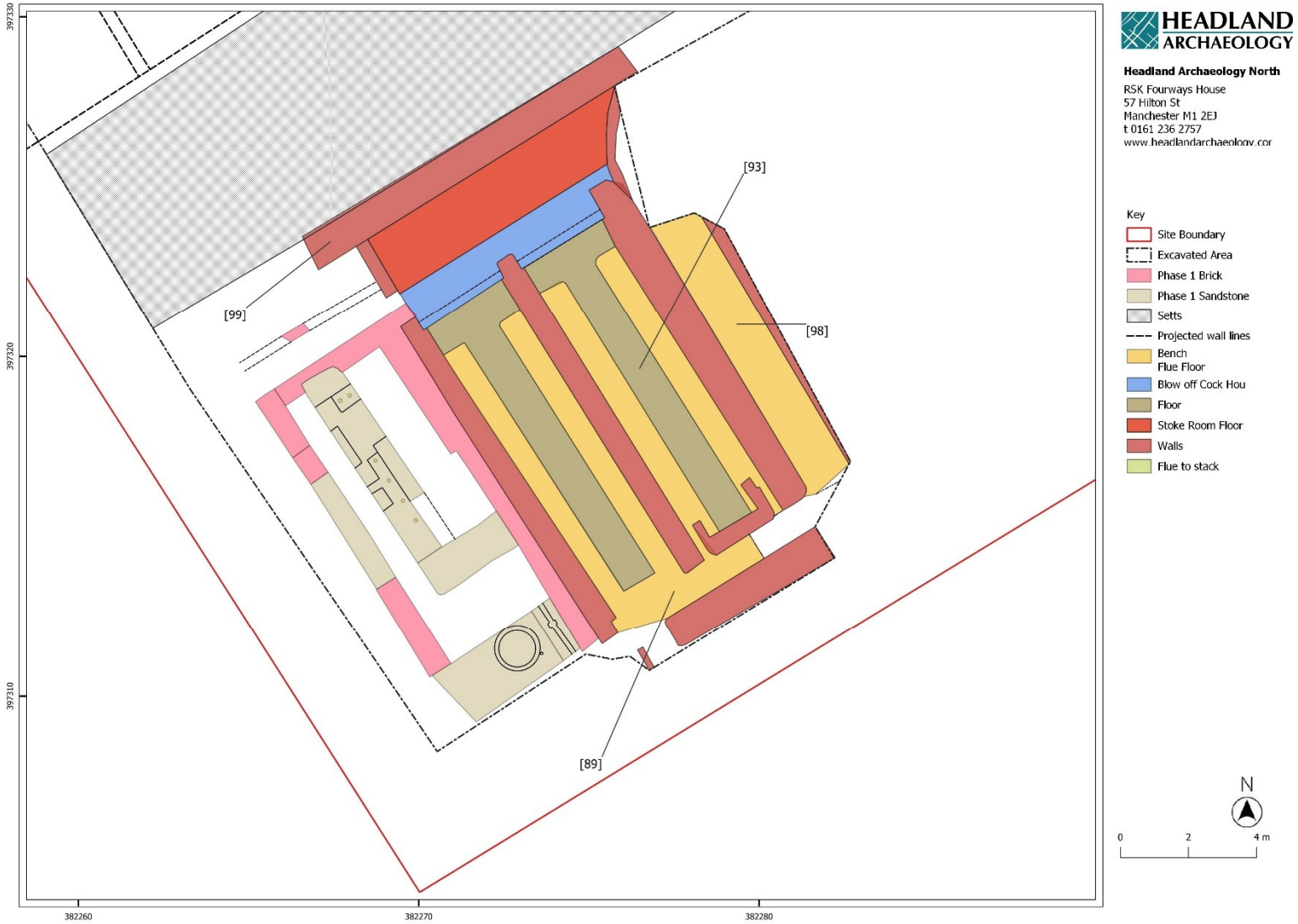
It was bounded from the Engine House by brick wall [90], which was constructed in hand-made unfrogged brick bonded with a coarse greyish white lime-mortar. As discussed above, [90] may be a rebuild of the original wall between the Engine and Boiler Houses.

The building contained two nearly identical boiler beds [89] and [93] constructed almost entirely in firebrick; hand-made red brick was used only in the external north wall and the cores of thicker internal walls.

Traces of the walls which marked the front of the boilers survived and, with the other internal walls, show that the boilers were up to 9.9 m (32 feet 6 inches) long with a diameter of c. 2.88 m c. (9 feet 6 inches), though allowing space for the side flues, maintenance etc suggests that the true dimensions of each boiler were 30 feet long with



Illus 14. Overview of Phase 3.



Illus 15. Detail plan of Phase 3 Boiler House.

a diameter of 8 feet. Analogy with similarly sized boilers suggests a capacity of 22,500 litres (5,000 gallons, 22.5 tons) of water and that they were capable of delivering 5500 kg (12,000 lbs) of steam an hour operating at 120-150 lbs per sq inch (psi) (https://lancashiremuseumsstories.wordpress.com/2020/08/01/the-lancashire-boilers-at-queen-street-mill/ consulted 20/6/23). This output far exceeds that required by the steam engine installed in Phase 1 which suggests that it was intended for another purpose.

Both boilers were mounted on firebrick plinths or benches c. 1 m (3 feet) high and c. 0.75 m (2 feet 6 inches) wide with distinctive roll top parapets to support the boilers above the bottom flue whilst forming the bases of the side flues (Illus 46).

To the rear of each boiler there were firebrick walls which formed the flues associated with the economisers. The better preserved of these was to the rear of the eastern boiler and stood to a height of c. 2.2 m (7 feet 7 inches) above the floor of the flues to the south where the flue passage was 0.93 m (3 feet) across. A wall, truncated by a 1960s inspection chamber, observed in the southern edge of the excavation to the south of the western boiler (Illus 47) was part of a flue which was also 0.93 m wide and would have fed flue gasses to the economiser which was situated to the south of the excavated area, below Worrall Street.

After leaving the economiser flue gasses were fed north though a flue [98] (this was severely disturbed by walls constructed in the 1940s and later) which curved north-east to connect to a chimney (not excavated).

At the front of the boilers (north) was the stoke room. This, like the boilers, was set below ground level, though there were no stairs for access which was presumably via a ladder from the internal ground floor. Two shallow arched recesses in the external wall [99] to the north were presumably used for storage. The floor was constructed in concrete with a drop of 0.75 m to the boiler floor to form a space for the blow off cock used for clearing deposits of sediment from the boiler.

There was no indication of how coal was let into the room and fed to the boilers. There were no mountings for a feed hopper, so presumably coal was fed manually.

The Boiler House is first shown on the 1850 OS Town Plan but appears to have been rebuilt c. 1870-90. The 1850 OS map (Illus 5) seems to show three boilers in a building the same width as the excavated structure, but significantly shorter at c. 10 m long. All the firebricks used in the construction of the excavated walls were stamped 'Cindrils', a trademark of Joseph Morton Ltd, Cinderhills Fireclay Works, Siddal, near Halifax (Barker 2015, 96). The Cinderhills works are mentioned in Kelly's Directory for 1857 (https://www.brocross.com/Bricks/Penmorfa/Pages/england15a.htm) but are not shown on the 1854 OS map of the Siddall area which was surveyed 1849-50, so the excavated structure must have been constructed after the production of the Salford Town Plan in 1850 (Illus 5).

However, other than the stamped firebricks no firm evidence was recovered for the date of the rebuild, the glazed bricks used in the stoke room (Illus 48) suggest a date of after c. 1860 and probably c. 1870-90.

Map and aerial photographic evidence shows that the Boiler House was demolished between 1932 and May 1948 and this was confirmed by the evidence of finds within the demolition infill [88] which consisted of glass and ceramic bottles dating to the period c. 1900-40 (See finds report).

3.4. PHASE 4 CONVERSION OF THE BACK-TO-BACKS TO TERRACED HOUSING (1901-2)

Phase 4 represents the conversion of the c. 1850s back-to-backs to terraced housing in 1901-2.

The foundations of all of the Phase 1 walls were retained and a new wall [38], which corresponds with the southern wall of the houses as depicted on the Goad map, was constructed. Wall [38] was constructed over make-up deposit [40] (Illus 50) and used much shallower foundations (0.35 m deep, four courses) than the walls to its north. However, an attempt seems to have been

Illus 16. Detail of Phase 4 back-to-back houses

made to bond [38] to the north-south aligned Phase 1 walls (i.e. [26], [36] and [37]), the mortar used was very similar to that used in Phase 1 and there was no clear evidence of a foundation cut for [38], so there is an element of doubt to this interpretation. The foundations of wall [39], the former front wall of the Phase 1 houses fronting Grey Place were retained in the 1901-2 rebuilding and used as the foundation for the backyard walls of Phase 2.

Historic map evidence suggests that the Phase 1 toilet block in this northern range was converted to a house, though no physical evidence was found for the conversion, other than the continuation of wall [38].

The loss of the toilet block meant that the new terrace required individual toilets, and evidence for one of these was found in the backyard of the easternmost house, where a drain fed to the south [103] (Illus 51) and was almost certainly for an outside toilet installed in the house's backyard.

3.5. PHASE 5 POST-1964 WORKS

Excavation of the foundations of the buildings constructed in 1964 and later was monitored during the watching brief. These were not recorded in detail, but this phase is included for completeness.

3.6. FINDS AND ENVIRONMENTAL

All retained finds, other than metal, were washed in water and air-dried prior to assessment.

Not all finds from demolition contexts (i.e. the rubble fills of basements, the Boiler and Engine House) were retained, the Boiler House for example contained numerous identical milk bottles, only a representative sample was kept for its potential as dating evidence.

Because finds were discarded on site a full quantification is not provided, though weights for individual items are provided where judged informative.

Finds are illustrated in Appendix 1.

Ceramics

Context 23
Incomplete grey salt-glazed stoneware marmalade jar, unstamped, probably c. 1850-1900.

Salt glazed stoneware toilet bowl or sink rim (Illus 52). Everted rim, interior glazed white, exterior pale brown. It is probably part of a 'pan and trap' or 'soil pan' toilet (Illus 53), a simple combination of a basic, durable pan and water-sealed trap flushed from a high-level cistern or, in places without an adequate piped water supply to the privy, by simply throwing a bucket of water down the pan. This style of pan was produced from the early 19th century into the early 20th century (https://www.toilet-timeline.org/ consulted 20/06/23).

Brown glazed earthenware teapot lid mid-19th-20th century.

Context 52
Seven fragments of blue and white-glazed white-bodied earthenware bowls or cups, possibly Staffordshire. 19th century (Illus 54).

One fragment polychrome glazed china cup. 19th century.

One fragment brown glazed earthenware handle from a teapot or similar. 19th century.

One fragment white glazed white-bodied earthenware cup with red rim. 19th century.

One fragment white glazed white-bodied earthenware plate with red rim. 19th century.

One fragment white glazed white-bodied transfer printed earthenware plate. 19th century.

One fragment white glazed white-bodied transfer printed earthenware bowl. 19th century.

One rim from undecorated china bowl or cup. 19th century.

Context 88
One stoneware vessel was recovered from context [88], the rubble backfill of the Boiler House (Illus 55).

This was a complete stoneware beer bottle or flagon with screw top cap marked:

'TO BE RETURNED TO S.F. JONES & SONS (MANCHESTER) LTD. BEVERAGE BREWERS, MANCHESTER.'

With an external diameter and height of 14 cm and height of 26 cm its capacity is estimated at c. 3500 cm^3 (6 pints).

Its overall form and the style of the lettering suggests a date in the range of 1880-1940, though no reliable dates for the company's foundation could be established. Date-stamped examples of the company's flagons were being produced from the early 1930s, so this example may be earlier.

Tobacco Pipes

Context 23
One tobacco pipe bowl (Illus 56) was recovered from context 23. It is moulded with in an acorn form with spur and an oak leaf design facing away from the smoker. The form of the bowl and the decoration suggest a mid-19th century date.

Context 52
Two stems, one with a spur from the joint with the bowl were recovered from context [52]. These are not diagnostic of anything beyond an 18th-19th century date.

Glass

Context 23
Clear glass base of bottle retaining some embossed lettering 'City Road Cornbrook Manchester'. Mid-19th to mid-20th century.

Neck from clear glass bottle, possibly a milk bottle, which would date it to post-1920.

Three clear glass tubes or vials (Illus 57). Broken at both ends with external diameters of 15.5-18 mm and a wall thickness of 2-3 mm, the longest measured 130 mm. One had an internal white coating with a red stripe along the side. The function of these pieces is unclear but they may be laboratory glass from the dye works. Date uncertain.

Numerous fragments of clear window glass in a range of thicknesses from 4-11 mm.

Context 40
Ten fragments of Codd bottle from at least two vessels were recovered from the fill around the back-to-back foundations.

Codd bottles were first made in 1872, though all of the fragments described here were recovered during hand-cleaning after machine excavation and are considered intrusive from demolition. They have therefore been discounted as evidence for the date of deposition of this context.

Context 88
Numerous glass bottles were noted in the fill of the Boiler Houses, though most were unstamped beer and wine bottles which could only be assigned a broad late 19th to mid-20th century date.

Only datable items were assessed and are described in brief below.

Clear glass bottle stamped 'Fletcher's Tomato Ketchup' (Illus 58). Fletcher's were established in 1907 and were producing sauce into the 1970s, though this a appears to date to the pre-WWII period. Weight 272 g.

Clear glass milk bottle stamped 'Allied Dairies' (Illus 59), capacity c. 2 pints. The squat, wide necked form is not indicative of date but was no longer commonly used from the 1970s and deliveries in bottles only became common from the 1920s.

Clear glass milk bottle stamped 'Allied Dairies', capacity 1 pint. Similar wide necked form and date.

Clear glass 1 pint milk bottle with crown cork capping and stamped 'Mayfair Dairy'. The company could not be traced, though the form of the bottle and the style of the lettering suggests a date of c. 1930-70.

Clear glass embossed bottle stamped 'Pickup Manchester, Leeds and Bradford' (Illus 60). The company was established c. 1907 and produced non-alcoholic drinks, including 'Tizer the Appetizer' from 1924. Their bottles seem to have been branded Tizer from c. 1936 so this example is probably 1907-1936 (http://westcountrybottles.co.uk/mike4/Companies/Bristol_Companies/Pickup.html and https://collection.sciencemuseumgroup.org.uk/objects/co8415633/tizer-bottle-bottle consulted 01/07/23). Weight 342 g.

Metal

The only metal item retained was a copper alloy printing plate (Illus 61) which was recovered from an unstratified context likely to be derived from the infilled basements at the eastern side of the site.

The plate is rectangular and measures 124 x 82 x 7 mm and carries the label in reverse bas relief;

VICTORIA BLACK

DYED BY

DICKINS & HEYWOOD

MIDDLETON

Dickins & Heywood were also dyers and the company operated from at least 1871 https://www.thegazette.co.uk/London/issue/23803/page/5537/data.pdf and specialised in the manufacture of polished yarns https://player.bfi.org.uk/free/film/watch-workers-at-dickens-heywood-middleton-1900-1900-online The minute books of the English Velvet and Cord Dyers Association for 1899 record the purchase of the company, who continued to release their products under the name Dickins & Heywood, though no other record of the company has been found. The plate would have been used for printing labels, possibly directly to the cloth's selvedge (border).

Assessment

Most of the finds are typical of domestic activity in the late 19th and early 20th century, with few which relate to the operation of the dye works other than the copper alloy printing plate and the glass vials recovered from context [23]. Those from the in-filling of the Boiler House suggest that that occurred after c. 1930.

No further assessment is required and all are recommend for discard apart from the copper alloy printing plate which should be offered to Salford Museum and Art Galleries.

4. DISCUSSION AND CONCLUSION

The majority of the excavation area had been disturbed by deep basements constructed for the dye works in the mid-19th century. These were used for storage and were of limited archaeological significance . Therefore the discussion below is confined to a consideration of the back-to-back housing, engine house and boiler room.

4.1. THE ENGINE HOUSE

No firm evidence was obtained for the construction date of the Engine House, though its layout conformed closely with that shown on the 1850 OS map, the style of the brickwork was consistent with a date in the first half of the 19th century and the general layout is also consistent with that of an engine constructed prior to c. 1850 (John Phillps, NMES pers. comm.). The position of the flywheel suggests that it was used to power machinery in the building to the west shown on historic mapping, though it was otherwise impossible to determine what its use was.

Map evidence suggests that this was the only large engine within the works. Further boilers are shown to the west on the 1850 OS map but no other engine houses are marked, though smaller engines were probably installed throughout the dye works.

The dimensions of the cylinder mount and other elements suggest a piston 0.8-0.9 m (30-35 inches in diameter with a stroke of c. 2 m (6 feet), which is broadly consistent with an engine with an output of 40 Nominal Horse Power (NHP) though this would be dependent upon other variables such as the available steam pressure and the speed of the piston. In addition, despite NHP being the commonly accepted means of measuring the output of steam engines in the 19th century, there were different means of calculating it, each of which provided slightly differing figures; it was more of a 'rule of thumb' than an accurate measure of output.

However, the excavated evidence suggest that it is probably the '*…broken 40-Horse Engine*' sold as scrap to S. Openshaw for £345 which was mentioned in a company minute of April 27th 1920, though it is not clear whether the power output cited was NHP or Brake Horse Power which would be a significantly different figure. There is therefore an element of uncertainty to this interpretation because no firm dating evidence was obtained from the excavation for the decommissioning and demolition of the engine house.

4.2. THE BOILER HOUSE

The remains of the Boiler House were well preserved, though the differences in layout and the distinctive fire bricks used throughout described above show that they were a rebuild of those depicted on the 1850 OS map, probably of c. 1870-80.

It housed two Lancashire Boilers, each 30 feet long with a diameter of 8 feet with economisers at the rear (south). The stoke room was situated at the northern end, though there was no evidence for how it was accessed, presumably iron stairs or a ladder were used from an internal upper floor.

There was no evidence for a coal feed hopper, which is perhaps unusual as they would have used several tons of coal per day.

The output of these boilers far exceeded that required by the steam engine and it seems likely that its output served a range of other purposes within the dyeworks which would have required large quantities of hot water.

The finds evidence suggests that the demolition of the Boiler House occurred in the period 1930-50. This may relate to a minute in the company records dated 5th November 1924 which approved a scheme to replace the existing boilers which was implemented because '…the age, the type & the scattered positions of the [existing] boilers….make economic working impossible.'

The new boilers were to be housed in a new central boiler house over two floors housing nine boilers

4.3. BACK-TO-BACK HOUSING

No finds or other archaeological evidence was recovered for the construction date of the back-to-back houses, so the date cited here remains reliant on map and documentary evidence, which shows that they were constructed after 1850 but before the 1851 census.

Nevell (2017b) dates the banning of the construction of back-to-backs in Salford to before 1850, which would suggest that these buildings were constructed illegally.

A ban in England on building new back-to-back houses was first proposed in the 1841 Building Regulation Bill, though the bill was plagued by problems and the ban was dropped when the bill was resubmitted in 1842 Ley (2000). Some northern towns and cities, for example Leeds, attempted to ban the construction of back-to-backs, but without a means of enforcement the regulations were never applied (Ley 2000, 28).

The 1844 Manchester Police Act actually specified that houses were '*….required to have a privy and an ashpit in a yard behind each house*' (Nevell (2017b)). Unlike earlier legislation, the 1844 Act was enforced by a dedicated committee which investigated some 9,400 dwellings in the first year alone, and by 1850 over one third of Manchester's dwellings had been 'reconditioned' (Hylton 2003, 153).

Despite the progress made in Manchester, Salford was relatively slow to improve the quality of its housing. Salford Waterworks and Improvement Act 1850 regulated the construction of new courts, specifically….*'it shall not be lawful to build any House in any Court which Court shall not be at least Eight Yards wide at all Points and the Passage or Entrance into which Court shall not be at least Six Feet wide and Eight Feet in Height from the Ground…'*

However, it was the 1862 Salford Improvement Act, Section 178 which finally banned the construction of back-to-backs. It stated that '*It shall not be lawful to convert any Building into a Dwelling, or any Dwelling House into two or more Dwellings, whether such Building or Dwelling House have been erected before or after the passing of this Act, unless each such Dwelling have a Front and Back Entrance, and a Yard or Ground Space attached thereto….. as shall be in accordance with the Provisions of any Byelaw to be made in pursuance of this Act with respect to Dwelling Houses to be erected after the Commencement of this Act.'*

In addition, the Corporation was empowered to make by-laws '*With respect to the Sufficiency (sic) of the space about buildings to secure a free Circulation of Air (sic), and with respect to the Ventilation of buildings.* 'The Act also prohibited the use of rooms over privies or ashpits as living or bedrooms. It also barred the conversion of cellars to dwellings and allowed existing cellar dwellings to be closed down.

The construction of the Grey Place back-to-backs was therefore legal in 1850-1, though the provision of a separate toilet block was an unusual feature rarely seen in Manchester or Salford back-to-backs and may reflect changing attitudes to what was acceptable.

There seem to be no similar blocks depicted in the back-to-backs shown on the 1850 OS mapping of Ancoats or Salford, so their provision on Grey Place seems to have been an innovation in Salford if it is accepted that they were an original feature of Grey Place. What prompted their provision is unclear, the company records for the period have been lost, though what survives for the later part of the 19th century does not suggest an organisation overly concerned with the conditions endured by its employees. An obituary for James Worrall published in the Manchester Evening News for 14th

July 1890 describes him as a '…strong Conservative'. There may be a connection with the contemporary provision `of toilets in the back-to-back houses of Leeds (Harrison 2018), and it may have been an attempt to attract workers at a time when Manchester's textile industry was booming.

The use of salt-glazed sanitary wares for drainage may be one of the earliest excavated examples of their use in Greater Manchester. Produced in St. Helens from c. 1849 as a response to the campaigns of Edwin Chadwick and other sanitary reformers, this type of drainage was first used in London in the mid-1840s (Barker & Harris 1993, 318) and were intended to provide watertight, non-porous drainage to reduce the prevalence of typhus. They appear to have been supplied with toilet bowls, though the means of flushing is uncertain, and it is possible that the drains were a later addition because they were not fitted to the toilets south of Grey Place. An alternative interpretation could be that the toilets to the north were constructed slightly later than the southern block.

5. STORAGE AND CURATION

The digital archive will be deposited with the Archaeology Data Service.

The majority of the finds were not suitable for retention and were discarded.

The only exception is the stone ware flagon (Illus 55) which was donated to Salford Museums and Art Galleries, and the copper alloy printing plate (Illus 61), which was donated to Rochdale Museums.

A copy of this report has been submitted to OASIS (Online Access to the Index of Archaeological Investigations https://oasis.ac.uk/).

6. PROPOSAL FOR FURTHER ANALYSIS AND PUBLICATION

The project has found significant evidence for the evolution of domestic housing and for the application of steam power in mid-19th century Salford and the results merit publication in a suitable academic journal, either Post-Medieval Archaeology or Industrial Archaeology Review.

7. ACKNOWLEDGEMENTS

John Phillp of the Northern Mill Engine Society and Maurice Handley of Merseyside Industrial Heritage Society provided invaluable technical advice on the interpretation of the engine house foundations. Field staff were Richard Woolley, Ian McAfee, Solomon Fairfax and Raphael Lam.

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9. APPENDICES

APPENDIX 1 EXCAVATION PHOTOGRAPHS

Illus 17. Overview of Phase 1 basements on eastern side of the site. View looking south-west, scales 1 m.

Illus 18. Overview of Phase 1 basements on eastern side of the site. View looking north-west, scales 1 m.

Illus 19. Road surface [18] exposed to the north of basement wall [16]. View looking west

Illus 20. Drain [17], view looking north, scales 1 m.

Illus 21. Drain [17], view looking south towards the door in Phase 1 wall [03], scales 1 m.

Illus 22. Drain incorporated into wall [16]. View looking east, scale 1 m.

Illus 23. Overview of basements on the western side of the site. View looking north, scales 1 m.

Illus 24. Overview of the Phase 1 Engine House. The cylinder mount is in the foreground. View looking north, scales 1 m.

Illus 25. Detail of cylinder mount in [92]. View looking north, scale 0.4 m.

Illus 26. Detail of the central block carrying the mounting post for the beam. The openings in the masonry would have carried the pipework from the pump to the condenser tank in the foreground. View looking north, scale 1 m.

Illus 27. Detail of wall [94] in the Engine House showing the mounting for the flywheel and the possible second motion gear to the left. View looking east, scale 1 m.

Illus 28. The Engine House during demolition showing the recesses for a water pump and flywheel gear exposed in wall [94]. The brickwork in the centre of the view is for a 20th century inspection chamber. View looking west, scale 1 m.

Illus 29. Excavating the flywheel pit on the eastern side of the Engine House. View looking north.

Illus 30. Overview of the back-to-back houses north of Grey Place. View looking north, scales 1 m.

Illus 31. Flags surfacing Grey Place, note the drainage gully in the centre. View looking east, scale 1 m.

Illus 32. Section across fill [40]. View looking north, scales 1 m.

Illus 33. Gap between walls [33] and [37] for drain [41]. View looking west, scale 1 m.

Illus 34. Overview of toilet block attached to back-to-back houses north of Grey Place. View looking north, scales 1 m.

Illus 35. Detail of arched foundation [29] in the back-to-back housing.

Illus 36. Overview of the Phase 2 blind back houses and factory extension. View looking west, scales 1 m.

Illus 37. Overview of the toilet block [51] found with the blind back houses south of Grey Place. View looking north, scale 1m.

Illus 38. The factory extension looking east, a cast-iron pillar found in the demolition fill has been placed in the socket on stanchion [100]. View looking west, scales 1 m.

Illus 39. Possible boiler mount [54]. View looking west, scale 1 m.

Illus 40. View north towards blind back toilets [51] showing stairs access from factory floor. Mounting [85] is on the right. Scale 1m.

Illus 41. Stanchion base [74] capped by Phase 5 wall. View looking east, scale 0.4 m.

Illus 42. Mountings [85], [86] and [87]. View looking west, scale 1 m.

Illus 43. Detail of mounting [85]. Scale 1 m.

Illus 44. Overview of the Phase 3 Boiler House. View looking north, scales 1 m.

Illus 45. Overview of the Phase 3 Boiler House. View looking south, scales 1 m. The Phase 1 Engine House is on the right.

Illus 46. View along boiler bed [93] showing the mounting for the boiler. View looking south, scales 1 m.

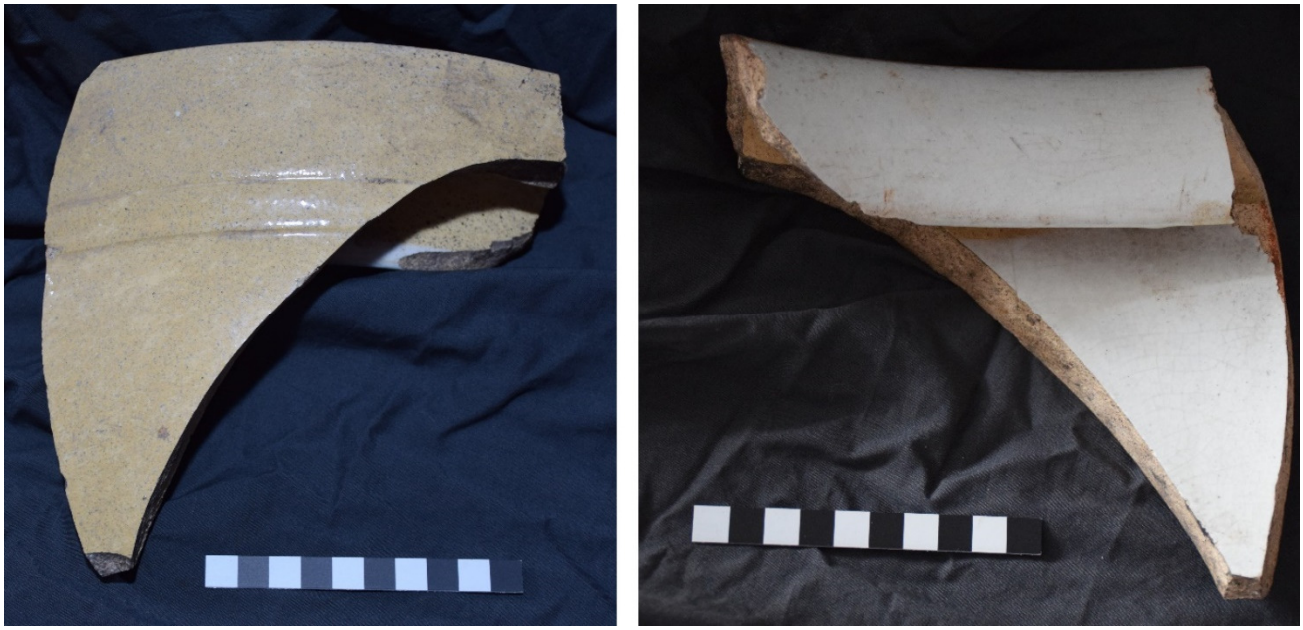
Illus 47. The truncated flue feeding the economiser visible in the southern edge of the excavation. View looking south , scale 1 m.

Illus 48. Storage recesses in wall [99]. View looking north-east, scales 1 m.

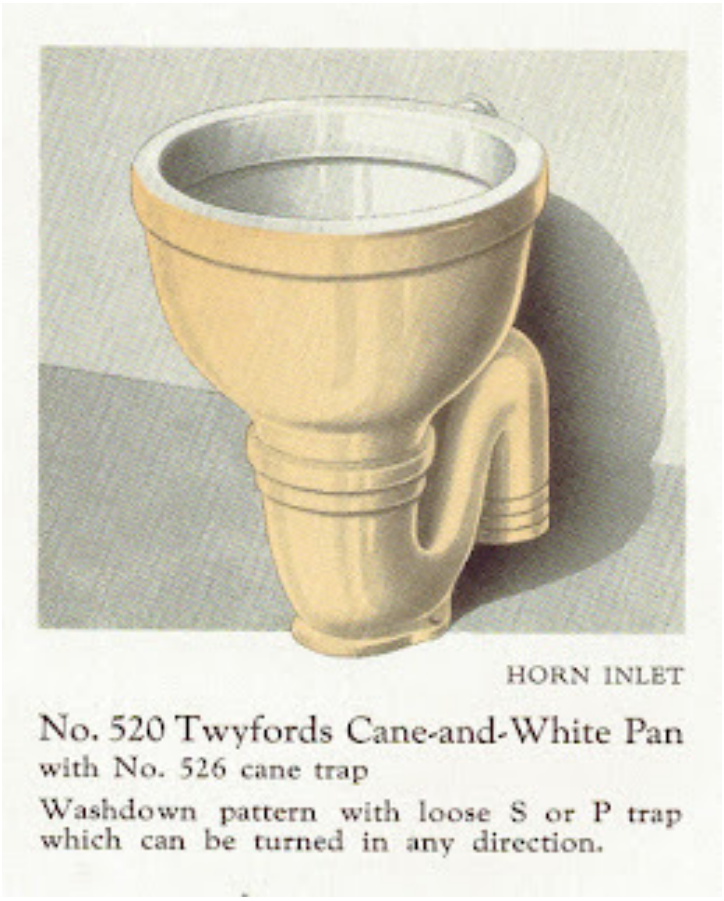
Illus 49. Storage recesses in wall [99]. View looking north, scale 1 m.

Illus 50. Phase 4 wall [38] constructed over in fill [40]. View looking south, scale 1 m.

Illus 51. Drains for Phase 2 toilet [103]. View looking north, scale 0.4 m.



Illus 52. Toilet bowl fragment from context [23]. Scale 100 mm.



Illus 53. Early 20th century Twyfords soil pan, the colour scheme was used for toilets by a range of different manufacturers. Note the water inlet just visible to the rear.

Illus 54. Ceramic finds from Context [52]. Scale 50 mm.

Illus 55. Stoneware flagon from Context [88]. Scale 100 mm.

Illus 56. Tobacco pipe bowl from Context [23]. Scale 50 mm.

Illus 57. Glass vials from Context [23]. Scale 100 mm.

Illus 58. Fletcher's sauce bottle from Context [88]. Scale 50 mm.

Illus 59. Allied Dairies milk bottle from Context [88]. Scale 50 mm.

Illus 60. Pickup pop bottle from Context [88]. Scale 50 mm.

Illus 61. Copper alloy printing plate, unstratified, scale 100 mm.

APPENDIX 2 OASIS ENTRY

Summary for headland1-517040

OASIS ID (UID)	headland1-517040
Project Name	Excavation at Worrall Street, Ordsall
Sitename	Worrall Street, Ordsall
Activity type	Excavation
Project Identifier(s)	WOST23
Planning Id	20/76684/FUL
Reason For Investigation	Planning: Post determination
Organisation Responsible for work	Headland Archaeology (UK) Ltd
Project Dates	30-Jan-2023 - 13-Mar-2023
Location	Worrall Street, Ordsall NGR : SJ 82274 97344 LL : 53.472522123526986, -2.268520121619147 12 Fig : 382274,397344
Administrative Areas	Country : England County : Greater Manchester District : Salford Parish : Salford, unparished area
Project Methodology	Archaeological excavation of remains of a 19th and 20th century dye-works and associated back-to-back housing.

Project Results	The site is located approximately 2 km southwest of Salford City centre, central Manchester lies c. 0.8 km to the east of the site which is situated on the north bank of the River Irwell, to the immediate east of the river's canalisation for the Manchester Ship Canal. The site covers approximately 0.31 hectares and is set with a wider landscape of domestic housing consisting of 19th century terraced housing and 21st century apartment blocks. Prior to the site works it was occupied by 20th century light industrial units. The excavation was targeted at buildings shown on historic mapping which relate to a dye works owned and operated by J. & J.M. Worrall who in the late 19th and early 20th centuries were the world's largest dyers of velvet and corduroy. Established in the late 1700's, their Ordsall dye-works was established in 1792 and operated until the company went out of business in 1964. The excavation was targeted at an engine house, boiler room and back-to-back housing shown on historic mapping. The first definite depiction of the engine house is on a map of c. 1850. The excavation found the foundations for a single cylinder beam engine and associated fittings similar to those produced by Boulton and Watt in the first decades of the 19th century. Additional documentary evidence found during the writing of this report suggests that it was a 40-horsepower engine sold for scrap in 1924. The boiler house lay to the immediate east of the engine house. It is first shown on the same 1850 map as the engine house, but the excavation found that it had been totally rebuilt in the late 1800s. The excavated remains showed that the rebuild was for two 30-foot Lancashire boilers of a type common in the late 19th century. Their capacity far exceeded that needed for the adjacent steam engine and it is likely that they supplied steam and hot water across the dyeworks. The back-to-back and blind back houses at the northern end of the site were constructed in 1850-1. The most significant evidence from these structures was the provision of blocks of toilets. These were probably among the first provided in working class houses of this type in Salford and a perhaps a reflection of changing social attitudes to housing at that period.
Keywords	Beam Engine House - POST MEDIEVAL - FISH Thesaurus of Monument Types Boiler House - POST MEDIEVAL - FISH Thesaurus of Monument Types Back To Back Terrace - POST MEDIEVAL - FISH Thesaurus of Monument Types Blind Back Terrace - POST MEDIEVAL - FISH Thesaurus of Monument Types Toilet - POST MEDIEVAL - FISH Thesaurus of Monument Types Warehouse - POST MEDIEVAL - FISH Thesaurus of Monument Types Dye House - POST MEDIEVAL - FISH Thesaurus of Monument Types
Funder	
HER	Greater Manchester HER - noRev - LITE
Person Responsible for work	Mark, Adams
HER Identifiers	
Archives	