# Bristol Digital Futures Institute
# 65 Avon Street, St Philip's Marsh, Bristol

Archaeological Watching Brief

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wessexarchaeology



Unit 9
City Business Park
Easton Road
Bristol
BS5 0SP

www.wessexarch.co.uk

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| Fieldwork directed by | Cai Mason |
| Assisted by | Amy Pannell, Chiara Sabaton, Chris Hambleton, Luke Jervis, Ray Holt, and Victor Jerjotoma Ortin |
| Project management by | Kirsty Nichol |
| Document compiled by | Cai Mason |
| Graphics by | Amy Wright, Carrie May, and Kasandra Boguslawska |

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## Summary

Wessex Archaeology was commissioned by Fulkers Bailey Russell, on behalf of the University of Bristol, to undertake a watching brief during groundworks associated with the conversion of a former gasworks retort house and coal store for use as a university building known as the Bristol Digital Futures Institute. The monitored works covered 0.18 ha, centred on NGR 360087 172551, at 65 Avon Street, St Philips Marsh, Bristol.

Built in 1821, the Bristol Gas Light Company retort house and coal store is Bristol's oldest surviving gasworks building. The building is not statutorily designated, but in recognition of its value as a heritage asset, it was added to Bristol City Council's Local List in August 2020 (ID 532). The gasworks perimeter wall, which defines the north-eastern boundary of the site, is a Grade II listed structure (National Heritage List for England List Entry Number 1279549).

The retort house (a building where coal gas, also known as town gas, was made by destructive distillation of coal) was a horseshoe-shaped building set within a high walled yard. Other gasworks structures, including coke stores, stables, workshops, offices, gasholders, purifiers, scrubbers, and a meter house, were situated in the yard around the retort house: none of the latter structures are extant. In the mid-1850s, the inner yard of the retort house was roofed over for use as a coal store. The north-east and south-east ranges of the retort house were demolished in the early 1920s and the building was converted for use as a gas cooker workshop and pipe store. Gas production at the Avon Street works ceased in the late 1950s, and between 1961 and 2020 the building was used as a garage and car showroom.

The watching brief, which was undertaken between 19 October 2021 and 11 January 2023, uncovered extensive structural remains associated with 19th-century gas production and the later use of the building as a gas company store and workshop. This included the foundations of a brick and stone weighbridge, five gas retort benches, and demolished parts of the retort house and gasworks office; an extensive system of underground brick-lined flues; large cast iron gas pipes; brick, sandstone sett, fireclay slab, and concrete floor and yard surfaces; and the base of a large early 20th-century 'cooker incinerator'.

The finds assemblage included a collection of firebricks and fireclay mouldings from the gasworks retort ovens and flues, and a small collection of pottery, including some early 19th-century wasters.

## Acknowledgements

Wessex Archaeology would like to thank Fulkers Bailey Russell, on behalf of the University of Bristol, for commissioning the archaeological watching brief, in particular Adam Staite. Wessex Archaeology is also grateful for the advice of Principal Historic Environment Officer, who monitored the project for Bristol City Council, and to Aztec Building Services, particularly Nathan Lynn and Simon Roberts, for their cooperation and help on site. We would also like to thank Maintain-A-Drain for permission to reproduce their survey of an underground flue that was uncovered during the groundworks.

# Bristol Digital Futures Institute
# 65 Avon Street, St Philip's Marsh
# Bristol

## Archaeological Watching Brief

## 1 INTRODUCTION

### 1.1 Project and planning background

1.1.1 Wessex Archaeology was commissioned Fulkers Bailey Russell (hereafter 'the client'), on behalf of the University of Bristol, to undertake an archaeological watching brief during groundworks associated with the conversion of a former gasworks retort house and coal store for use as a university building known as the Bristol Digital Futures Institute. The monitored works covered 0.18 ha, centred on NGR 360087 172551, at the Bristol Digital Futures Institute, 65 Avon Street, St Philips Marsh, Bristol (Fig. 1).

1.1.1 Built in 1821, the Bristol Gas Light Company retort house and coal store is Bristol's oldest surviving gasworks building. The building is not statutorily designated, but in recognition of its value as a heritage asset, it was added to Bristol City Council's (BCC) Local List in August 2020 (BCC 2020, 25; Local List ID 532). The gasworks perimeter wall, which defines the north-eastern boundary of the site, is Grade II listed structure (National Heritage List for England [NHLE] List Entry Number 1279549).

1.1.2 The archaeological work was carried out as a condition of planning permission, granted by Bristol City Council (ref. 21/02496/F). The watching brief forms part of a programme of archaeological works, which has included two heritage statements (Wessex Archaeology 2019; Dittrich Hudson Vasetti Architects 2021), a desk-based assessment (Wessex Archaeology 2020), and a historic building record (Wessex Archaeology 2022a).

1.1.3 The watching brief was undertaken in accordance with a written scheme of investigation (WSI) which detailed the aims, methodologies, and standards to be employed (Wessex Archaeology 2021a). The Principal Historic Environment Officer approved the WSI, on behalf of the Local Planning Authority (LPA), prior to fieldwork commencing. The watching brief was undertaken between the 19 October 2021 and 11 January 2023.

### 1.2 Scope of the report

1.2.1 The purpose of this report is to provide the results of the watching brief, to interpret the results within their local or regional context (or otherwise), and to assess their potential to address the aims outlined in the WSI, thereby making available information about the archaeological resource (a preservation by record).

### 1.3 Location, topography, and geology

1.3.1 The site was located at 65 Avon Street, Bristol, formerly the Bristol Gas Light Company retort house and coal store. The property is bounded by Avon Street to the south-west, part of a former Vauxhall car dealership to the north-west, a Wales and West Utilities gas distribution site to the south-east, and Gas Lane to the north-east.

1.3.2 The ground level within the building lie at approximately 9.1 m OD. External ground levels range between 8.75 m OD on Avon Street and 9.1 m OD in the yard adjacent to Gas Lane.

1.3.3 The underlying geology is mapped as Triassic Sandstone of the Redcliffe Sandstone Member, overlain by Pleistocene gravels of the Avon Formation and Holocene tidal flat deposit of the Wentlooge Formation (British Geological Survey 2021; Wilkinson *et al.* 2013, 24–8).

1.3.4 Geotechnical investigations along Silverthorne Lane (RSK 2019) have shown that solid geology lies at -4.57 m OD (13.7 m bgl). This is overlain by approximately 3 m of river terrace gravels (upper surface at 10.7 m bgl; -1.57 m OD), and 7 m of tidal flat deposits (upper surface at 5.5 m bgl; 3.63 m OD), which are in turn sealed by 5.5 m of anthropogenic made ground deposits of mid-18th-century or later date. The upper surface of tidal flat deposits in central Bristol are typically found at 7 m OD, which suggest that there has been significant truncation in this location: probably due to post-medieval clay extraction for brick and pot making.

## 2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

### 2.1 Introduction

2.1.1 The archaeological and historical background is drawn from a previous desk-based assessment (DBA: Wessex Archaeology 2020) and heritage statement (Dittrich Hudson Vasetti Architects 2021), a summary of which is presented below, with relevant entry numbers from Bristol City Historic Environment Record (BHER), and the National Heritage List for England (NHLE) included. Additional sources of information are referenced, as appropriate.

### 2.2 Previous investigations related to the development

*Heritage statement (2019)*

2.2.1 In December 2019, Wessex Archaeology (2019) produced a heritage statement, which assessed a 2.6 ha area of land, comprising three plots adjoining Avon Street, Silverthorne Lane, and Gas Lane, which included the former retort house and coal store.

*Desk-based assessment (2020)*

2.2.2 In November 2020, Wessex Archaeology (2020) produced a DBA of the land detailed in the preceding heritage statement.

*Heritage statement (2021)*

2.2.3 In April 2021, Dittrich Hudson Vasetti Architects (2021) published an additional heritage statement, focussed specifically on the former retort house and coal store.

*Historic building record (2022)*

2.2.4 In 2022, Wessex Archaeology (2022) created an historic building record (HBR) of the former retort house and coal store.

### 2.3 Archaeological and historical context

*Prehistoric – medieval (pre-AD 1500)*

2.3.1 The site is situated in a low lying and historically marshy and flood-prone area, and there is no evidence for anything other than seasonal agricultural activity prior to the post-medieval period.

2.3.2 The City of Bristol is thought to have originated as an Anglo-Saxon 'burg' (fortified settlement), named *Brycgstow* (place of the bridge), in the 9th or 10th century AD. By the early 11th century, the settlement had become an important trading centre with a mint that produced silver pennies stamped with its name (Wessex Archaeology 2021b, 3). Development of the area to the east of *Brycgstow* began with the construction of Bristol Castle in AD 1088. Further development to the east of the castle, an area known as *La Feria* or *La Markette*, is recorded in 12th/13th-century documents. *La Feria* appears to have been a planned settlement, with narrow burgage plots arranged around a wide street, referred to 'Old Market' or 'Old Market Street' form the 15th-century onwards.

*Post-medieval and early 19th century (AD 1500–1820)*

2.3.3 During the post-medieval period, the area to the south of Old Market, known as St Philip's Marsh, became significant centre of industrialisation. Early industrialisation, which included brass/copper works, sugar refining, tobacco processing, and alcohol production, was closely linked to Bristol's role in the transatlantic slave trade. During the 18th and 19th centuries, pottery and glass production, along with coal mining, metal working, chemical production and engineering became increasingly important industries.

2.3.4 Development of St Philip's Marsh began with the establishment of a series of industrial sites along Avon Street and the north bank of the River Avon in the late 17th century. These included glass, brick, and lead works; potteries; and lime kilns. Roque's 1742 plan of Bristol shows that much of the surrounding area was quarried for clay used for brick and pot making.

2.3.5 A late 18th-century plan of area (not illustrated) shows several of industrial works along the west side of Avon Street and a large dock immediately to the south of what is now the Feeder Canal (Chatwin 1976, 17, fig. 1). Avon Street and Marsh Lane (later known as Cook's Lane; now Gas Lane) existed by this date. The plan also shows that the development site was known as Day's Field or Day's Ground, named after its owner John Day. The map shows a few small buildings along the Avon Street frontage, but most of the site remained undeveloped at this date.

2.3.6 In 1804–9, the local topography was heavily modified to allow major improvements to the city's port facilities. As part of these works, the natural course of the River Avon was dammed at the western end of the city, and the river flow was diverted into an artificial channel, known as the New Cut. The old course of the river became the Floating Harbour, the level of which was maintained by channelling water from a weir at Netham via the Feeder Canal. Construction of the Feeder Canal also facilitated the transport of goods and materials to and from the centre of Bristol, which contributed to the burgeoning industrial economy in St Phillip's Marsh (Wessex Archaeology 2020, 8).

*Modern (1821–1949)*

2.3.7 The first significant development within the site was the construction of Bristol's second coal gasworks in 1821.

<u>Origins of the coal gas industry</u>

2.3.8 The process of manufacturing coal gas, also known as town gas, was developed in the 1790s by the engineer William Murdoch. The basic process involved heating coal in sealed oxygen-poor chambers, known as retorts, to drive off flammable gasses (mostly hydrogen, methane, carbon monoxide, and ethylene): a process known as destructive distillation. The resultant gasses were then cooled in a condenser and purified. The gas was then stored in gasholders (also known as gasometers), prior to distribution via a

network of underground pipes. After the gas had been driven off, the red-hot coal from the retorts was raked out and quenched with water to halt combustion. The resultant material, known as coke, is a useful fuel that burns at a higher temperature than raw coal.

2.3.9 Murdock was an employee of the steam engine manufacturers *Boulton & Watt*, and in 1803 he installed the first large scale system of gaslights at their Soho Foundry in Smethwick. Raw coal gas contains a variety of unwanted chemicals, including sulphur, ammonia, and heavy hydrocarbons (coal tar), which must be removed before the gas can be used as a fuel. Although some of the tar and ammonia naturally precipitated out during cooling, many contaminants remained. During the period 1805–12, Murdoch's colleague, Samuel Clegg, developed a method of purification which involved bubbling raw gas through a water trough (known as a hydraulic main) and a tank of lime water: a method was known as the 'wet lime process'. Purification produced several by-products, principally ammoniacal liquor, coal tar, and spent lime. The latter was a foul-smelling substance known as 'Blue Billy', which is a form of ferric ferrocyanide, commonly known as Prussian blue. Coal tar is a complex mixture of hydrocarbons, which include naphtha, creosote, and pitch, as well as more volatile substances such as benzine, many of which are carcinogenic. As well as being a pollutant, coal tar has a huge range of industrial, medicinal and construction uses.

2.3.10 In 1808, the German engineer Friedrich Albrecht Winzer (Anglicized to Frederick Albert Winsor), installed the first public streetlights in Pall Mall, and promoted the idea of district gasworks that could provide lighting over a wide area. The company he founded, the *London and Westminster Gas Light and Coke Company*, built their first gasworks in Westminster in 1812. Samuel Clegg, by then the country's most renown gas manufacturing expert, was appointed as chief engineer.

2.3.11 The Westminster gasworks was a success, and entrepreneurs in other British cities were keen establish their own works. Bristol was amongst the first to do so, and in 1815 the city's first gas company, the *Bristol Gas Light Company* was established by a Huguenot silk dyer named John Breillat. Technical advice and specifications for the gas making apparatus was provided Samuel Clegg.

Bristol Gas Light Company 1817–53

2.3.12 Bristol's first gasworks, built on a riverside site in Temple Back, opened in May 1817. The gasworks was, by later standards, small, but its gasholder, known as 'Aladdin', was then the largest in the world. Archaeological work on the site of the Temple Back gasworks showed that unlike later circular gasholders, Aladdin was sub-rectangular structure with bowed sides. Foundations of the 1817 gasholder are now preserved beneath modern office buildings (Bristol and Region Archaeological Services [BaRAS] 2000, 3, figs 19, plate 18; BaRAS 2004, 5, figs 3, 10, plates 9–10).

2.3.13 There was a huge demand for gas lighting in Bristol, and by 1819 it had become obvious that the Temple Back site was too small, so the company started looking for a new premises. They eventually settled on a large plot, known as Day's Field, on the east side of Avon Street, in St Philip's Marsh. The foundation stone of the new gasworks was laid on 6 March 1821, and within three months gas production was already underway. Two months later, the Avon Street gasworks was producing enough gas to supply the city, and a decision was taken to close the Temple Back gasworks and sell the plot (Nabb 1987, 12).

2.3.14 The earliest surviving depiction of the site is Hugh O'Neill's watercolor of the *New Gas Works* (Fig. 2), viewed from the south, during its construction. The painting shows a grand

pedimented building (gasworks offices and chief engineer's house) fronting Avon Street, with a large retort house that contained the gas-making apparatus to the east. The latter is partially obscured by a high wall close to the Silverthorne Lane frontage. The retort house, which is depicted as a horseshoe-shaped building on Plumley and Ashmead's plan of 1828 (Fig. 3), had louvred clerestory roofs and a very large chimney at the north-east end of the building. The 1828 plan shows that the entrance to the works was via a covered way under the gasworks offices. There were further ancillary buildings, included a coke store, stables, and workshops, to the north of the offices and retort house. Gas was stored in a row of five circular gasholders along the southern edge of the gasworks. The 1847 tithe map of St Philip and St Jacob (Fig. 4), shows the same layout as the 1828 plan. The accompanying apportionment identifies two long buildings (labelled plot 1101) fronting onto Silverthorne Lane as 'premises adjoining gas works', owned, and occupied by *Leonard Jordan & Co*. Pigot's directory of 1842 lists Jones, Leonard, Jordan & Co. of Avon Street as an aerated water manufacturer (West Country Bottles 2022).

Bristol United Gaslight Company 1853–91

2.3.15 In 1853, the *Bristol Gas Light Company* merged with the *Bristol and Clifton Gaslight Company* to form the *Bristol United Gaslight Company* (Nabb 1987, 18–19).

2.3.16 Ashmead's plan of 1854 (Fig. 5) shows that by this date, the gasworks had expanded eastwards, and a larger circular gasholder had been erected to the east of the retort house. The plan also shows a small structure to the east of the retort house, and another structure to the east of the new gasholder. A detailed plan of the gasworks, dating from 1857 (Fig. 6), identifies the structure to the east of the gasholder as a bank of purifiers; the structure to the east of the retort house is labelled 'gas meter'. The plan also shows that the yard between the retort house ranges, labelled 'coal store', had been roofed over by this date. The 1857 plan also shows narrow coal stores abutting the north-west and south-east sides of the retort house, and a similar narrow room abutting the north-east side of the retort house. The 1857 plan shows that the north-west and south-east ranges of the retort house each contained four retort benches (rows of ovens that heated the retorts), all but one of which were aligned north-west/south-east. Elsewhere in the gasworks, the 1857 plan shows additional purifiers, three circular scrubber towers (for purifying gas), a circular well, and three large rectangular tar tanks. A long building fronting Silverthorne Lane (formerly occupied by Leonard Jordan & Co) is labelled 'Gas Company's land occupied by Dr Rogers'. The plan also shows a small rectangular structure in the main entrance: later plans identify this as a weighbridge.

2.3.17 An 1860 plan (Fig. 7) shows several major alterations to the gasworks. These include the removal of the meter house, scrubbers, purifiers, tar tanks, and the five 1820s gasholders. In their place, there was a new purifier house and four walled yards. The northern two yards were used for storing refuse, tar, and ammonia. The southern yards contained two condensers, three scrubbers, and a group of small unlabelled buildings. The latter buildings are identified on an 1895 plan (Fig. 10) as a pump house and exhauster house. The 1860 plan also shows two additional two retort benches in the formerly empty north-east range of the retort house, and a new retort bench at the south-western end of the north-west range of the retort house. A large new gasholder had also been erected in the east corner of the gasworks.

2.3.18 Cartographic evidence (Figs 3–7) suggests that most of the northern and eastern parts of the gasworks perimeter wall (NHLE 1279549) was constructed between 1847 and 1854. The Silverthorne Lane frontage was probably built between 1857 and 1860, though it possible that there may be earlier and later fabric within both the Gas Lane and Silverthorne Lane sections of the wall.

2.3.19 In 1860, three adjoining retort houses were erected on a new site on the west side of Avon Street (*Western Daily Press*, 29 July 1908, 3). This structure, now 74–78 Avon Street, in an extant Grade II listed building (NHLE 1201975).

2.3.20 Ashmead's plan of 1874 (Fig. 8) shows continued expansion of the gasworks: an additional large gasholder had been added between the two 1850s gasholders; and a new building, identified on later plans as a meter house, had been built to the south-east of the gasworks offices. The gasworks had also expanded onto a new site between Silverthorne Lane and the Feeder Canal: this plot contained a purifier house, five circular scrubber towers, a pump house, and engine exhauster house.

2.3.21 In 1879, a new gasworks was established on a 34-acre site in Stapleton. This works eventually become the largest gasworks in Bristol but did not exceed the manufacturing capacity of the Avon Street works until after 1889 (Nabb 1987, 26).

2.3.22 The 1884 Ordnance Survey 1:500 Town Plan (Fig. 9) shows essentially the same layout as the 1874 plan, but with more detail and a few minor changes. Notably, there were 11 small rectangular structures abutting the outer edge of the retort house: whilst these may potentially have been buttresses, a comparison with an early 1920s aerial photograph (Fig. 13) suggest that these might have been chimneys for the retorts. Elsewhere within gasworks, the plan shows additional buildings, including a circular brick kiln to the south of the retort house, and a large additional purifier house to the south of Silverthorne Lane.

Bristol Gas Company 1891–1949

2.3.23 Gas companies were originally founded to supply gas for lighting, but from the 1830s onwards, new appliances such as gas-fired cookers, water heaters, and other contraptions became available, and by the end century, gas had a wide variety of domestic, industrial, and commercial applications. To reflect the more varied use of their product, the *Bristol United Gaslight Company* was renamed as the *Bristol Gas Company* in 1891 (Nabb 1987, 30).

2.3.24 On 16 July 1892, Bristol was hit by a major thunderstorm, during which the south-eastern range of the 1821 retort house sustained serious damage from a lightning strike. A report of the incident (*Bristol Times and Mirror* 18 July 1892, 5), includes a detailed description of the building and the damage it sustained:

> *The older building on the east side of the street consists of a very large central shed, containing thousands of tons of coal, and a retort house extending round three sides outside the central building. This outer building contains about 254 retorts arranged like rounds in a ladder. The retort house, the walls of which are massive and solid, had an iron roof covered with tiles and slates. Although the roof was 60 or 70 years old, it was well constructed, and was overhauled some years ago, when necessary repairs were done, and strength added where required. Of the 254 retorts, 40 on the Marsh side were in action during Saturday night, and nine men were attending them. About one o'clock yesterday morning, during the storm, accompanied by thunder and lightning, one of the men heard a great noise on the city side of the building and gave warning to his companions, who ran out of the retort-house towards the river just in time to escape being crushed by the falling roof.* […]*. The fallen roof, held together by the iron rods, presented much the appearance of a switchback railway.*

2.3.25 Goad's fire insurance plan of 1895 (Fig. 10) shows essentially the same layout as the 1884 plan, with the addition of a few small buildings, labelled 'valve house', exhauster

house', 'governor house' and 'meter' in the yard to the south and east of the 1821 retort house.

2.3.26 In 1901, an additional two storeys were added to the 1860 retort houses on the west side of Avon Street to allow for the installation of a bank of inclined retorts. These retorts were loaded using an elevator and hopper. After the gas had been extracted, a hatch was opened to allow the hot coal to drop out onto a conveyor, where it was quenched to produce coke. This was then removed to a large hopper for storage prior to sale (Nabb 1987, 30; *Western Daily Press*, 29 July 1908, 3). The hand-charged retorts in the 1821 retort house are likely to have become redundant soon after the inclined retorts became operational.

2.3.27 An early 1920s aerial photograph of the Temple Meads area (Fig. 13) shows part of the Avon Street gasworks in the background. The 1821 retort house appears to have been intact when the photograph was taken, but later aerial photographs, taken in 1926 (Fig. 14; Historic England 2022a), show that the north-east and south-east ranges of the retort house had been demolished by this date. The extant north-east wall of the 1821 retort house was built when the north-east range was demolished.

2.3.28 A detailed 1933 plan of the Avon Street gasworks (Fig. 11) shows that by this date, the 1850s coal store had been converted for use as a cooker and mains pipe store. The surviving north-west range of the 1821 retort house was used as a workshop and store that contained a 'cooker incinerator'. The function of this piece of equipment is uncertain, but it may have been used to clean parts during the servicing/refurbishment of gas cookers. The 1933 plan shows two new structures abutting the west corner of the retort house: these are labelled 'oil store' and 'underground petrol tank'. New structures are also depicted on the site of the demolished south-east range of the retort house: these are identified as 'benzole plant' and 'dry gas plant'. Elsewhere within the gasworks, various new pieces of equipment and buildings are shown. These include CWG (carburettor water gas) plant and purifiers, water softening plant, exhausters, boosters, boilers, and oil tanks. Interestingly, three of the five demolished 1820s gasholders are depicted as sub-surface structures: one of these is labelled 'liquor tank'; the others are sited close to tar separating equipment and may have been used to store tar oil. The plan also shows that the chief engineer's house had been converted into a laboratory, and that the coke store in the west corner of the site was being used as a stable.

2.3.29 During World War 2, the stables and outbuildings of the Avon Street gasworks were damaged by incendiary bombs, and a high explosive bomb landed in the coal yard. Fortunately, the latter failed to detonate (Nabb 1987, 44–45).

*Post-1949*

The British gas industry

2.3.30 On the 30 April 1949, Bristol Gas Company, along with all other private gas companies, were nationalised (Nabb 1987, 47). The Bristol area was placed under the jurisdiction of one of the 12 newly formed area gas boards, known as the *South Western Gas Board*.

2.3.31 In 1966, there was a national switch from coal gas to natural gas: the switchover took several years to complete, but by 1976, the South Western Gas Board had fully transitioned to natural gas (Alderwick 2019, 6).

2.3.32 Following the passing of the Gas Act 1972, the British gas industry was reorganised, and the area gas boards became regions of the *British Gas Corporation*.

2.3.33 In 1986, Margaret Thatcher's Conservative government transferred ownership of the UK gas industry to the privately-owned *British Gas plc*. This company subsequently divested its gas sales, trading, retail, and some gas production, to *Centrica*, and was renamed as *BG Group plc*.

2.3.34 In 2000, BG Group plc demerged its UK gas transmission business to form the *Lattice Group*, which subsequently merged with *National Grid plc* to form *National Grid Transco* in 2002.

2.3.35 In 2004, National Grid Transco sold its four regional gas distribution networks: the Welsh and south-west English regions were sold to a new consortium known as *Wales and West Utilities*.

The Avon Street gasworks

2.3.36 A 1951 plan (Fig. 12) of the Avon Street gasworks shows essentially the same layout and use of space as the 1933 plan. The only significant change was the decommissioning of one of the three remaining retort houses at 74–78 Avon Street. The other two were decommissioned *c*. 1952–8.

2.3.37 In 1959, the former retort houses at 74–78 Avon Street were reduced in height and converted for use by the *Marble Mosaic Company*, who were based there until 1983. The building was then leased to a car spares business. In 1996, the building was converted for use as a skatepark named *Motion*, which subsequently became a music venue and nightclub of the same name (Anon 2021).

2.3.38 By 1961, the former coal store and retort house at Avon Street had been converted for use as a vehicle garage. The former gasworks offices, meter house and the *c*. 1847–54 gasholder were all demolished *c*. 1963: the resulting rubble was used to infill the redundant gasholder tank.

2.3.39 Between 1961 and 1979, a series of planning applications were granted for the construction of garage buildings and offices around the former retort house and coal store. A 1966 aerial photograph (Historic England 2022b) show that large portal framed building that abutted the north-west side of the retort house was constructed before this date.

2.3.40 The property was acquired by *Vauxhall c*. 1997, and a new steel-framed single-storey vehicle body shop and salesroom was added to the south-west for the former retort house and coal store. A concrete mezzanine floor at south-west end of the retort house was probably constructed at this date.

2.3.41 Remediation works by Wales and West Utilities in 2016 uncovered a large stone plaque, engraved *BRISTOL GAS LIGHT COMPANY INCORPORATED 25 MARCH 1819,* from the infilled *c*. 1847–54 gasholder tank. This plaque was originally mounted on the pediment of the gasworks office building.

2.3.42 Drive Vauxhall vacated the site in 2020. The two surviving gasholders in the south-east corner of the former gasworks were decommissioned in 2021.

# 3 AIMS AND OBJECTIVES

## 3.1 Aims

3.1.1 The aims of the watching brief, as stated in the WSI (Wessex Archaeology 2021a) and as defined in the CIfA *Standard and guidance for an archaeological watching brief* (CIfA 2014a), were to:

- allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of the development or other works;
- provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard; and
- guide, not replace, any requirement for contingent excavation or preservation of possible deposits.

## 3.2 Objectives

3.2.1 In order to achieve the above aims, the objectives of the watching brief, also defined in the WSI (Wessex Archaeology 2021a), were to:

- determine the presence or absence of archaeological features, deposits, structures, artefacts or ecofacts within the specified works area;
- record and establish, within the constraints of the works, the extent, character, date, condition and quality of any surviving archaeological remains (a preservation by record);
- place any identified archaeological remains within a wider historical and archaeological context in order to assess their significance; and
- make available information about the archaeological resource on the site by preparing a report on the results of the watching brief.

# 4 METHODS

## 4.1 Introduction

4.1.1 All works were undertaken in accordance with the detailed methodology set out within the WSI (Wessex Archaeology 2021a) and in general compliance with the standards outlined in CIfA guidance (CIfA 2014a). The methods employed are summarised below.

## 4.2 Fieldwork methods

*General*

4.2.1 The watching archaeologist monitored all mechanical excavations within the specified area. Where necessary, the surfaces of uncovered archaeological deposits were cleaned by hand to aid visual definition. A sample of archaeological features and deposits was hand-excavated, sufficient to address the aims of the watching brief.

4.2.2 Spoil from machine stripping and hand-excavated archaeological deposits was visually scanned for the purposes of finds retrieval. Artefacts were collected and bagged by context. All artefacts from excavated contexts were retained.

*Recording*

4.2.3 All exposed archaeological deposits and features were recorded using Wessex Archaeology's pro forma recording system. A complete record of excavated features and deposits was made, including plans and sections drawn to appropriate scales (1:20 for plans and 1:10 for sections) and tied to the Ordnance Survey (OS) National Grid.

4.2.4 A Leica GNSS connected to Leica's SmartNet service surveyed the location of archaeological features. All survey data is recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSTN15and OSGM15, with a three-dimensional accuracy of at least 50 mm.

4.2.5 A full photographic record was made using digital cameras equipped with an image sensor of not less than 10 megapixels. Digital images have been subject to managed quality control and curation processes, which has embedded appropriate metadata within the image and will ensure long term accessibility of the image set.

4.2.6 A detailed record of the exposed structures was made using photogrammetry. The survey was checked, and minor inaccuracies corrected, to match the detailed photogrammetric models.

### 4.3 Finds and environmental strategies

4.3.1 Strategies for the recovery, processing and assessment of finds and environmental samples were in line with those detailed in the WSI (Wessex Archaeology 2021a). The treatment of artefacts and environmental remains was in general accordance with: *Guidance for the collection, documentation, conservation and research of archaeological materials* (CIfA 2014b), *Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation* (English Heritage 2011) and CIfA's *Toolkit for Specialist Reporting* (Type 1: Description).

### 4.4 Monitoring

4.4.1 The Principal Historic Environment Officer monitored the watching brief on behalf of the LPA. Any variations to the WSI, where required to better address the project aims, were agreed in advance with the client and the Principal Historic Environment Officer.

## 5 STRATIGRAPHIC EVIDENCE

### 5.1 Introduction

5.1.1 The watching brief revealed extensive structural and other remains forming part of the Bristol Gas Light Company's Avon Street gasworks (Figs 15–29). The gasworks, which was constructed in 1821, contained a gas manufacturing building known as a retort house, and ancillary structures including offices, workshops, stables, coal stores, and gasholders. The gasworks was modified throughout the 19th and early 20th centuries, though gas production ceased by the mid-1920s. The building was then used as a gas company workshop and store until it was converted for use as a garage *c*. 1961.

5.1.2 The upstanding parts of the building (Figs 30–5), which comprise the north-west range of the retort house, and an adjoining 1850s coal store, were recorded during a historic building survey (Wessex Archaeology 2022a).

5.1.3 In this report, 'retort house' refers to the entirety of the horseshoe-shaped building built in 1821. The surviving part of this building is referred to as the 'north-west range of the retort house'. Where relevant, upstanding, and demolished parts of the gasworks are referenced to provide a context for the below ground remains.

5.1.4 Where possible, structural remains of the gasworks have been assigned to one of four broad phases that correspond with the tenure of the Bristol Gas Light Company (1821–53), Bristol United Gaslight Company (1853–91), Bristol Gas Company (1891–1949), and post-nationalisation (1949–2021). Some features, particularly the large external iron gas pipes, can only be broadly dated to the 19th or early 20th centuries.

## 5.2 Soil sequence and natural deposits

5.2.1 Natural alluvial deposits of brown silty clay were uncovered it two locations: a deep service trench adjacent to Gas Lane (Fig. 36), and a pile clearance pit towards the south-west end of the coal store. The upper surface of the alluvium (4078) was recorded at 7.28 m OD (1.8 m bgl) next to Gas Lane and was briefly exposed at 7 m OD (2 m bgl) in the coal store.

5.2.2 The alluvium (4078) at the north-eastern end of the site was capped by a 0.1 m thick buried topsoil horizon (4077), which was overlain by 1.3 m of made ground (4076). Similar made ground deposits (group 1091, 2005 and 5003), up to 1.4 m thick, were recorded throughout the site. The made ground comprised a mixture of dark red and black sand containing brick and stone rubble, slag, clinker, ash, pottery wasters, and glass working waste. These deposits are interpreted as ground raising dumps associated with the construction of the gasworks in 1821. Within the coal store, the made ground abutted the foundations of the retort house, indicating that this material was dumped after the footings had been built. The made ground was overlain by structural remains and deposits associated with the development of the gasworks in the 19th and 20th centuries.

## 5.3 Bristol Gas Light Company 1821–53

*Gasworks office and entrance*

5.3.1 The original entrance to the gasworks was via a covered way below a nine-bay, three-storey, Neo-Classical pedimented office building. The covered way contained a large arched vehicle passage, flanked by two arched pedestrian walkways. The gasworks office was demolished *c*. 1963.

5.3.2 Remains of the gasworks office comprised a series of sandstone rubble footings, all bonded with grey lime mortar (group 2046; Figs 16, and 38–9). This group of structures included foundations of the building's Avon Street frontage (2027; Figs 16 and 38), which was 0.47 m wide; and the 0.85 m wide footings (2039; Fig. 16) that defined the south-east side of the covered way. A parallel brick wall foundation (2025 and 2040; Figs 16 and 39) would have supported a row of piers that separated the pedestrian walkway from the vehicle passage.

5.3.3 The only other remains of the gasworks office was a short stretch of curving foundation (2030; Fig. 16) that defined the north corner of the building. Foundation 2030 was abutted by a sandstone sett pavement (2031; Figs 16 and 89), which was probably laid during a reconfiguration of the gasworks in the late 1850s.

*Retort house and coal stores*

5.3.4 The Bristol Gas Light Company retort house (group 1083; Figs 16–17 and 30–5) was a large horseshoe-shaped building, built in 1821 to house the primary gas making

apparatus, namely the gas retort benches. These structures were housed in the south-east and north-west ranges of the building. Secondary purification processes may initially have been carried out in the north-east range of the building. The retort house originally measured approximately 69 m north-east to south-west by 60 m north-west to south-east. The building's external walls were approximately 7 m high. At the north-east end of the building, there was a tiered, 5.6 x 2.65 m wide and 30 m high, masonry chimney, which was linked to the retort benches via a system of underground brick flues. The building was reduced to its current size following the demolition of the south-east and north-east ranges in the 1920s. The surviving parts of the 1821 retort house comprise: the north-west range; the south-west wall of the north-east range; and the north-west wall of the south-east range. The chimney is also extant, though now reduced to approximately 13 m in height (Figs 46–7). The retort house was originally abutted by single storey, 3 m wide, lean-to coal stores that ran around all sides of the building apart from the south-west elevation. This arrangement was probably retained until the mid-1850s, but by 1857 the yard between the north-west, north-east, and south-east ranges of the retort house had been roofed over to provide a much larger coal store. The south-west gable of the extant coal store is contemporary with the mid-1850s roof.

5.3.5 The retort house is constructed of random coursed sandstone rubble bonded with pinkish brown and pale grey lime mortar. The walls are pierced by numerous arched openings: cart-width doorways on the ground floor, interspersed with tall narrow openings topped with firebrick arches. Above these, there are rows of unglazed (now blocked) round arched windows. There are also various inserted doorways at ground level, all of which are 20th-century additions.

5.3.6 The foundations of the retort house were over 2 m deep. It is unknown if the lower parts of the foundations were constructed in trenches, or if they were built directly on the underlying alluvium. Given the size of the retort house, and the soft nature of the underlying deposits, it is possible that the building is founded on timber piles, though there is no evidence to confirm or refute this suggestion. Remains of the original lean-to coal stores were recorded in the coal store (group 1085; Figs 16, 17, and 44–6) and rear yard (4040; Figs 17, and 48–9).

5.3.7 The foundations of the retort house (group 1083; Figs 16–17, 40–1, and 54) and lean-to coal stores (group 1085; Figs 16–17 and 42–6) were abutted by a 1.4 m thick ground raising deposit (group 1091). The upper surface of this deposit, which comprised a compacted surface of crushed clinker, was recorded at 8.4 m OD (0.6 m bgl): this is interpreted as the floor of the original gasworks yard. Within the north-west range of the retort house, there was a similar ground raising deposit (4025), which also abutted the foundations of the building.

5.3.8 The foundations of the lean-to coal stores (group 1085; Figs 16–17 and 42–6) were 0.6 m wide and 0.8 m deep. The height and angle of the lean-to coal store roof was evident from a line of angled coping stones on the sides of the coal store chimney (Figs 45–6). A course of coping stones with the remnants of lead flashing below, were also evident to the sides of the chimney and along the inner south-east and north-west elevations of the coal store.

5.3.9 There was an identical lean-to structure (4040; Figs 17 and 48–9) on the north-east side of the former north-east range of the retort house. This part of the building was paved with a mixture of bricks and stone slabs (4042). The surface of the floor was recorded at 8.27 m OD, which is 0.64 m lower that the internal floor of the adjacent retort house, and 0.81 m lower that the external yard to the north-east, indicating that the lean-to had a semi-

basement. In the east corner of the room, there was a brick step (4043) up to a doorway that provided access to the adjacent yard. On the south-west side of the room, there was another opening into the adjacent retort house. Both openings were blocked (see section 5.4.11).

*Retort benches and flue system*

5.3.10 At the north-east end of the north-west range of the retort house, there were two north-west to south-east aligned retort benches (groups 3056 and 3058; Figs 17, 19–20, and 50–3). These were constructed of unmarked firebricks bonded with red sand. Neither structure was fully exposed, but enough was visible to reconstruct their original dimensions and layout: the report benches measured 12.4 x 6.35 m wide, and each had a row of four retort ovens facing south-west and north-east (eight ovens per retort bench). Each oven would have heated between four and eight individual retorts, depending on the configuration used. Below each oven, there was a 3.4 m long by 0.22 m wide, and up to 0.6 m deep, ash pit that extended outwards beyond the main structure of the retort bench. Excavations at the north-east end of the retort house showed that the foundations of the retort benches were over 1 m thick, which is unsurprising given the massive weight of brick and ironwork they would have supported.

5.3.11 The north-east side of retort bench 3058 was abutted by a sequence of ground raising deposits (4010–11, 4016, and 4024; Figs 52–3). Similar ground raising deposits (4017–19) were recorded in a former doorway on the north-west side of the retort house (Fig. 54). Layer 4010 was overlain by the brick ash pits (group 4079; Figs 52–3) that abutted the north-east side of the retort bench. This may simply indicate that layers 4010–11 and 4016–19 and the ash pits (group 4079) were the last parts of the retort bench to be built. Alternately, it could indicate that the ash pits were a later modification to the retort benches: perhaps to lengthen existing pits. Layers 4011 and 4024 were notable in that they comprised 0.1 m thick layers of pure white lime with patches of blue staining. The latter is likely to be ferric ferrocyanide, commonly known as Blue Billy – i.e., spent lime derived from the 'wet lime' gas purification process.

5.3.12 Between retort benches 3056 and 3058, there was a brick floor (3041–3; Figs 17, 19–20 and 50) and a truncated tubular brick flue (3030; Figs 17, 19–20 and 55). The brick floor, the surface of which was recorded as 9.02 m OD, was probably contemporary with the retort benches, though it may have been repaired or re-laid during the later 19th or early 20th centuries. A similar brick floor (4022; Fig. 54) was recorded in a doorway along the north-west side of the retort house. Flue 3030, which was constructed of firebricks and had an internal diameter of 0.4 m, was centrally placed along the north-east to south-west axis of the retort house. It is also likely to be contemporary with the retort benches. The flue is likely to have been used to exhaust smoke from the central retort ovens and would probably have been linked to the flue (group 1087) that channeled smoke from the north-east end of the retort house to the main gasworks chimney.

5.3.13 The flue (group 1087; Figs 17, 43, and 56–8) in the north corner of the coal store appears to have respected the foundations (group 1085) of the 1821 lean-to coal store, which suggests that the flue was built while the lean-to was still standing (i.e., before the mid-1850s). Flue 1087 had an oval internal profile that measured 0.6 m wide and 0.74 m high. Externally, the flue was 1.4 m wide and over 1.1 m deep. The south-eastern terminus of the flue was truncated by modern disturbance, but it is likely to have originally had a rectangular opening at floor level, with an above-ground brick or iron flue that linked it to the high-level opening in the side of the adjacent chimney.

*Other structures within the retort house*

5.3.14 To the north-east of retort bench group 3058, there were various heavily truncated stone foundations (4015, 4047, 4050, 4051, and 4052; Figs 17, 52–3, and 59–61) of uncertain function. These structures are tentatively interpreted as foundations for gas purification equipment. This suggestion is supported by the fact that there are no external condensers, washers, or scrubbers, shown on any of the pre-1854 mapping (Figs 3–4), which suggests that purification processes were probably undertaken in the north-east range of the retort house (the other two ranges were filled with retort benches).

5.3.15 To the north-east of structures 4050 and 4051, there were two small areas of flooring (4049; Figs 17, 62), paved with 300 mm square yellow fireclay slabs. The surface of the floor was recorded as 8.91 m OD. There were no earlier floors in the north-east range of the retort house, which suggests that this surface was an original feature of the 1821 retort house.

5.3.16 The main gasworks chimney (Figs 17, 35, and 46–7) at the north-east end of the coal store is an unusual structure that incorporates a large arched doorway that provided a link between the coal store (originally an open yard) and the former north-east range of the retort house. Below the doorway there was a circular stone-lined well (4069; Figs 63–4) that measured 1.2 m externally and 0.95 m internally. On the west side of the well, there was an *in situ* 80 mm thick lead pipe, indicating that water would originally have been drawn using some form of pump. The well was infilled with soft black silt (4070) and is of unknown depth. Gas purification requires copious quantities of water, and this well, located in a part of the building where these processes are likely to have been carried out, is interpreted as the primary water source for the early 19th-century gasworks. By the 1850s, a purpose-built purifier house and a bank of scrubbers had been constructed in other parts of the gasworks. These would have required additional water, possibly supplied by a piped mains connection.

## 5.4 Bristol United Gaslight Company 1853–91

5.4.1 In 1853, the *Bristol Gas Light Company* merged with the *Bristol and Clifton Gaslight Company* to form the *Bristol United Gaslight Company* (Nabb 1987, 18–19). The new company undertook a programme of modernization and expansion of the Avon Street works, which was evident in the upstanding and buried remains within the site.

*Coal store*

5.4.2 Between 1854 and 1857, the inner yard of the retort house was roofed over to create a large new coal store. These works entailed demolishing the old lean-to coal stores (group 1085); constructing a high gable end wall with arched doorways and windows at the south-west end of the yard; and covering the whole area with a clear-span roof supported by sixteen 25 m wide composite timber and iron scissor trusses.

5.4.3 Most of the foundations of lean-to coal store wall (group 1085) were robbed out to a depth of 1 m bgl. The resulting robber trench (1051; Fig. 43) was backfilled with a mixture of crushed mortar, ash, clinker, and stone fragments (1050). A short section of walling (1054; Figs 16 and 65) in the west corner of the coal store appears to have been retained as part of an internal room. Wall 1054 was abutted by a modern red concrete floor (1055), which suggest that the wall remained extant until very recently.

5.4.4 After the lean-to coal stores (group 1085) had been demolished, a large underground flue (group 1084; Figs 16–17, 29, 42, and 66–73; Appendix 4) was constructed along the south-east side of the building. The flue was 52 m long, 2.5 m wide and 2.2 m high

externally, and 0.96 m wide by 1.4 m high internally. The internal profile had an arched top and a concave base, which was level along its entire length. There were four access chambers along the length of the flue, one of which was heavily truncated. The others were all caped with large plates of reused iron (Fig. 67; possibly scrap from iron ship hulls, locomotives, or steam boilers), which covered a pair of large fireclay slabs (820 x 620 x 100 mm), with interlocking tongue and groove mouldings (Figs 68 and 70). Although these chambers were clearly designed to allow access to the flue, they might never have been used, and certainly were not opened frequently, as they were covered by a contemporary paved floor surface (group 1082). At the north end of flue group 1084, there were two rectangular openings (Figs 72–3), one of which lined up with a high-level opening into the adjacent chimney (Fig. 74), which suggest that they were once linked via a (now removed) brick or iron flue. The south-western opening was probably an access chamber, possibly to facilitate the raking out of any accumulated soot. An inserted blocking wall (Fig. 73) between the two openings was probably built when the flue was decommissioned.

5.4.5 A survey of the flue by Maintain-A-Drain (Appendix 4) identified three bricked up connections to between flue group 1084 and the adjacent (demolished) south-east range of the retort house. Further blocking was identified at the north end of the flue. All the blocking is associated with the decommissioning of the flue, which probably occurred when the main chimney was replaced by two rows of four smaller chimneys next to the retort benches in the south-east and north-west ranges of the retort house.

5.4.6 Flue group 1084 was overlain by a 1.1 m thick dump of red sand mixed with lime mortar and brick rubble (1004; not illustrated). Elsewhere in the coal store, there was a 0.3 thick layer of made ground (1031, 1036, 1046, and 1049; not illustrated) that raised the internal ground level to approximately 8.8 m OD. The made ground was capped by a paved firebrick, fireclay slab, and sandstone sett floor (group 1082; Figs 16–17, 23–8, and 75–9), which was laid across at least two thirds of the coal store. The south-east side of the room was paved with a 2.45 m wide strip of 300 mm square fireclay paving slabs. These was flanked by a 4.7 m wide strip of sandstone setts, which were in turn flanked by a 3.6 m wide firebrick floor. The north-west side of the room was paved with a 3.6 m wide strip of sandstone setts, flanked by a 5.2 m wide are of firebrick flooring. The central strip of the coal store, which was 6.9 m wide, was unpaved: it is uncertain if this was always the case, or if the paving was truncated prior to the construction of a concrete floor *c*. 1961.

5.4.7 In the center of the coal store, there were two lengths of brick- and stone-lined drain (1081 and group 1088; Figs 16–17 and 80–3). Drain 1081 was aligned north-east to south-west, with a curving section at the south-west end that turned towards to the south-east. The north-eastern end of drain group 1088 was aligned east-west: the rest of eth drain was aligned north-east to south-west and got progressively deeper towards the south-west. Drain group 1088 was constructed within an outsized construction cut (Fig. 83): the disparity between the size of the construction trench and the drain structure is unexplained. These drains were probably used to remove surface water accumulations within the coal store.

5.4.8 Removal of the paved surface along the south-east side of the coal store revealed a network of cast iron water pipes (1018; Figs 16–17). These were linked to rainwater downpipes from the gully between the coal store and retort house roofs and are likely to be an original feature of the 1850s coal store.

*Retort benches and flues*

5.4.9 Cartographic evidence (Figs 6–7) indicates that the retort benches at the south-west end of the north-west range of the retort house (group 3059; Figs 16, 18, and 84–5), and the

north-east range of the retort house (groups 4080 and 4081; Figs 17, 21, and 86–7), were all built between 1857 and 1860. The new retort benches were built to the same design and dimensions as the earlier examples. Retort bench groups 3059 and 4080 both contained post-1873 firebricks made by Mobberley & Perry, indicating that their ovens were either relined or totally rebuilt after this date.

5.4.10 Between retort benches 4080 and 4081, there was a complex underground flue system (group 4083; Figs 17, 21, and 88), which was constructed of firebricks bonded with red sand. There flues appear to have been linked to the north-east and south-west ends of the retort benches and are likely to have been vented into the openings on the south-east and north-west sides of the chimney in the coal store. The flue system is probably contemporary with retort benches 4080 and 4081, i.e., *c*. 1857–60.

*Other structures*

5.4.11 A *c*. 1850–75 Perrens & Harrison fireclay slab used as blocking (4041; Figs 17 and 48) in a doorway on the east side of the retort house, indicates that this doorway was infilled in the second half of the 19th century. Undated blocking 4046 on the opposite side of the room is likely to be broadly contemporary.

*External*

5.4.12 To the south-west of the retort house and coal store, there was an extensive sandstone sett yard surface (group 2047; Figs 16, 22, and 89–90). An adjacent sandstone sett pavement (3031) and associated iron kerb (2032) are contemporary. There was an iron stopcock (2035) embedded in the pavement. This is likely to have been linked to a nearby network of lead waterpipes (2009, 2017, and 2018; Fig. 16), which were recorded towards the top of layer 2005. There were no discernable trench cuts associated with these pipes. A further area of sandstone setts (5002; Figs 16 and 37) on the north-east side of Avon Street is likely to be part of surface group 2047.

5.4.13 The remains of a sunken weighbridge (2019; Figs 16 and 91), constructed of red brick and sandstone bonded with black ash mortar, was uncovered in a service trench through what was originally the gasworks entrance. The weighbridge measured approximately 6.4 m north-east to south-west, 3 m north-west to south-east, and was approximately 0.4 m deep internally. This structure is depicted on various plans dating from 1857 to 1951 (Figs 6–12), but the fact that it does not appear on earlier mapping does not preclude an early date of construction: it may simply have been omitted from these plans.

## 5.5 Bristol Gas Company 1891–1949

5.5.1 The formation of the Bristol Gas Company in 1891, led to a consolidation and rationalisation of the city's various gasworks. Gas production at 65 Avon Street continued until at least 1892, but the installation of mechanised inclined retorts in the retort house on the west side of the street in 1901, and the continued expansion of Stapleton Gasworks, led to a decision to cease using the hand-charged retorts in the 1821 retort house. The south-east and north-east ranges of the retort house were demolished in the mid-1920s, and by 1933, the coal store was being used as a gas pipe store. The surviving north-west range of the retort house was converted for use as a gas cooker workshop.

*Coal store*

5.5.2 During the early 20th century, there were various piecemeal concrete repairs (group 1086; Figs 16–17, 23–8, 77, and 79) to the existing 19th-century floor. Remains of small brick-built rooms with concrete floors (1016 and 1055; Figs 16–17, 27, 65, and 92) were recorded along the south-east side and the west corner of the coal store. These are likely

to have been used as messes, offices, lavatories, and tool stores for gas company workers in the pipe store and cooker workshop. The presence of ceramic drainpipes in the floor of structure 1016, suggest that there were lavatories in this part of the building. On the south-east side of the coal store, there were two metal brackets (1011 and 1012; not illustrated) imbedded in concrete. These were clearly fixtures of some sort, but their exact function is unknown.

*Retort house*

5.5.3 During the mid-1920s, the north-east and south-east ranges of the retort house were demolished, leaving the north-west range as the last intact part of the 1821 building. Following the demolition of the north-east range, a new wall (4002; Figs 17 and 52–3) was erected at the north-east end of the retained north-west range. Wall 4002, which is constructed of sandstone rubble with red brick details, was founded on the truncated remains of retort bench group 3058. The other retort benches in the north-west range were probably demolished at the same time, and the building was converted for use as a gas cooker workshop. Deposits associated with the demolition of these structures include a demolition layer (3023) above retort bench group 3056, the infill (4004) of an ash pit on the north-east side of retort bench 3058, and the infill (3037) of an ash pit on the south-west side of retort bench group 3059. The latter contained a discarded leather shoe.

5.5.4 At the south-west end of the retort house there was a large brick and concrete structure (group 3060; Figs 16, 18, 93–5), which corresponds with the location of a 'cooker incinerator' depicted on 1933 plan (Fig. 11). The structure measured over 9.9 m north-east to south-west, 3.7 m north-west to south-east, and had a 1 m wide and 0.35 m deep central trough along its long axis and is interpreted as the foundations for an above-ground incinerator. The concrete showed no evidence of heating, which suggests that there was a gap between the foundations and the incinerator, which was probably a long metal structure. The function of the incinerator is uncertain, but it may have been used to clean cooker parts by burning off accumulations of soot and grease, as part of their maintenance or refurbishment. The south-west side of the incinerator base was abutted by a contemporary red brick floor (group 3055; Figs 16, 18, 94–5). Below this floor, there was a north-west to south-east aligned brick wall (3035; Fig. 16), which is likely to be contemporary with the cooker incinerator: its function is unknown.

5.5.5 Elsewhere in the retort house, there were piecemeal early 20th-century brick and concrete repairs (group 3057; Figs 16–19) to existing 19th-century floors and truncated retort benches.

*External*

5.5.6 To the south-west of the retort house, there were various structures related to the use of the gasworks in the early 20th century. Immediately to the south of the retort house, there was a brick and concrete structure (group 2048; Figs 16, 22, and 96–7), which can be identified as the foundations of a ramp into the gas cooker workshop. This ramp is visible on a 1950 aerial photograph (Dittrich Hudson Vasetti Architects 2021, 7). The sandstone sett yard surface (2049) to the south-west and north-west was re-laid on a bed of Portland cement after this structure was built.

5.5.7 To the north-west of surface 2049, there was an underground concrete petrol tank (2037; Figs 16, 22, and 96), capped with an iron access hole cover. The petrol tank is marked on a 1933 plan of the gasworks (Fig. 11).

5.5.8 Following the demolition of the north-east range of the retort house, a brick inspection chamber (4035; Figs 17 and 48–9) was constructed around gas pipe 4034, which was

presumably still live at this date. Sometime after the mid-1920s, a trench (4071) for a 200 mm diameter steel pipe (4066) was dug through the foundations of the demolished north-east retort benches. The site of the demolished north-east range of the retort house was concreted over around the same time.

### 5.6 Uncertain date - 19th or early 20th century

5.6.1 Within the gasworks there were various features, mostly gas pipes and yard surfaces, of uncertain date. These features all date from the use of the site as a gasworks (i.e., 1821–1961), but cannot be more accurately dated with any certainty within this period.

*Flue on north-west side of the retort house*

5.6.2 A heavily truncated north-east to south-west aligned underground flue (2041; Figs 16–17, and 98–9), constructed of firebricks bonded with red sand, was uncovered immediately to the north-west of the north-west range of the retort house. There was a rectangular opening, 0.75 m square and over 0.9 m deep internally, at the north-east terminus of the flue. It is unknown if this flue was originally linked to the main coal store chimney, perhaps via flue group 1087, or if was associated with the row of four chimneys visible on the north-west side of the building on an early 1920s aerial photograph (Fig. 13). It is uncertain when this flue was constructed.

*Pits in the coal store*

5.6.3 Along the north-west side of the coal store, there were two large rectangular north-east to south-west aligned pits (1038/1039 and 1045; Figs 16–17, and 100). The pits were 1.5 m wide, over 1 m deep, and up to 6.2 m long, and were backfilled with a mixture of dark grey made ground and large quantities broken Double Roman ceramic roof tiles. The purpose of these pits is unknown, but a plausible interpretation is that they were dug to facilitate underpinning of the wall between the coal store and north-west range of the retort house. A shallow brick structure (1029; Fig. 16) of uncertain date or purpose was recorded along the north-west side of the coal store.

*External features*

5.6.4 The north-east wall of the north-east lean-to building (4040) was abutted by a by a 15.2 m long by 0.6 m wide north-east to south-west aligned cast iron gas pipe (4034; Figs 17, 48–9). The south-eastern end of the gas pipe was terminated by a bolted iron blanking plate. The north-east end of the pipe curved upwards and would have originally continued above ground alongside the Gas Lane perimeter wall. The north-eastern end of the pipe was broken off at ground level, and the pipe itself was partially filled with coal tar (Fig. 101), some of which had leaked onto the surrounding yard, where it had solidified to form a bituminous layer overlying the brick paving. Within lean-to building 4040, there was a 0.75 m square stone block (4045; Figs 17 and 102), which is interpreted as a pad stone for a removed north-west to south-east aligned section of gas pipe 4034. Gas pipe 4034 was overlain by made ground 4033, which was sealed by a brick-paved yard (group 4082; Fig. 17 and 103). There was a further area of brick paving (2045; Fig. 17), predominantly constructed using used firebricks, to the north of the retort house. The date of this yard surface is uncertain.

5.6.5 To the south-west of the retort house and coal store, there were various large cast iron gas pipes (Fig. 16) of uncertain date. Pipe 2009 was sealed by a 0.1 m thick layer of compacted ash and clinker that contained occasional lumps of copper-rich slag (2004). This deposit, which may have been sourced from a local brass works, may have been the original surface of the gasworks yard.

5.6.6 Surface 2004 was cut by the trench (2007) for a 450 mm diameter cast iron gas pipe (2006). The backfill (2008) of the pipe trench was cut by another trench (2011) for a 100 mm diameter cast iron gas pipe (2010). The backfill (2012) of the latter trench was sealed by the bedding (2003) for sandstone sett yard surface (group 2047). There was another 450 mm diameter cast iron gas pipe (2026) below the pedestrian walkway through the gasworks entrance building.

## 5.7 Post-Nationalisation 1949–2021

*Coal store*

5.7.1 Concrete floor group 1086 was overlain by bedding (1001) for another concrete floor (1000). The later floor was constructed in more than one phase, and part of it was cast over a slightly earlier post-1950s concrete vehicle inspection pit (1076; Figs 17 and 78). A modern drain (1026; Figs 16–17) and access holes (1026 and 1058; Figs 16–17 and 58) were also recorded. The concrete floor, inspection pit, drain, and access holes are all associated with the use of the building as a commercial garage from *c*. 1961 onwards.

*Retort house*

5.7.2 Following the conversion of the retort house for use as a garage, a large cut of unknown purpose (3054) was dug through the north corner of retort bench group 3059 (Fig. 16). The backfill (3029) of the cut was sealed by modern bedding (3001) for concrete floor 3000.

*External*

5.7.3 Following the demolition of the gasworks offices *c*. 1963, and the clearance of other gasworks structures, the area to the south-west of the retort house and coal store was covered with a sequence of demolition/levelling deposits (2001, 2016, 2044, and 2043; not illustrated) and modern floor and yard surfaces (2000 and 2042; not illustrated). Demolition layer 2044, which infilled demolished weighbridge 2019, was notable in that it contained numerous placed fireclay voussoir blocks, derived from demolished retort ovens. The backfill of the weighbridge was cut by a modern trench (2022) for a cast iron pipe (2021). The demolished gasworks offices (group 2046) were cut by trenches for a modern electric cable and gas pipe (2028 and 2029; not illustrated).

5.7.4 Post-gasworks features in the rear yard (not illustrated) comprised infilling (4039) of inspection chamber 4035; made ground (4072) over the backfill (4075) of gas pipe (4074); a modern concrete filled utility trench (4012); and bedding (4001) for concrete floor 4000.

5.7.5 On the north-east side of Avon Street, sandstone setts 5002, were cut by a modern drain (5005) and electric cable (5004), which were overlain by bedding (5001) for modern tarmac pavement 5000.

# 6 FINDS EVIDENCE

## 6.1 Introduction

6.1.1 A small assemblage of 19th- and 20th-century finds was recovered during the watching brief at 65 Avon Street. All finds have been quantified by material type within each context, and totals by material type are given in Table 1. In this report, the use of a forward slash symbol denotes a line break in the wording on marked firebricks.

**Table 1** Finds by material type (number of pieces/weight in grammes)

| Material | Quantity | Wight (g) |
|---|---|---|

| | | |
|---|---|---|
| Pottery | 15 | 2,946 |
| Firebrick | 24 | 141,731 |
| Leather | 1 | 410 |
| **Total** | **34** | **145,087** |

## 6.2 Pottery

*Wasters*

6.2.1 Twelve pieces of biscuit-fired white earthenware were recovered from layer 2005. These comprise eight pottery wasters and four pieces of probable kiln furniture The pottery comprises fragments of shallow bowls. The probable kiln furniture comprises rings of white earthenware, which may have been bases for tube props. The pottery wasters were recovered from a ground-raising deposit associated with the construction of the Avon Street Gas Works in 1821.

6.2.2 The only white earthenware manufacturer in Bristol at this date was the Water Lane Pottery, also known as the Temple Back or Bristol Pottery. This pottery was established *c*. 1682 and initially focussed on the production of tin-glazed wares, mottled earthenware with iron rich glaze, brown stoneware, and red earthenware, including sugar moulds and chimney pots. By 1784, the pottery had diversified into creamware production, some of which had transfer-printed decoration. Creamware, and later pearlware and refined whiteware became the main products of the pottery, which remained operational until production was transferred to the company's Bristol Victoria Pottery in St Philip's Marsh in 1885. Between 1816 and 1835, the pottery was operated by John Decimus Pountney and Edwin Allies, trading as *Pountney & Allies* (Jackson 2019a). Their pottery was sold across the British Isles and the colonies of Canada and the West Indies. It was also exported France, Spain, Portugal, the Italian Kingdom of the Two Sicilies, the United States of America, and the Empire of Brazil (Jackson 2019b).

*Redware*

6.2.3 The bases of thee incomplete redware vessels were recovered from made ground layer 1049, which was probably deposited in the mid-1850s.The vessels all had a slightly tapered profiles, which were slightly everted towards the top, and a white residue (possibly limescale, or chemical) in the base. Two of the vessels were nearly identical: these had 104 mm wide bases, pale brown internal glaze, and survived 80–100 mm high. The other had a 93 mm base, black internal glaze, a more everted profile, and survived up to 90 mm high.

## 6.3 Firebrick

6.3.1 A total of 24 firebricks were recovered during the watching brief. The bricks, all made from coal measures clay, fired to a pale buff or pink colour, are catalogued in Appendix 2. Eighteen of the bricks were marked with identifiable manufacturers marks: one was imported from Stobswood, Northumberland; the others came from the Black Country towns of Stourbridge and Dudley, both in the historic county of Worcestershire. The other firebricks were either unmarked, or their marks were illegible.

6.3.2 The firebricks comprised 16 standard-sized 'nine-inch' bricks; one feather edged nine-inch brick; two fragments of large slabs; and five large voussoir mouldings. The latter would have been used in the construction of arches within of gas retort ovens.

*Stourbridge bricks*

6.3.3 Thirteen bricks from six Stourbridge brick manufacturers were recovered: three from *George King Harrison*; three from *Mobberley & Perry*; one from *Perrens & Harrison*; two from *Rufford & Co*.; one from *Harris & Pearson*; and one from *J & W King*.

6.3.4 *Rufford & Co*. was a firebrick manufacturing company that was founded by Francis Rufford in 1802. By c. 1880, the company had diversified into the production of glazed bricks and porcelain baths. The company ceased trading in 1936 (Grace's Guide 2022c). The Rufford & Co. bricks were recovered from flues 1015 and 4067, both of which probably date from c. 1821.

6.3.5 Six of the marked bricks were made by a Stourbridge-based brickmaking family that ran a succession of companies between the early 19th and mid-20th centuries. It is unknown when the family first started mining fireclay and making firebricks, but William King I was certainly mining clay prior to his death in 1818 (Liverpool Record Office, Non-Conformist Registers, ref. 289 QUA/L; TNA Society of Friends' Registers, Notes and Certificates of Births, Marriages and Burials, Class RG 6, Piece 926). After William King I's death, the firm was run as a partnership between his sons Joseph and William, trading as *J & W King* (*Aris's Birmingham Gazette*, 1 January 1838, 4). William King II died in 1850, and the brickworks passed to his nephews William King Perrens and George King Harrison, who traded as *Perrens & Harrison*. This company exhibited widely, notably in Paris in 1855 and 1878, London in 1862, and Sidney in 1875. Their products were exported internationally, some as far as the Empire of Japan in 1879. Perrens retired in 1875, leaving Harrison to continue trading as *George King Harrison* (Sallery 2022a). By 1904, *George King Harrison* had become a limited company, which operated until 1963 (*County Advertiser & Herald for Staffordshire and Worcestershire*, 30 July 1904, 4; Dudley Archives ref. DBCM/1). The *Perrens & Harrison* firebrick was a large flat slab, used in blocking wall 4041; the *George King Harrison* bricks, which were all standard nine-inch firebricks, were used in retort benches 3028 and 4065. The *J & W King* brick was used in flue 1015.

6.3.6 *Harris & Pearson* was another Stourbridge fireclay mining and firebrick manufacturing company, which was founded by Peter Harris and George Pearson in 1852. During the early 1930s, the company became part of *E. J. and J. Pearson Ltd*, though they continued trading as *Harris and Pearson Ltd* until production ceased in 1968 (Grace's Guide 2022b; Cooksley 2022). The Harris & Pearson brick was used in the construction of retort bench 4006.

6.3.7 *Hickman & Co*. of Lye, near Stourbridge, was founded some time before 1852, by which date they were producing gas retorts *of less creditable appearance* than their competitors (*Gateshead Advertiser*, 14 August 1852, 3). There are records of a firebrick manufacturer in Lye named Edward Hickman, who died before 1830 (*Aris's Birmingham Gazette*, 15 March 1830, 4), and a fireclay merchant named Richard Hickman from the same area, who was active in 1845 (*Leamington Spa Courier*, 9 November 1844, 3). It seems probable that Hickman & Co. was another long-running family business, which was probably established in the early 19th century. The company remained active until at least 1915 (*County Express*, 9 January 1915, 5), but probably closed soon after. The Hickman & Co. brick was recovered from flue 1008.

6.3.8 *Mobberley & Perry* were operating from Lye by 1873 (*County Advertiser & Herald for Staffordshire and Worcestershire*, 27 December 1873, 5), and by 1912 they had become a limited company (*Dudley Chronicle*, 12 October 1912, 10). Mobberley & Perry Ltd were acquired by *J. T. Price & Co*. in 1957 (*Birmingham Daily Post*, 1 May 1957, 23). The

company's drying sheds were destroyed in a major fire in 1963 (*Birmingham Daily Post*, 18 February 1963, 7), and probably closed soon after. The collected Mobberley & Perry bricks were all large voussoir blocks, which were recovered as unstratified finds from modern demolition debris. These bricks would have been used to line gas retort ovens. Mobberley & Perry bricks were also used in the construction of retort benches 3025 and 4062, though these were not collected.

*Dudley bricks*

6.3.9 *Gibbons (Dudley) Ltd* was founded by Benjamin Gibbons in 1834 and became a limited company in 1919. The company specialised in the production of fireclay products for industrial use, particularly for gas retorts. The company closed in 1999 (Black Country History 2022; Grace's Guide 2022a; Companies House 2022a). The *Gibbons (Dudley) Ltd* bricks were all recovered as unstratified finds.

*Northumberland brick*

6.3.10 One of the gas oven voussoir bricks was marked *SUPERAXE*. This was a product of *The Burn Fireclay Co. Ltd* of Stobswood Colliery, Northumberland. This company was established as *Rayne and Burn Fireclay Co.*, *c*. 1859, and was incorporated as *The Burn Fireclay Company Ltd* in 1936. The company was liquidated in 1999 (Sallery 2022b; Northumberland Archives ref. NRO 00438/C; Companies House 2022b). The *SUPERAXE* brick, which would have been used to line gas retort ovens, was recovered as an unstratified find.

## 6.4 Discussion

6.4.1 The finds from 65 Avon Street date from the operation of the gasworks (1821–1961). The earliest finds, which comprise a small assemblage of pottery wasters dating from *c*. 1821, are likely to have been imported onto the site as industrial waste used to reclaim the low-lying land of St Philip's Marsh. The other finds comprise the bases of three redware vessels, and a collection of marked firebricks used in the construction of gas retort ovens and associated flue systems. The earliest bricks probably date from 1821, the others date from the later 19th to mid-20th centuries.

6.4.2 Marked firebricks provide direct dating for some of the structures within the gasworks, and evidence for the trading networks used by the Bristol Gas Light Company, and its successor businesses during the 19th and 20th centuries. All the firebricks were imported from specialist manufacturers, mostly from Stourbridge and Dudley in the West Midlands, but also from Northumberland. The use of firebricks from different companies in the same structures suggests that the bricks were either supplied by middlemen, who scoured their products from several brickyards, or that individual brickmakers supplemented their stock with bricks from other works to meet an order.

6.4.3 Although Bristol had its own local fireclay industry, industrial customers appear to have favoured bricks from either Stourbridge or Scotland, examples of this can be found at the Blackswarth Lead Works (*Bristol Times and Mirror*, 11 June 1883, 8), Bedminster Smelting Works (Wessex Archaeology 2022b, 28–30), Barton Hill Pottery (Mason 2017, 117), and Powell & Rickett's Bottle Works (Gregory *et al*. 2018, 267)

6.4.1 The firebricks indicate that flue 4067 post-dates 1802; flue 1015 post-dates 1818; retort bench 4006 post-dates 1852; and retort benches 3028 and 4065 post-date 1875.

6.4.2 The three redware vessels are very similar to a large group of incomplete pots, described as 'ledged vessels', that were recovered from a redware kiln waste dump at nearby Glass

Wharf, Avon Street (Jackson and Gregory, 2019, 120, fig. 4, nos 6 and 7). These vessels were found in large quantities throughout the waster dump, and were interpreted as having a specialised, though undetermined function. The wasters at Glass Wharf are likely to have originated from one of two potteries nearby that operated between *c.* 1760 and 1842 (*ibid*., 122). The three vessels from 65 Avon Street were found in an mid-1850s made ground deposit, which suggests that they were either redeposited from elsewhere after the above potteries closed, or that they originated from one of the other two Avon Street redware potteries that were active between 1815 and 1890 (Mason 2017, fig. 3). Although the function of these vessels remains unknown, it is probable that they were used in an industrial process.

# 7 CONCLUSIONS

## 7.1 Summary

7.1.1 The Bristol Gas Light Company retort house was a large horseshoe-shaped building set within a high walled yard. Other gasworks structures, including coke stores, stables, workshops, offices, gasholders, purifiers, scrubbers, and a meter house, were located elsewhere in the yard: none of the latter structures are extant. During the mid-1850s, the inner yard of the retort house was roofed over for use as a coal store. Coal gas production on the site probably ceased in the early 1900s, though gas manufacturing continued in other parts of the works until the 1950s. The north-east and south-east ranges of the retort house were demolished in the early 1920s and the building was converted for use as a gas cooker workshop and pipe store. Between 1961 and 2020, the building was used as an automotive garage.

7.1.2 The watching brief uncovered extensive structural remains associated with 19th-century gas production and the later use of the building as a gas company store and workshop. This included the foundations of a brick and stone weighbridge, five gas retort benches, and the walls of demolished parts of the retort house and gasworks offices. An extensive system of underground brick-lined flues; large cast iron gas pipes; brick, sandstone sett, fireclay slab, and concrete floor and yard surfaces; and the base of a large early 20th-century ‘cooker incinerator’ were also recorded.

7.1.3 The finds assemblage included a collection of firebricks and fireclay mouldings from the gasworks retort ovens and flues, and a small collection of pottery, including some locally produced early 19th-century wasters.

## 7.2 Discussion

7.2.1 The 1821 retort house was designed with a single 30 m high chimney that served all eight of the original retort benches, each of which would have been fitted with eight retort ovens heating between 24 and 56 gas retorts. Smoke from the ovens was transmitted to the chimney via a system of underground flues. During the mid-1850s, the flue system was reconfigured, possibly with the aim of improving draw. This effort does not appear to have been entirely successful, and by the end of the 19th century, the large shared chimney appears to have been replaced by eight smaller chimneys located next to their respective retort benches.

7.2.2 It is likely that the gas purification equipment was originally housed in the north-east range of the retort house, but by 1854 these processes were being undertaken in purpose-built structures elsewhere in the gasworks. By 1860, an additional two retort benches had been built in the north-east range of the retort house. These retort benches were built to the same simple design as the earlier examples. Hand charged retort ovens appear to have

remained in use until *c*. 1901, by which date they became superfluous following the installation of mechanically fed inclined retorts on the opposite side of Avon Street. Routine gas production in the 1821 retort house probably ceased around this time, though the plant may have been kept serviceable to cope with peak demand during cold spells. During the mid-1920s, the south-east and north-east ranges of the retort house were demolished, and the gas making equipment was dismantled to allow the remaining parts of the building to be used as a workshop and store. Gas production at the Avon Street works did not entirely cease: the inclined retorts on the south-west side of the street continued to make coal gas, and new buildings, housing carburettor water gas (CWG) plant were built to the south of the original works.

7.2.3 The excavated remains at Avon Street can usefully be compared with remains from other excavated gasworks, such the 1813 Curtain Road Gasworks, London (Museum of London Archaeology [MOLA] 2016); the 1817 Temple Back Gasworks, Bristol (BaRAS 2000 and 2004; the 1819 Gas Street Gasworks, Birmingham (Birmingham University Field Archaeology Unit [BUFAU] 2001); the 1822 Ansell Road Gasworks, Saltisford (Cambrian Archaeological Projects [CAP] 2005); and the 1824 Cannons Marsh Gasworks, Bristol (RemedX 1998 and 2005).

7.2.4 Many gasworks retort benches were constructed with arched cellars below the retort ovens. These were sometimes used as a place where hot coke could be raked out and quenched. An arched cellar at the Ansell Road Gasworks was tentatively identified as this type of structure (CAP 2005, 16, fig. 10, plates 25, 28, and 30–2), however given the lack of stepped access, it is more likely to have been a tar or liquor tank. More convincing examples were recorded at Cannons Marsh (RemedX 2005, 31, fig. 13–14) and Gas Street (BUFAU 2001, fig. 3). The Canons Marsh works was built as an oil gas rather than coal gas works, though much of the technology, including the basic design of the retort benches, was common to both. The retort benches at Avon Street had a much simpler design, with shallow ash pits below ground level ovens, with no cellars below. An example of this type of retort bench is depicted in Thomas (2013, fig. 5). This design seems to have been used throughout the life of the Avon Street works. A possible retort bench at Curtain Road (MOLA 2016, 24, fig. 12), may have been built to this simpler design, but it was too heavily truncated to be certain. No retort benches were identified at the Temple Back or the Ansell Road works.

7.2.5 The only one of the above sites with underground flues was Curtain Road: this had similar tubular firebrick-lined flues to Avon Street (MOLA, 24, figs 12 and 36). This type of flue was widely used in 18th- and 19th-century industrial sites, nearby examples include the Bedminster Smelting Works (Wessex Archaeology 2022) and Powell & Ricketts' Bottle Works (Gregory et al. 2018). Some of the above gasworks contained tanks associated with the wet lime process (MOLA 2016, 68, figs 12 and 37–8), and gasholders (BUFAU 2001, fig. 8; BaRAS 2005, fig. 10, plates 9–10; RemedX 2005, figs. 7–8, CAP 2005, fig. 8, plates 7–16). Similar features will exist elsewhere within the former Avon Street gasworks site, but none were identified during the watching brief.

7.2.6 By 1961, the former retort house and coal store was being used as a garage, but some large pieces of gas infrastructure, including two gasholders, survived until 2016. The whole of the former gasworks will eventually be redeveloped as part of Bristol University's new Temple Quarter Campus, and it is perhaps fitting that the 1821 retort house – an example of cutting-edge Georgian technology – has been repurposed as the Bristol Digital Futures Institute, a hub for the developing technologies of the 21st century.

# 8 ARCHIVE STORAGE AND CURATION

## 8.1 Museum

8.1.1 The archive resulting from the watching brief is currently held at the offices of Wessex Archaeology in Bristol. Bristol Museum and Art Gallery has agreed in principle to accept the archive on completion of the project, under the accession code BRSMG 2021.34. Deposition of any finds with the museum will only be carried out with the full written agreement of the landowner to transfer title of all finds to the museum.

## 8.2 Preparation of the archive

*Physical archive*

8.2.1 The physical archive, which includes paper records, and graphics, will be prepared following the standard conditions for the acceptance of excavated archaeological material by Bristol Museum and Art Gallery, and in general following nationally recommended guidelines (SMA 1995; CIfA 2014c; Brown 2011).

8.2.2 All archive elements will be marked with accession code BRSMG 2021.34, and a full index will be prepared. The physical archive currently comprises the following:

- 1 files/document cases of paper records

*Digital archive*

8.2.3 The digital archive generated by the project, which comprises born-digital data (e.g., site records, survey data, databases and spreadsheets, photographs and reports), will be deposited with a Trusted Digital Repository, in this instance the Archaeology Data Service (ADS), to ensure its long-term curation. Digital data will be prepared following ADS guidelines (ADS 2013 and online guidance) and accompanied by metadata.

## 8.3 Selection strategy

8.3.1 It is widely accepted that not all the records and materials (artefacts and ecofacts) collected or created during the course of an archaeological project require preservation in perpetuity. These records and materials will be subject to selection in order to establish what will be retained for long-term curation, with the aim of ensuring that all elements selected to be retained are appropriate to establish the significance of the project and support future research, outreach, engagement, display and learning activities, ie the retained archive should fulfil the requirements of both future researchers and the receiving Museum.

8.3.2 The selection strategy, which details the project-specific selection process, is underpinned by national guidelines on selection and retention (Brown 2011, section 4) and generic selection policies (SMA 1993; Wessex Archaeology's internal selection policy) and follows CIfA's 'Toolkit for Selecting Archaeological Archives'. It should be agreed by all stakeholders (Wessex Archaeology's internal specialists, external specialists, local authority, museum) and fully documented in the project archive.

8.3.3 In this instance, given the relatively low level of finds recovery, the selection process has been deferred until after the fieldwork stage was completed. Project-specific proposals for selection are presented below. These proposals are based on recommendations by Wessex Archaeology's internal specialists and will be updated in line with any further comment by other stakeholders (museum, local authority). The selection strategy will be fully documented in the project archive.

8.3.4 Any material not selected for retention may be used for teaching or reference collections by Wessex Archaeology.

*Finds*

8.3.5 The finds assemblage recovered during the watching brief was small. The finds date from the 19th and 20th centuries and are associated with the Avon Street gasworks, operating 1821–1961, and other nearby industrial premises (building materials, pottery wasters, and a leather shoe). The small pottery assemblage comprises common ware types that are well represented in other local assemblages. It is proposed that none of the finds are retained.

*Documentary records*

8.3.6 Paper records comprise site registers (other pro-forma site records are digital), drawings and reports (Written Scheme of Investigation, client report). All will be retained and deposited with the project archive.

*Digital data*

8.3.7 The digital data comprise site records (tablet-recorded on site) in spreadsheet format; finds records in spreadsheet format; survey data; photographs; reports. All will be deposited, although site photographs will be subject to selection to eliminate poor quality and duplicated images, and any others not considered directly relevant to the archaeology of the site.

### 8.4 Security copy

8.4.1 In line with current best practice (eg, Brown 2011), on completion of the project a security copy of the written records will be prepared, in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

### 8.5 OASIS

8.5.1 An OASIS (online access to the index of archaeological investigations) record (http://oasis.ac.uk) has been initiated, with key fields completed (Appendix 3). A.pdf version of the final report will be submitted following approval by the Principal Historic Environment Officer on behalf of the LPA. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service (ADS) ArchSearch catalogue.

## 9 COPYRIGHT

### 9.1 Archive and report copyright

9.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act 1988* with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations 2003*.

9.1.2 Information relating to the project will be deposited with the Historic Environment Record (HER) where it can be freely copied without reference to Wessex Archaeology for the purposes of archaeological research or development control within the planning process.

## 9.2 Third party data copyright

9.2.1 This document and the project archive may contain material that is non-Wessex Archaeology copyright (eg, Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material.

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## APPENDICES

### Appendix 1 Context summary

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **1000** | **Masonry** | **Floor surface** | **n/a** |
| Concrete floor. 0.1 m thick. | | | |
| **1001** | **Layer** | **Bedding layer** | **n/a** |
| Dark red fine to coarse angular gravel. | | | |
| **1002** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from small rectangular sandstone cobbles, bonded with hard dark grey lime mortar. Maximum thickness 0.1 m. | | | |
| **1003** | **Layer** | **Bedding layer** | **n/a** |
| Very dark grey compact sand, clinker, ash and mortar with frequent sand and fine gravel sized flecks of lime, brick, clinker, and stone inclusions. | | | |
| **1004** | **Layer** | **Made ground** | **n/a** |
| Pink mortar, sand, and fine to medium brick and stone gravel with frequent flecks of lime. | | | |
| **1005** | **Masonry** | **Wall** | **n/a** |
| Aligned North-east / south-west with straight sides and an unknown base. Constructed from sandstone and bonded with dark grey lime mortar. | | | |
| **1006** | **Masonry** | **Flue** | **n/a** |
| Access chamber into underground flue. Constructed from yellow firebricks, with plate iron capping. Bonded with pink lime mortar and red sand. Maximum height: >2.2 m. | | | |
| **1007** | **Masonry** | **Floor surface** | **n/a** |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| Concrete floor. 0.1 m thick. | | | |
| **1008** | **Masonry** | **Flue** | **n/a** |
| North-east to south-west aligned underground flue with straight sides and an unknown base. Constructed from firebricks, with iron plate capping. Bonded with red sand, and pink lime mortar with lime, sand, and fine gravel inclusions. Maximum height: 2.2 m. | | | |
| **1009** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from fireclay paving slabs, bonded with grey lime mortar. Maximum thickness 0.11 m. | | | |
| **1010** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from fireclay paving slabs, bonded with grey lime mortar. Maximum thickness 0.11 m. | | | |
| **1011** | **Metal** | **Fixture** | **n/a** |
| Metal fixture of uncertain purpose in floor. | | | |
| **1012** | **Metal** | **Fixture** | **n/a** |
| Metal fixture of uncertain purpose in floor. | | | |
| **1013** | **Layer** | **Floor surface** | **n/a** |
| Concrete floor. 0.1 m thick. | | | |
| **1014** | **Masonry** | **Floor surface** | **n/a** |
| Concrete floor. 0.1 m thick. | | | |
| **1015** | **Masonry** | **Flue** | **n/a** |
| North-east to south-west aligned underground flue with straight sides and an unknown base. Constructed from yellow firebricks, bonded with red sand. Maximum height: 2 m. | | | |
| **1016** | **Masonry** | **Building** | **n/a** |
| North-east to south-west aligned building inside the coal store. Constructed from concrete and machine-made bricks, bonded with Portland cement. Ceramic drains embedded in the floor. | | | |
| **1017** | **Masonry** | **Floor surface** | **n/a** |
| Concrete floor. 0.2 m thick. | | | |
| **1018** | **Metal** | **Pipe** | **n/a** |
| North-east to south-west aligned cast iron pipe. | | | |
| **1019** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from large square fireclay slabs, bonded with grey lime mortar. Maximum thickness 0.11 m. | | | |
| **1020** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from sandstone setts, bonded with grey lime mortar. Maximum height: Maximum thickness 0.14 m. | | | |
| **1021** | **Masonry** | **Access hole** | **1075** |
| Aligned east-west. Constructed from brick and bonded with Portland cement. | | | |
| **1022** | **Masonry** | **Foundation** | **n/a** |
| Linear wall foundation aligned north-east to south-west with straight sides. Constructed from Pennant Sandstone and bonded with grey lime mortar. Maximum height: 1 m. | | | |
| **1023** | **Masonry** | **Flue** | **n/a** |
| Access hole at south-west terminus of underground flue. Constructed from yellow firebricks and capped with two large interlocking fireclay slabs, bonded with lime mortar. | | | |
| **1024** | **Masonry** | **Flue** | **n/a** |
| Opening into north-west end of underground flue. Aligned north-east to south-west with straight sides and an unknown base. Constructed from yellow firebricks bonded with red sand and white lime mortar. Maximum height: 1 m. | | | |
| **1025** | **Masonry** | **Flue** | **n/a** |
| Opening into north-west end of underground flue. Aligned North-east to south-west with straight sides and an unknown base. Constructed from yellow firebricks. Maximum height: >1 m. | | | |
| **1026** | **Masonry** | **Drain** | **1075** |
| Modern ENE-WSW aligned drainpipe encased in concrete. | | | |
| **1027** | **Masonry** | **Floor surface** | **n/a** |
| Concrete floor. Maximum thickness: 0.20 m. | | | |
| **1028** | **Layer** | **Layer** | **n/a** |
| Blackish brown cinders (80%) and sand. | | | |
| **1029** | **Masonry** | **Structure** | **1030** |
| Rectangular north-west to south-east aligned structure of unknown purpose. Constructed from a single layer of red bricks bonded with lime mortar. Maximum height: 0.1 m. | | | |
| **1030** | **Cut** | **Construction cut** | **1029, 1034, 1041** |
| Rectangular construction cut for structure 1029, with vertical, straight sides and a flat base. | | | |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **1031** | **Layer** | **Made ground** | **n/a** |
| Mixed clay, cinders, and mortar. | | | |
| **1032** | **Layer** | **Bedding layer** | **1030** |
| Grey clay with mortar and sandstone fragments. | | | |
| **1033** | **Layer** | **Deliberate backfill** | **n/a** |
| Black cinders with sandstone fragments. | | | |
| **1034** | **Layer** | **Deliberate backfill** | **1030** |
| Dark grey sand, silt, and clinker, infilling structure 1029. | | | |
| **1035** | **Fill** | **Deliberate backfill** | **1038** |
| Reddish brown silty sand with occasional mortar fragments, and rare cinders | | | |
| **1036** | **Layer** | **Made ground** | **n/a** |
| Greyish black clay with mortar flecks. | | | |
| **1037** | **Layer** | **Made ground** | **n/a** |
| Dark grey silty sand, clinker with brick, tile, slag, and stone rubble inclusions. | | | |
| **1038** | **Cut** | **Pit** | **1035** |
| North-east to south-west aligned cut along north-west side of coal store. Possible underpinning trench. Length: >1 m. Width: 1.5 m. Depth: 0.8 m. | | | |
| **1039** | **Cut** | **Pit** | **1040** |
| North-east to south-west aligned cut along the north-west side of the coal store. Possible underpinning trench. Length: >1 m. Width: 1.50 m. Depth: 0.80 m. | | | |
| **1040** | **Fill** | **Deliberate backfill** | **1039** |
| Broken ceramic 19th/20th-century Double Roman roof tiles (75%) mixed with black silty sand. | | | |
| **1041** | **Layer** | **Layer** | **n/a** |
| Spread of white lime mortar | | | |
| **1042** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from sandstone setts and bonded with pale grey lime mortar. Maximum thickness: 0.15 m. | | | |
| **1043** | **Masonry** | **Wall foundation** | **n/a** |
| Linear wall foundation aligned north-east to south-west with straight sides and a flat base. Constructed from sandstone rubble and bonded with pale pinkish brown lime mortar. Maximum height: 0.8 m. | | | |
| **1044** | **Fill** | **Deliberate backfill** | **1045** |
| Mid greyish brown silty sand with abundant broken ceramic 19th/20th-century Double Roman roof tiles. Large angular sandstone boulders in lower down. | | | |
| **1045** | **Cut** | **Pit** | **1044** |
| Rectangular north-east to south-west aligned with vertical straight sides. Length: 6.3 m. Width: 1.5 m. Depth: 0.8 m. | | | |
| **1046** | **Layer** | **Made ground** | **n/a** |
| Dark brownish grey silty sand with common angular stone and gravel | | | |
| **1047** | **Masonry** | **Flue** | **n/a** |
| Underground north-west to south-east and north-east to south-west aligned flue. Constructed from yellow firebricks, bonded with red sand and pinkish lime mortar. | | | |
| **1048** | **Masonry** | **Foundation** | **n/a** |
| Linear wall foundation aligned north-west to south-east with straight sides and an unknown base. Constructed from sandstone rubble and bonded with grey lime mortar. Maximum height: 0.1 m. | | | |
| **1049** | **Layer** | **Made ground** | **n/a** |
| Black, grey, and white clinker, ash, and lime. | | | |
| **1050** | **Fill** | **Deliberate backfill** | **1051** |
| Dark grey and pinkish brown lime mortar lumps, mixed with ash and clinker, with common angular stone rubble inclusions. | | | |
| **1051** | **Cut** | **Robber cut** | **1050** |
| Linear robber cut aligned north-east to south-west with vertical, straight sides and a flat base. Length: >1.20 m. Width: >0.40 m. Depth: 0.50 m. | | | |
| **1052** | **Masonry** | **Foundation** | **n/a** |
| Linear wall foundation aligned north-east to south-west and south-east to north-west with straight sides and an unknown base. Constructed from sandstone and bonded with pinkish brown lime mortar. Maximum height: >0.05 m. | | | |
| **1053** | **Layer** | **Made ground** | **n/a** |
| Dark greyish brown and dark red sand, silty sand, clinker and ash with common angular stone and sub-angular clinker and slag | | | |
| **1054** | **Masonry** | **Flue** | **1089** |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| Linear east-west aligned underground flue with straight sides and a flat base. Constructed from firebricks, bonded with red sand and white lime mortar. | | | |
| **1055** | **Masonry** | **Floor surface** | **n/a** |
| Red concrete floor. | | | |
| **1056** | **Masonry** | **Foundation** | **n/a** |
| Linear north-east to south-west aligned wall foundation. Constructed from sandstone and bonded with white lime mortar. | | | |
| **1057** | **Masonry** | **Access hole** | **1058** |
| Rectangular access hole with straight sides. Constructed from red brick and bonded with Portland cement. Maximum height: >0.08 m. | | | |
| **1058** | **Cut** | **Construction cut** | **1057** |
| Rectangular construction cut for access hole 1057. | | | |
| **1059** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from un-mortared sandstone setts. | | | |
| **1060** | **Masonry** | **Drain** | **1062** |
| Linear north-east to south-west aligned drain with straight sides and a flat base. Constructed from brick with sandstone capstones, all bonded with grey lime mortar. Maximum height: 0.7 m. | | | |
| **1061** | **Masonry** | **Drain** | **n/a** |
| L-shaped drain with straight sides and a flat base. Constructed from sandstone and bonded with grey lime mortar. | | | |
| **1062** | **Cut** | **Drain** | **1060, 1063** |
| Linear drain aligned north-east to south-west with vertical, straight sides and a flat base. | | | |
| **1063** | **Fill** | **Deliberate backfill** | **1062** |
| Dark greyish brown silty sand. | | | |
| **1064** | **Masonry** | **Floor surface** | **n/a** |
| Constructed with red brick border and concrete centre. | | | |
| **1066** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red brick and yellow firebrick, bonded with grey lime mortar. | | | |
| **1067** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red bricks and bonded with grey silty mortar. Maximum height: 0.08 m. | | | |
| **1068** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red bricks and bonded with grey silty mortar. | | | |
| **1069** | **Masonry** | **Floor surface** | **n/a** |
| Concrete floor. | | | |
| **1070** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red bricks, bonded with grey lime mortar. | | | |
| **1071** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from un-mortared limestone slabs. | | | |
| **1072** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from sandstone setts bonded with dark grey lime mortar. | | | |
| **1073** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from bricks and bonded with grey lime mortar. | | | |
| **1075** | **Cut** | **Construction cut** | **1021, 1026** |
| Linear construction cut. Length: >7.2 m. Width: 1.1 m. | | | |
| **1076** | **Masonry** | **Access hole** | **1077** |
| Rectangular access hole with straight sides and a flat base. Constructed from concrete and brick, bonded with Portland cement. Maximum height: 0.9 m. | | | |
| **1077** | **Cut** | **Construction cut** | **1076** |
| Rectangular construction cut with vertical, straight sides and a flat base. Length: >2.6 m. Width: 3.15 m. Depth: 0.9 m. | | | |
| **1078** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from bricks and cobbles and bonded with grey lime mortar. | | | |
| **1079** | **Masonry** | **Floor Surface** | **n/a** |
| Concrete floor. | | | |
| **1080** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from sandstone setts bonded with pinkish grey lime mortar. Maximum thickness: 0.12 m. | | | |
| **1081** | **Masonry** | **Drain** | **n/a** |
| Drain. Constructed from sandstone rubble, bonded with pale grey lime mortar. | | | |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **1082** | **Group** | **Floor surface** | **n/a** |
| Brick and sandstone sett floor within the coal store, probably laid during the late 1850s.<br><br>Group components: 1072,1009,1070,1059,1010,1067,1073,1071,1042,1002,1019,1003,1014,1020,1066,1080 | | | |
| **1083** | **Group** | **Retort house** | **n/a** |
| Gasworks retort house, constructed of stone in 1821. Lean-to structures on north-east, north-west, and south-east sides (group 1085 and 4040) are probably contemporary.<br><br>Group components: 4023,4048,4036,1005,3031,4056 | | | |
| **1084** | **Group** | **Flue** | **n/a** |
| Underground brick flue in coal store, probably constructed in the late 1850s. Cuts demolished lean-to coal store (group 1085).<br><br>Group components: 1024,1015,1025,1008,1006,1023 | | | |
| **1085** | **Group** | **Foundation** | **n/a** |
| Wall foundations for lean-to coal stores, probably constructed in 1821.<br><br>Group components: 1043,1022,1048,1056,1052 | | | |
| **1086** | **Group** | **Floor surface** | **n/a** |
| Early/mid-20th-century concrete repairs to coal store floor (group 1082).<br><br>Group components: 1064,1007,1079,1013,1027,1069,1017 | | | |
| **1087** | **Group** | **Flue** | **n/a** |
| Underground brick flue from north-west range of the retort house to chimney at the north-east end of coal store. Cut by access hole 1058.<br><br>Group components: 1089,1047 | | | |
| **1088** | **Group** | **Drain** | **n/a** |
| Stone-lined drain in coal store. Mid/late 19th century.<br><br>Group components: 1060, 1061, 1062 | | | |
| **1089** | **Cut** | **Construction cut** | **n/a** |
| Linear construction cut aligned north-west to south-east with vertical, straight sides. Length: >4.4 m. Width: >1.8 m. Depth: 1 m. | | | |
| **1090** | **Fill** | **Deliberate backfill** | **1089** |
| Dark red sand with frequent lumps of pink and white lime mortar. | | | |
| **1091** | **Group** | **Made ground** | **n/a** |
| Made ground below coal store. Probably deposited in 1821.<br><br>Group components: 1037, 1053 | | | |
| **2000** | **Masonry** | **Floor Surface** | **n/a** |
| Reinforced concrete floor. Maximum thickness: 0.14 m. | | | |
| **2001** | **Layer** | **Bedding layer** | **n/a** |
| Reddish brown angular gravel. | | | |
| **2002** | **Masonry** | **Floor surface** | **n/a** |
| Yard surface. Constructed from un-mortared sandstone setts. Maximum thickness: 0.19 m. | | | |
| **2003** | **Layer** | **Bedding layer** | **n/a** |
| Mid grey lime mortar with abundant clinker inclusions. | | | |
| **2004** | **Layer** | **Made ground** | **n/a** |
| Black ash and clinker with sparse copper slag inclusions. | | | |
| **2005** | **Layer** | **Made ground** | **n/a** |
| Dark red and black sandy clay and gravel with abundant brick fragments. | | | |
| **2006** | **Metal** | **Pipe** | **2007** |
| NNW-SSE aligned, 800 mm diameter, cast iron gas pipe. | | | |
| **2007** | **Cut** | **Pipe trench** | **2006, 2008, 2029** |
| Linear north-south aligned pipe trench with vertical, straight sides. Length: >2 m. Width: >0.8 m. Depth: >0.7 m. | | | |
| **2008** | **Fill** | **Deliberate backfill** | **2007** |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| Black sand and clinker. | | | |
| **2009** | **Metal** | **Pipe** | **n/a** |
| North-east to south-west aligned, 40 mm diameter, lead water pipe. | | | |
| **2010** | **Metal** | **Pipe** | **2011** |
| East-west aligned, 100 mm diameter, cast iron gas or water pipe. | | | |
| **2011** | **Cut** | **Pipe trench** | **2010** |
| Linear east-west aligned pipe trench with vertical, straight sides and a concave base. Length: >1.70 m. Width: 0.50 m. Depth: 0.50 m. | | | |
| **2012** | **Fill** | **Deliberate backfill** | **2011** |
| Grey, black and pale brown sand, mortar, clinker, and slag with frequent fine to coarse gravel sized stones and clinker | | | |
| **2013** | **Masonry** | **Structure** | **2014** |
| Rectangular structure aligned north-east to south-west with straight sides and a flat base. Constructed from concrete and brick bonded with Portland cement. Maximum height: 0.45 m. | | | |
| **2014** | **Cut** | **Construction cut** | **2013, 2015** |
| Rectangular construction cut aligned north-east to south-west with straight sides. | | | |
| **2015** | **Fill** | **Deliberate backfill** | **2014** |
| Dark brown compact sand. | | | |
| **2016** | **Layer** | **Demolition layer** | **n/a** |
| Grey sandy silt with abundant angular brick, stone, and concrete rubble inclusions. | | | |
| **2017** | **Metal** | **Pipe** | **n/a** |
| NNW-SSE aligned, 80 mm diameter, lead water pipe. | | | |
| **2018** | **Metal** | **Pipe** | **n/a** |
| NNW-SSE aligned, 80 mm diameter, lead water pipe. | | | |
| **2019** | **Masonry** | **Weighbridge** | **n/a** |
| Rectangular north-east to south-west aligned structure with straight sides and a flat base. Constructed from sandstone (sides) and brick (floor), bonded with black ash mortar. Maximum height: 0.45 m. | | | |
| **2021** | **Metal** | **Pipe** | **2022** |
| North-east to south-west aligned, 100 mm diameter iron water, gas, or fuel pipe. | | | |
| **2022** | **Cut** | **Pipe trench** | **2021** |
| Linear utility trench aligned N-S with steep, straight sides and an irregular / undulating base. | | | |
| **2023** | **Fill** | **Deliberate backfill** | **2022** |
| Dark greyish brown slit loam with brick and stone inclusions. | | | |
| **2024** | **Metal** | **Pipe** | **n/a** |
| Linear gas pipe aligned NW to SE with straight sides and a concave base. Constructed from iron. | | | |
| **2025** | **Masonry** | **Wall** | **n/a** |
| Linear wall aligned NW to SE with straight sides and an irregular / undulating base. Constructed from brick and bonded with whitish grey silty lime mortar. Maximum height: 0.37 m. | | | |
| **2026** | **Metal** | **Pipe** | **n/a** |
| North-east to south-west aligned, 450 mm diameter, cast iron gas pipe. | | | |
| **2027** | **Masonry** | **Wall** | **n/a** |
| Linear wall aligned NE to SW with straight sides and an unknown base. Constructed from stone and bonded with grey silty mortar. | | | |
| **2028** | **Masonry** | **Electric cable** | **n/a** |
| North-east to south-west armoured electric cable. | | | |
| **2029** | **Masonry** | **Pipe** | **n/a** |
| NNW-SSE aligned, 800 mm diameter, cast iron gas pipe. | | | |
| **2030** | **Masonry** | **Wall foundation** | **n/a** |
| Curving WNW-ESE to NW-SE sandstone wall foundation. | | | |
| **2031** | **Masonry** | **Floor surface** | **n/a** |
| External pavement. Constructed from sandstone setts and bonded with grey silty cement. | | | |
| **2032** | **Metal** | **Iron kerb** | **n/a** |
| Curvilinear iron kerb aligned NW-SE to N-S, with straight sides and a flat base. Maximum height: >0.10 m. | | | |
| **2033** | **Masonry** | **Floor surface** | **n/a** |
| External yard surface. Constructed from stone setts, rounded like river cobbles in the drainage channel. red sandstone brick-sized cobbles in the road surface, bonded with grey mortar. | | | |
| **2034** | **Masonry** | **Floor surface** | **n/a** |
| External yard surface. Constructed from rounded sandstone setts, bonded with reddish mortar. | | | |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **2035** | **Metal** | **Stopcock** | **n/a** |
| Iron stopcock associated with buried lead water pipes. | | | |
| **2036** | **Masonry** | **Foundation** | **n/a** |
| Rectangular structure aligned north-east to south-west with straight sides and a flat base. Constructed from red brick bonded with Portland cement. Maximum height: 0.08 m. | | | |
| **2037** | **Masonry** | **Access hole** | **n/a** |
| Sub-rectangular access hole for underground petrol tank. Constructed from concrete with an iron access hole cover. | | | |
| **2038** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red brick. | | | |
| **2039** | **Masonry** | **Wall** | **n/a** |
| North-east to south-west aligned wall with straight sides and an unknown base. Constructed from sandstone bonded with lime mortar. Maximum height: 0.87 m. | | | |
| **2040** | **Masonry** | **Wall** | **n/a** |
| North-east to south-west aligned wall with straight sides and an unknown base. Constructed from sandstone bonded with lime mortar. Maximum height: 0.95 m. | | | |
| **2041** | **Masonry** | **Flue** | **n/a** |
| Linear north-east to south-west aligned underground flue. Constructed from firebricks bonded with red sand and pink lime mortar. Maximum height: 0.96 m. | | | |
| **2042** | **Layer** | **Floor surface** | **n/a** |
| Tarmac floor. | | | |
| **2043** | **Layer** | **Bedding layer** | **n/a** |
| Pale brown angular gravel. | | | |
| **2044** | **Layer** | **Made ground** | **n/a** |
| Mid brown silt mixed with brick and stone rubble with abundant angular brick and stone rubble. | | | |
| **2045** | **Masonry** | **Floor surface** | **n/a** |
| External yard surface. Constructed from red brick and yellow firebricks. | | | |
| **2046** | **Group** | **Building** | **n/a** |
| Gasworks office and entrance building, built in 1821.<br><br>Group components: 2025,2027,2030,2039, 2040 | | | |
| **2047** | **Group** | **Floor surface** | **n/a** |
| External yard surface, paved with sandstone setts. Probably laid in the late 1850s.<br><br>Group components: 2002 2003 2033 2034 | | | |
| **2048** | **Group** | **Structure** | **n/a** |
| 20th-century ramp into north-west range of the retort house.<br><br>Group components: 2036,2038,2014 | | | |
| **2049** | **Masonry** | **Floor surface** | **n/a** |
| Sandstone setts bedded on Portland cement. | | | |
| **3000** | **Masonry** | **Floor surface** | **n/a** |
| Concrete floor. | | | |
| **3001** | **Layer** | **Bedding layer** | **n/a** |
| Reddish brown silty gravel. | | | |
| **3002** | **Masonry** | **Floor Surface** | **n/a** |
| Constructed from brick and bonded with grey mortar. | | | |
| **3013** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-west to south-east. Constructed from firebricks bonded with lime mortar and red sand. | | | |
| **3015** | **Layer** | **Demolition layer** | **n/a** |
| Mid reddish brown sandy silt. | | | |
| **3016** | **Masonry** | **Retort bench** | **n/a** |
| Retort oven ash pit. Aligned north-east to south-west. Constructed from firebricks bonded with red sand and lime mortar. Large cast iron bars forming grate for ash pit. Maximum height: 0.45 m. | | | |
| **3017** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red brick bonded with Portland cement. Maximum thickness: 0.11 m. | | | |
| **3018** | **Layer** | **Made ground** | **n/a** |
| Mid greyish brown sandy silt. | | | |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **3019** | **Masonry** | **Floor Surface** | **n/a** |
| Constructed from red brick and bonded with Portland cement. Maximum thickness: 0.08 m. | | | |
| **3020** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from firebricks bonded with Portland cement. Maximum thickness: 0.06 m. | | | |
| **3021** | **Layer** | **Made ground** | **n/a** |
| Thin lenses of black, pale brown, and white sandy silt. | | | |
| **3022** | **Layer** | **Made ground** | **n/a** |
| Mid greyish brown sandy silt | | | |
| **3023** | **Layer** | **Made ground** | **n/a** |
| Mid reddish brown and blackish brown sandy silt. | | | |
| **3024** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-west to south-east. Constructed from yellow firebricks bonded with red sand. | | | |
| **3025** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-west to south-east. Constructed from yellow firebricks bonded with red sand. | | | |
| **3026** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-west to south-east. Constructed from yellow firebricks bonded with red sand. | | | |
| **3027** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-west to south-east. Constructed from yellow firebricks bonded with red sand. | | | |
| **3028** | **Masonry** | **Retort bench** | **n/a** |
| Retort oven ash pit. Aligned north-east to south-west. Constructed from firebricks, with large iron bars forming a fire grate over the ash pit. Maximum height: 0.9 m. | | | |
| **3029** | **Fill** | **Deliberate backfill** | **3054** |
| Mid reddish brown to black sandy silt. | | | |
| **3030** | **Masonry** | **Flue** | **n/a** |
| Underground north-east to south-west aligned flue. Constructed from firebricks bricks, with a sandstone rubble core bonded with lime mortar. Maximum height: 0.38 m. | | | |
| **3031** | **Masonry** | **Wall** | **n/a** |
| North-east wall of the retort house. Constructed from sandstone, bonded with grey lime mortar. Constructed in the 1920s. | | | |
| **3032** | **Masonry** | **Retort bench** | **n/a** |
| Constructed from yellow firebricks and red bricks, bonded with red clay. Maximum height: 0.11 m. | | | |
| **3033** | **Masonry** | **Cooker incinerator** | **3036** |
| Rectangular north-east to south-west aligned structure with a large central trough. Constructed from concrete. Maximum height: 0.35 m. | | | |
| **3034** | **Masonry** | **Wall** | **n/a** |
| South-west wall of the retort house. Constructed from sandstone, bonded with grey lime mortar. | | | |
| **3035** | **Masonry** | **Foundation** | **n/a** |
| North-west to south-east aligned foundation. Constructed from red brick, stretcher bonded with Portland cement. Maximum height: 0.3 m. | | | |
| **3036** | **Cut** | **Construction cut** | **3033** |
| Rectangular north-east to south-west aligned construction cut, with vertical, straight sides and a flat base. Length: >9.8 m. Width: 3.7 m. Depth: 0.4 m. | | | |
| **3037** | **Layer** | **Made ground** | **n/a** |
| Mid reddish brown sandy silt. | | | |
| **3040** | **Masonry** | **Floor surface** | **n/a** |
| Concrete floor. Maximum thickness: 0.1 m. | | | |
| **3041** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red brick. Maximum thickness: 0.1 m. | | | |
| **3042** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red brick. Maximum thickness: 0.1 m. | | | |
| **3043** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red brick. Maximum height: 0.1 m. | | | |
| **3044** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red brick. Maximum height: 0.1 m. | | | |
| **3045** | **Masonry** | **Retort bench** | **n/a** |
| Retort oven ash pit. Constructed from yellow firebricks with large iron bars forming a fire grate over the ash pit. Maximum height: 0.3 m. | | | |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **3046** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red brick. Maximum thickness: 0.1 m. | | | |
| **3047** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from brick. Maximum thickness: 0.1 m. | | | |
| **3048** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-west to south-east. Constructed from firebricks. | | | |
| **3049** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-west to south-east. Constructed from firebricks. Maximum height: 0.4 m. | | | |
| **3050** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-west to south-east. Constructed from firebricks. | | | |
| **3051** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red bricks and large square fireclay slabs, bonded with dark grey lime mortar. | | | |
| **3052** | **Masonry** | **Cooker incinerator** | **3053** |
| Aligned north-east to south-west. Constructed from concrete and red bricks bonded with Portland cement. | | | |
| **3053** | **Cut** | **Construction cut** | **3052** |
| Irregular construction cut. | | | |
| **3054** | **Cut** | **Uncategorised feature** | **3029** |
| Incomplete uncategorised feature with vertical, straight sides. Length: >2.1 m. Width: >1.55 m. Depth: 1 m. | | | |
| **3055** | **Group** | **Floor surface** | **n/a** |
| 20th-century brick floor abutting cooker incinerator 3052.<br><br>Group components: 3002,3051 | | | |
| **3056** | **Group** | **Retort bench** | **n/a** |
| 19th-century gas retort bench<br><br>Group components: 3016,3013 | | | |
| **3057** | **Group** | **Floor surface** | **n/a** |
| 20th-century brick floor between retort benches.<br><br>Group components: 3019,3040,3042,3017,3041 | | | |
| **3058** | **Group** | **Retort bench** | **n/a** |
| 19th-century retort bench at north-east end of the retort house. Abutted by ground make up layers 4024 and 4010, which form a base for ash pits Group 4079.<br><br>Group components: 3047,4014,3044,3046,4005,4013,3048,3049,4008,4026,3045,4027,3050 | | | |
| **3059** | **Group** | **Retort bench** | **n/a** |
| Mid-19th-century retort bench, heavily truncated by cooker incinerator 3060 and truncation cut 3054.<br><br>Group components: 3027,3025,3028,3026,3032,3024 | | | |
| **3060** | **Group** | **Incinerator** | **n/a** |
| Cooker incinerator. Pre-1933<br><br>Group components: 3053,3036 | | | |
| **4000** | **Layer** | **Floor surface** | **n/a** |
| Concrete floor. | | | |
| **4001** | **Layer** | **Bedding layer** | **n/a** |
| Angular orange gravel. | | | |
| **4002** | **Masonry** | **Wall** | **n/a** |
| Constructed from Pendant Sandstone rubble bonded with Portland cement. | | | |
| **4003** | **Fill** | **Deliberate backfill** | **4004** |
| Mid brownish red silty sand. | | | |
| **4004** | **Cut** | **Robber cut** | **4003** |
| Sub-circular robber cut with moderate, concave sides and a flat base. Length: 0.85 m. Width: 0.72 m. Depth: 0.46 m. | | | |
| **4005** | **Masonry** | **Retort bench** | **n/a** |
| Constructed from yellow firebricks bonded with grey lime mortar. | | | |
| **4006** | **Masonry** | **Retort bench** | **n/a** |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| Retort oven ash pit. Constructed from yellow firebricks, with Pennant Sandstone slabs for base of ash pit. Bonded with very hard lime mortar. Maximum height: 0.15 m. | | | |
| **4007** | **Layer** | **Deliberate backfill** | **n/a** |
| Mid greyish brown silty sand. | | | |
| **4008** | **Masonry** | **Retort bench** | **n/a** |
| Constructed from yellow firebricks, bonded with lime mortar. Maximum height: 0.14 m. | | | |
| **4009** | **Fill** | **Deliberate backfill** | **4012** |
| Concrete over unknown utility. | | | |
| **4010** | **Layer** | **Made ground** | **n/a** |
| Dark reddish brown silty sand. | | | |
| **4011** | **Layer** | **Made ground** | **n/a** |
| White lime, with occasional patches of bright Prussian blue ('Blue Billy'). | | | |
| **4012** | **Cut** | **Utility trench** | **n/a** |
| Utility trench. Length: >2 m. Width: 0.6 m. Depth: 0.23 m. | | | |
| **4013** | **Masonry** | **Retort bench** | **n/a** |
| Constructed from yellow firebricks. | | | |
| **4014** | **Masonry** | **Retort bench** | **n/a** |
| Constructed from limecrete. Maximum height: 0.25 m. | | | |
| **4015** | **Masonry** | **Foundation** | **4030** |
| Foundations of unknown purpose. Aligned north-east to south-west. Constructed from mix of broken brick and stone, with slag adherence around the base. Maximum height: 0.29 m. | | | |
| **4016** | **Layer** | **Made ground** | **n/a** |
| Mid brownish grey silty sand. | | | |
| **4017** | **Layer** | **Bedding layer** | **n/a** |
| Pale to dark grey lime mortar, fine gravel, clinker, and slag. | | | |
| **4018** | **Layer** | **Made ground** | **n/a** |
| Mid grey lime mortar with common angular stone and brick rubble inclusions. | | | |
| **4019** | **Layer** | **Made ground** | **n/a** |
| Dark grey and dark red sand gravel and slag with common slag and stone rubble. Complete bricks at top. | | | |
| **4022** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from firebricks bonded with cream coloured gritty lime mortar. Maximum height: 0.07 m. | | | |
| **4023** | **Masonry** | **Wall** | **n/a** |
| Linear wall aligned north-east to south-west, with straight sides and an unknown base. Constructed from Pennant Sandstone and bonded with lime mortar. Maximum height: 1.06 m. | | | |
| **4024** | **Layer** | **Made ground** | **n/a** |
| White lime. | | | |
| **4025** | **Layer** | **Made ground** | **n/a** |
| Pinkish red silty sand. | | | |
| **4026** | **Masonry** | **Retort bench** | **n/a** |
| Linear retort bench aligned north-east to south-west, with straight sides and a flat base. Constructed from firebricks, bonded with lime mortar. Maximum height: 0.9 m. | | | |
| **4027** | **Layer** | **Retort bench** | **n/a** |
| Limecrete foundation. Maximum height: 0.3 m. | | | |
| **4028** | **Cut** | **Uncategorised feature** | **4029** |
| Uncategorised feature with steep, concave sides. Width: 0.26 m. Depth: 0.21 m. | | | |
| **4029** | **Fill** | **Deliberate backfill** | **4028** |
| Mid brown silty sand. | | | |
| **4030** | **Cut** | **Construction cut** | **4015** |
| Linear construction cut aligned north-east to south-west. Depth: 0.13 m. | | | |
| **4031** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from brick and sandstone and bonded with white lime mortar. Maximum thickness: 0.10 m. | | | |
| **4032** | **Layer** | **Bedding layer** | **n/a** |
| White lime mortar. | | | |
| **4033** | **Layer** | **Made ground** | **n/a** |
| Black clinker and slag with abundant gravel to cobble sized slag inclusions. | | | |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **4034** | **Metal** | **Pipe** | **n/a** |
| North-east to south-west aligned, 600 mm diameter, gas pipe. Filled with coal tar. | | | |
| **4035** | **Masonry** | **Access hole** | **n/a** |
| Rectangular access hole with straight sides and an unknown base. Constructed from machine made brick and bonded with grey Portland cement. Maximum height: 0.6 m. | | | |
| **4036** | **Masonry** | **Wall** | **n/a** |
| Linear wall aligned north-west to south-east with straight sides and an unknown base. Constructed from sandstone and bonded with pale pinkish grey lime mortar. Maximum height: 0.8 m. | | | |
| **4037** | **Masonry** | **Retort bench** | **n/a** |
| Constructed from yellow firebricks, bonded with pinkish grey lime mortar. Maximum height: 0.6 m. | | | |
| **4038** | **Masonry** | **Floor surface** | **n/a** |
| Concrete floor. Maximum thickness: 0.1 m. | | | |
| **4039** | **Layer** | **Deliberate backfill** | **n/a** |
| Black coal and clinker with abundant brick and fine to coarse gravel. | | | |
| **4040** | **Masonry** | **Wall** | **n/a** |
| Linear wall with straight sides and an unknown base. Constructed from sandstone and bonded with brownish grey lime mortar. Maximum height: 0.1 m. | | | |
| **4041** | **Masonry** | **Blocked doorway** | **n/a** |
| Rectangular blocked doorway aligned north-south with straight sides and an irregular base. Constructed from red brick and yellow firebricks and large fireclay slabs bonded with white lime mortar. Maximum height: 0.30 m. | | | |
| **4042** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from mixture of bricks and stone slabs. Maximum thickness: 0.11 m. | | | |
| **4043** | **Masonry** | **Step** | **n/a** |
| Rectangular step with straight sides and a flat base. Constructed from red bricks and yellow firebricks and bonded with white lime mortar. Maximum height: 0.18 m. | | | |
| **4044** | **Layer** | **Made ground** | **n/a** |
| Black silty sand and rubble with abundant stone, brick, clinker, and slag inclusions. | | | |
| **4045** | **Masonry** | **Structure** | **n/a** |
| Single square Pennant Sandstone slab. | | | |
| **4046** | **Masonry** | **Blocked opening** | **n/a** |
| Infill of doorway. Constructed from firebricks bonded with dark grey lime mortar. Maximum height: 0.45 m. | | | |
| **4047** | **Masonry** | **Foundation** | **n/a** |
| Linear wall foundation with straight sides aligned north-west to south-east. Constructed from brick and bonded with grey lime mortar. | | | |
| **4048** | **Masonry** | **Foundation** | **n/a** |
| Linear wall foundation with straight sides aligned east-west. Constructed from sandstone bonded with lime mortar. | | | |
| **4049** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from brick paving slabs. | | | |
| **4050** | **Masonry** | **Structure** | **n/a** |
| Constructed from Pennant Sandstone and firebricks bonded with lime mortar. | | | |
| **4051** | **Masonry** | **Structure** | **n/a** |
| Linear structure aligned north-west to south-east with irregular sides. Constructed from brick and sandstone, bonded with grey lime mortar. Maximum height: 0.38 m. | | | |
| **4052** | **Masonry** | **Foundation** | **n/a** |
| Incomplete foundation aligned north-west to south-east with irregular sides and an unknown base. Constructed from sandstone, bonded with grey lime mortar. Maximum height: 0.2 m. | | | |
| **4053** | **Masonry** | **Retort bench** | **n/a** |
| Retort oven ash pit. Aligned North-west to south-east. Constructed from red bricks and yellow firebricks, bonded with dark grey lime mortar. Maximum height: 0.4 m. | | | |
| **4054** | **Masonry** | **Retort bench** | **n/a** |
| Retort oven ash pit. Aligned North-west to south-east. Constructed from red brick and yellow firebrick and bonded with dark grey lime mortar. Maximum height: 0.4 m. | | | |
| **4055** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-east to south-west with straight sides and a flat base. Constructed from bricks and firebricks, bonded with grey lime mortar. | | | |
| **4056** | **Masonry** | **Wall** | **n/a** |
| Linear wall aligned north-west to south-east. Constructed from sandstone rubble bonded with grey lime mortar. | | | |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **4057** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-east to south-west. Constructed from firebricks and stone, bonded with grey silt mortar. Maximum height: 0.33 m. | | | |
| **4058** | **Masonry** | **Floor surface** | **n/a** |
| Concrete and stone floor. | | | |
| **4059** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red bricks, bonded with soft black mortar. Maximum height: 0.1 m. | | | |
| **4060** | **Masonry** | **Floor surface** | **n/a** |
| Constructed from red bricks. Maximum height: 0.1 m. | | | |
| **4061** | **Layer** | **Bedding layer** | **n/a** |
| Off white lime mortar. | | | |
| **4062** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-east to south-west with straight sides. Constructed from red bricks and yellow firebricks bonded with pale grey mortar and red sand. Maximum height: 0.38 m. | | | |
| **4063** | **Masonry** | **retort bench** | **n/a** |
| Aligned north-east to south-west with straight sides. Constructed from red bricks and yellow firebricks bonded with dark grey mortar. Maximum height: 0.24 m. | | | |
| **4064** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-east to south-west with straight sides. Constructed from red brick bonded with dark grey ash mortar. Maximum height: 0.10 m. | | | |
| **4065** | **Masonry** | **Retort bench** | **n/a** |
| Aligned north-east to south-west with straight sides. Constructed from brick bonded with grey lime mortar. | | | |
| **4066** | **Metal** | **Pipe** | **4071** |
| North-east to south-west aligned, 200 mm diameter steel gas, fuel, or water pipe. | | | |
| **4067** | **Masonry** | **Flue** | **n/a** |
| Irregular underground flue system. Constructed from firebricks and bonded with red sand. | | | |
| **4068** | **Masonry** | **Flue** | **n/a** |
| Irregular underground flue system. Constructed from firebricks bonded with grey mortar. Maximum height: 0.23 m. | | | |
| **4069** | **Masonry** | **Well** | **n/a** |
| Circular well with straight sides and an unknown base. Constructed from sandstone rubble and bonded with grey lime mortar. Maximum height: 0.2 m. | | | |
| **4070** | **Layer** | **Layer** | **n/a** |
| Black sandy silt. | | | |
| **4071** | **Cut** | **Pipe trench** | **4066** |
| Linear utility trench with steep, concave sides and a flat base. Length: >7.5 m. Width: 0.8 m. Depth: 0.2 m. | | | |
| **4072** | **Layer** | **Made ground** | **n/a** |
| Dark grey silt, clinker, and ash, with sparse brick and stone inclusions. | | | |
| **4073** | **Fill** | **Deliberate backfill** | **4075** |
| Dark greyish brown silt, ash, and clinker, with sparse brick, stone, clinker, and slag inclusions. | | | |
| **4074** | **Metal** | **Pipe** | **4075** |
| North-west to south-east aligned, 700 mm diameter, iron gas pipe. | | | |
| **4075** | **Cut** | **Pipe trench** | **4072, 4073** |
| Linear pipe trench aligned north-west to south-east with vertical, straight sides and a u-shaped base. Length: >5 m. Width: 1 m. Depth: 1.5 m. | | | |
| **4076** | **Layer** | **Made ground** | **n/a** |
| Mid brown Sandy silt with lenses of pale-yellow lime and black ash and clinker, with frequent angular gravel sized stone, lime, and brick inclusions. | | | |
| **4077** | **Layer** | **Buried topsoil** | **n/a** |
| Dark grey silty clay. | | | |
| **4078** | **Layer** | **Alluvium** | **n/a** |
| Pale yellowish and greyish brown silty clay. | | | |
| **4079** | **Group** | **Retort bench** | **n/a** |
| Ash pits on north-east side of retort bench group 3058. Stratigraphically above made ground layers 4010 and 4024, which in turn abut retort bench group 3058.<br><br>Group components: 4006,4053,4054 | | | |

| Context Number | Type | Category | Fill of/Filled With |
|---|---|---|---|
| **4080** | **Group** | **Retort bench** | **n/a** |
| Constructed in the late 1850s in the (demolished) north-east range of retort house.<br><br>Group components: 4057,4063,4037,4062,4064 | | | |
| **4081** | **Group** | **Retort bench** | **n/a** |
| Constructed in the late 1850s in the (demolished) north-east range of the retort house.<br><br>Group components: 4055,4065 | | | |
| **4082** | **Group** | **Floor surface** | **n/a** |
| 19th-century brick-paved yard surface.<br><br>Group components: 4060,4059,4031 | | | |
| **4083** | **Group** | **Flue** | **n/a** |
| Flue system. Probably a late 1850s addition.<br><br>Group components: 4067,4068 | | | |
| **5000** | **Masonry** | **Floor surface** | **n/a** |
| Tarmac pavement. Maximum thickness: 0.15 m. | | | |
| **5001** | **Layer** | **Bedding layer** | **n/a** |
| Dark reddish brown silty loam with small stone rubble inclusions. | | | |
| **5002** | **Masonry** | **Floor surface** | **n/a** |
| Pavement. Constructed from sandstone setts. Maximum thickness: 0.43 m. | | | |
| **5003** | **Layer** | **Made ground** | **n/a** |
| Mid brown clay loam with small rare stone rubble inclusions. | | | |
| **5004** | **Metal** | **Electric cable** | **n/a** |
| Aligned north-west to south-east. Armoured cable coated with bitumen and capped with electric bricks. | | | |
| **5005** | **Masonry** | **Drain** | **n/a** |
| Ceramic drainage pipe. Aligned north-west to south-east. Maximum height: 0.15 m. | | | |

## Appendix 2 Marked firebrick catalogue

| Context | Group number | Structural function | Length (mm) | Breadth (mm) | Thickness (mm) | Stamp | Comments |
|---|---|---|---|---|---|---|---|
| 1008 | 1084 | Flue | >200 | 114 | 65 | HICKMAN & Co<br>STOURBRIDGE | Buff 9-inch firebrick. |
| 1015 | 1084 | Flue | 230 | 112 | 66 | J & W KING<br>STOURBRIDGE | Buff 9-inch firebrick. |
| 1015 | 1084 | Flue | 232 | 112 | 66 | RUFFORD<br>STOURBRIDGE | Buff 9-inch firebrick. |
| 3025 | 3059 | Retort bench | 230 | 112 | 65 | illegible | Nine-inch firebrick orange fabric with coarse white grits and clay pellets |
| 3025 | 3059 | Retort bench | 225 | 110 | 64 | illegible | Buff 9-inch firebrick. |
| 3025 | 3059 | Retort bench | 220 | 110 | 62 | illegible | Nine-inch firebrick orange fabric with coarse white grits and clay pellets. |
| 3028 | 3059 | Retort bench | 235 | 112 | 64 | GEOE. K. HARRISON<br>STOURBRIDGE | Buff 9-inch firebrick. |
| 3045 | 3058 | Retort bench | >300 | >150 | 100 | | Fragment of large flat slab with tongue and groove moulding on edge. |
| 4006 | 4079 | | >110 | 112 | 62 | SPE[…] | Buff 9-inch firebrick with stamp on edge |
| 4006 | 4079 | | >110 | 112 | 62 | […]RISON<br>[…]BRIDGE | Incomplete buff 9-inch firebrick |
| 4006 | 4079 | | >180 | 108 | 65 | HARRIS & PEARSON<br>STOURBRIDGE | Incomplete buff 9-inch firebrick |
| 4041 | - | Blocking of doorway | >220 | >140 | 70 | PERRENS<br>& HARRISON<br>[…]OURBRIDGE | Buff. Part of a large flat slab |
| 4065 | 4081 | Retort bench | 240 | 112 | 70 | […]KING HARRIS[…]<br>STOURBRIDGE | Buff 9-inch firebrick. Pink lime mortar and bitumen adhering. Probably made by George King Harrison. |
| 4067 | 4083 | Flue | 225 | 105 | 62 | RUFFORD<br>STOURBRIDGE | Buff 9-inch firebrick |
| Unstrat. | | | 230 | 115 | 50 | […]HARRIS[…]<br>STOURBRIDGE | Buff 9-inch firebrick. Probably made by George King Harrison. |
| Unstrat. | | | 230 | 112 | 75 | GIBBONS | Pink 9-inch firebrick |
| Unstrat. | | | 230 | 112 | 75 | GIBBONS | Pink 9-inch firebrick |

| Context | Group number | Structural function | Length (mm) | Breadth (mm) | Thickness (mm) | Stamp | Comments |
|---|---|---|---|---|---|---|---|
| Unstrat. | | | 100 | 230–330 | 230 | T3[…] | Buff retort voussoir firebrick |
| Unstrat. | | | 230 | 115 | 62 | GIBBONS (DUDLEY) LTD<br>N$^{O}$ 1 FIRECLAY | Buff 9-inch firebrick |
| Unstrat. | | | 230 | 115 | 62 | GIBBONS (DUDLEY) LTD<br>N$^{O}$ 1 FIRECLAY | Buff 9-inch firebrick |
| Unstrat. | | | 230 | 0–120 | 0–60 | GIBBONS (DUDLEY) LTD<br>N$^{O}$ 1 FIRECLAY | Buff feather edge firebrick |
| Unstrat. | | | 150 | 280–330 | 185 | SUPERAXE<br>S277 | Buff retort voussoir firebrick |
| Unstrat. | | | 180 | 250–330 | 220 | MOBBERLEY<br>& PERRY LTD<br>STOURBRIDGE | Retort voussoir firebrick Orange with black and white grits. |
| Unstrat. | | | 180 | 260–320 | 215 | S248 | Retort voussoir firebrick Orange with black and white grits. Probably made by Mobberley & Perry. |
| Unstrat. | | | 125 | 300–355 | 230 | 1930<br>O[…]TY<br><br>MOBBERLY<br>& PERRY LT<br>STOURBRIDGE | Retort voussoir firebrick Orange with black and white grits. |

## Appendix 3 OASIS record

| | |
|---|---|
| OASIS ID (UID) | wessexar1-430457 |
| Project Name | Bristol Digital Futures Institute, 65 Avon Street, Bristol, Archaeological Watching Brief |
| Sitename | Bristol Digital Futures Institute, 65 Avon Street, St Philip's Marsh |
| Activity type | WATCHING BRIEF, Descriptive Buildings Record (Level 2), Comprehensive Analytical Buildings Record (Level 4) |
| Project Identifier(s) | TQEC Hub |
| Planning Id | 21/076439/X, 21/02496/F |
| Reason For Investigation | Planning requirement |
| Organisation Responsible for work | Wessex Archaeology |
| Project Dates | 15-Oct-2021 - 31-Dec-2022 |
| Location | Bristol Digital Futures Institute, 65 Avon Street, St Philip's Marsh<br>NGR : ST 60087 72551<br>LL : 51.450527349975, -2.57576361907126<br>12 Fig : 360087,172551 |
| Administrative Areas | Country : England<br>County : Bristol<br>District : Bristol, City of<br>Parish : Bristol, City of, unparished area |
| Project Methodology | Historic building record (level 2 for overall building; level 4 for coal store roof trusses) and archaeological watching brief during the conversion of an 1821 gas retort house and coal store for use as a university building. |
| Project Results | Historic building record of early gasworks retort house (built in 1821), with large adjoining mid-1850s coal store. Watching brief during below ground works uncovered an extensive system of 19th-century underground brick flues, foundations of the 1821 gasworks office and coal stores, the bases of five 19th-century gas retort benches, and an early 20th-century brick and concrete 'cooker incinerator', which was housed in a former retort house used as a gas cooker repair workshop. |
| Keywords | COAL SHED - POST MEDIEVAL - FISH Thesaurus of Monument Types<br>GAS WORKS - POST MEDIEVAL - FISH Thesaurus of Monument Types<br>RETORT HOUSE - POST MEDIEVAL - FISH Thesaurus of Monument Types<br>Flue - POST MEDIEVAL - FISH Thesaurus of Monument Types<br>Incinerator - 20TH CENTURY - FISH Thesaurus of Monument Types<br>Office - POST MEDIEVAL - FISH Thesaurus of Monument Types<br>Yard - POST MEDIEVAL - FISH Thesaurus of Monument Types |
| Funder | |
| HER | Bristol City SMR - unRev - STANDARD |
| Person Responsible for work | C, Mason |
| HER Identifiers | |

## Appendix 4 Survey of flue on south-east side of coal store

**Maintain A Drain**
Unit 17 Kenn Court Business Park, Bristol
Tel 0117 9714447
info@maintainadrain.co.uk

**Project**

| | |
|---|---|
| **Project Name:** | TQEC |
| **Project Description:** | WinCan Import in Miraculix Standard |
| **Project Date:** | 23/11/2021 |

TQEC Ver:1.2021.10.3

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel 0117 9714447*
*info@maintainadrain.co.uk*

## Table of Contents

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 0117 9714447*
*info@maintainadrain.co.uk*

## Project Information

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |

### Client

**Company:** Aztec Building Services
**Contact:** Mr Simon Roberts
**Street:** Unit 8 St Martins Business Park, Moorend Farm Ave
**Town or City:** Bristol
**Post Code:** BS11 0RS
**Phone:** 0117 9825533
**Mobile:** 07826845844
**Email:** simon@aztechbuildingservices.co,uk

### Site

**Company:** c/o Aztech Building Services
**Street:** TQEC, Avon Street
**Town or City:** Bristol
**Post Code:** BS2 0PZ

### Contractor

**Company:** Maintain A Drain
**Street:** Unit 17 Kenn Court Business Park
**Town or City:** Bristol
**Post Code:** BS4 1UL
**Phone:** 0117 9714447
**Email:** info@maintainadrain.co.uk

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel 0117 9714447*
*info@maintainadrain.co.uk*

## Scoring Summary

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |

### Structural Defects

| Section | PLR | Grade | Description |
|---|---|---|---|
| All inspected pipes are in an acceptable structural condition (< grade 3). | | | |

### Service / Operational Condition

Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.

Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.

Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

| Section | PLR | Grade | Description |
|---|---|---|---|
| 2 | MH2X | 3 | Settled deposits, fine, 10% cross-sectional area loss, finish |

### Abandoned Surveys

| Section | PLR | Description |
|---|---|---|
| All inspections complete, none are abandoned. | | |

### Information

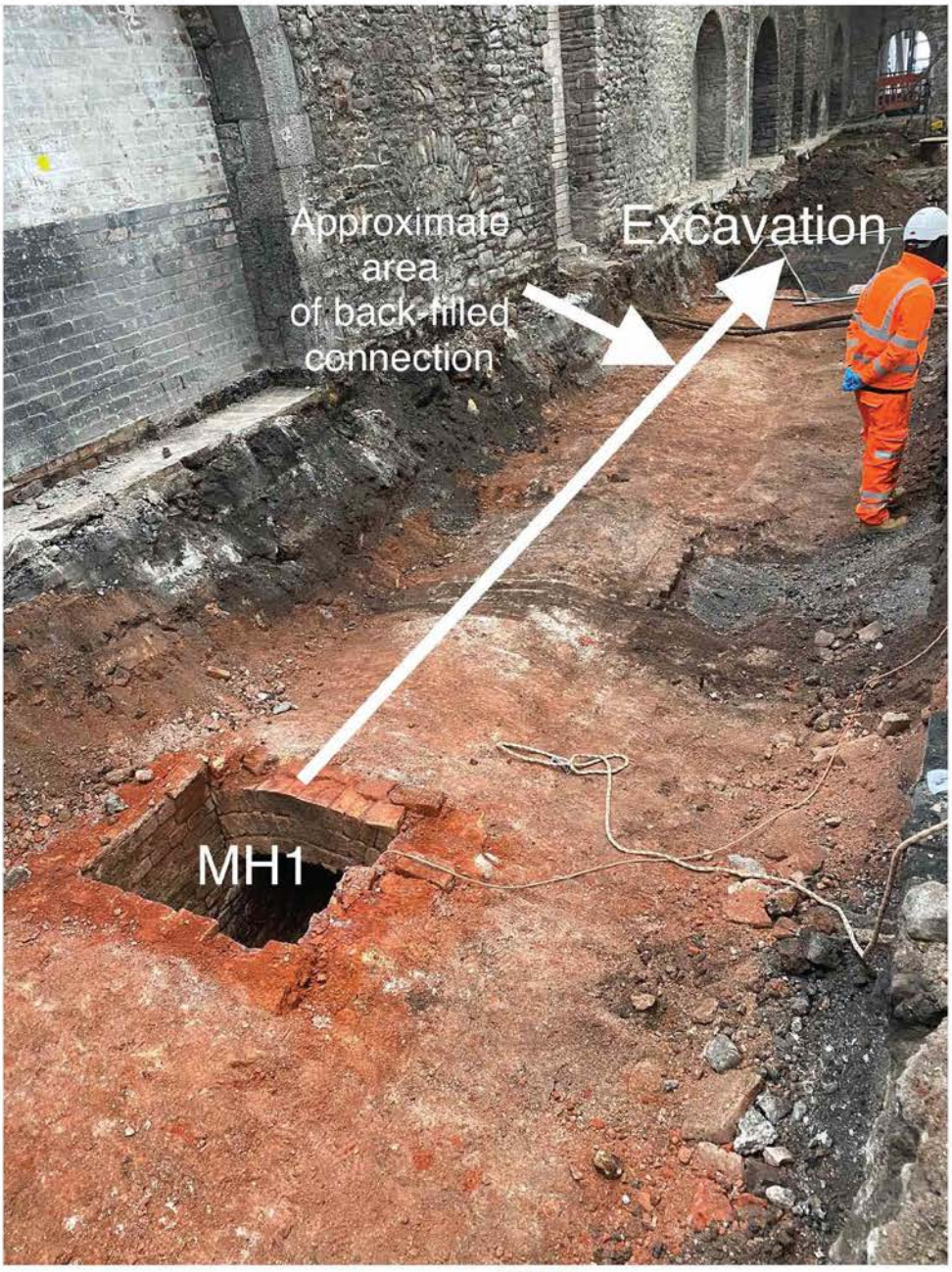
These scoring summaries are based on the SRM grading from the WRc.

TQEC P-2

Maintain A Drain
Unit 17 Kenn Court Business Park, Bristol
Tel. 0117 9714447
info@maintainadrain.co.uk

## Project Pictures

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |



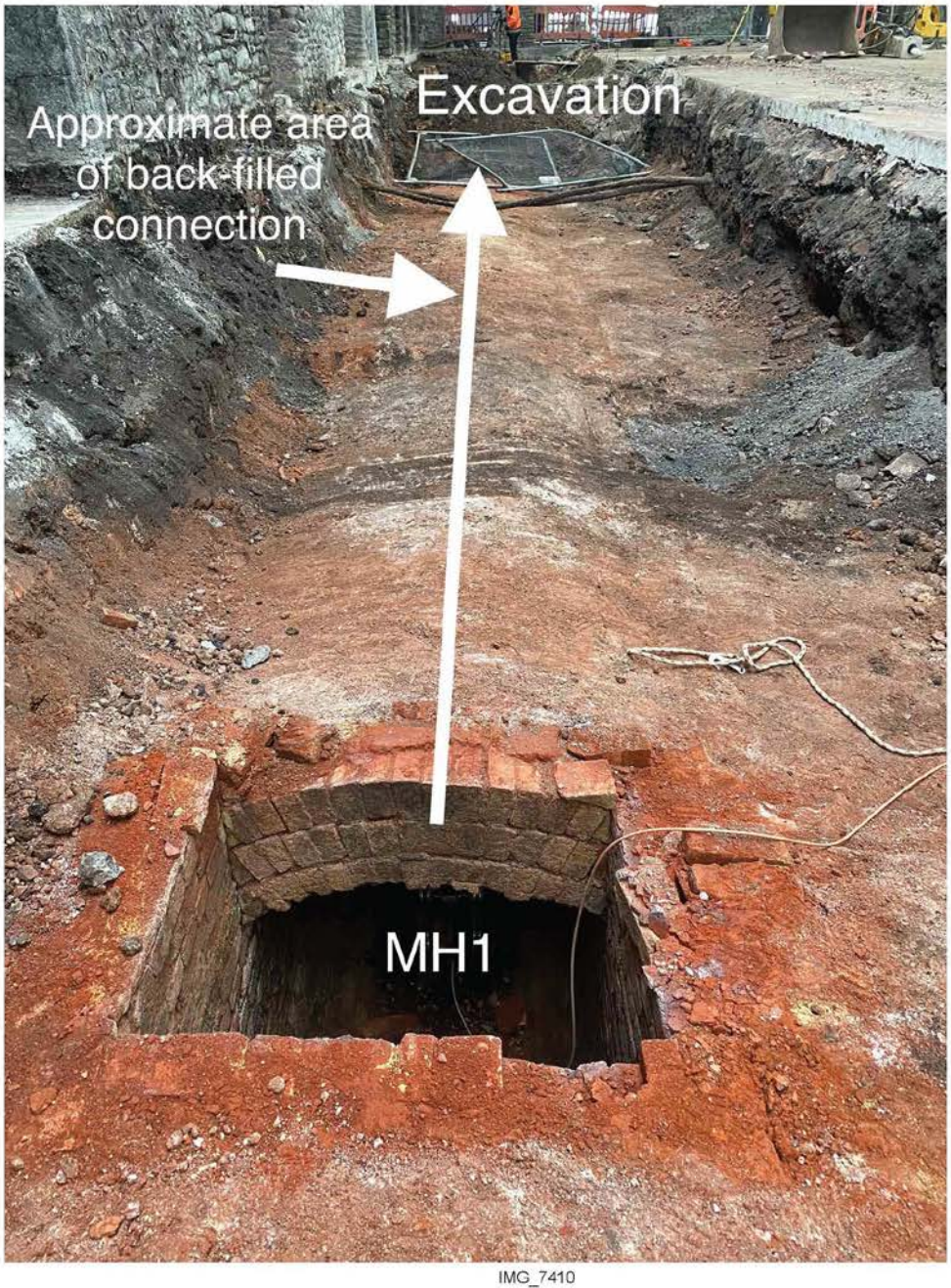

IMG_7411

TQEC P-3

Maintain A Drain
Unit 17 Kenn Court Business Park, Bristol
Tel. 0117 9714447
info@maintainadrain.co.uk

## Project Pictures

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |



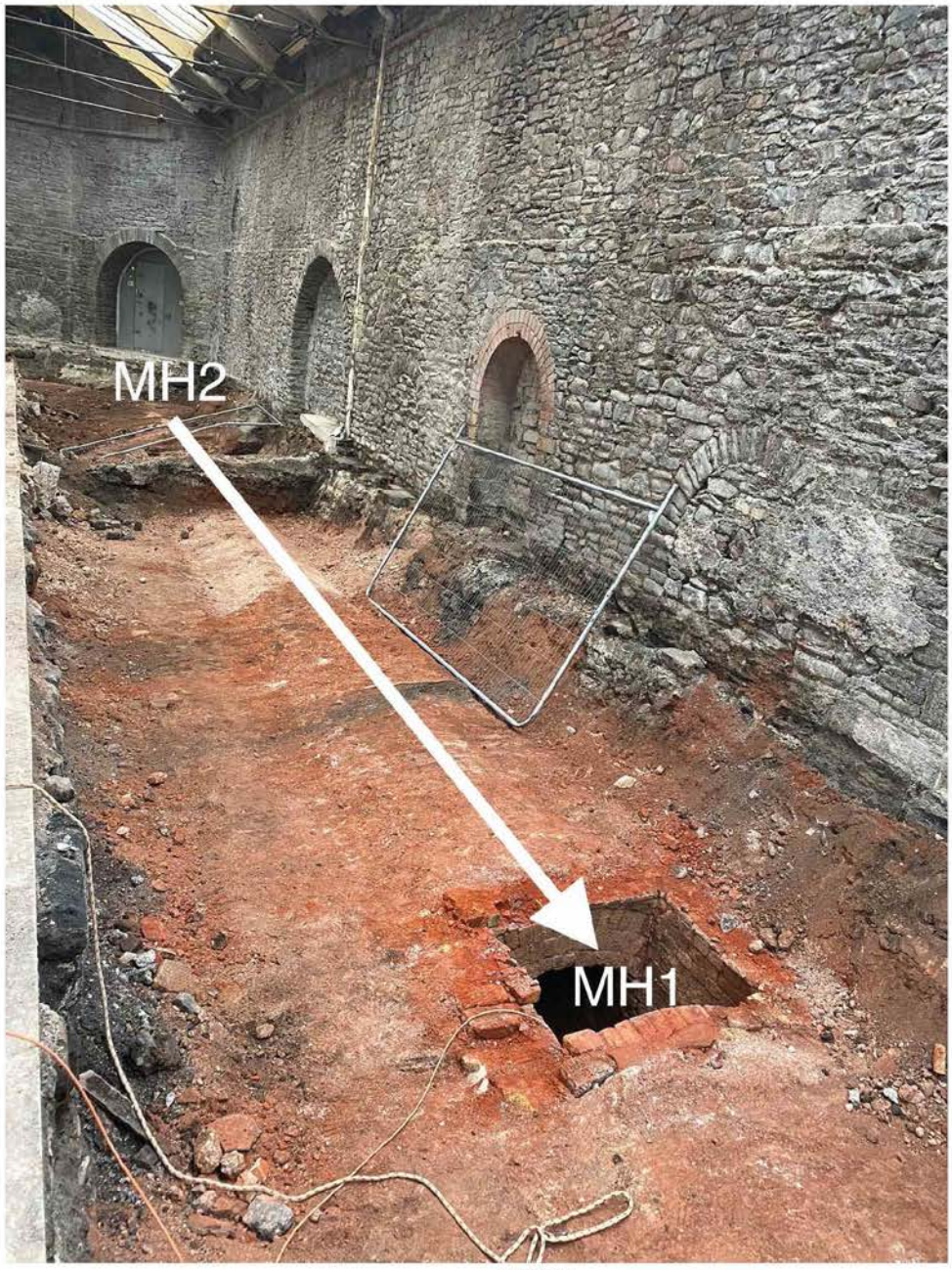

IMG_7410

TQEC P-4

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 0117 9714447*
*info@maintainadrain.co.uk*

## Project Pictures

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |



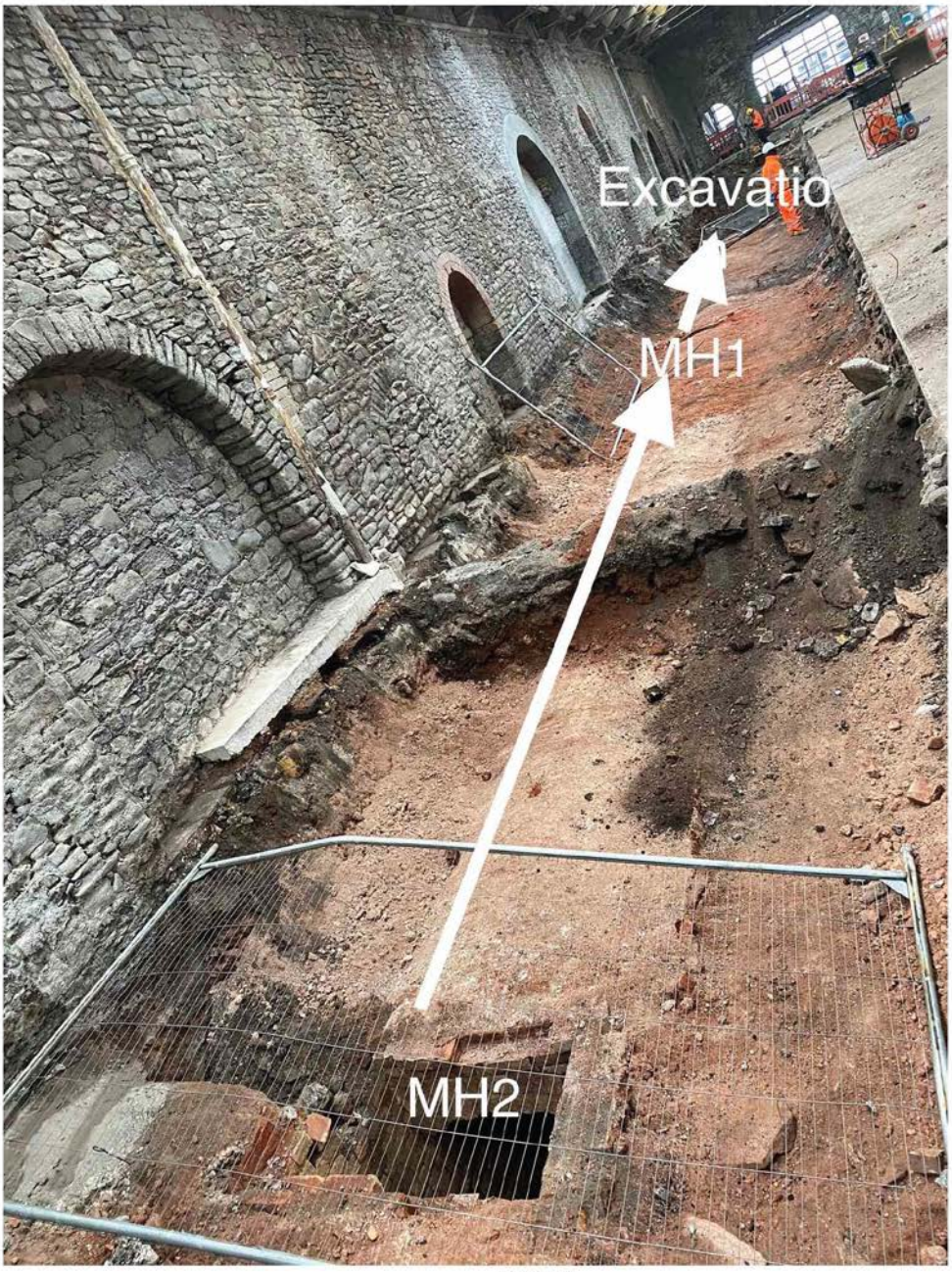

IMG_7412

TQEC P-5

Maintain A Drain
Unit 17 Kenn Court Business Park, Bristol
Tel. 0117 9714447
info@maintainadrain.co.uk

## Project Pictures

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |




IMG_7413

TQEC P-6

Maintain A Drain
Unit 17 Kenn Court Business Park, Bristol
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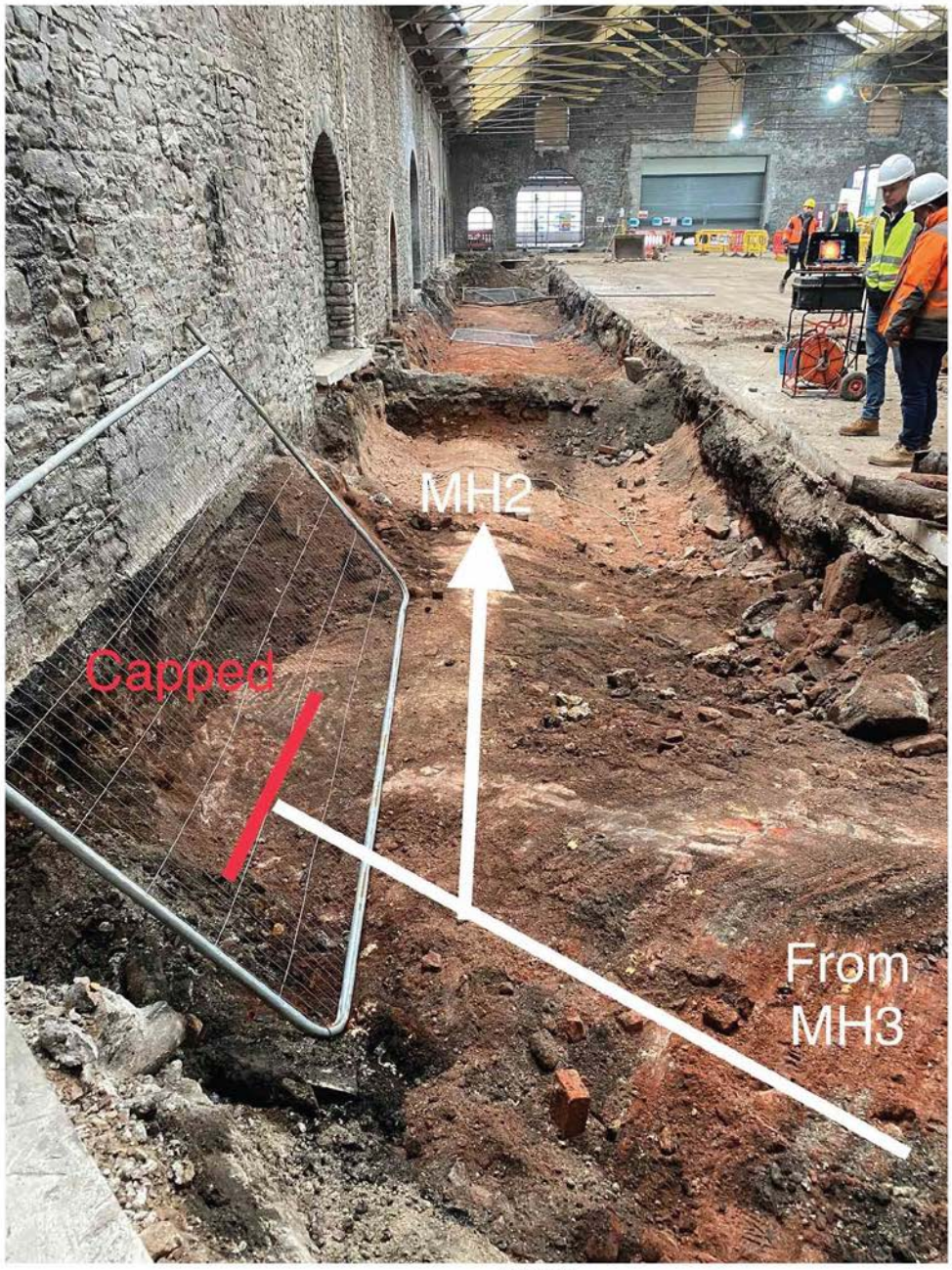
info@maintainadrain.co.uk

## Project Pictures

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |



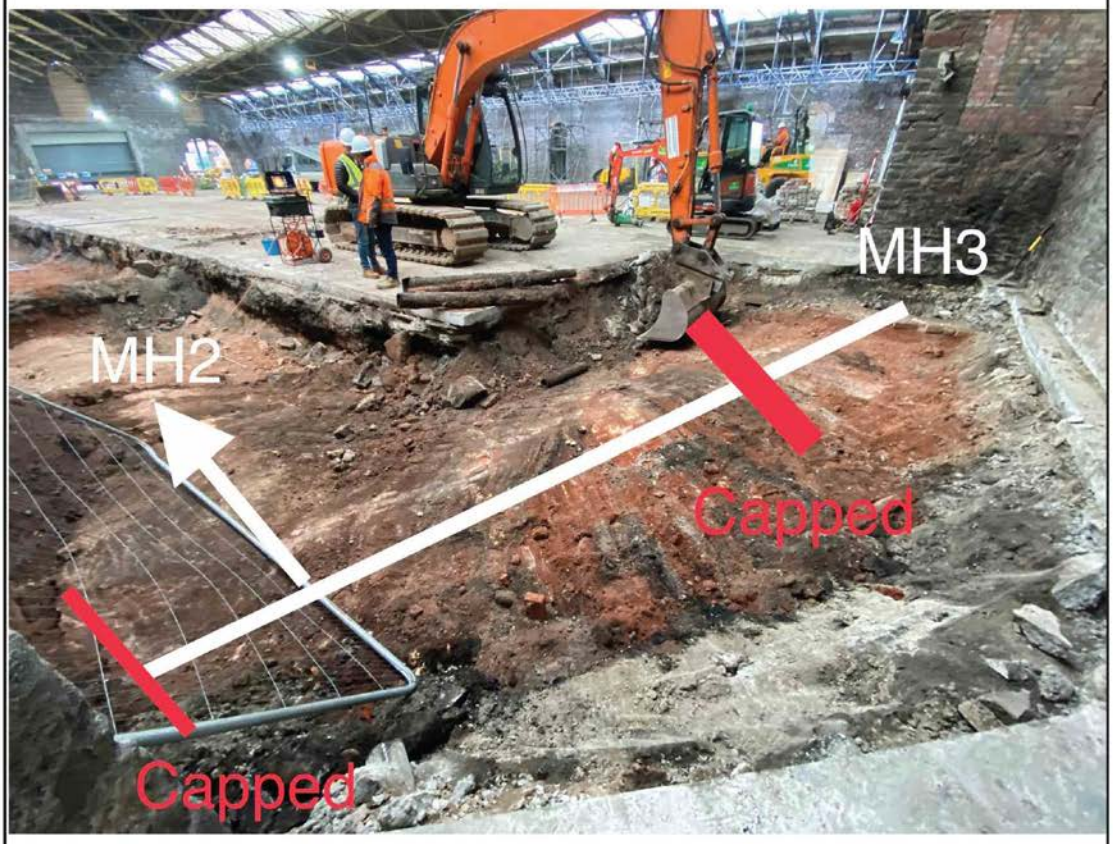

IMG_7415

TQEC P-7

Maintain A Drain
Unit 17 Kenn Court Business Park, Bristol
Tel. 0117 9714447
info@maintainadrain.co.uk

## Project Pictures

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |




IMG_7416

TQEC P-8

Maintain A Drain
Unit 17 Kenn Court Business Park, Bristol
Tel. 0117 9714447
info@maintainadrain.co.uk

## Project Pictures

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |

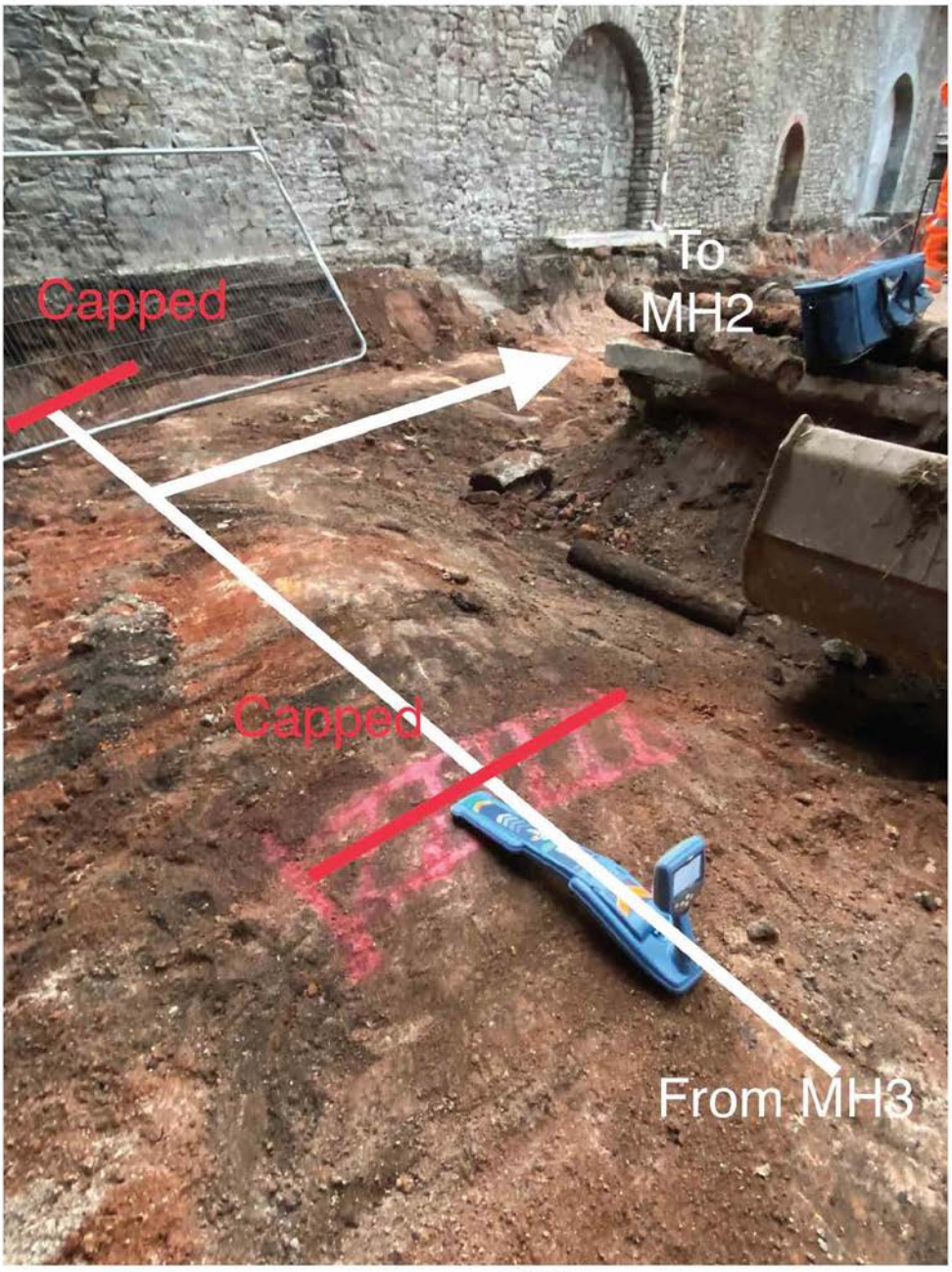

IMG_7417

TQEC P-9

Maintain A Drain
Unit 17 Kenn Court Business Park, Bristol
Tel. 0117 9714447
info@maintainadrain.co.uk

## Project Pictures

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |




IMG_7419

TQEC P-10

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel 0117 9714447*
*info@maintainadrain.co.uk*

## Defect Grade Description (Section)

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |

| | |
|---|---|
| **1:** | Brick: No structural defects.<br><br>Other: No structural defects.<br><br>**Acceptable structural condition.** |
| **2:** | Brick: Circumferential cracking; single longitudinal crack; surface mortar loss (depth missing < 15mm); surface damage - slight spalling (breaking away of small fragments from the surface); surface damage - slight wear (increased roughness).<br><br>Other: Circumferential crack; moderate joint defects (i.e. medium open joint or medium displaced joint); surface damage - slight spalling (breaking away of small fragments from the surface) or slight wear (increased roughness).<br><br>**Minimal collapse likelihood in the short term but potential for further deterioration.** |
| **3:** | Brick: Medium mortar loss (depth missing 15-50mm) without other defects; more than one longitudinal crack (at a single location); multiple cracking; single bricks displaced; deformation < 5%; no fracture and only moderate mortar loss; surface damage - medium spalling (large areas of chipped brick); surface damage - medium wear (large area of brick surface is missing).<br><br>Other: Fracture with no deformation or deformation < 5%; longitudinal cracking or multiple cracking; minor loss of level; severe joint defects (i.e. large open joint or large displaced joint); surface damage - partial area of pipe surface is missing or worn.<br><br>**Collapse unlikely in the near future but further deterioration likely.** |
| **4:** | Brick: Total mortar loss (depth missing > 50mm) with deformation > 10%; deformation up to 10% and fractured; displaced or hanging brickwork; small number of missing bricks; dropped invert (drop > 20mm); moderate loss of level; surface damage - large spalling (entire surface of brick is missing); surface damage - large wear (entire surface of brick is missing).<br><br>Other: Broken; deformation up to 10% and broken; fracture with deformation 5-10%; multiple fractures; serious loss of level; serious joint defects with voids or soil visible (open joint with > 50mm soil or void visible or joint displacement > 25% of diameter); surface damage - entire area of pipe surface is missing or severly worn.<br><br>**Collapse likely in the foreseeable future.** |
| **5:** | Brick: Already collapsed; missing Invert; deformation > 10% and fractured; displaced or hanging brickwork and deformation < 10%; extensive areas of missing brickwork.<br><br>Other: Already collapsed; deformation > 10% and broken; extensive areas of pipe fabric missing; fractures with deformation > 10%<br><br>**Collapsed or collapse imminent.** |

TQEC P-11

Maintain A Drain
Unit 17 Kenn Court Business Park, Bristol
Tel 0117 9714447
info@maintainadrain.co.uk

## Section Profile

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |

### Oval, 1 mm

| Item No. | Upstream Node | Downstream Node | Date | Road | Material | Total Length | Inspected Length |
|---|---|---|---|---|---|---|---|
| 1 | MH1 | EXCAVATION | 23/11/2021 | AVON STREET | Brick | 6.02 m | 6.02 m |
| 2 | MH2 | MH1 | 23/11/2021 | AVON STREET | Brick | 10.86 m | 10.86 m |
| 3 | MH3 | MH2 | 23/11/2021 | AVON STREET | Brick | 6.45 m | 6.45 m |

**Total: 3 Inspections x Oval 1 mm = 23.33 m Total Length and 23.33 m Inspected Length**

**Total: 3 Inspections = 23.33 m Total Length and 23.33 m Inspected Length**

TQEC P-12

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel 0117 9714447*
*info@maintainadrain.co.uk*

## Section Summary

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |

| | |
|---|---|
| Number of sections | 3 |
| Total length of sections | 23.33 m |
| Total length of inspected sections | 23.33 m |
| Total length of abandoned inspections | 0.00 m |
| Number of abandoned inspections | 0 |
| Number of section inspection photos | 26 |
| Number of section inspection videos | 3 |
| Number of section inspection scans | 0 |
| Number of section inclination measurements | 0 |

| | | | |
|---|---|---|---|
| **PLR:** | MH1X | **Upstream Node:** | MH1 |
| **Inspection Direction:** | Downstream | **Downstream Node:** | EXCAVATION |
| **Inspected Length:** | 6.02 m | **Dia/Height:** | 1 mm |
| **Total Length:** | 6.02 m | **Material:** | Brick |

| No. | m+ | Code | Observation |
|---|---|---|---|
| 1 | 0.00 | MH | Start node, manhole, reference: MH1 |
| 2 | 0.00 | WL | Water level, 0% of the vertical dimension |
| 3 | 0.00 | DES | Settled deposits, fine, 5% cross-sectional area loss, start |
| 4 | 3.94 | GP | General photograph taken at this point |
| 5 | 5.55 | CN | Connection other than junction at 9 o'clock, 1300mm dia |
| 6 | 6.02 | GP | General photograph taken at this point |
| 7 | 6.02 | DES | Settled deposits, fine, 80% cross-sectional area loss, change |
| 8 | 6.02 | OCF | Finish node, other special chamber, reference: EXCAVATION |

| | | | |
|---|---|---|---|
| **PLR:** | MH2X | **Upstream Node:** | MH2 |
| **Inspection Direction:** | Upstream | **Downstream Node:** | MH1 |
| **Inspected Length:** | 10.86 m | **Dia/Height:** | 1 mm |
| **Total Length:** | 10.86 m | **Material:** | Brick |

| No. | m+ | Code | Observation |
|---|---|---|---|
| 1 | 0.00 | MH | Start node, manhole, reference: MH1 |
| 2 | 0.00 | WL | Water level, 0% of the vertical dimension |
| 3 | 0.00 | DES | Settled deposits, fine, 10% cross-sectional area loss, start |
| 4 | 0.18 | OBBJ | Other obstacles, brick or masonry in invert at joint from 4 o'clock to 7 o'clock, 20% cross-sectional area loss, start |
| 5 | 3.27 | OBBJ | Other obstacles, brick or masonry in invert at joint from 4 o'clock to 7 o'clock, 20% cross-sectional area loss, finish |
| 6 | 3.27 | GP | General photograph taken at this point |
| 7 | 3.34 | OBBJ | Other obstacles, brick or masonry in invert at joint from 5 o'clock to 8 o'clock, 20% cross-sectional area loss, start |
| 8 | 6.76 | OBBJ | Other obstacles, brick or masonry in invert at joint from 5 o'clock to 8 o'clock, 20% cross-sectional area loss, finish |

Maintain A Drain
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## Section Summary

| Project Name | Project Number | Project Date |
|---|---|---|
| TQEC | | 23/11/2021 |

| No. | m+ | Code | Observation |
|---|---|---|---|
| 9 | 9.55 | DES | Settled deposits, fine, 10% cross-sectional area loss, finish |
| 10 | 9.55 | OBBJ | Other obstacles, brick or masonry in invert at joint from 4 o'clock to 8 o'clock, 35% cross-sectional area loss |
| 11 | 10.86 | MHF | Finish node, manhole, reference: MH2 |

| | | | |
|---|---|---|---|
| **PLR:** | MH3X | **Upstream Node:** | MH3 |
| **Inspection Direction:** | Upstream | **Downstream Node:** | MH2 |
| **Inspected Length:** | 6.45 m | **Dia/Height:** | 1 mm |
| **Total Length:** | 6.45 m | **Material:** | Brick |

| No. | m+ | Code | Observation |
|---|---|---|---|
| 1 | 0.00 | MH | Start node, manhole, reference: MH2 |
| 2 | 0.00 | WL | Water level, 0% of the vertical dimension |
| 3 | 0.00 | DES | Settled deposits, fine, 10% cross-sectional area loss, start |
| 4 | 1.07 | GP | General photograph taken at this point |
| 5 | 1.95 | GP | General photograph taken at this point |
| 6 | 3.67 | LL | Line deviates left |
| 7 | 6.45 | OCF | Finish node, other special chamber, reference: MH3 |

TQEC P-14

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel 0117 9714447*
*info@maintainadrain.co.uk*

## Section Inspection - 23/11/2021 - MH1X

| Item No. | Insp. No. | Date | Time | Client's Job Ref | Weather | Pre Cleaned | PLR |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 23/11/21 | 14:04 | 01 | No Rain Or Snow | No | MH1X |

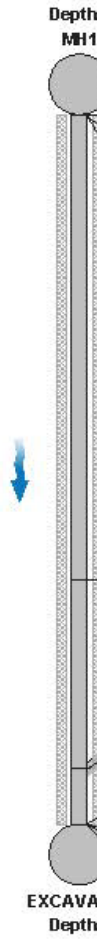
| Operator | Vehicle | Camera | Preset Length | Legal Status | Alternative ID |
|---|---|---|---|---|---|
| LEE BRAY | Not Specified | Crawler | Not Specified | Unknown | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **Town or Village:** | Bristol | **Inspection Direction:** | Downstream | **Upstream Node:** | MH1 |
| **Road:** | Avon Street | **Inspected Length:** | 6.02 m | **Upstream Pipe Depth:** | 1.550 m |
| **Location:** | | **Total Length:** | 6.02 m | **Downstream Node:** | EXCAVATION |
| **Surface Type:** | | **Joint Length:** | | **Downstream Pipe Depth:** | |

| | | | |
|---|---|---|---|
| **Use:** | Other | **Pipe Shape:** | Oval |
| **Type of Pipe:** | | **Dia/Height:** | 1 mm |
| **Flow Control:** | No flow control | **Material:** | Brick |
| **Year Constructed:** | 1900 | **Lining Type:** | No Lining |
| **Inspection Purpose:** | Routine inspection | **Lining Material:** | No Lining |

**Comments:**
**Recommendations:**

**Scale:** 1:52




| Position [m] | | Code | Observation | MPEG | Photo | Grade |
|---|---|---|---|---|---|---|
| 0.00 | | MH | Start node, manhole, reference: MH1 | 00:00:00 | 1 | |
| 0.00 | | WL | Water level, 0% of the vertical dimension | 00:00:05 | 2 | |
| 0.00 | S01 | DES | Settled deposits, fine, 5% cross-sectional area loss, start | 00:00:05 | 3 | 3 |
| 3.94 | | GP | General photograph taken at this point: Connection to Main Culvert visiable ahead | 00:00:56 | 4 | |
| 5.55 | | CN | Connection other than junction at 9 o'clock, 1300mm dia: Connection Back-Filled | 00:01:31 | 5 | |
| 6.02 | | GP | General photograph taken at this point: Excavation visible ahead | 00:02:08 | 6 | |
| 6.02 | C01 | DES | Settled deposits, fine, 80% cross-sectional area loss, change | 00:02:08 | 7 | |
| 6.02 | | OCF | Finish node, other special chamber, reference: EXCAVATION: Excavation visible beyond debris | 00:02:08 | 8 | |

| STR No. Def | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def | SER Peak | SER Mean | SER Total | SER Grade |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 | 0.0 | 0.0 | 1.0 | 1 | 0.0 | 0.0 | 2.0 | 1.0 |

TQEC 1

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 0117 9714447*
*info@maintainadrain.co.uk*

## Section Pictures - 23/11/2021 - MH1X

| Item No. | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 1 | Downstream | MH1X | 01 | |


1, 00:00:00, 0.00 m
Start node, manhole, reference: MH1


2, 00:00:05, 0.00 m
Water level, 0% of the vertical dimension


3, 00:00:05, 0.00 m
Settled deposits, fine, 5% cross-sectional area loss, start


4, 00:00:56, 3.94 m
General photograph taken at this point, Connection to Main Culvert visiable ahead

TQEC 2

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 0117 9714447*
*info@maintainadrain.co.uk*

## Section Pictures - 23/11/2021 - MH1X

| Item No. | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 1 | Downstream | MH1X | 01 | |


5, 00:01:31, 5.55 m
Connection other than junction at 9 o'clock, 1300mm dia, Connection Back-Filled


6, 00:02:08, 6.02 m
General photograph taken at this point, Excavation visible ahead


7, 00:02:08, 6.02 m
Settled deposits, fine, 80% cross-sectional area loss, change


8, 00:02:08, 6.02 m
Finish node, other special chamber, reference: EXCAVATION, Excavation visible beyond debris

TQEC 3

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel 0117 9714447*
*info@maintainadrain.co.uk*

## Section Inspection - 23/11/2021 - MH2X

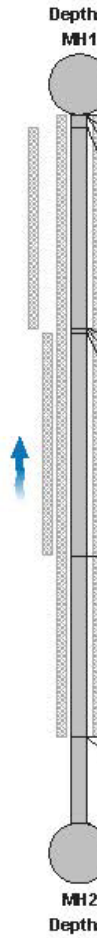
| Item No. | Insp. No. | Date | Time | Client's Job Ref | Weather | Pre Cleaned | PLR |
|---|---|---|---|---|---|---|---|
| 2 | 2 | 23/11/21 | 14:04 | 01 | No Rain Or Snow | No | MH2X |

| Operator | Vehicle | Camera | Preset Length | Legal Status | Alternative ID |
|---|---|---|---|---|---|
| LEE BRAY | Not Specified | Crawler | Not Specified | Unknown | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **Town or Village:** | Bristol | **Inspection Direction:** | Upstream | **Upstream Node:** | MH2 |
| **Road:** | Avon Street | **Inspected Length:** | 10.86 m | **Upstream Pipe Depth:** | 1.550 m |
| **Location:** | | **Total Length:** | 10.86 m | **Downstream Node:** | MH1 |
| **Surface Type:** | | **Joint Length:** | | **Downstream Pipe Depth:** | 1.550 m |

| | | | |
|---|---|---|---|
| **Use:** | Other | **Pipe Shape:** | Oval |
| **Type of Pipe:** | | **Dia/Height:** | 1 mm |
| **Flow Control:** | No flow control | **Material:** | Brick |
| **Year Constructed:** | 1900 | **Lining Type:** | No Lining |
| **Inspection Purpose:** | Routine inspection | **Lining Material:** | No Lining |

**Comments:**
**Recommendations:**




| Scale: 1:94 Position [m] | | Code | Observation | MPEG | Photo | Grade |
|---|---|---|---|---|---|---|
| 0.00 | | MH | Start node, manhole, reference: MH1 | 00:00:00 | 1 | |
| 0.00 | | WL | Water level, 0% of the vertical dimension | 00:00:08 | 2 | |
| 0.00 | S01 | DES | Settled deposits, fine, 10% cross-sectional area loss, start | 00:00:10 | 3 | |
| 0.18 | S02 | OBBJ | Other obstacles, brick or masonry in invert at joint from 4 o'clock to 7 o'clock, 20% cross-sectional area loss, start | 00:00:17 | 4 | |
| 3.27 | F02 | OBBJ | Other obstacles, brick or masonry in invert at joint from 4 o'clock to 7 o'clock, 20% cross-sectional area loss, finish | 00:02:06 | 5 | |
| 3.27 | | GP | General photograph taken at this point: Bricked up/sealed connection @ 3 o'clock | 00:02:06 | 6 | |
| 3.34 | S03 | OBBJ | Other obstacles, brick or masonry in invert at joint from 5 o'clock to 8 o'clock, 20% cross-sectional area loss, start | 00:02:13 | 7 | |
| 6.76 | F03 | OBBJ | Other obstacles, brick or masonry in invert at joint from 5 o'clock to 8 o'clock, 20% cross-sectional area loss, finish | 00:02:32 | 8 | |
| 9.55 | F01 | DES | Settled deposits, fine, 10% cross-sectional area loss, finish | 00:02:43 | 9 | 3 |
| 9.55 | | OBBJ | Other obstacles, brick or masonry in invert at joint from 4 o'clock to 8 o'clock, 35% cross-sectional area loss | 00:02:43 | 10 | |
| 10.86 | | MHF | Finish node, manhole, reference: MH2 | 00:02:50 | 11 | |

| STR No. Def | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def | SER Peak | SER Mean | SER Total | SER Grade |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 | 0.0 | 0.0 | 1.0 | 1 | 2.0 | 0.0 | 20.0 | 3.0 |

TQEC 4

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 0117 9714447*
*info@maintainadrain.co.uk*

## Section Pictures - 23/11/2021 - MH2X

| Item No. | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 2 | Upstream | MH2X | 01 | |


1, 00:00:00, 0.00 m
Start node, manhole, reference: MH1


2, 00:00:08, 0.00 m
Water level, 0% of the vertical dimension


3, 00:00:10, 0.00 m
Settled deposits, fine, 10% cross-sectional area loss, start


4, 00:00:17, 0.18 m
Other obstacles, brick or masonry in invert at joint from 4 o'clock to 7 o'clock, 20% cross-sectional area loss, start

TQEC 5

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 0117 9714447*
*info@maintainadrain.co.uk*

## Section Pictures - 23/11/2021 - MH2X

| Item No. | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 2 | Upstream | MH2X | 01 | |


5, 00:02:06, 3.27 m
Other obstacles, brick or masonry in invert at joint from 4 o'clock to 7 o'clock, 20% cross-sectional area loss, finish


6, 00:02:06, 3.27 m
General photograph taken at this point, Bricked up/sealed connection @ 3 o'clock


7, 00:02:13, 3.34 m
Other obstacles, brick or masonry in invert at joint from 5 o'clock to 8 o'clock, 20% cross-sectional area loss, start


8, 00:02:32, 6.76 m
Other obstacles, brick or masonry in invert at joint from 5 o'clock to 8 o'clock, 20% cross-sectional area loss, finish

TQEC 6

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 0117 9714447*
*info@maintainadrain.co.uk*

## Section Pictures - 23/11/2021 - MH2X

| Item No. | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 2 | Upstream | MH2X | 01 | |


9, 00:02:43, 9.55 m
Settled deposits, fine, 10% cross-sectional area loss, finish


10, 00:02:43, 9.55 m
Other obstacles, brick or masonry in invert at joint from 4 o'clock to 8 o'clock, 35% cross-sectional area loss


11, 00:02:50, 10.86 m
Finish node, manhole, reference: MH2

TQEC 7

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel 0117 9714447*
*info@maintainadrain.co.uk*

## Section Inspection - 23/11/2021 - MH3X

| Item No. | Insp. No. | Date | Time | Client's Job Ref | Weather | Pre Cleaned | PLR |
|---|---|---|---|---|---|---|---|
| 3 | 3 | 23/11/21 | 14:04 | 01 | No Rain Or Snow | No | MH3X |

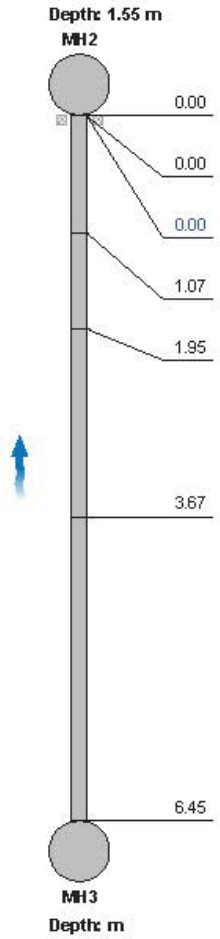
| Operator | Vehicle | Camera | Preset Length | Legal Status | Alternative ID |
|---|---|---|---|---|---|
| LEE BRAY | Not Specified | Crawler | Not Specified | Unknown | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **Town or Village:** | Bristol | **Inspection Direction:** | Upstream | **Upstream Node:** | MH3 |
| **Road:** | Avon Street | **Inspected Length:** | 6.45 m | **Upstream Pipe Depth:** | |
| **Location:** | | **Total Length:** | 6.45 m | **Downstream Node:** | MH2 |
| **Surface Type:** | | **Joint Length:** | | **Downstream Pipe Depth:** | 1.550 m |

| | | | |
|---|---|---|---|
| **Use:** | Other | **Pipe Shape:** | Oval |
| **Type of Pipe:** | | **Dia/Height:** | 1 mm |
| **Flow Control:** | No flow control | **Material:** | Brick |
| **Year Constructed:** | 1900 | **Lining Type:** | No Lining |
| **Inspection Purpose:** | Routine inspection | **Lining Material:** | No Lining |

**Comments:**
**Recommendations:**

**Scale:** 1:56




| Position [m] | | Code | Observation | MPEG | Photo | Grade |
|---|---|---|---|---|---|---|
| 0.00 | | MH | Start node, manhole, reference: MH2 | 00:00:00 | 1 | |
| 0.00 | | WL | Water level, 0% of the vertical dimension | 00:00:06 | 2 | |
| 0.00 | S01 | DES | Settled deposits, fine, 10% cross-sectional area loss, start | 00:00:06 | 3 | 3 |
| 1.07 | | GP | General photograph taken at this point: Camera entering connection | 00:00:37 | 4 | |
| 1.95 | | GP | General photograph taken at this point: Camera panned right 90 degrees, line capped | 00:01:01 | 5 | |
| 3.67 | | LL | Line deviates left: Line Left 90 degrees through connection | 00:01:47 | 6 | |
| 6.45 | | OCF | Finish node, other special chamber, reference: MH3: Line capped prior to MH3 | 00:02:03 | 7 | |

| STR No. Def | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def | SER Peak | SER Mean | SER Total | SER Grade |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 | 0.0 | 0.0 | 1.0 | 1 | 0.0 | 0.0 | 2.0 | 1.0 |

TQEC 8

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 01179714447*
*info@maintainadrain.co.uk*

## Section Pictures - 23/11/2021 - MH3X

| Item No. | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 3 | Upstream | MH3X | 01 | |


1, 00:00:00, 0.00 m
Start node, manhole, reference: MH2


2, 00:00:06, 0.00 m
Water level, 0% of the vertical dimension


3, 00:00:06, 0.00 m
Settled deposits, fine, 10% cross-sectional area loss, start


4, 00:00:37, 1.07 m
General photograph taken at this point, Camera entering connection

TQEC 9

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel. 0117 9714447*
*info@maintainadrain.co.uk*

## Section Pictures - 23/11/2021 - MH3X

| Item No. | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 3 | Upstream | MH3X | 01 | |


5, 00:01:01, 1.95 m
General photograph taken at this point, Camera panned right 90 degrees, line capped


6, 00:01:47, 3.67 m
Line deviates left, Line Left 90 degrees through connection


7, 00:02:03, 6.45 m
Finish node, other special chamber, reference: MH3, Line capped prior to MH3

TQEC 10

**Maintain A Drain**
*Unit 17 Kenn Court Business Park, Bristol*
*Tel 0117 9714447*
*info@maintainadrain.co.uk*

## MAD

Thank you for choosing to use MAD (Maintain A Drain) incorporating WinCan to carry out your drainage investigation works.

The results and views carried in this report are those of the engineer(s) appointed to carry out the investigation and are considered relevant on the day of the survey.

Drain and sewer performance is known to alter over time, so liability cannot be accepted for differences between the recorded data and the actual data at a time after this report was generated.

This survey has been created in accordance with the drainage standard used in the country and language settings for this PC.

CCTV subsidence investigations do not account for the water tightness of the pipes and are merely a visual inspection of inside of the drains. CCTV drainage engineers are generally not qualified to comment on the causes of subsidence, and can only suggest required remedial actions for the pipes, and not the affected buildings.

Subsidence is a building structural failure, which can occur for many reasons. Although drainage failures can contribute to subsidence problems, other causes should always be investigated as part of a considered approach. In order to eliminate drains from suspicion, WinCan suggests that all pipes within at least 10m of the subsidence area be pressure tested over and above a CCTV inspection, and remedial suggestions considered based on the findings.

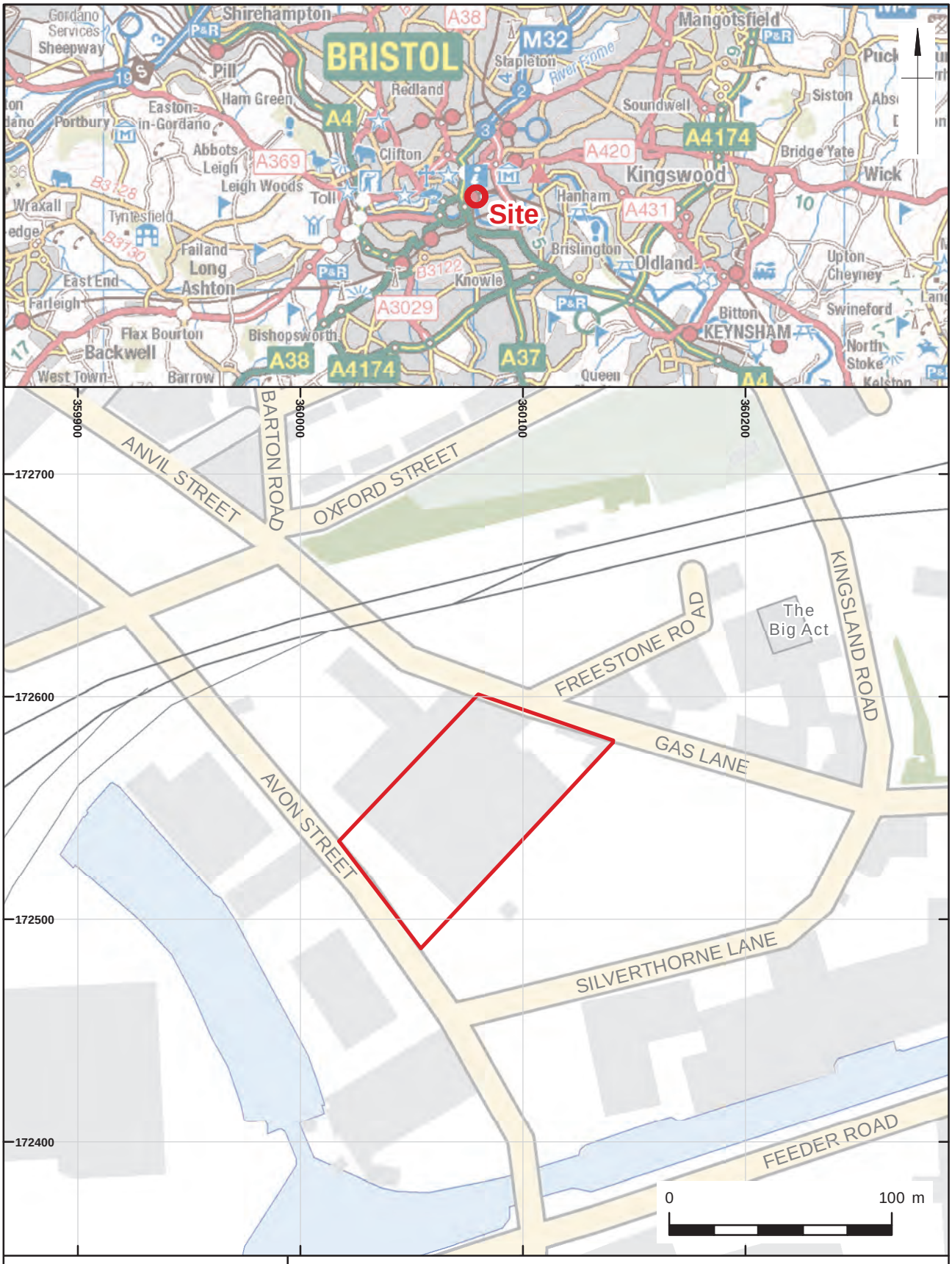
Unless otherwise specified in an associated task order (or similar), the data gathered in this report may not be suitable for use as a pre-lining investigation. WinCan are happy to carry out such surveys, but this must be agreed prior to the commencement of the works, and a the client must specify the data they wish to capture and the acceptable tolerances.

Where GPS coordinates and heights have been issued within this report, they are to 1m accuracy, and 2m accuracy for heights. Greater accuracy can be provided on request.

If you have any queries please do not hesitate to contact us.

MAD - 0117 971 4447

info@maintainadran.co.uk




Site Location



| | | | |
|---|---|---|---|
| Date: | 14/03/2023 | Revision Number: | 0 |
| Scale: | 1:2500 at A4 | Illustrator: | OD |
| Path: | X:\Projects\223262\GIS\FigsMXD\2023_03_14\223262_WB_Figure1.mxd | | |

Site Location

Figure 1

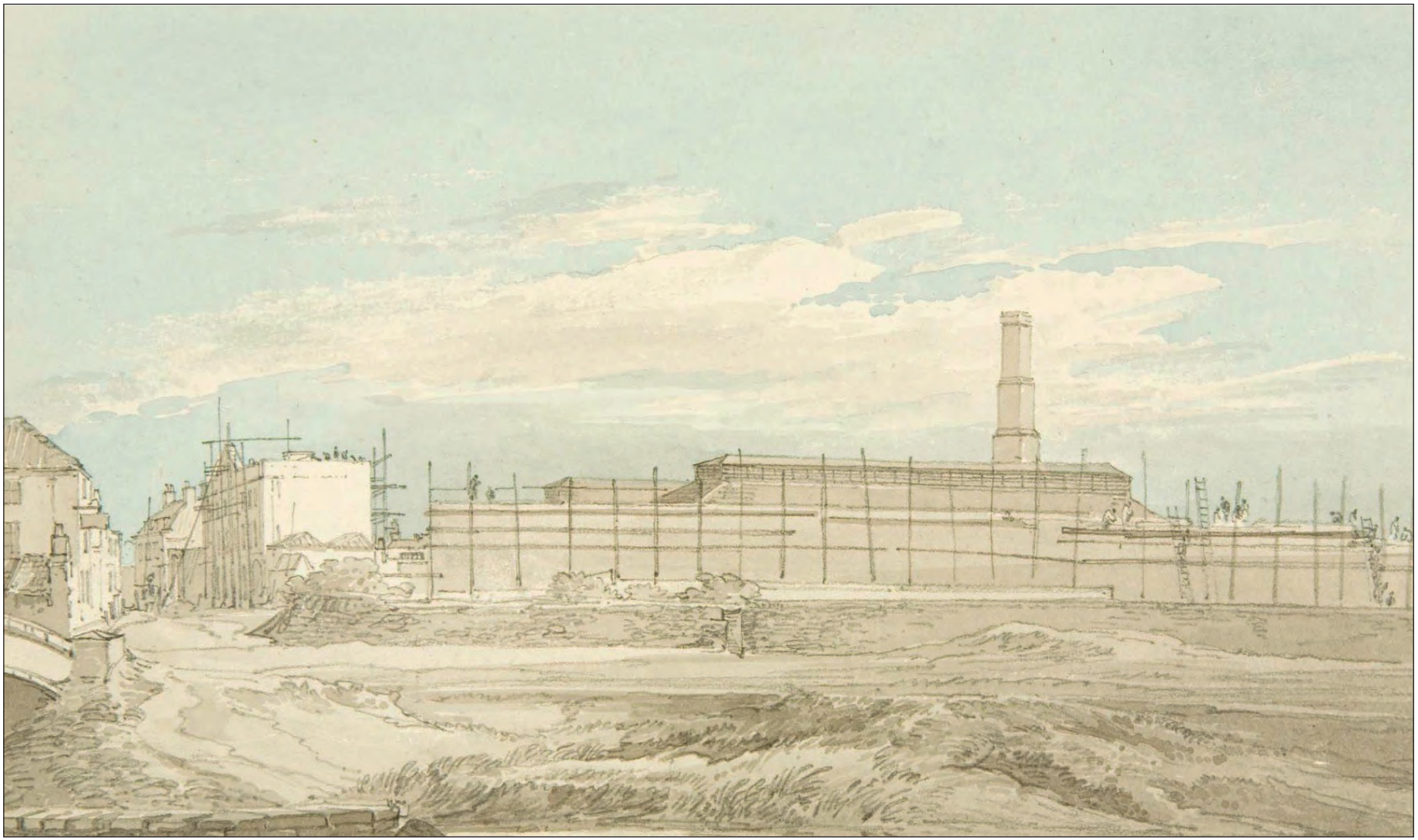


Figure 2: New Gas Works, 1821, by High O'Neill (Bristol Museum and Art Gallery M2778)



| | | | |
|---|---|---|---|
| Date: | 14/03/2023 | Revision Number: | 0 |
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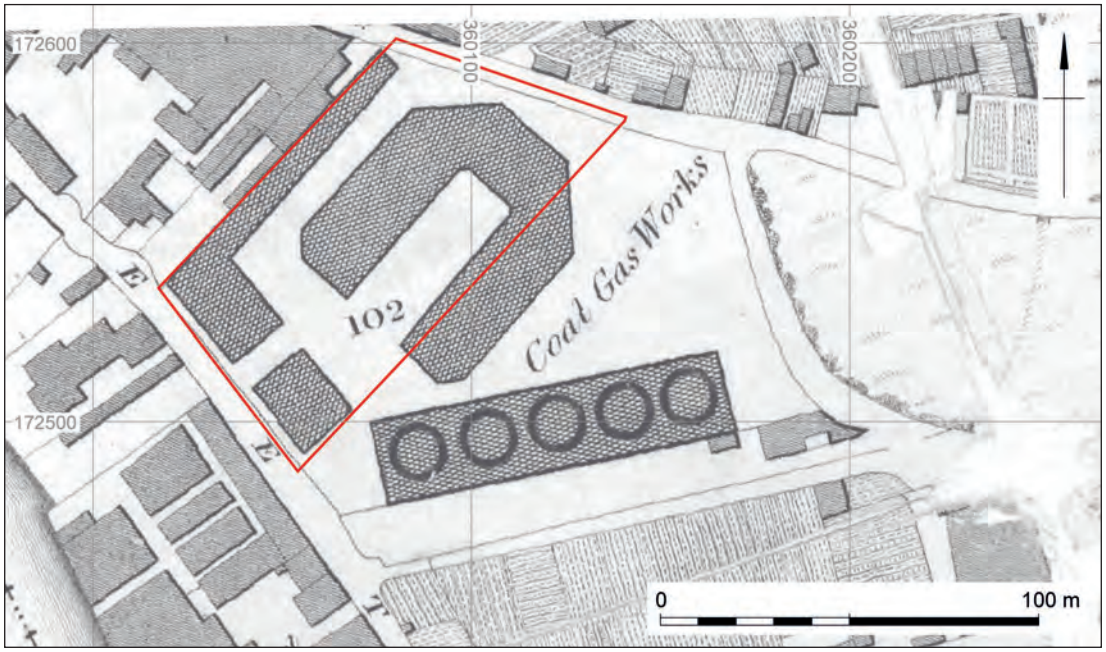


Figure 3: Plumley and Ashmead's map, 1828, found on Know Your Place.
Reproduced with the permission of Bristol Archives (seen at 1:2000).

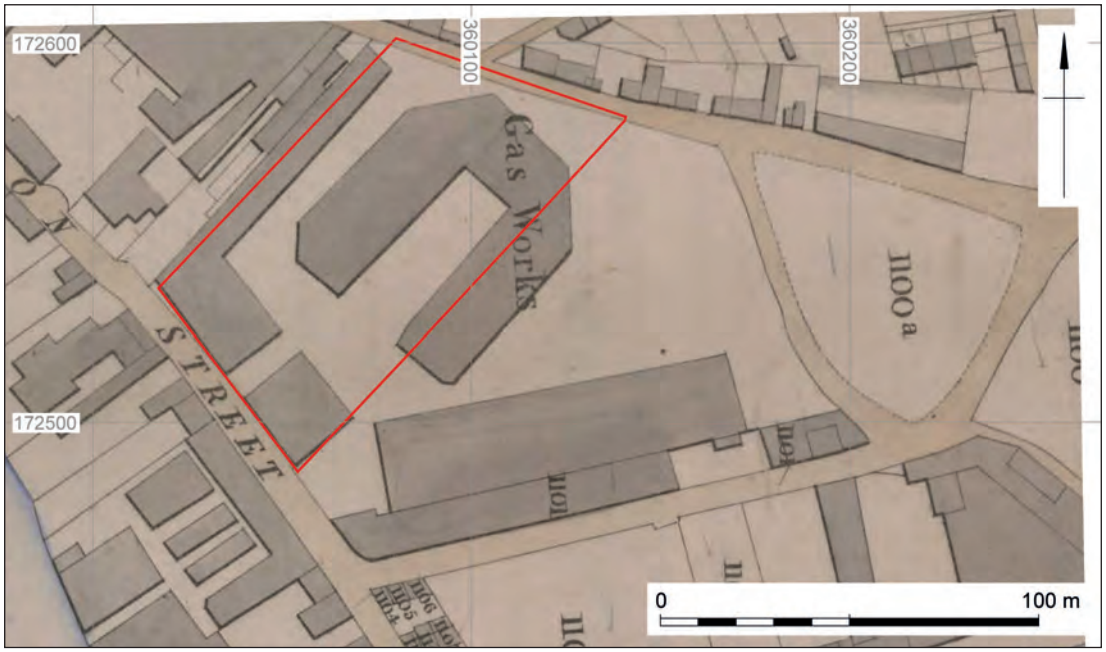


Figure 4: St Philip and St Jacob tithe map, 1847, found on Know Your Place.
Reproduced with the permission of Bristol Archives (seen at 1:2000).



| | | | |
|---|---|---|---|
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| Scale: | 1:2000 | Illustrator: | AW |
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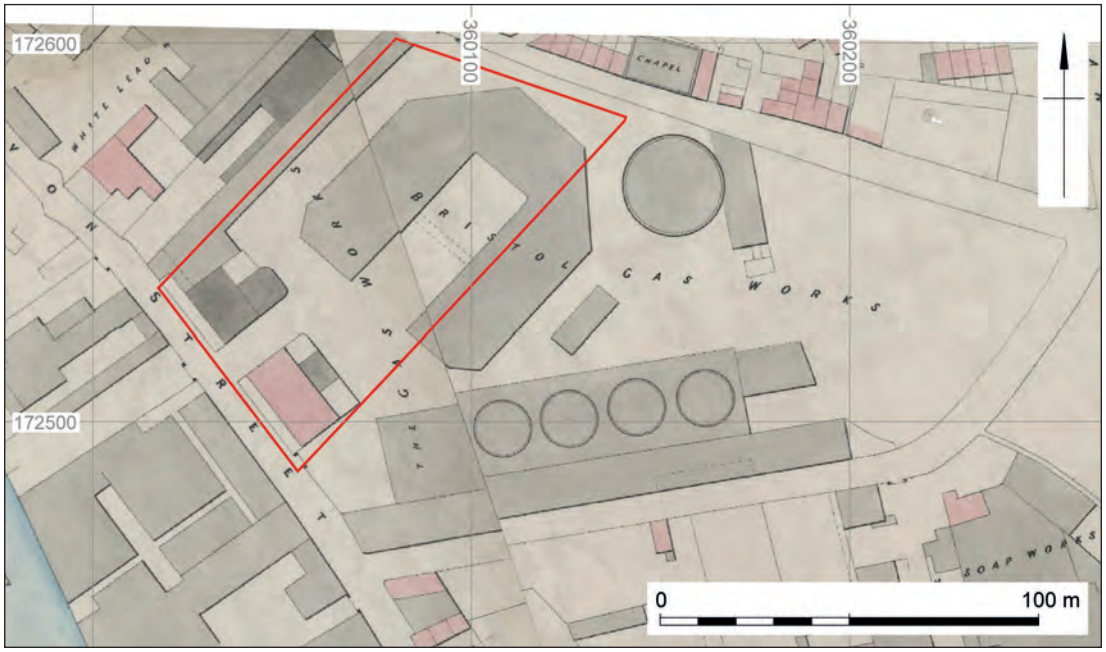


Figure 5: Ashmead's plan, 1854, found on Know Your Place.
Reproduced with the permission of Bristol Archives (seen at 1:2000).

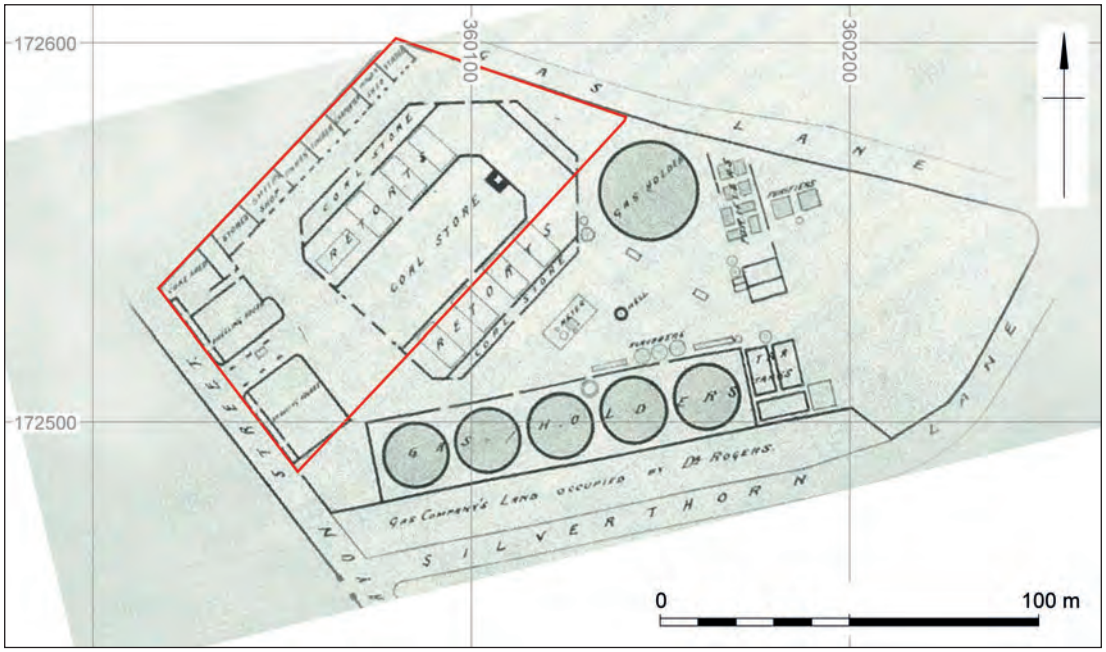


Figure 6: Plan of the Avon Street gasworks, 1857, used with permission of IGEM (seen at 1:2000).



| | | | |
|---|---|---|---|
| Date: | 14/03/2023 | Revision Number: | 0 |
| Scale: | 1:2000 | Illustrator: | AW |
| Path: | X:\Projects\223262\Graphics_Office\Rep figs\WB\2023_03_14 | | |

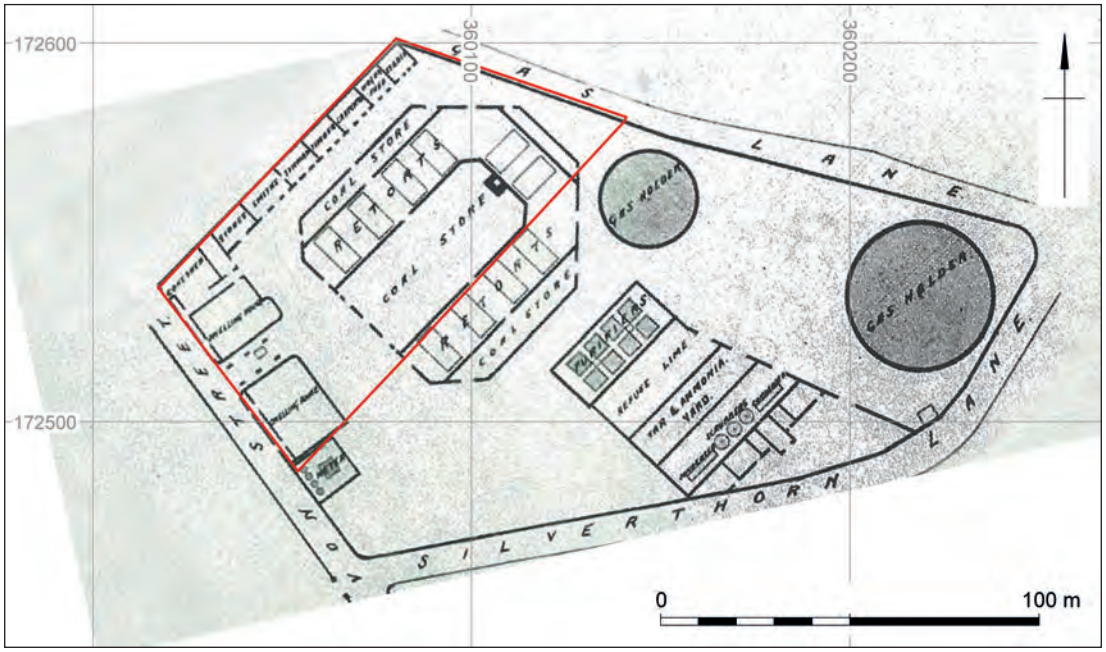


Figure 7: Plan of the Avon Street gasworks, 1860, used with permission of IGEM (seen at 1:2000).

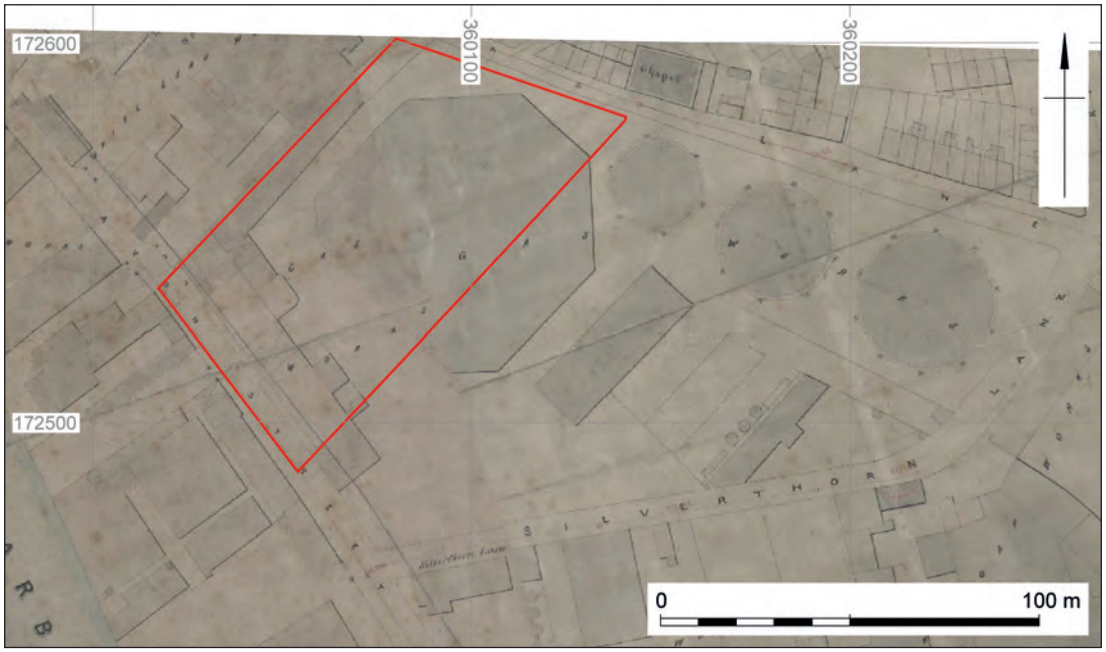


Figure 8: Ashmead's plan, 1874, found on Know Your Place.
Reproduced with the permission of Bristol Archives (seen at 1:2000).



| | | | |
|---|---|---|---|
| Date: | 14/03/2023 | Revision Number: | 0 |
| Scale: | 1:2000 | Illustrator: | AW |
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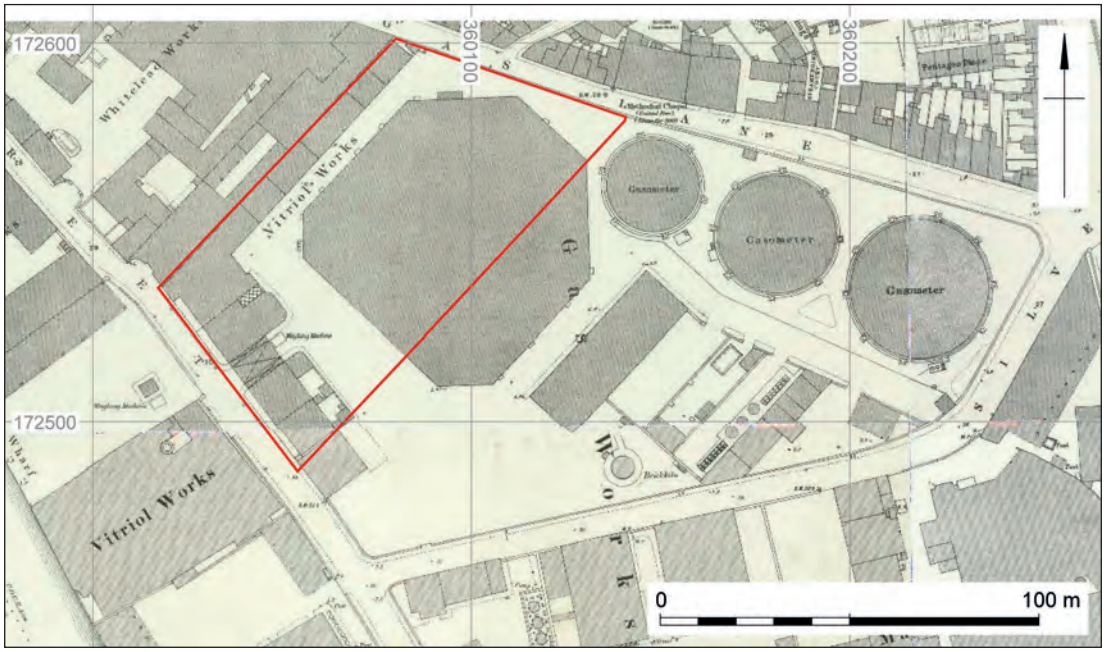


Figure 9: Ordnance Survey 1:500 Town Plan, 1884, found on Know Your Place.
Reproduced with the permission of the National Library of Scotland (seen at 1:2000).

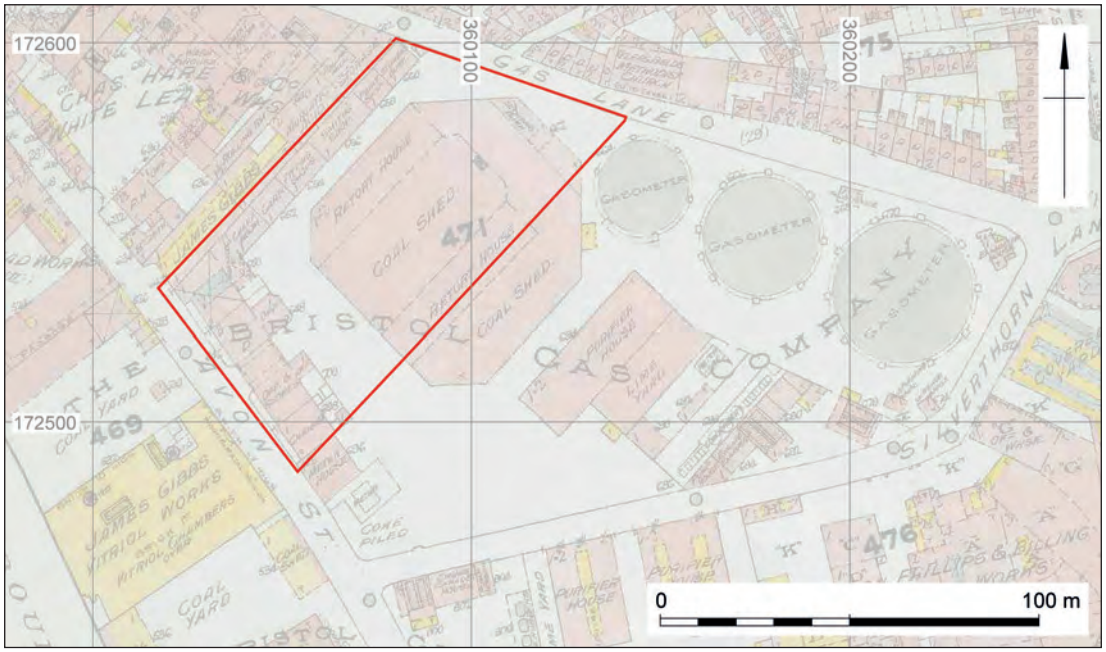


Figure 10: 1895 Goad Map, found on Know Your Place and used with permission of the British Library (seen at 1:2000)



| | | | |
|---|---|---|---|
| Date: | 14/03/2023 | Revision Number: | 0 |
| Scale: | 1:2000 | Illustrator: | AW |
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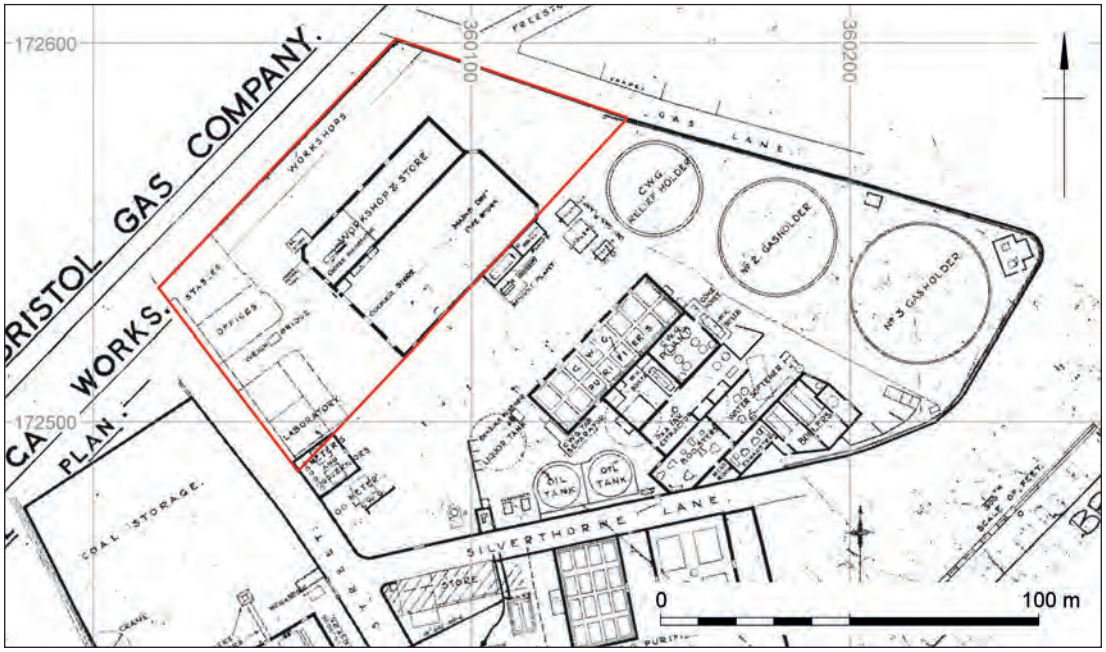


Figure 11: 1933 plan, used with permission of IGEM (seen at 1:2000).


Figure 12: 1951 plan, used with permission of IGEM (seen at 1:2000).



| | | | |
|---|---|---|---|
| Date: | 14/03/2023 | Revision Number: | 0 |
| Scale: | 1:2000 | Illustrator: | AW |
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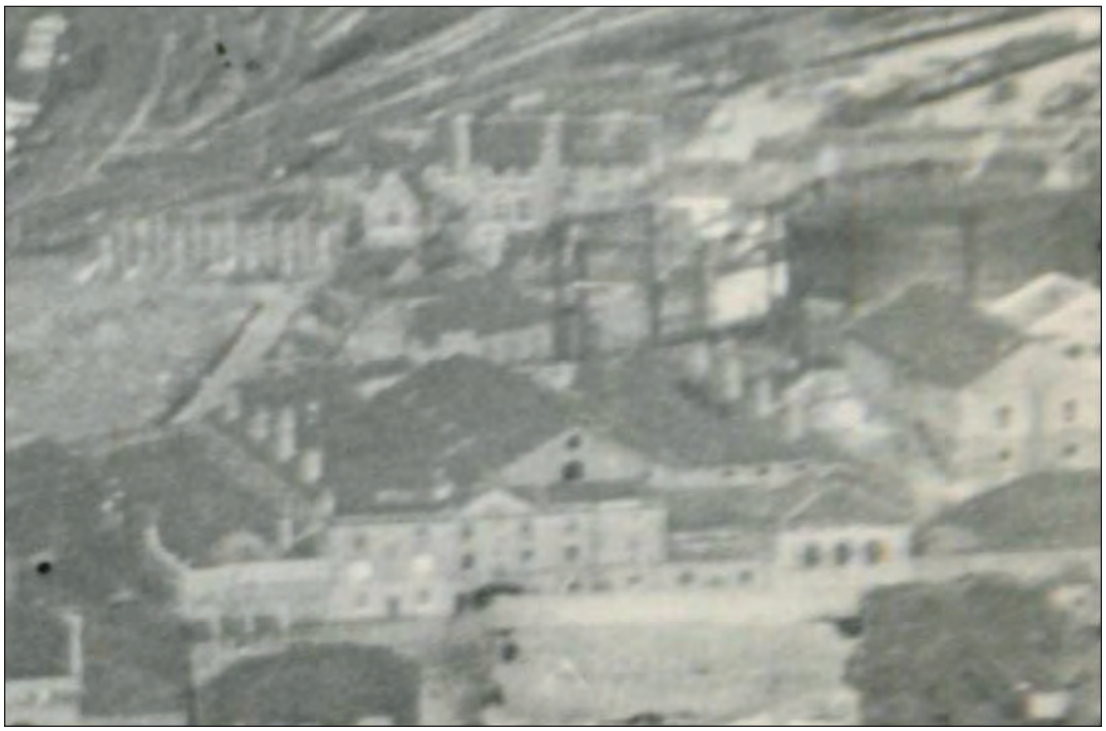

Figure 13: Extract from early 1920 aerial photograph, showing Avon Street gasworks, viewed from the west (Bristol Archives 44819/3/50)

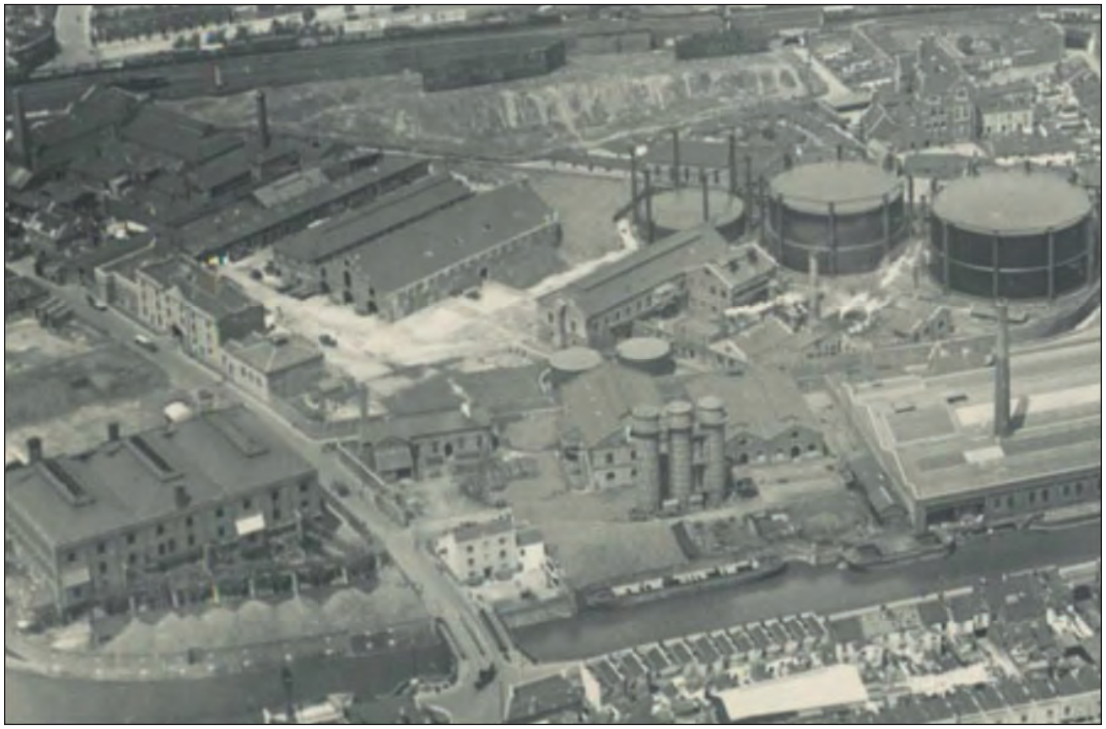

Figure 14: Extract from 1926 aerial photograph, showing Avon Street gasworks from the south (Bristol Archives 44819/3/6)



| | | | |
|---|---|---|---|
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172600
172580
172560
172540
172520
172500

360020
360040
360060
360080
360100
360120
360140

Retort House
(north-east range)

Retort House
(north-west range)

Coal Store

Gasworks Office

Yard

Gasworks Office

see fig. 29
for elevation

0 20 m

Site boundary
Trench top
Trench base
Cut feature
Metal structure
Structure
Projected structure
Paved floor
Concrete floor
Retort benches and underground flues
Projected retort benches and underground flues
Other projected feature
Disturbance
Walls of standing building



| Date: 17/03/2023 | Created by: AW | Revision: 0 | Scale: 1:400 at A3 |
|---|---|---|---|

Figure 15: Site plan, showing areas of investigation and archaeological features

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360040 360060 360080 360100

172540 172520

Group 3059 (retort bench)
Group 3060 (cooker incinerator)
Group 3059 (retort bench)
Group 3055
Group 2048
Group 2047
Group 2046
Group 1082
Group 1085
Group 1086
Group 1088
Group 1084

3054 2037 2049 3035 1038-9 1029 1045 1081 1055 1016 2010 2030 2031 2009 2032 2035 2017-8 2006 2019 2040 2021 2024 2026 2039 2025 2027 5002-5 1026

flue access chamber

see fig. 29 for elevation

0 10 m

- Site boundary
- Trench top
- Trench base
- Cut feature
- Metal structure
- Structure
- Projected structure
- Paved floor
- Concrete floor
- Retort benches and underground flues
- Projected retort benches and underground flues
- Other projected feature
- Disturbance
- Walls of standing building



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Figure 16: Detailed plan of archaeological features (south-west)

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360080 360100 360120

172580 172560 172540

2045
Group 1083
doorway
4022
flue opening
4049
4076-8
4051
4047
4015
4050
4049
Group 2041
4002
4052
Group 3058 (retort bench)
Group 4081 (retort bench)
Group 4083
Group 1087
4034
4040
Group 4082
4035
1058
4066
3030
4042
3041-3
Doorway (blocked with 4041)
4045
4043
4069
Group 3056 (retort bench)
Group 3057
1076 (outline only)
chimney
Group 4080 (retort bench)
Group 1085
flue openings
Group 1084
1045
Group 1082
1081
1018
flue access chamber
1029
Group 1082
Group 1088
1038-9
Group 1082

0 10 m

Site boundary
Trench top
Trench base
Cut feature
Metal structure
Structure
Projected structure
Paved floor
Concrete floor
Retort benches and underground flues
Projected retort benches and underground flues
Other projected feature
Disturbance
Walls of standing building



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Figure 17: Detailed plan of archaeological features (north-east)

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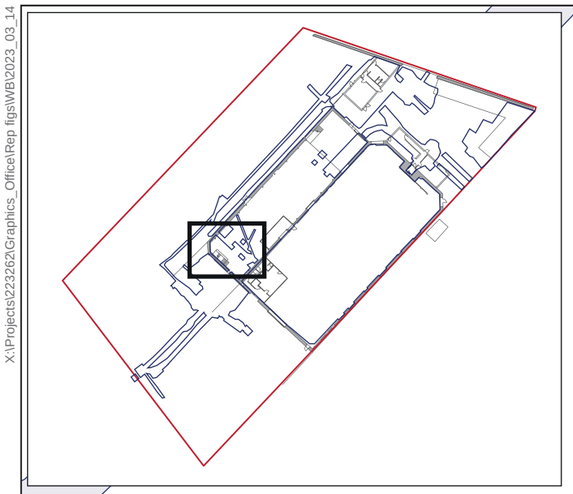

360045

360050

360055

172545

172540

**Group 3059**
(retort bench)

**Group 3060**
(cooker
incinerator)

**Group 3059**
(retort bench)

**Group**
**3055**

2037

2049

Trench top
Feature
Projected feature
Walls of standing building

0 2 m



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Figure 18: Orthographic plan from photogrammetry of late 19th-century retort bench (group 3059), and early 20th-century cooker incinerator (group 3060) and floor (group 3055) at the south-west end of the retort house.

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360090

360095

360100

172570

172565

**Group 3058**
(retort bench)

**Group 1087**

3041-3

**Group 1082**

1076

**Group 3056**
(retort bench)

**Group 3057**

Trench top
Feature
Projected feature
Walls of standing building

0 2 m



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Figure 19: Orthographic plan from photogrammetry of 19th-century retort bench (group 3058) at the north-east end of the retort house

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360085

360090

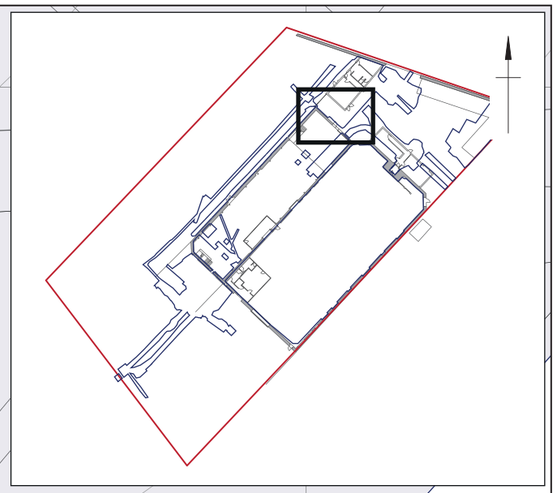
360095

172585

172580

172575

4015



Trench top
Feature
Projected feature
Walls of standing building

0 2 m

Coordinate system: OSGB 1936 British National Grid



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Figure 20: Orthographic plan from photogrammetry of 19th-century retort bench (group 3058) at the north-east end of the retort house

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360105 360110 360115

172575 172570 172565

Group 4081
(retort bench)

Group
4083

1069

Trench top
Feature
Projected feature
Walls of standing building

0 2 m



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Figure 21: Orthographic plan from photogrammetry of 1850s retort benches (groups 4080 and 4081), and associated flues (group 4083) in the north-east range of the retort house

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360040

360045

360050

172540

172535

172530

2037

2049

Group 2047

Group 2048

Group 2047

Trench top
Feature
Projected feature
Walls of standing building

0 2 m



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Figure 22: Orthographic plan from photogrammetry of 19th-century yard surface (group 2047) to the south-west of the retort house coal store

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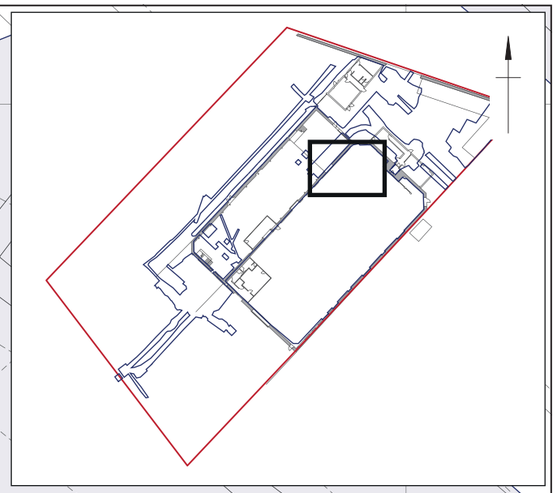
360090
360095
360100
172570
172565
172560

Group 3048
3041-3
Group 3057
Group 1087
1076
Group 1082
Group 1082
Group 1082



Trench top
Feature
Projected feature
Walls of standing building

0 2 m



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Figure 23: Orthographic plan from photogrammetry of 1850s floor surface (group 1082), and 20th-century concrete repairs (group 1086) in coal store

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360080

360085

360090

360095

172555

172550

172545

Group 1082

Group 1086

Group 1082

Group 1086

Group 1082

0 2 m

Trench top
Feature
Projected feature
Walls of standing building

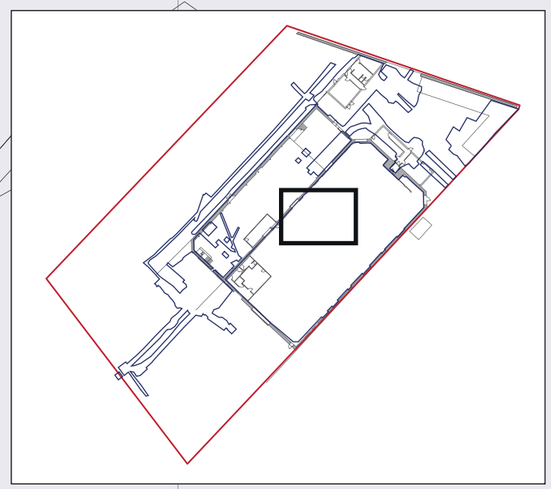



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Figure 24: Orthographic plan from photogrammetry of 1850s floor surface (group 1082), and 20th-century concrete repairs (group 1086) in coal store

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360070
360075
360080
360085
172540
172535

Group 1082

Group 1086

0 2 m

Trench top
Feature
Projected feature
Walls of standing building

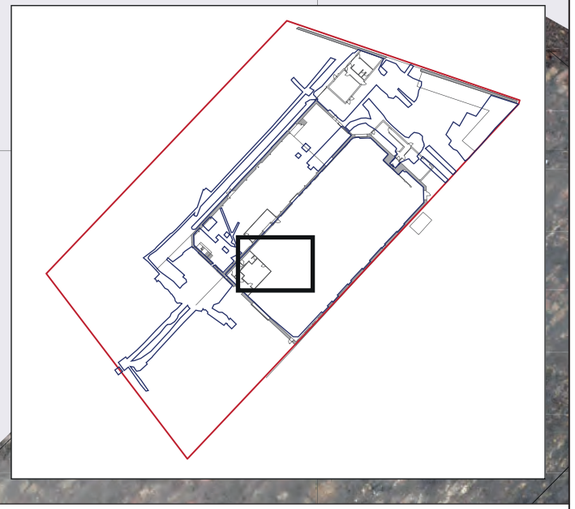



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Figure 25: Orthographic plan from photogrammetry of 1850s floor surface (group 1082), and 20th-century concrete repairs (group 1086) in coal store

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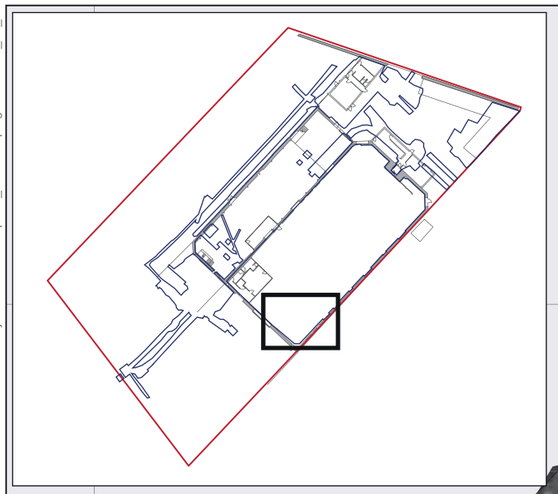

360080

360085

360090

172525

172520

Group 1082

Group 1082

Group 1082

Group 1082

Trench top
Feature
Projected feature
Walls of standing building

0 2 m



| Date: 17/03/2023 | Created by: AW | Revision: 0 | Scale: 1:50 at A3 |
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Figure 26: Orthographic plan from photogrammetry of 1850s floor surface (group 1082), and 20th-century concrete repairs (group 1086) in coal store

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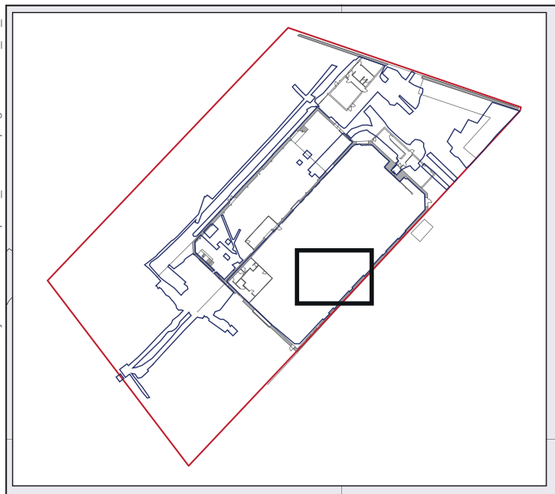
3600090

3600095

3600100

172535

172530



see fig. 29 for elevation

Group 1084

Group 1082

1016

Group 1082

Group 1082

Trench top
Feature
Projected feature
Walls of standing building

0 2 m

Coordinate system: OSGB 1936 British National Grid



| Date: 17/03/2023 | Created by: AW | Revision: 0 | Scale: 1:50 at A3 |
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Figure 27: Orthographic plan from photogrammetry of 1850s floor surface (group 1082), and 20th-century concrete repairs (group 1086) in coal store

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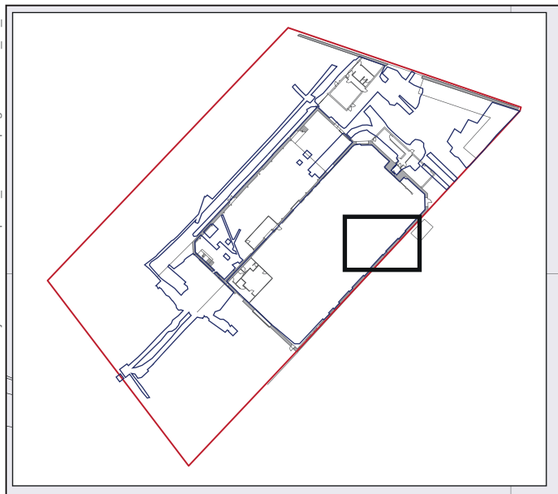

360105

360110

172545

172540

Group 1082

Group 1084

see fig. 29 for elevation

0 2 m

Trench top
Feature
Projected feature
Walls of standing building



| Date: 17/03/2023 | Created by: AW | Revision: 0 | Scale: 1:50 at A3 |
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Figure 28: Orthographic plan from photogrammetry of 1850s floor surface (group 1082), and 20th-century concrete repairs (group 1086) in coal store

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Figure 29: South-west facing elevation and cross section of flue (group 1084) from photogrammetry.

Figure 30: Coal store and retort house, looking north (photograph by C. Mason).

Figure 31: Coal store, looking west (photograph by C. Mason).



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Figure 32: North-east elevation of the coal store (photograph by C. Mason).

Figure 33: Interior of retort house, facing north-east, looking west (photograph by C. Mason).



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Figure 34: Interior of coal store, looking south-west (photograph by C. Mason).

Figure 35: Interior of coal store, looking north-east (photograph by C. Mason).



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Figure 36: Alluvium 1078, buried topsoil 1078, and made ground layer 4076, looking north-east towards Gas Lane, (photograph by C. Mason).


Figure 37: Made ground 5003, sandstone sett road surface 5002, and modern pavement 5000. North-east side of Avon Street, looking north-east. Scale: 1 m (photograph by C. Sabato).



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Figure 38: Stone wall foundation (2027) north-east of Avon Street, looking north-east. Scale: 0.5 m (photograph by C. Sabato).

Figure 39: Brick wall foundation (2025) north-east of Avon Street, looking south-east. Scale: 1 m (photograph by C. Sabato).



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Figure 40: Stone wall foundation (4048, group 1083) on north side of retort house, looking east. Scale: 1 m (photograph by C. Mason).

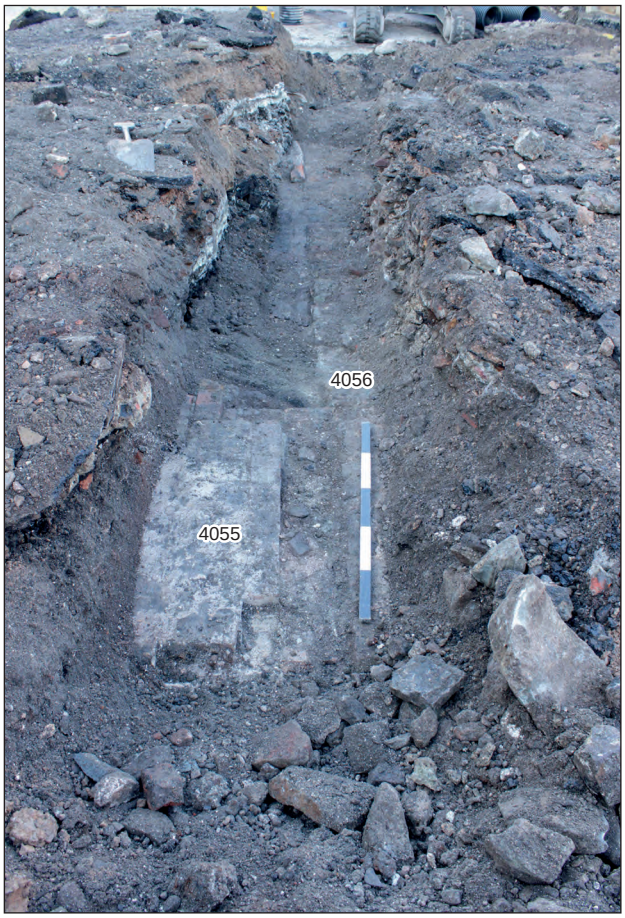


Figure 41: Stone wall foundation (4056, group 1083), retort bench (4055, group 4081) on north-east side of retort house, looking north-west. Scale: 1 m (photograph by C. Sabato).



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Figure 42: Stone wall foundation (group 1085) and brick flue (group 1084) in coal store, looking north-east. Scale: 1 m (photograph by C. Mason).

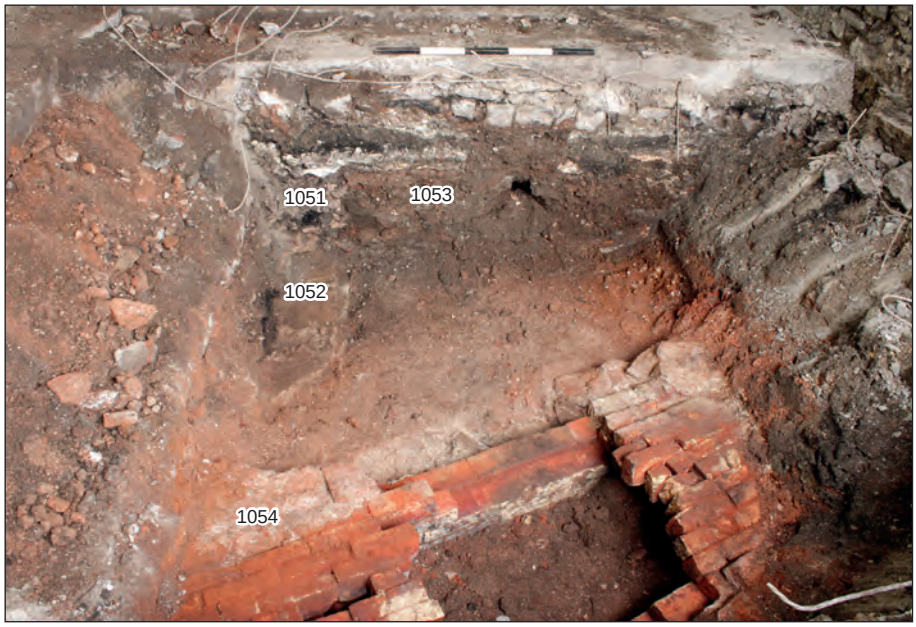


Figure 43: Stone wall foundation (1052, group 1085), made ground (1053, group 1091), robber cut 1051, and brick flue (1054, group 1087). North corner of coal store, looking south-west. Scale: 1 m (photograph by C. Sabato).



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Figure 44: Stone wall foundation (group 1085), in south corner of coal store, looking west. Scale: 1 m (photograph by A. Pannell).

Figure 45: Stone wall foundation (1048, group 1085) and upstanding chimney in coal store, looking south-east. Scale: 0.5 m (photograph by C. Mason).



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Figure 46: Stone wall foundation (1048, group 1085) and upstanding chimney in coal store, showing line of coping stones and opening into north-west side of chimney. Looking south-east. Scale: 1 m (photograph by C. Mason).

Figure 47: Chimney at north-east end of coal store, looking east (photograph by C. Mason).



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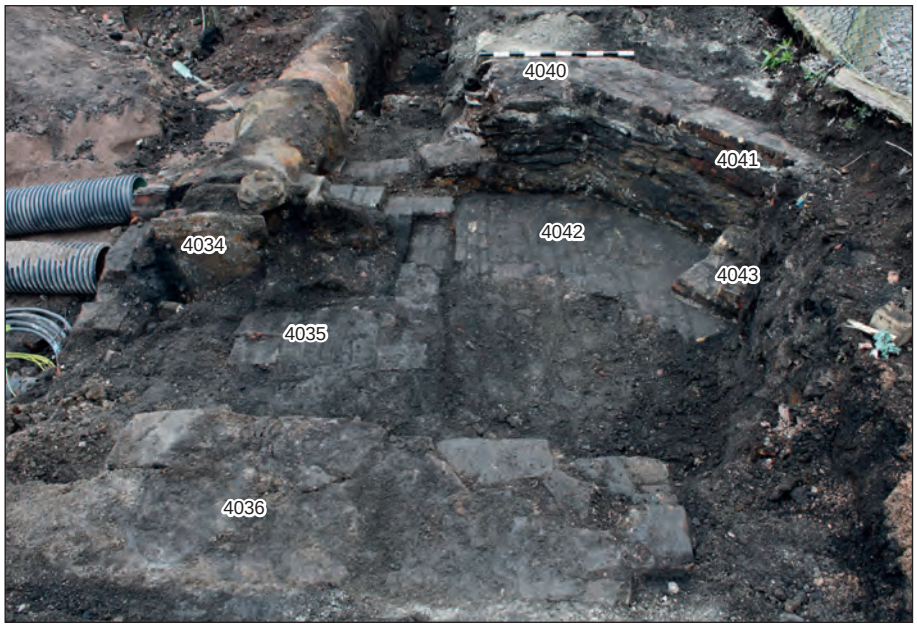


Figure 48: North-east stone wall (4036, group 1083) of the north-east range of the retort house; stone wall (4040), floor surface (4042), and step (4043) of the adjacent lean-to building; and gas pipe 4034 and associated access chamber (4035). Looking north-east. Scale: 1 m (photograph by C. Mason).


Figure 49: North-east stone wall (4036, group 1083) of the north-east range of the retort house; stone wall (4040), floor surface (4042), and step (4043) of the adjacent lean-to building; and gas pipe 4034 and associated access chamber (4035). Looking south-east. Scale: 1 m (photograph by C. Mason).



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Figure 50: Retort bench (group 3058) and brick floor (3041–3) at the north-east end of the north-east range of the retort house. Looking east (photograph by A. Pannell).

Figure 51: Ash pit in retort bench (group 3058) at the north-east end of the north-east range of the retort house. Looking north-east (photograph by A. Pannell).



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Figure 52: Ground raising deposits (4010, 4016, 4024-5), retort oven ash pits (4053, 4054, group 4079), structure 4052, wall 4002, and modern concrete floor 4000. Looking south-west. Scale: 1m (photograph by C. Sabato).


Figure 53: Ground raising deposits (4010–11, 4016, and 4024) and retort oven ash pit (4006, group 3058) overlain by the 1920s north-east wall (4002) of extant range of the retort house. Looking south-west. Scale: 1m (photograph by C. Sabato).



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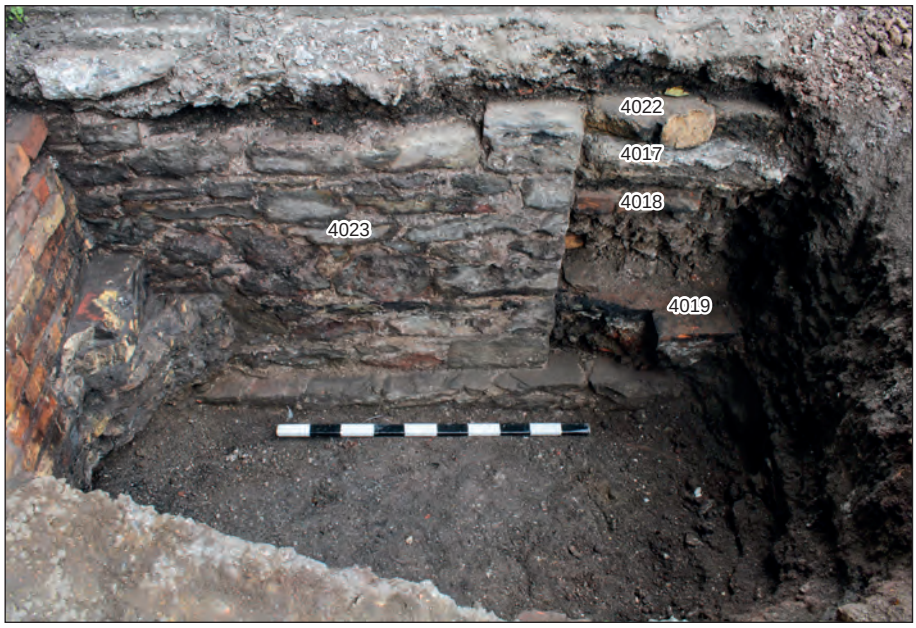


Figure 54: Ground raising deposits (4017–19) and brick floor (4022) in a doorway through the north-west wall (4023, group 1083) of the north-west range of the retort house. Looking north-west. Scale: 1m (photograph by C. Mason).

Figure 55: Brick flue 3030 in the north-west range of the retort house, Looking north-east. Scale: 1m (photograph by C. Hambleton).



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Figure 56: Brick flue (1054, group 1087) in north corner of coal store, looking west. Scale: 1 m (photograph by C. Mason).

Figure 57: Detail of brick flue (1054, group 1087) in north corner of coal store, looking west. Scale: 0.5 m (photograph by C. Mason).



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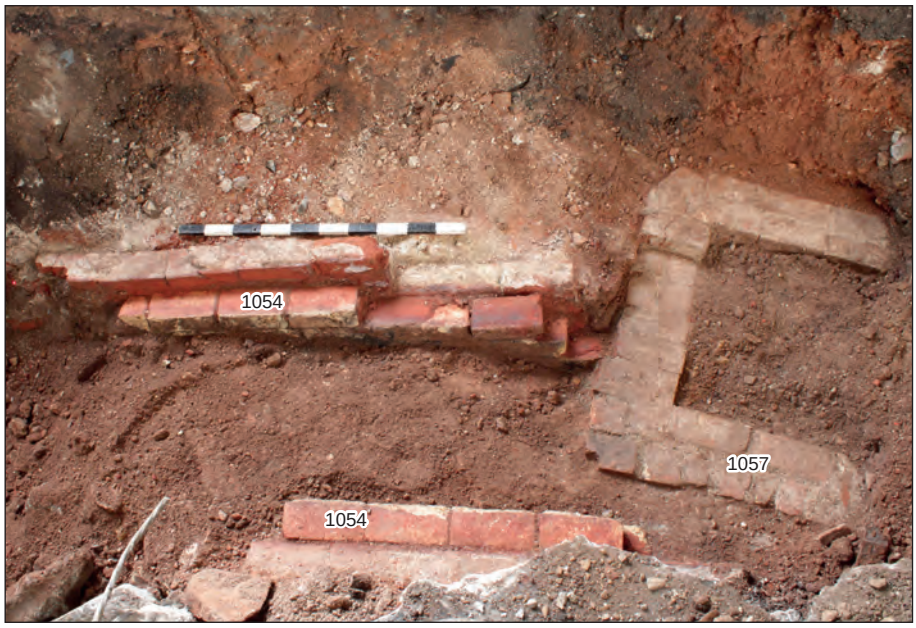


Figure 58: Brick flue (1054, group 1087) and brick access hole (1057) in north corner of coal store, looking north-east. Scale: 1 m (photograph by C. Sabato).


Figure 59: Foundations 4015 at the north-east end of the north-west range of the retort house. Looking north-east. Scale: 1 m (photograph by C. Sabato).



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Figure 60: Foundations 4047 and 4052 at the north-east end of the north-west range of the retort house. Looking north-east. Scale: 0.5 m (photograph by V. Jerjotoma Ortin).


Figure 61: Foundations 4047 and 4050–1 at the north-east end of the north-west range of the retort house. Looking north-east. Scale: 0.5 m (photograph by V. Jerjotoma Ortin).



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Figure 62: Floor surface 4049 in the north-east range of the retort house. Looking north. Scale: 1 m (photograph by C. Sabato).

Figure 63: Arched doorway under the coal store chimney, looking north-east towards well 4069 and flue system 4083 (photograph by C. Mason).



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Figure 64: Well 4069, looking north-east. Scale: 1 m (photograph by C. Mason).


Figure 65: Wall 1054 and red concrete floor 1055 in west corner of coal store, looking north-west. Scale: 1 m (photograph by C. Mason).



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Figure 66: Flue (group 1084) in coal store, looking south-west. Scale: 1 m (photograph by V. Jerjotoma Ortin).

Figure 67: Iron capping over access hole into underground flue (group 1084) in coal store, looking north-east. Scale: 1 m (photograph by C. Mason).



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Figure 68: Interlocking fireclay slabs over access hole into underground flue (group 1084) in coal store, looking north-east. Scale: 1 m (photograph by C. Mason).

Figure 69: Access hole into underground flue system (group 1084) in coal store, looking north-east. Scale: 1 m (photograph by C. Mason).



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Figure 70: Detail of fireclay capping slab showing tongue and grove moulding on edge. Scale: 0.2 m (photograph by C. Mason).

Figure 71: Internal view of flue (group 1084) in coal store, looking north-east (photograph by C. Mason).



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Figure 72: Openings at north end of flue (group 1084) in coal store, looking north-west (photograph by C. Sabato).

Figure 73: Openings at north end of flue (group 1084) in coal store, looking north-east (photograph by C. Sabato).



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Figure 74: High level flue opening into the coal store chimney, looking north-west (photograph by C. Mason).

Figure 75: Fireclay slab and sandstone sett floor (group 1082) on the south-east side of the coal store, looking south-west (photograph by C. Mason).



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Figure 76: Firebrick and sandstone sett floor (group 1082) on the south-east side of the coal store, looking south-east. Scale: 1 m (photograph by C. Sabato).

Figure 77: Sandstone sett floor (group 1082) with inserted brick and concrete strip (group 1086) on north-west side of the coal store, looking north-west. Scale: 1 m (photograph by C. Sabato).



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Figure 78: Sandstone sett floor (group 1082), cut by modern concrete vehicle inspection pit. Scale: 1 m (photograph by C. Hambleton).

Figure 79: Sandstone sett floor (group 1082) and modern concrete repairs (group 1086). Scale: 1 m (photograph by C. Sabato).



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Figure 80: Brick- and stone-lined drain (group 1088), looking north-east. Scale: 0.5 m (photograph by C. Sabato).

Figure 81: Brick- and stone-lined drain (group 1088), showing in-situ capstones. Looking north-east. Scale: 1 m (photograph by C. Sabato).



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Figure 82: Brick- and stone-lined drain (group 1088), after removal of capstones. Looking north-east. Scale: 1 m (photograph by C. Sabato).

Figure 83: Brick- and stone-lined drain (group 1088), showing oversized construction cut. Looking north-east. Scale: 1 m (photograph by C. Sabato).



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Figure 84: Ash pit on south-west side of retort bench 3059, looking north. Scale: 1 m (photograph by C. Hambleton).

Figure 85: Truncated north-west end of retort bench 3059, looking south-west. Scale: 1 m (photograph by A. Pannell).



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Figure 86: Ash pit on south-east side of retort bench (group 4080) in north-east range of the retort house, looking north-west. Scale: 0.5 m (photograph by L. Jervis).

Figure 87: Ash pit on south-east side of retort bench (group 4080) in north-east range of the retort house, looking north-west. Scale: 0.5 m (photograph by C. Sabato).



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Figure 88: Flue system (group 4080) in north-east range of the retort house, looking south-west. Note direction of flues in relation to blind arches in the adjacent wall. Scale: 1 m (photograph by C. Sabato).


Figure 89: Sandstone sett yard surface (group 2047) and pavement (2031), iron kerb 2032, and stopcock 2035, looking north. Scale: 1 m (photograph by A. Pannell).



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Figure 90: Sandstone sett yard surface (group 2047 and 2049) and concrete petrol tank chamber 2037, looking north-east. Scale: 1 m (photograph by C. Sabato).

Figure 91: Weighbridge 2019, looking north-east. Scale: 0.5 m (photograph by C. Sabato).



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Figure 92: Brick and concrete structure (1016) within the coal store, looking north-east. Scale: 1 m (photograph by C. Sabato).

Figure 93: Concrete trough of cooker incinerator (group 3060) in the north-west range of the retort house, looking east. Scale: 1 m (photograph by C. Hambleton).



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Figure 94: Brickwork at south-west end of cooker incinerator (group 3060) and brick floor (group 3055) in the north-west range of the retort house, looking north-west. Scale: 1 m (photograph by C. Sabato).

Figure 95: Brickwork at south-west end of cooker incinerator (group 3060) and brick floor (group 3055) in the north-west range of the retort house, looking south-east. Scale: 1 m (photograph by C. Sabato).



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Figure 96: Underground concrete petrol tank (2037), brick and concrete ramp structure (group 2048) and associated re-laid sandstone sett floor to the south-west of the retort house, looking north. Scale: 1 m (photograph by C. Sabato).

Figure 97: Brick and concrete ramp structure (group 2048), looking south-east. Scale: 1 m (photograph by C. Sabato).



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Figure 98: Brick flue (2041) to the north-west of the retort house, looking east (photograph by L. Jervis).

Figure 99: Opening at north-east terminus of brick flue (2041) to the north-west of the retort house, looking south-west. Scale: 1 m (photograph by L. Jervis).



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Figure 100: Wall (group 1085) and pit (1045) on the north-west side of the coal store, looking north-east. Scale: 1 m (photograph by C. Mason).

Figure 101: Gas pipe 4034 filled with coal tar oil. Looking north-east (photograph by C. Mason).



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Figure 102: Stone block 4045 in lean-to building on north-east side of retort house, looking south-west. Scale: 0.5 m (photograph by C. Mason).

Figure 103: Brick floor (group 4082) to the north-east of the retort house, looking east. Scale: 1 m (photograph by L. Jervis).



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Wessex Archaeology Ltd registered office Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www. wessexarch.co.uk


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