Archaeological Research Services Ltd

Furnival Square, Sheffield

Desk-Based Assessment

Fairbanks 1797 map of Sheffield

ARS Ltd Report 2006/20
June 2006

Compiled By:
James Brightman and Jessika Shakarian
Archaeological Research Services Ltd
Suite 7 Angel House
Bakewell
Derbyshire
DE45 1HB

Checked By:
Dr. Clive Waddington
Tel: 01629 814540
Fax: 01629 814657
admin@archaeologicalresearchservices.com
www.archaeologicalresearchservices.com

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Executive Summary

Archaeological Research Services Ltd were commissioned to produce a desk-based assessment of the archaeological potential of land at Furnival Square, Sheffield (SK 354868) and how this resource would be affected by the proposed development.

The development area was enclosed agricultural and pasture land until the late 18th century, when it was developed into industrial cutlery and steel works. If undisturbed deposits survive below the constructional works built from the 18thcentury onwards then they could have the potential to contain earlier archaeological features. However, according to sites and monuments record there is no record of any pre-18th century archaeological finds having been found in the development area. The works remained until the late 1960s when they were demolished to make way for the Furnival Square roundabout. Documentary and photographic evidence shows that the works covered the whole development site and so there is the potential for survival of archaeological remains relating to the early industrial past of the site in any areas where modern construction has not disturbed deposits in any areas not affected by modern construction.

1. Introduction

1.1 This document reports the findings of a desk-based assessment undertaken by James Brightman of Archaeological Research Services Ltd on behalf of Urban Innovations. The assessment focused on the now disused 'Office World' store on the corner of Furnival Street and Eyre Street, Furnival Square, Sheffield.

2. Location, Land Use and Geology

2.1 The development area is located at SK 3537 8678, and comprises the land to the south of the Furnival Square roundabout on the corner of Eyre Street and Furnival Street (Figs 1-2), now covered by the disused 'Office World' store and the attached car park.

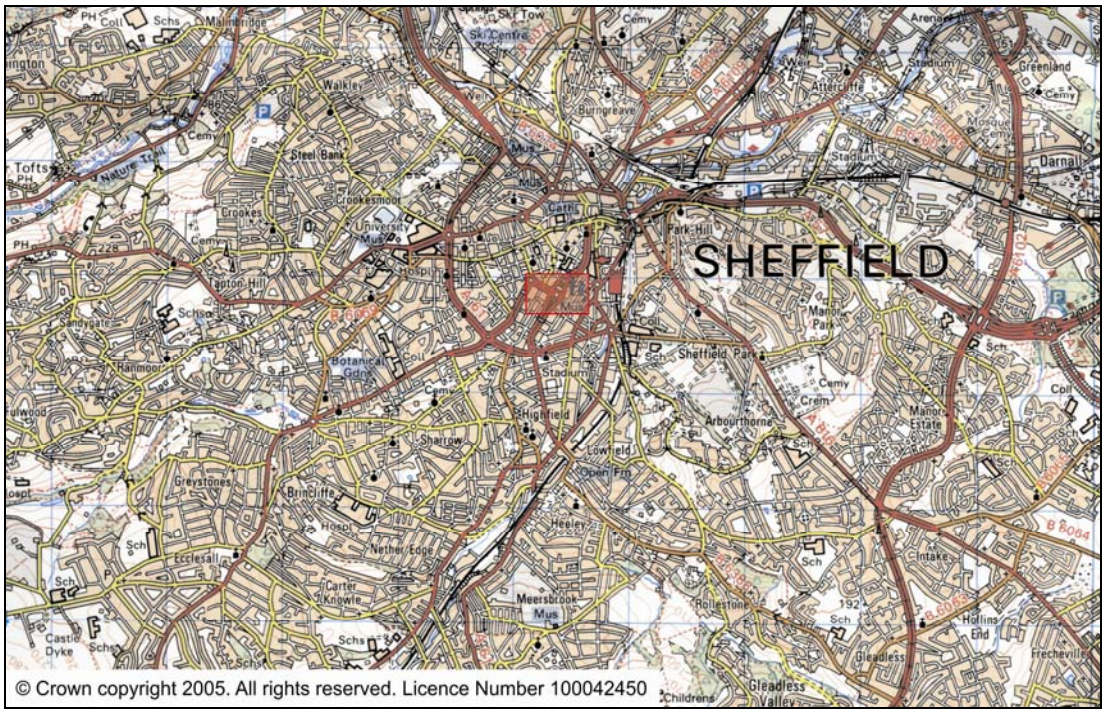


Fig. 1 Location of development site within Sheffield.

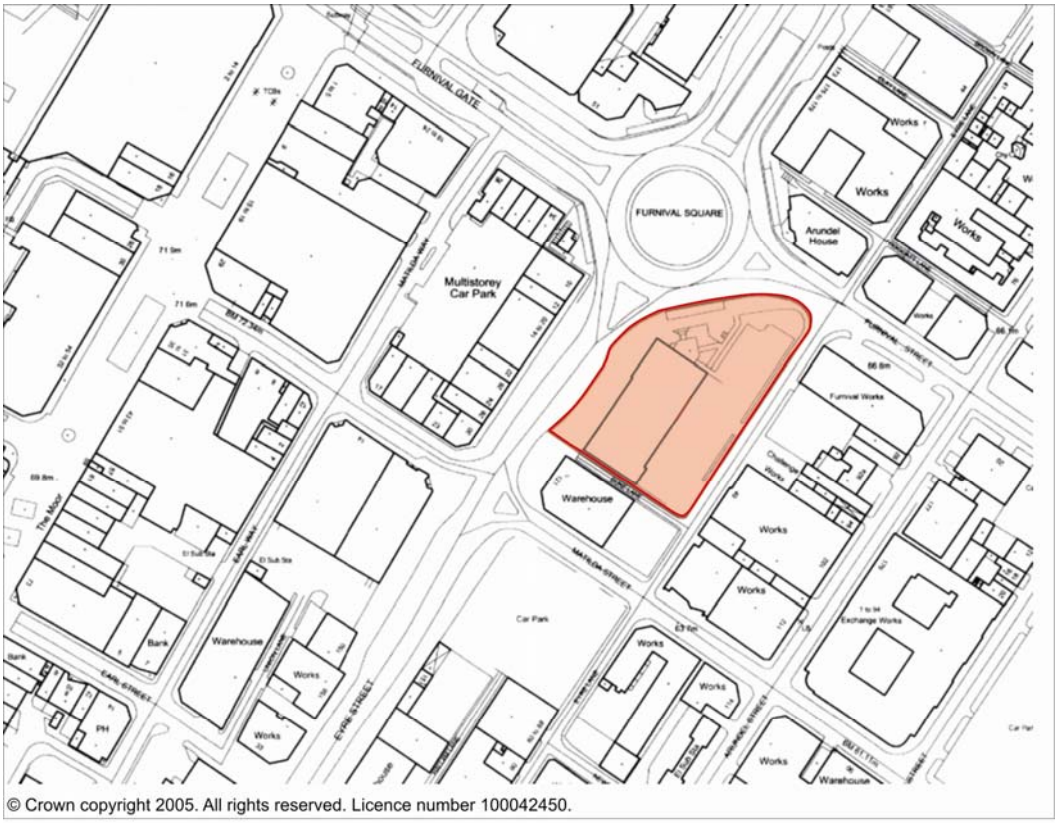


Fig. 2 Position of development area to the south of the Furnival Square roundabout.

2.2 The area in and around the development area has been classified in the Historic Landscape Characterisation as Industrial for the period c.AD1791 to the present day. The full characterisation given by the South Yorkshire Archaeology Service notes that much of the original building fabric of the area was cleared in the mid 20th century, and that very few original buildings remain.

2.3 Sheffield lies on the Upper Carboniferous lower coal measures of the Westphalian A series. According to geological maps the proposed development area has a coal seam running directly below the south corner of the car park. The borehole samples reveal that this seam runs directly across the site although it is overlain by a veneer of natural clay deposits. Natural coal deposits were found in seven of the nine boreholes taken, on average, between 2-3m below the surface. Borehole 4 in the centre of the site did not produce any coal as this borehole stopped when it hit a brick structure – probably the chimney base. Borehole 1, located in the southernmost corner of the site, did not strike any coal but instead came down on to the sandstone that is inter-bedded with the coal measures. Although maps of the area suggest the site was mined for coal pre-1797 it may not be true for this specific

location as the coal is present in so many of the cores and there is no evidence for any working.

3. Aims and Objectives

3.1 The aim of this desk-based assessment is to establish the nature, likely extent and survival of the archaeological resource on the proposed development site, and assess how this development would impact upon the archaeological resource. The results of this desk-based assessment will allow for a strategy for any further archaeological work to be undertaken prior to, or as the result of, the planning application. This report aims to summarise and synthesise the available archaeological and historical resource available for the study area and use this to highlight any archaeological constraints which would affect potential development on the site.

4. Methodology

4.1 A search of the South Yorkshire Sites and Monuments Record (SMR) was made, as well as online consultation the Online Access to the Index of Archaeological Investigations (OASIS). These preliminary searches provide information on Scheduled Ancient Monuments, Listed Buildings, a list of any other archaeological sites and monuments, as well as references to previous archaeological work conducted in the area. Any further archaeological sites were identified through a search of relevant historic maps, documents, texts and photographs held at the Sheffield City Library, Local Studies Section and at the Sheffield Archives. The following is a list of sources and resources consulted for this desk-based assessment:

- Visual inspection of the site.
- South Yorkshire SMR (Appendix 1).
- National Building Records (Appendix 1).
- Historic Landscape Character Information provided by the South Yorkshire Archaeology Service.
- Plans and maps of the site and its environs including Ordnance Survey maps up to the present day, and historical pictorial and surveyed maps (Appendix 3).
- Surveys/plans of any former buildings in the development area.
- Street name evidence.
- Historical documents and photographs held by the Sheffield Archives and the Sheffield City Library (Local History Section).
- Relevant archaeological archive reports housed by the South Yorkshire Archaeology Service, and online in the OASIS database.
- Archaeological and historical journals and books.
- Trade and business directories.
- Geotechnical data.

4.2 An archaeological watching brief was carried out as requested by Urban Innovations on the geotechnical boreholing. The aim of the watching brief was to observe the removal of the borehole cores and check them for any evidence of surviving archaeological deposits. Nine cores taken both outside and inside the disused 'Office

World' building were checked for archaeological residues. The stratigraphy of each core was recorded (see borehole logs in Appendix 6) and each core photographed.

4.3 The assessment of the archaeological and historical resource is undertaken in the following sections:

- Chronological assessment of the resource by period
  - Prehistoric (-AD43)
  - Romano-British (AD43 – AD410)
  - Early Medieval (AD410 – AD 1066)
  - Medieval (AD 1066 – AD 1539)
  - Post-Medieval – Modern (AD 1539 – Present Day)

4.4 The relevant legal framework and planning context relating to this assessment is set out by the following documents:

- Planning Policy Guidance Note 15 (Planning and the Historic Environment)
- Planning Policy Guidance Note 16 (Archaeology and Planning)

5. Assessment Results

5.1 Historical Overview

No archaeological finds are known from the site, though, as the background shows, the area around the development site and the wider Sheffield area are rich in archaeological remains dating from all periods, and particularly those dating to its early industrial past.

5.1.1 Prehistoric

The prehistoric period of British history encompasses the Palaeolithic or Old Stone Age (c.650,000BC – c. 10,500BC), the Mesolithic or Middle Stone Age (c.10,500BC – c. 4000BC), the Neolithic or New Stone Age (c. 4000BC – c.2500BC), the Bronze Age (c.2500BC – 700BC), and the Iron Age (c. 700BC – AD43) and ends with the arrival of the Romans in Britain.

Palaeolithic life and settlement was based on a hunter-gatherer society and seasonal adaptation to the climatic conditions of the last Ice Age. The presence of Palaeolithic peoples in the archaeological record is rare in Britain and their technology is defined by rough stone tools and bone or antler implements. Recent work at Cresswell Crags has revealed the first examples of Late Upper Palaeolithic cave art in the British Isles. The retreat of the Ice sheets 12,000 years ago and the warming of the climate is seen as the start of the Mesolithic period where Britain was transformed not only from a tundra landscape to one of rich deciduous woodland, but also from an extension of NW Europe to an island archipelago. This period is again characterised by a hunter-gatherer subsistence lifestyle, though there is evidence for exploitation of different types of plants and animals than before and limited land management. Recent work in Northumberland has shown that in some parts of Britain, the lifestyle of later Mesolithic peoples may have been more sedentary and less nomadic than previously thought (Waddington in press). There is no evidence for Hunter-Gatherer activity known within the environs of the development site although flint tools from the

Late Upper Palaeolithic and Mesolithic are frequently in the hills around Sheffield (e.g. Radley and Mellars 1964; Radley *et al.* 1974).

The Neolithic period is traditionally seen as the period when agriculture and a more sedentary existence was adopted in the British Isles. The technology of the Neolithic is characterised by new types of stone tools including ground and polished stone axe heads and the introduction of ceramics. Cup and ring marked rocks occur during this period and a good example can be found in Eccleshall Woods (Barnatt and Frith 1983) at SK 326831. The Bronze Age is characterised by the emergence of metalworking in Britain with copper and bronze artefacts found. Evidence for copper mining has been determined from a radiocarbon dating of a mining tool found at Ecton, Staffordshire (Barnatt and Penny 2004, 2.7). Evidence for Bronze Age people in Sheffield was found in 1887 with the discovery of a funerary urn and a Bronze knife in Crookes, the artefacts now reside in the British Museum (Hey 2005, 6). This period also sees the emergence of a more settled economy seemingly based on intensive arable production and formalized field systems, including widespread expansion, and later abandonment of the uplands. The Iron Age is characterised in the archaeological record by the emergence of more elaborate metalworking and the introduction of iron artefacts. The monuments most associated with the Iron Age are the hillforts of which one of the best surviving in an urban/semi-urban environment is that on Wincobank hill above the River Don. Iron Age industry in the Sheffield area can be shown by the large quernstone factory at Wharncliffe, near Stocksbridge, noted by English Heritage as the most important of its type in Britain and possibly Europe (Rotherham *et al.* 2000).

5.1.2 Romano-British

The Romano-British period runs from AD43 to AD410, from Claudius' invasion until the final withdrawal of Roman troops to protect the Western Roman Empire in mainland Europe. The north of Britain including the area of the Hope Valley was under Roman control by the end of the 70's AD and AD122 the northern boundary of the Roman Empire had been established by the building of Hadrian's Wall. The Roman period is characterised in the archaeological record by the arrival of a wide variety of imported material culture, increased agriculture, monumental stone buildings, roads and military structures markedly different to the earth and timber construction of the late prehistoric period. The area around Sheffield was very much a frontier during the early years of the Roman occupation. When the legions arrived in the area in AD54, they constructed the fort of Templeborough facing the hillfort at Wincobank hill across the River Don (Hey 2005, 8). The Roman road through Sheffield connected to the Roman fort of Navio (Brough) in the Hope Valley Derbyshire and will have been a routeway for the Roman lead trade – one of the principal reasons for the Roman occupation of the area (Lane 1986, 15) – a foreshadowing of Sheffield's later ties with the metal industry. The search of the SMR showed that a hoard of Roman coins was found within the 1km area around the development site (Appendix One, site no. 2), though the exact location of the find is not recorded. A hoard of Roman coins is an important and rare find and it is now housed in the Sheffield City Museum.

5.1.3 Early Medieval

The early medieval period began when the Romans withdrew. It is also known as the Anglo-Saxon period and is sometimes still referred to as the Dark Ages. The period covers the reimposition of native British kingdoms along the old tribal boundaries of pre-Roman Britain and the invasions of the Angles, Saxons and Jutes from northern Europe and Scandinavia. The Anglo-Saxon kingdoms founded by the invaders were in turn invaded by the Danes in the latter part of the Early Medieval period, and the Early Medieval comes to a close with the Norman Conquest and the defeat of the last Anglo-Saxon King Harold Godwinson, at the Battle of Hastings. The Early Medieval period saw the reintroduction of Christianity and the founding of the earliest churches date from this period. The area around Sheffield was one of the longest surviving British kingdoms, Elmet, until it was incorporated into Northumbria in AD617 by King Edwin after the death of the British King Ceretic. The border position of Sheffield was demonstrated in AD829 when King Ecgbert of Wessex led his army to Dore against King Eanred of Northumbria after whose submission, King Ecgbert became overlord of all England. Furthermore, according to the Anglo-Saxon chronicle in AD942 King Edmund is reported as having conquered the Danes "as far as where Dore divides". Dore overlooks the Limb Valley which derives from the Anglo-Saxon word for limit (Hey 2005, 10).

5.1.4 Medieval

The Medieval period runs from the Norman Conquest in 1066 and the accession of William I to the dissolution of the monasteries by Henry VIII in 1539. In this period it is common to see the emergence in rural areas of a more familiar landscape and many of the place names and street layouts that are still there today. The majority of the medieval period saw 'single field' agriculture, leaving a distinctive archaeological trace visible from aerial photographs and quite often on the ground too. As well as the traces of agriculture, documentary and archaeological evidence shows the widespread continuation of lead mining. There was a great demand for lead in the Medieval period due to the boom in church and cathedral construction (Barnatt and Penny 2004, 2.9). Within South Yorkshire, as in much of the north, the first and most imposing evidence of the medieval period comes from castles. In south Yorkshire, 13 castles have been identified, controlling strategic passes and routeways, with the most spectacular at Conisbrough, originally the seat of the de Warenne family (Hey 2003, 68). The medieval period saw the real beginnings of the Sheffield metal industry. It is recorded that in the mid-twelfth century the monks of Kirkstead have rights to smelt iron, and by the mid-thirteenth century there was small-scale smelting and smithying within the Sheffield area (Barraclough 1976, 9). The most famous reference to the early Sheffield metal trade comes from Chaucer's Canterbury Tales in the late 14th century with his mention of a 'Sheffield thwytel' – a multi-purpose knife tool (Wray *et al.* 2001, 3).

5.1.5 Post Medieval – Modern

The Post Medieval and Modern periods extend from the end of the medieval period up until the present day and the majority of archaeological and historical sites and monuments are from this period. In rural areas, enclosure continued to shape the landscape and was enforced by Parliament in a series of Enclosure Acts during the 18th and 19th centuries. The movement toward 'Enclosure' of land not only set out

the landscape of large enclosed fields that can be seen today but also provided a number of maps and charts showing the Enclosures which are of use in tracing the evolution of a landscape. The modern period is generally acknowledged as beginning with the Industrial Revolution in the mid-late 18th century. This time saw the genesis of machine power and mass-production, and changed the face of Britain. The increase in demand for raw materials and agricultural produce to feed the engines and people, along with the advent of the railways and the boom in canal transport, shaped the South Yorkshire area into the landscape which is familiar today. It is in this period where the levels of industry in the Sheffield area reached their peak. Sheffield became the centre of the steel industry due to its unique combination of natural resources, namely huge quantities of ironstone and high quality coal and charcoal, combined with the water power of the rivers running down from the Peak District. Up to the beginning of the Industrial Revolution (c.1750) the Sheffield area mainly produced iron and imported steel (Barraclough 1976, 8). After this date in the boom of the Industrial Revolution, Sheffield became the steel capital of the world. From c.1750 through to 1865, through the 'Sheffield methods' using cementation furnaces and crucibles, Sheffield produced the first cast steel, and by the end of this period was producing 100,000 tons per annum (Barraclough 1976, 8). After this the introduction of the 'Bessemer process' led to bulk manufacturing of steel, with the zenith of Sheffield's production in 1873 (120,000 tons)(Barraclough 1976, 8). From the end of the 19th century onwards, Sheffield's exports of steel have become increasingly specialised. The early 20th century still saw large-scale exporting, though through the 20th century this productivity has declined to the present day, where Sheffield still exports specialist tools and cutlery, though the days of mass production and the works buildings that accompanied it are, for the most part, gone.

5.2 Chronological Assessment of the Site

5.2.1 With the exception of the Roman coin hoard from near the development site (noted above), all sites and finds represent the industrial heritage of Sheffield and relate to the post-medieval and modern periods.

5.2.2 Due to the development area lying above an outcrop of the Lower Coal Measures (as shown on BGS Sheet 100 Sheffield, 1993) the chances of the site having been worked for coal at some point before 1797 are quite high. A plan showing old and present workings of the area clearly indicates the surrounding area has been mined (see Appendix 6). There is no evidence however to state what form these workings took or their extent. It is impossible to determine from the available evidence whether or not the Furnival Square site was worked for coal, though the borehole evidence suggests that the coal seam below the site is untouched (see fig. 3 for evidence of coal)

Fig. 3 BH 6 shows presence of natural coal.

5.2.3 The first buildings on the development site are shown on the Fairbanks' map of 1797. This area of Sheffield was laid out in the late 18th century as shown through the progression of old maps that survive for the area (Appendix Four). On the Gosling map of 1736, the area is shown as large enclosed fields edged with trees and the name is given as 'Alsop fields'. By the time of the Fairbanks map of 1771, the area known as 'Alsop fields' is still undeveloped, but there is a grid of 'proposed streets' laid out where the development area now sits. On Fairbanks' map of 1797, the proposed streets have been constructed in a grid bordered by Union Street to the north-west, and Duke Street and Howard Street to the south-west and north-east respectively.

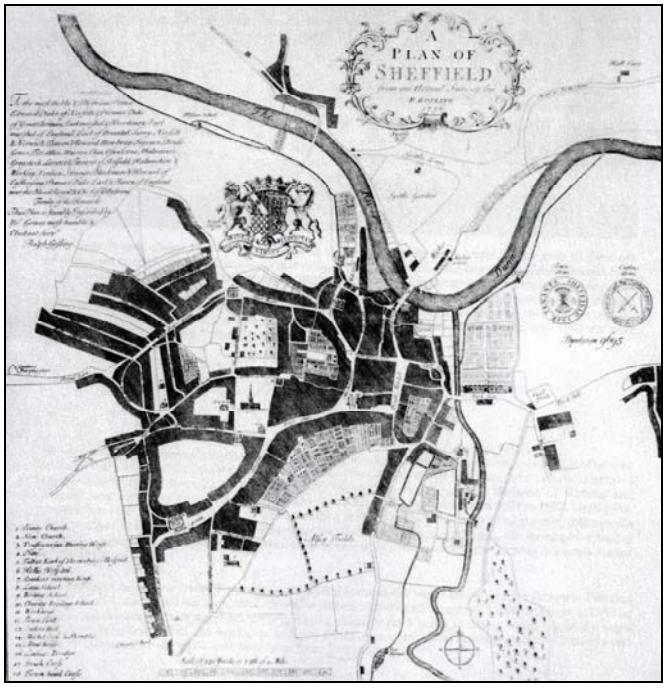


Fig. 4 Gosling's Map of 1736, in the south the fields where the development site now lies are given as 'Alsop fields'.

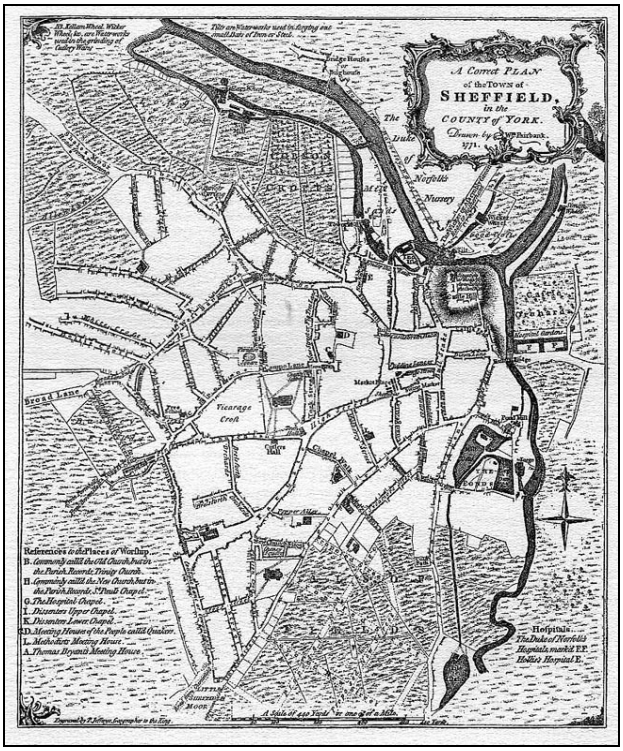


Fig. 5 Fairbanks' map of 1771 showing the proposed grid of streets on the former site of 'Alsop fields'.

5.2.4 The new streets created at this time were all named after local landowners and dignitaries. The development area is bordered by Furnival Street, Duke Lane, Eyre Street and Eyre Lane. Furnival Street, along with Furnival Road, Furnival Square and Furnival Gate were named for the de Furnival family who were the lords of the manor of Sheffield from 1198 to 1383 (Harvey 2001, 62). Duke Lane, like nearby Duke Street was also named after the landowner who led the development, in this case the Duke of Norfolk (Harvey 2001, 51). Eyre Street and Eyre Lane were both named after a local dignitary of the time, Vincent Eyre, Town Trustee 1784-1801, Town Collector 1790-1793 and chief agent for the Dukes of Norfolk (Harvey 2001, 56). It was Vincent Eyre who supervised much of the redevelopment of the Duke of Norfolk's land to create the new streets in this area of Sheffield.

5.2.5 The earliest industrial features within the environs of the study area are the water wheels (Appendix One, Sites 5-8) which probably have their origins in the 17th century. All the wheels represent the gradual growth of small-scale to large-scale industry on and around the River Sheaf and Porter Brook. At least two of the four wheels (the Sylvester Wheel and the Marriott Wheel) were grinding wheels for cutlery and edge-tool works. The later industry within the study area is represented by 14 factories and works, one later water wheel and a tilt hammer (Appendix One). In addition to the buildings representing the industry of the area, the study area around the development site also encompasses a number of civic buildings, including the late 19th century Town Hall, and the sites of the former St. Paul's Church and Ecclesall Debtor's Prison.

5.2.6 The development area itself was the site of two industrial Works (Appendix One, Sites 25-6), the Wallace Steelworks and the Trinity Cutlery works. These sites are not noted in the SMR or in any building records as they were demolished in 1968 when the Furnival Square roundabout was constructed. The history of the two works is best constructed through analysis of the companies that owned and worked at them. The first mention of the Trinity cutlery works in the trade directories of Sheffield is in relation to the company G. Butler and Co. who move from a previous Trinity Works on Trinity Street, to the Trinity Works on Eyre Street between 1852 and 1865. By 1879, the company is titled as 'Butler, George and co. Ltd, manufacturers of table and pocket knives, scissors, razors & electroplated goods' (White's 1879). It is noted in the history of Sheffield electroplated wares that George Butler and Co. began electroplating in 1872 which concurs with the trade directories (Mathieu-Raven 1997, 62). Butler and Co. are present under the same description at the Trinity Works, Eyre Street, until 1922, when the company changes to simply 'manufacturers of table cutlery' (Kelly's 1922). Despite indications that Butler and Co. ceased to exist as a company in 1925 (Mathieu-Raven 1997, 62), the Sheffield trade directories show that they continued in operation at the Trinity Works until some point between 1951 and 1961, when the Trinity Works were operated solely as a builder's merchants by Arnold Carter & Co. It is probable that at some point between 1931 and 1934, Butler and Co. shrank as a company, as for the first time, the Trinity Works were home to other businesses. Between 1934 and 1961, the Trinity Works on Eyre Street housed, at various points, Newton & Sons cutlery manufacturers, Needham & Co. cutlery manufacturers and Ashberry & Sons cutlery manufacturers.

5.2.7 The operational history of the Wallace steelworks is less complicated than the Trinity Cutlery works. Blyde, Ledingham and Co. are first noted as manufacturers of crucible steel working from the Wallace steelworks in 1895-6. In 1907, the company change their name to A. Blyde & Co. and continue steel manufacturing from the Wallace steelworks until between 1961 and the demolition of the works in 1968. The works were probably vacated some time prior to 1968, as the photographs taken prior to the construction of the Furnival Square roundabout show parts of the Wallace steelworks derelict in the upper storeys, with the roof falling in, in places (Appendix three).

5.2.8 The available maps of the two works show that the ground plan changed little throughout their operational history. The most detailed plan of the buildings is that of the Goad Fire Insurance Plans which have been updated to 1934, showing areas of stone and timber construction (Fig. 6 and Appendix Four). The Wallace steelworks are at this point solely the northerly block on the corner of Furnival Street and Eyre Street. They comprise four ranges surrounding a central courtyard. In the 1965 photographs (Appendix three), the north-west range on Eyre Street has three storeys, and the north-east range has two. A letterhead of 1926 purports to show the Wallace steelworks, Sheffield (Fig. 7), but the picture only very slightly tallies with the Goad Fire plans, and so it would seem reasonable to suggest that this perhaps represents a different Blyde & Co. Works. The Trinity Works are a larger complex of four ranges built around a covered courtyard with a smaller second open courtyard to the south west of the complex. It is reasonable to suggest that the two works were still arranged on this ground plan up to their demolition in advance of the 1968 construction of Furnival Square roundabout.

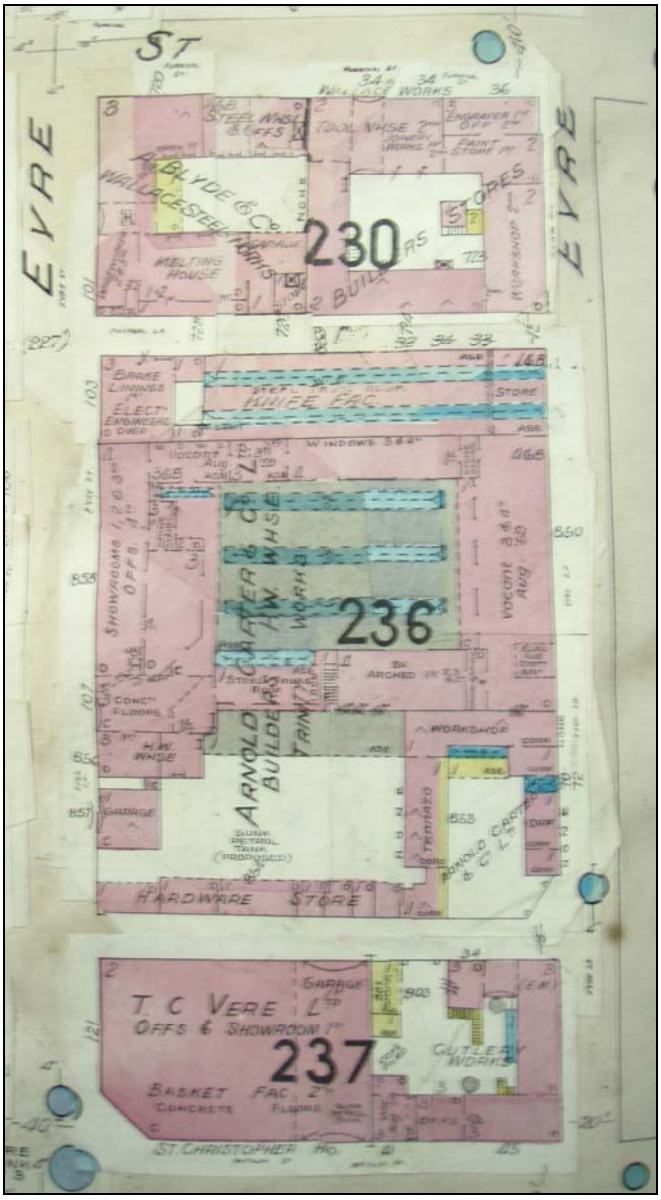


Fig. 6 The Goad Fire Insurance Plan for the Wallace and Trinity Works.

Fig. 7 A. Blyde & Co. Letterhead

5.2.9 Photographic evidence (Appendix three) and also Ordnance Survey maps before and after 1968 (Figs 8-9) show the total demolition of the Wallace and Trinity Works, before the construction of the 'Office World' store and car park which now occupies the site.

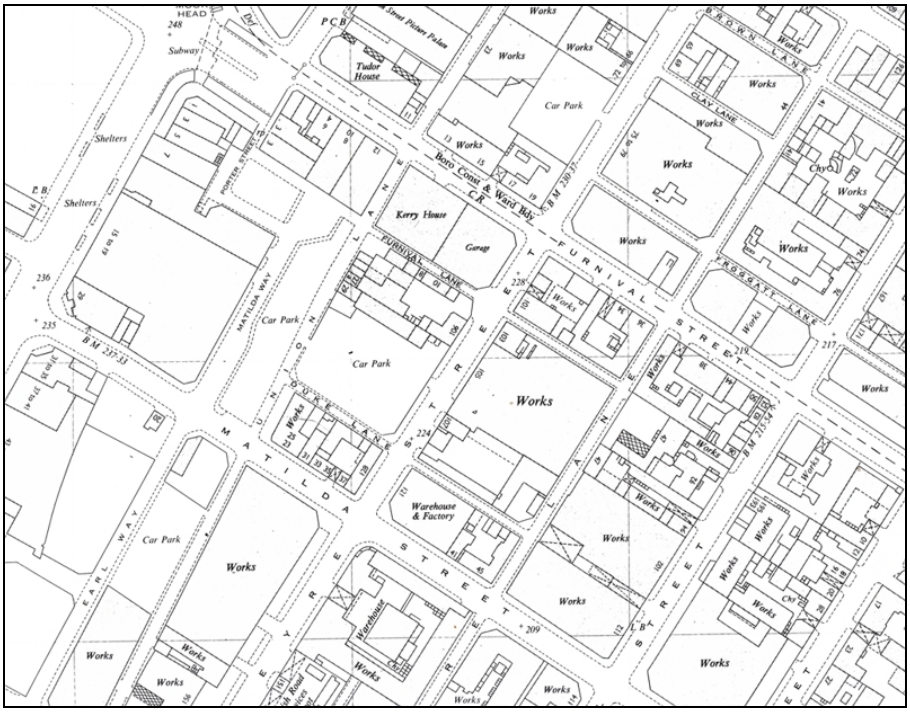


Fig. 8 Ordnance Survey 1961 showing development site before the construction of the Furnival Square roundabout and the demolition of the Wallace and Trinity Works.

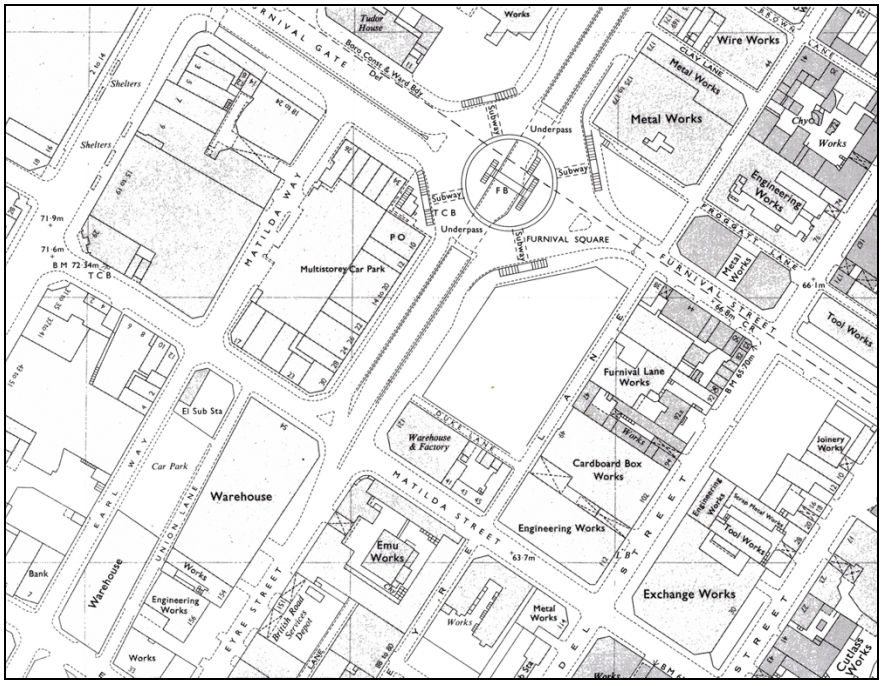


Fig. 9 Ordnance Survey 1970 showing the cleared land on the development site after the demolition of the Wallace and Trinity Works.

6. Likely Extent and Survival of Archaeological Remains

Based on the Duke of Norfolk plan 1883 (Appendix 4) and Fairbanks 1797 map (Appendix 4) there is likely to be old coal workings dating from before 1797 in the vicinity of the development site. However, the presence of natural coal deposits in all but one of the boreholes (Borehole 1) implies that the coal reserves in the development area itself may not have been worked in the past.

6.1 The earliest known buildings on the development site were built in the late 18th century. Prior to this, the development site was enclosed agricultural or pasture land. On the basis of the borehole data from across the site, and the position of the empty superstore on a shelf cut into the natural slope of the ground, it appears that all original soil deposits that could have held any archaeological deposits pre-dating the industrial works on the site have been removed.

6.2 There is potential for survival of archaeological deposits associated with the industrial buildings that stood on the site, such as building foundations and in particular deep foundations such as that for the chimney in the centre of the works. Borehole 4 is thought to have hit part of the surviving chimney base as it hit a brick structure that prevented boring any deeper (see Appendix 6 BH4 and Fig. 10). As indicated in Fig. 10 the north-west side of the development area, along Eyre Street, has been lowered and the 'Office World' store constructed on it. This later development is likely to have had a more damaging effect on the survival of any archaeological deposits than to the south east, where a car park was constructed after the demolition of the industrial works buildings.

Fig. 10. Borehole 4 sediments showing a fragment of brick at the base.

Fig. 11 Simplified plan of site showing probable areas of relative survival of any industrial archaeological deposits.

7 Publicity, Confidentiality and Copyright

7.1 Any publicity will be handled by the client.

7.2 Archaeological Research Services Ltd will retain the copyright of all documentary and photographic material under the Copyright, Designs and Patent Act (1988).

8. Statement of Indemnity

8.1 All statements and opinions contained within this report arising from the works undertaken are offered in good faith and compiled according to professional

standards. No responsibility can be accepted by the author/s of the report for any errors of fact or opinion resulting from data supplied by any third party, or for loss or other consequence arising from decisions or actions made upon the basis of facts or opinions expressed in any such report(s), howsoever such facts and opinions may have been derived.

9. Acknowledgements

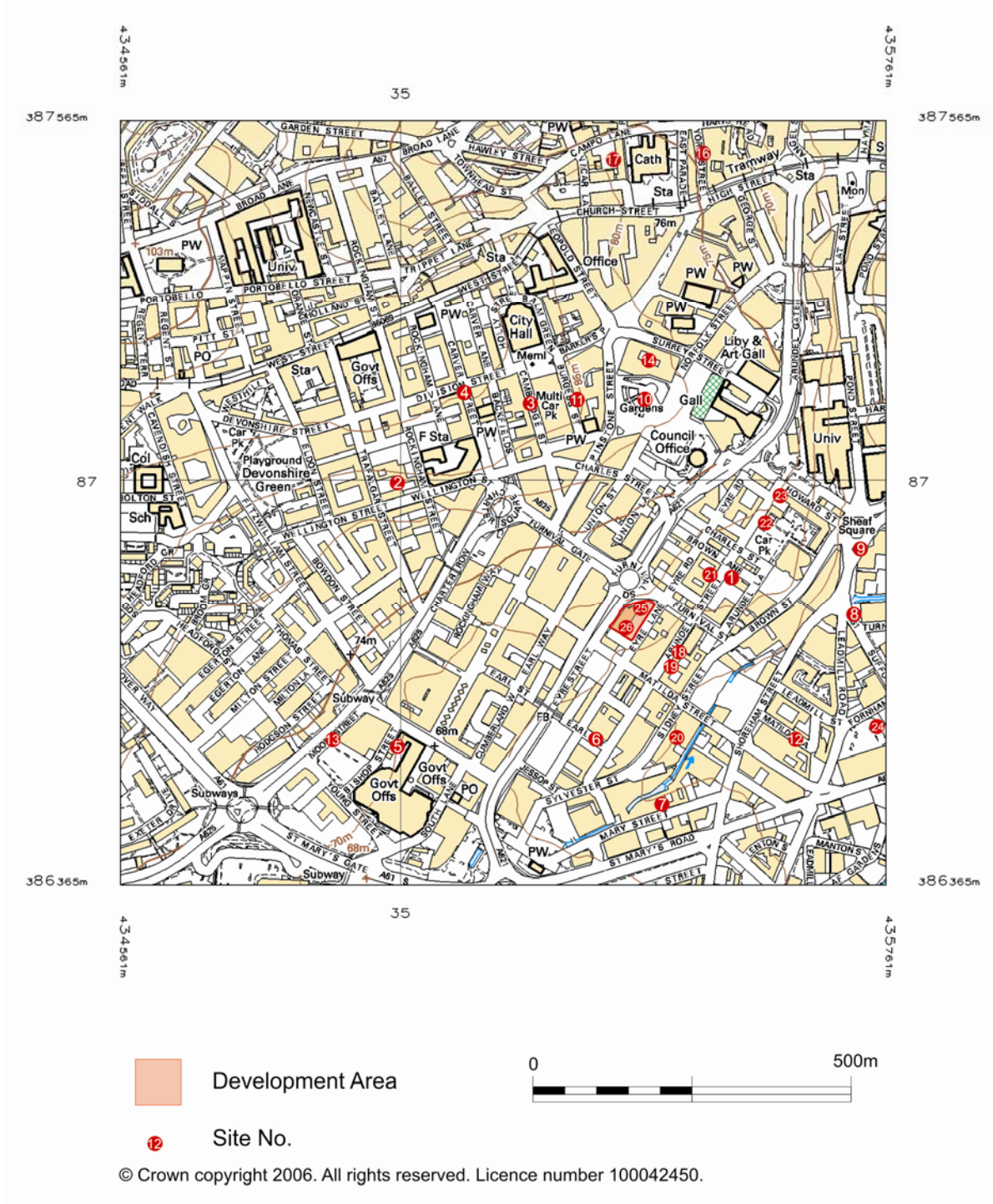
9.1 ARS Ltd would like to thank all those who have provided information relating to the Furnival Square site and the surrounding area. In particular, Mike Plimmer of Geotechnical and Environmental Associates, Louisa Matthews at the South Yorkshire Archaeology Service and the staff of both the Sheffield Archives, and the Sheffield City Library (Local Studies), and the client Urban Innovations.

Appendix One: Gazetteer of Sites

Ref. No.	Description	Source
1	**Sterling Works** – Occupied in the 19th century by the Lockwood Bros. cutlery and edge tool manufacturers. Left the site in the late 19th century. C.W. Fletcher, silversmiths took over the site after World War I. Now the site consists of C.W. Fletcher (Silversmiths) Ltd, a small company making silver by traditional methods; and C.W. Fletcher and Sons Ltd, precision engineers.	• SMR No. 04574/01 • Bayliss 1995: 14.
2	Roman coin hoard – exact location unknown and now stored at the Sheffield City Museum.	• SMR No. 2756/01
3	Stone drain and cistern fed by Portobello drain.	• SMR No. 2760/01
4	Well and associated wooden pipe work.	• SMR No. 2762/01 • SMR No. 2762/02
5	**Bennett's Wheel** – Originally named the 'Little Sheffield Moor' Wheel, this water wheel on the River Porter was constructed c. 1604 and can be traced through to 1737 when it took the name Bennett's Wheel. The wheel and dam were later attached to the Vulcan Works rolling mill and the Bennett Wheel's dam is also known as the 'Vulcan Dam'.	• SMR No. 01618/01 • SMR No. 01618/02 • SMR No. 01618/03 • Crossley 1989: 86.
6	**Sylvester Wheel** – Also known as the 'Hynde Wheel', this was probably one of the 'wheels in the pastures' though it's 17th century origins are obscure. In the early 18th century, the Sylvester Wheel was a small-scale grinding wheel for an edge-tool works. The wheel was used into the mid 19th century, where contemporary plans show that the dams were marked as reservoirs suggesting there usage as storage for steam boilers.	• SMR No. 01619/01 • Crossley 1989: 87.
7	**Cinderhill Wheel** – The Cinderhill Wheel (later the New Pond Mill) can be traced through rentals to 1581, and represented one of the unnamed 'wheels in the pastures' throughout the 17th century. During the 19th century, plans show that the New Pond Mill had two wheels associated with the corn mill and these continued in use until the end of the lease in 1860. The dam was filled and mill demolished in 1866.	• SMR No. 01620/01 • SMR No. 01620/02 • Crossley 1989: 88-9.
8	**Marriott Wheel** – This wheel was best known as part of a Lead Mill, though it was originally a cutler's grinding wheel constructed by George Marriott. It is known from the early 18th century though possibly represents another of the unnamed 'wheels in the pastures' through the 17th century. The Lead Mill associated with the wheel was erected in 1759. The Marriott Wheel was larger than the wheel son the Porter described above, and in 1830 measured 17' 7" in diameter and 6'6" wide. The rates show that the changeover to steam power came about in the mid-1850s.	• SMR No. 01739/01 • SMR No. 01739/02 • Crossley 1989: 111.
9	**Pond Tilt Forging Hammer** – Currently under the Midland Station car park. Site of an old, forge, tilt hammer, steam engine, and water wheel. New tilt was built by 1793, whilst the Old Tilt was converted into a saw mill. Banforth dam was constructed next to the site in 1780 as a reserve supply.	• SMR No. 01740/01 • SMR No. 01740/02
10	**St. Paul's Church** – Opened in 1740, this large church was extended with a domed 'temple-like' feature in 1769. Though the architect is unknown it is generally thought to be either William	• SMR No. 02217/01 • Wragg 1981. • ARCUS 1997a

	Platt of Rotherham, or Thomas Archer, a pupil of Vanburgh. The church was demolished in 1936 to clear the way for proposed extensions to the Town Hall (14). In 1997, archaeological evaluations were undertaken on the site in advance of extensions to the Peace Gardens. Preliminary evaluations concluded that all remains of the church had been destroyed during extensive remodelling in the 1970s. During works however, the graveyard of St. Paul's Church was found to be at least partially *in situ*. All burials were recorded and extracted.	• ARCUS 1997b • ARCUS 2000
11	**Barker's Pool Waterworks**	• SMR No. 02761/01
12	**Truro Works** - Factory and crucible furnace at 169 Matilda Street. Originally built as a triple-range cutlery works around a triangular courtyard, containing offices, workshops and a power plant. It was expanded through the late 19th and early 20th centuries with the surviving original range housing a crucible furnace for non-ferrous metals.	• SMR No. 03503/01 • SMR No. 03503/02 • RCHME 1990
13	**Debtors Prison** – This was a debtor's prison built by subscription on land given by Earl Fitzwilliam in 1791. It predominantly housed debtors from the manor of Ecclesall.	• SMR No. 03872/01
14	**Sheffield Town Hall** – Constructed by E.W. Mountford in 1897, this is a large free-standing building in the rich free northern renaissance style. It is constructed of stone with slate roofing and was extended in similar style in 1923.	• SMR No. 03986/01 • Harman and Minnis 2004
15	**Washington Works** – Cutlery works, cutlery workshop and tenement factory.	• SMR No. 04671
16	**Atlas Works** – Site of the old Atlas works on Furnival Street, works of John Brown, steel and file manufacturer up until 1857. The Atlas works then became the Cambria Works of Austin and Dodson and remained until their demolition in the late 20th century.	• NBR No. 98206
17	Small electroplating factory at 16-20 Sidney Street dating from the late 19th century comprising of two ranges of offices and workshops across a courtyard.	• NBR No. 98202
18	**Lion Works** – Situated at 92-2a Arundel Street. Consisting of a three-storey workshop with three industrial hearths. These works appear to represent an example of the domestic stage of processing and manufacture. Now a Grade II Listed building.	• NBR No. 98303
19	**Challenge Works** – Only half the works now survive and were probably originally built in the 1880s as a steel and file manufacturers. In 1890 they were converted into a silver and electroplate works and in 1893 into and edge tool works. Various trades were shown to be in residence in 1896.	• NBR No. 98220 • Structural Perspectives 2003.
20	**Central Cutlery Forge and Albert Works** – Apparently steam-powered file-making factory constructed in the late 19th through to early 20th century.	• NBR No. 98219
21	**Butcher's Wheel** – Large edge tool, file and cutlery works from the 19th century. This works was originally constructed as six separate properties and amalgamated in the mid-19th century by William and Samuel Butcher. The complex is classified as a Grade II listed building and is one of the largest of its type still surviving in Sheffield.	• NBR No. 94655
22	Part of a terrace of substantial 18th houses at 113 Arundel Street. Originally residential, but converted to an industrial premises for tool and cutlery manufacture by the late 19th century.	• NBR No. 98206
23	**Venture Works** – Situated at 103-5 Arundel Street this was originally a late 18th century residential town house. It was	• NBR No. 98296

	converted to industrial usage by 1850 and manufactures cutlery and other goods.	
24	A large works situated at 46 Colombia Place, Suffolk Road, of which two ranges remain. The south range is probably the earliest construction, dating to c. 1825-50, whilst the west range most probably dates to the period 1850-90. Successive occupants of the works manufactured cutlery, saws, and pipe organ pipes, amongst other goods.	• NBR No. 98203
25	**Wallace Steelworks** – old steelworks within development site, see main text for a full discussion of the works.	
26	**Trinity Cutlery works** – cutlery works within development site, see main text for a full discussion of the works.	


435561m
435761m
35
387565m
386365m
87
Development Area
0
500m
Site No.
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Appendix Two: Trade Directory Listings

Directories consulted with no mention of the Trinity Works or Wallace works:
Robson's 1839; Rodger's 1841; Pigot 1841, White's 1841, 1845, 1849, Melville 1859; Kelly's 1965, 1969, 1971, 1974.

White's 1852	• G. Butler and Co. working in the **Trinity Works** on Trinity Street.
White's 1865	• G. Butler and co. moved to the **Trinity Works** on Eyre Street, presumably named for their previous works on Trinity Street.
White's 1879	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street.
White's 1889	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street.
White's 1893	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street. • Blyde, Ledingham. & Co. Steel Manufacturers of crucible tool steel for all purposes,. Eyre Street (not named the Wallace steelworks at this point.
White's 1895-6	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street. • Blyde, Ledingham. & Co. Steel Manufacturers of crucible tool steel for all purposes,. **Wallace Steelworks**. Eyre Street
White's 1900	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street. • Blyde, Ledingham. & Co. Steel Manufacturers of crucible tool steel for all purposes,. **Wallace Steelworks**. Eyre Street
White's 1903	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street. • Blyde, Ledingham. & Co. Steel Manufacturers of crucible tool steel for all purposes,. **Wallace Steelworks**. Eyre Street
White's 1907	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street. • Blyde, A. & Co. Steel Manufacturers of crucible tool steel for all purposes,. **Wallace Steelworks**. Eyre Street
White's 1913	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street. • Blyde, A. & Co. Steel Manufacturers of crucible tool steel for all purposes,. **Wallace Steelworks**. Eyre Street
White's 1917	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street. • Blyde, A. & Co. Ltd. Steel Manufacturers. **Wallace Steelworks**, Eyre Street.
White's 1919-20	• Butler, George and co. Limited, manufacturers of table & pocket knives, scissors, razors &electro-plated goods (Robert Belfitt, Managing Director) **Trinity Works**, Eyre Street. • Blyde, A. & Co. Steel Manufacturers. **Wallace Steelworks**. Eyre Street
Kelly's 1922	• Butler, George and co. Ltd. Manufacturers of table cutlery. **Trinity Works**,

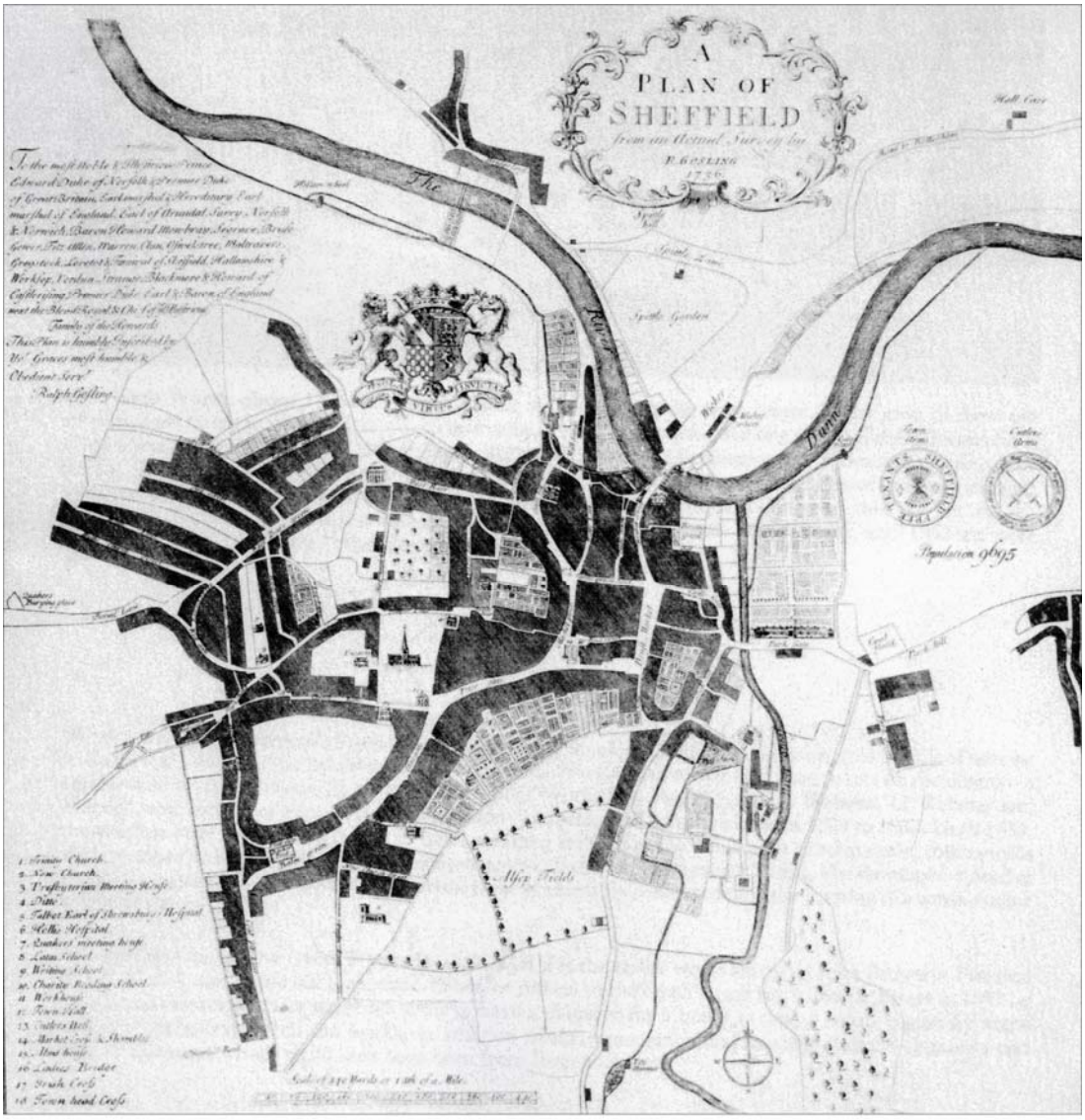
	Eyre Street.
Kelly's 1931	• Blyde, A. & Co. Steel Manufacturers. **Wallace Steelworks**. Eyre Street • Butler, George and co. Ltd. Manufacturers of table cutlery. **Trinity Works**, Eyre Street.
Kelly's 1934	• Blyde, A. & Co. Steel Manufacturers. **Wallace Steelworks**. Eyre Street • Butler, George and co. Ltd. Manufacturers of table cutlery. **Trinity Works**, Eyre Street. • Newton, Francis & Sons, cutlery manufacturers. **Trinity Works**, Eyre Street
Kelly's 1940	• Blyde, A. & Co. Steel Manufacturers. **Wallace Steelworks**. Eyre Street • Butler, George and co. Ltd. Manufacturers of table cutlery. **Trinity Works**, Eyre Street. • Newton, Francis & Sons. Cutlery Manufacturers. **Trinity Works**, Eyre Street • Needham, Edwin H. & co. Cutlery Manufacturers. **Trinity Works**, Eyre Street.
Kelly's 1951	• Blyde, A. & Co. Ltd. Steel Manufacturers. **Wallace Steelworks**, Eyre Street. • Butler, George and co. Ltd. Manufacturers of table cutlery. **Trinity Works**, Eyre Street. • Newton, Francis & Sons. Cutlery Manufacturers. **Trinity Works**, Eyre Street • Needham, Edwin H. & co. Cutlery Manufacturers. **Trinity Works**, Eyre Street • Ashberry & Sons. Cutlery Manufacturers. **Trinity Works**, Eyre Street.
Kelly's 1961	• Blyde, A. & Co. Ltd. Steel Manufacturers. **Wallace Steelworks**, Eyre Street. • Carter, Arnold & Co. Builder's Merchants. **Trinity Works**, Eyre Street. • Blyde, A. & Co. Ltd. Steel Manufacturers. **Wallace Steelworks**, Eyre Street.

Appendix Three: Catalogue of Old Photographs.

Due to copyright restrictions, the old photographs relevant to the development site cannot be reproduced in any document relating to planning applications. They are held in open access by the Sheffield Libraries. Below is a catalogue of the photographs consulted for this assessment. All the picture labels and accession numbers refer to the catalogue number within the database of Sheffield Library Local Studies Collection.

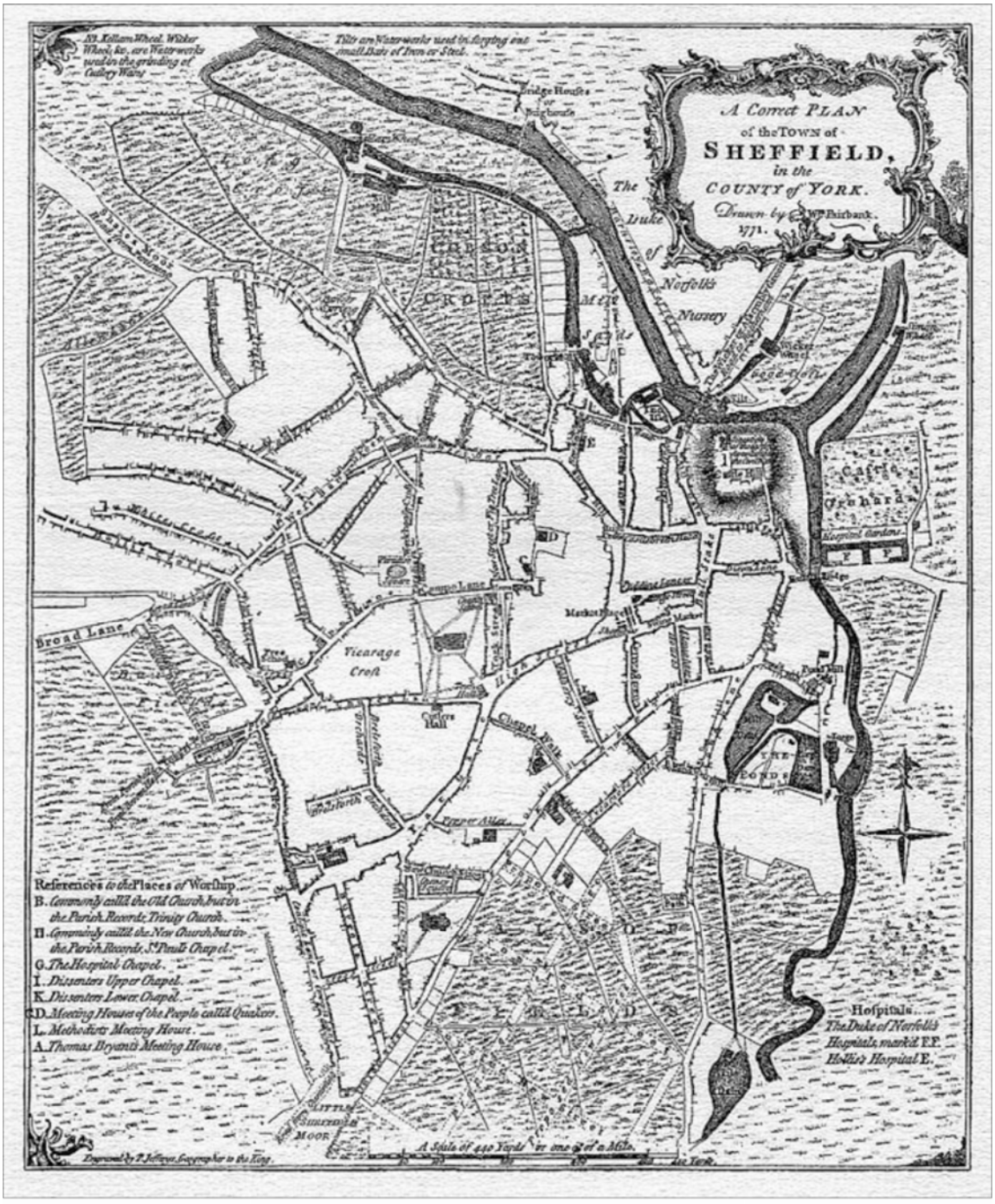
Pic. Label	Date of Picture	Description	Acc. No.	Copyright
S15539	1966	The view from the junction of Furnival Street and Eyre Street looking south west down Eyre Street. The north frontage of the former Wallace Steel Works can be seen in the foreground with demolition rubbish in front of the building. Eyre Street is fenced off with a 'work in progress' sign in advance of the construction of the Furnival Gate roundabout.	0774-52	Sheffield Newspapers
S16189	1965	Facing west at the junction of Furnival Street and Eyre Lane, this photograph shows the clearly disused and semi-derelict former Wallace steelworks.	0654-202	Unknown
S15533	1965	South facing view of the former Wallace Steelworks taken from across Furnival Street to the junction of Furnival street and Eyre Street. This photograph shows the Wallace steelworks to be a substantial three-storey building along its northern range with a large cart entrance opening out onto Eyre Street.	0654-168	Unknown
S15535	1965	View from the junction of Furnival Street and Eyre Street looking south west down Eyre Street. Along the left hand side of Eyre Street, the end of Wallace steelworks can be seen, and the four storey Trinity Works (at this time still housing Arnold Carter & co. Builder's Merchants).	0667-10	Sheffield Newspapers
S14404	1968	Photograph taken from an elevated position on the northern side of Eyre Street at the crossing with Duke Lane, looking towards Arundel Gate. The focus of the photograph is on the construction of the Furnival Gate roundabout. To the right of the shot, the former Wallace steelworks have been completely demolished, though the four-storey Trinity works are still standing at this time, though disused.	0997-14	P Fletcher

Appendix Four: Maps showing the development site and its environs, and the transformation of the buildings within the development site.



Gosling 1736

The development area lies immediately to the south of this antiquarian map, within the area given here as 'Alsop Fields'. This map illustrates that at this time, Sheffield had not expanded to encompass what is now the Furnival Gate Area.

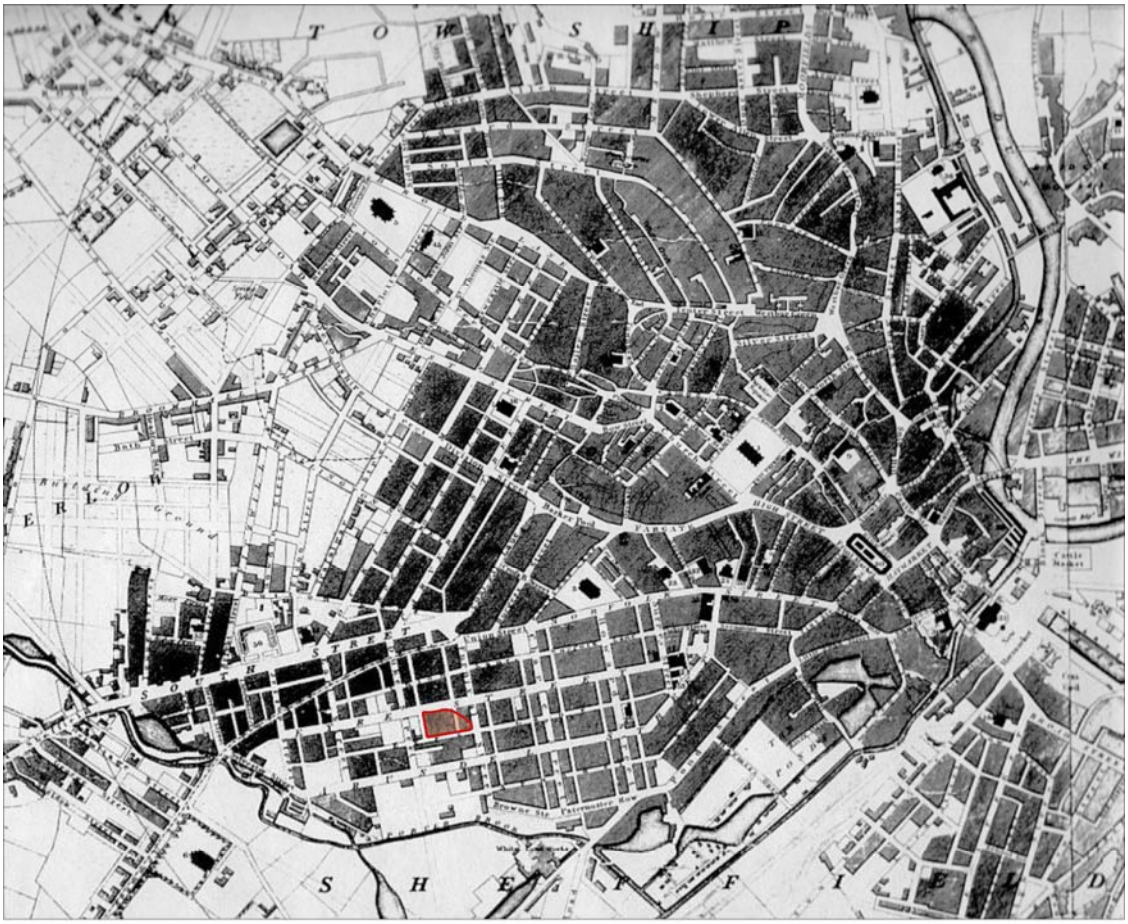


Fairbanks 1771

As with the Gosling map of 1736, the early Fairbanks map above shows that the development are at this time was still not built up. However this map does show the proposed grid pattern of streets around Furnival Street and Eyre Street, indicating that the streets were constructed shortly after this date.

Fairbanks 1797

Development Area

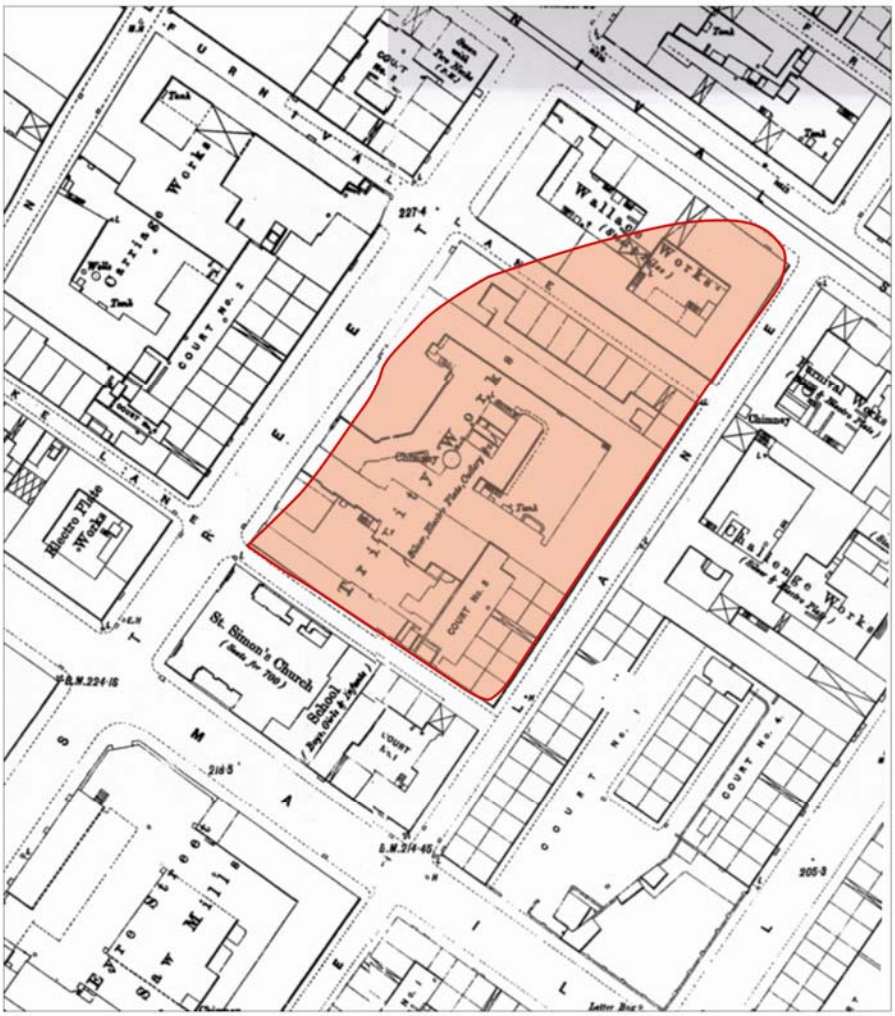


Taylor 1832

Development Area

Ordnance Survey 1850

Development Area

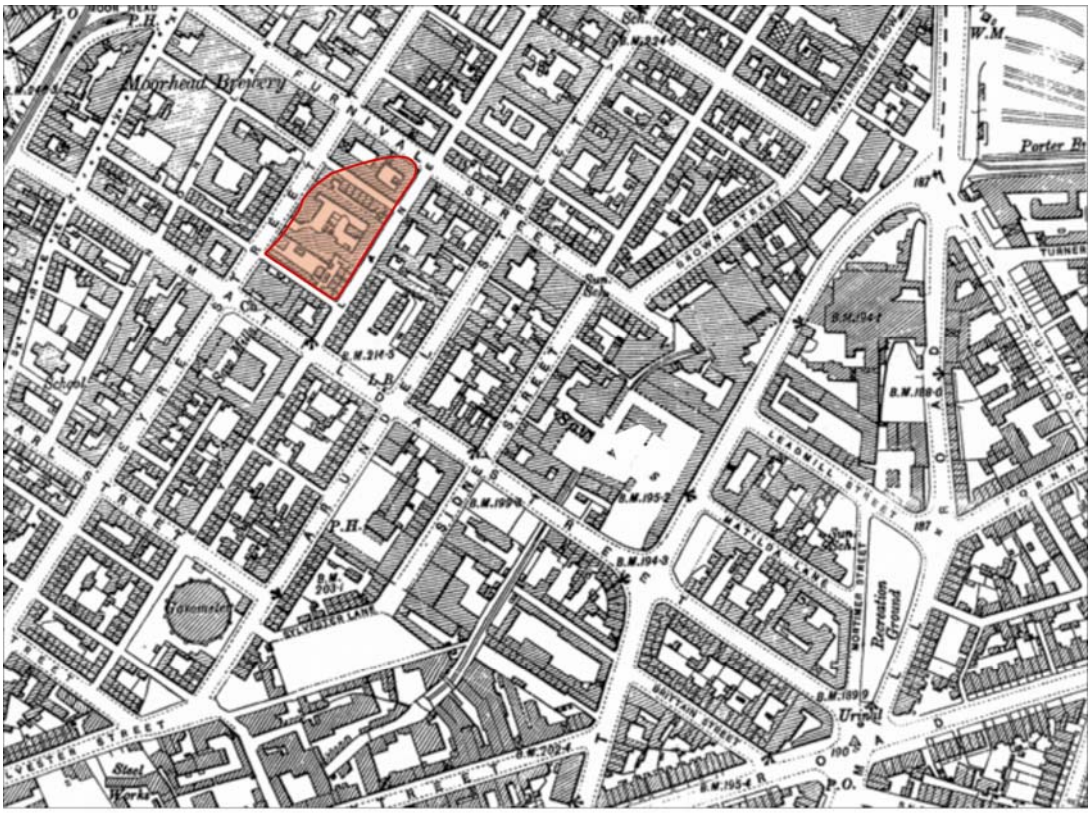


Ordnance Survey 1889

Development Area

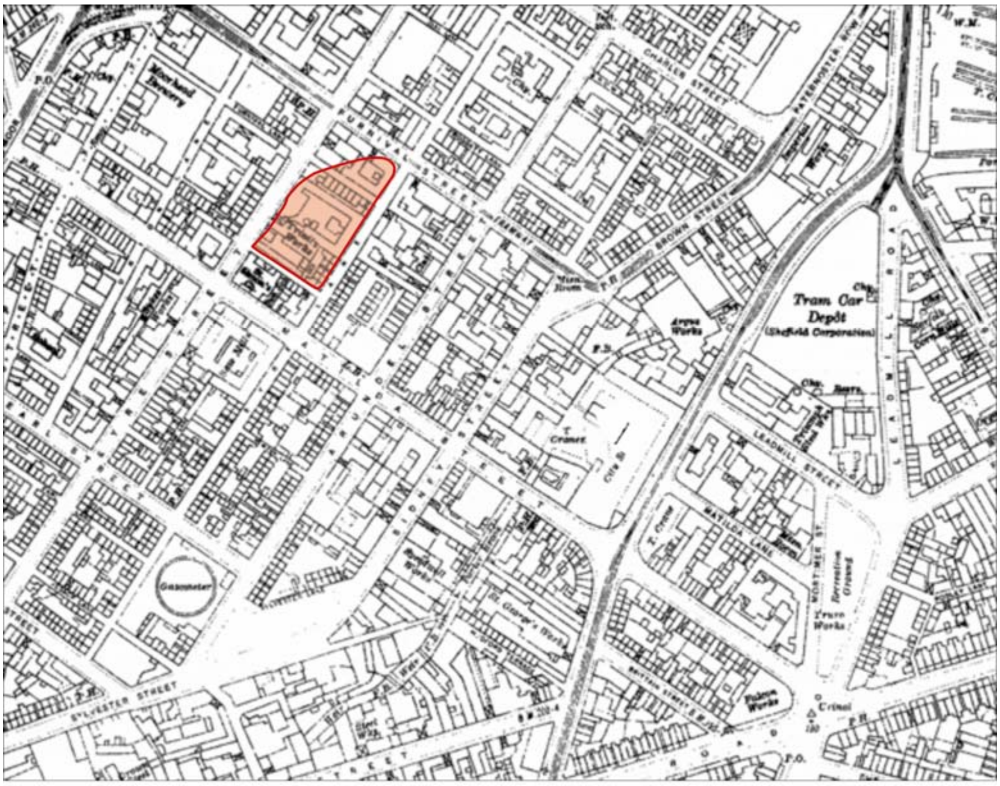
Ordnance Survey 1894

Development Area



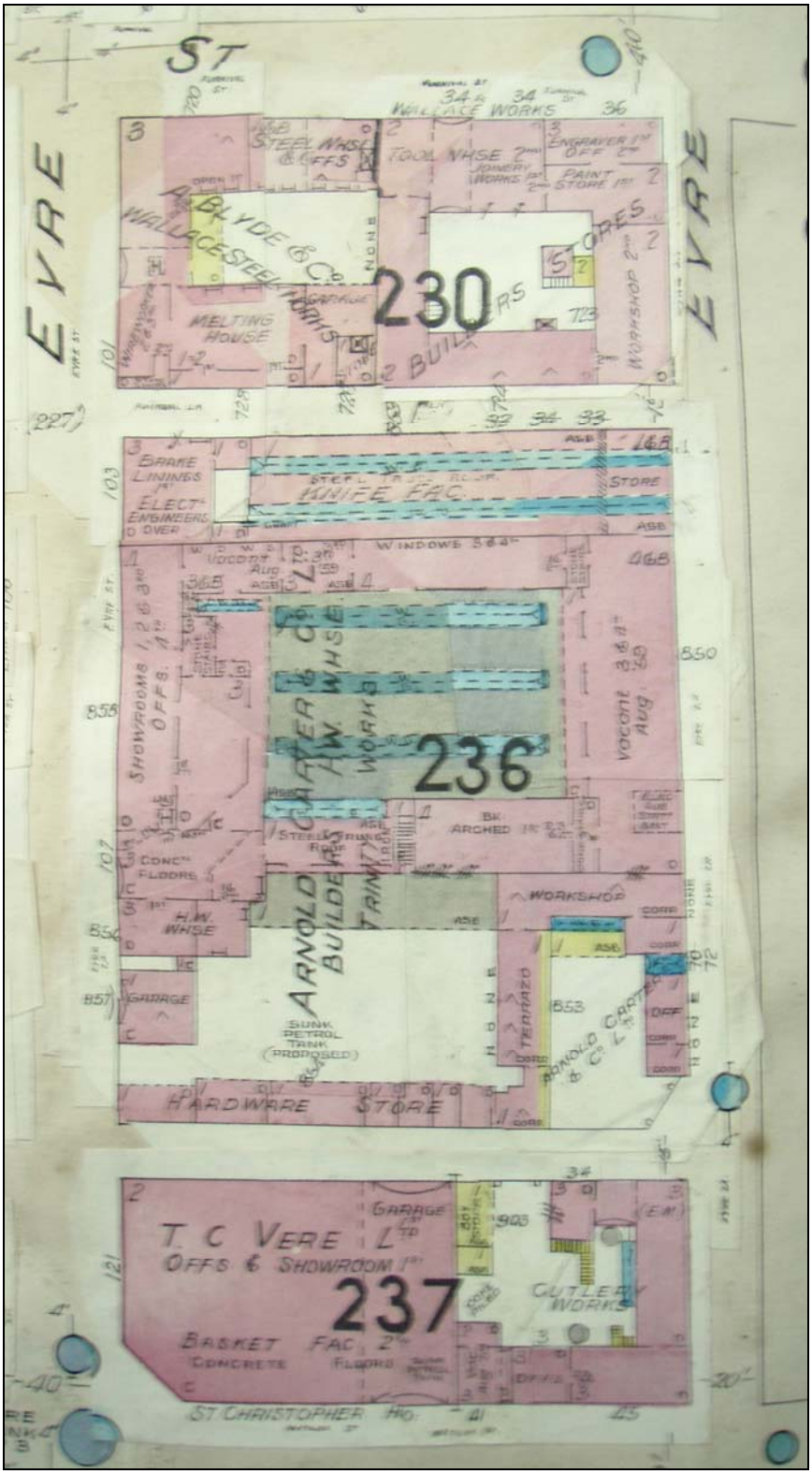
Ordnance Survey 1905

Development Area

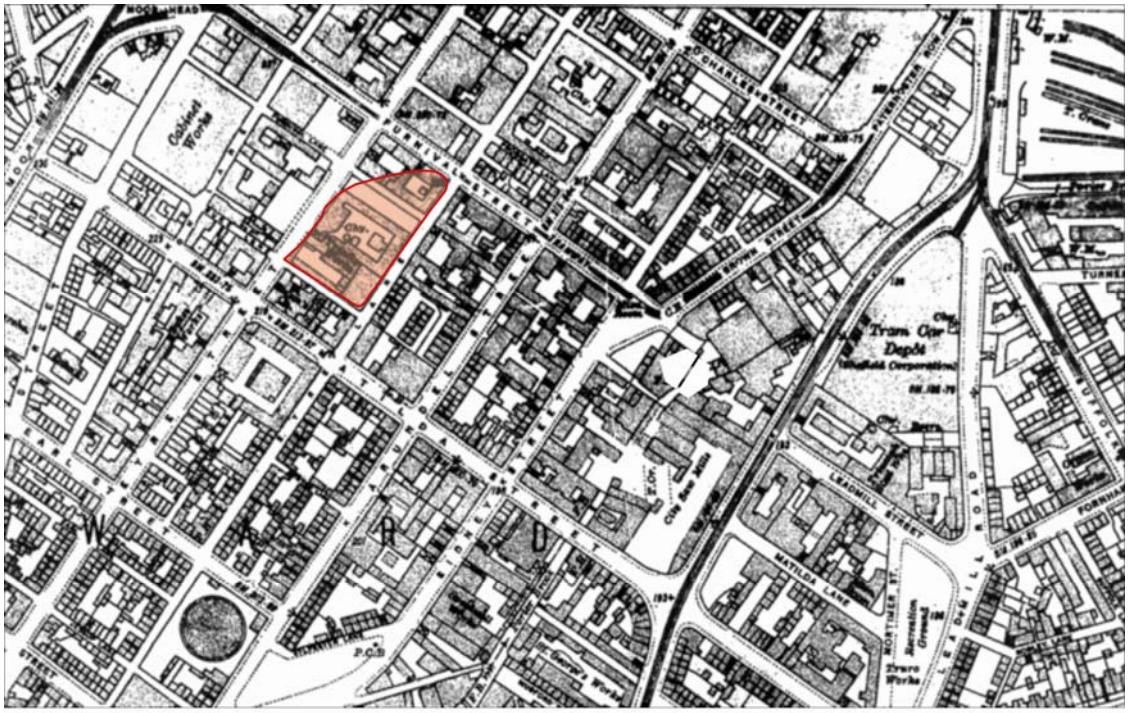


Ordnance Survey 1923

Development Area

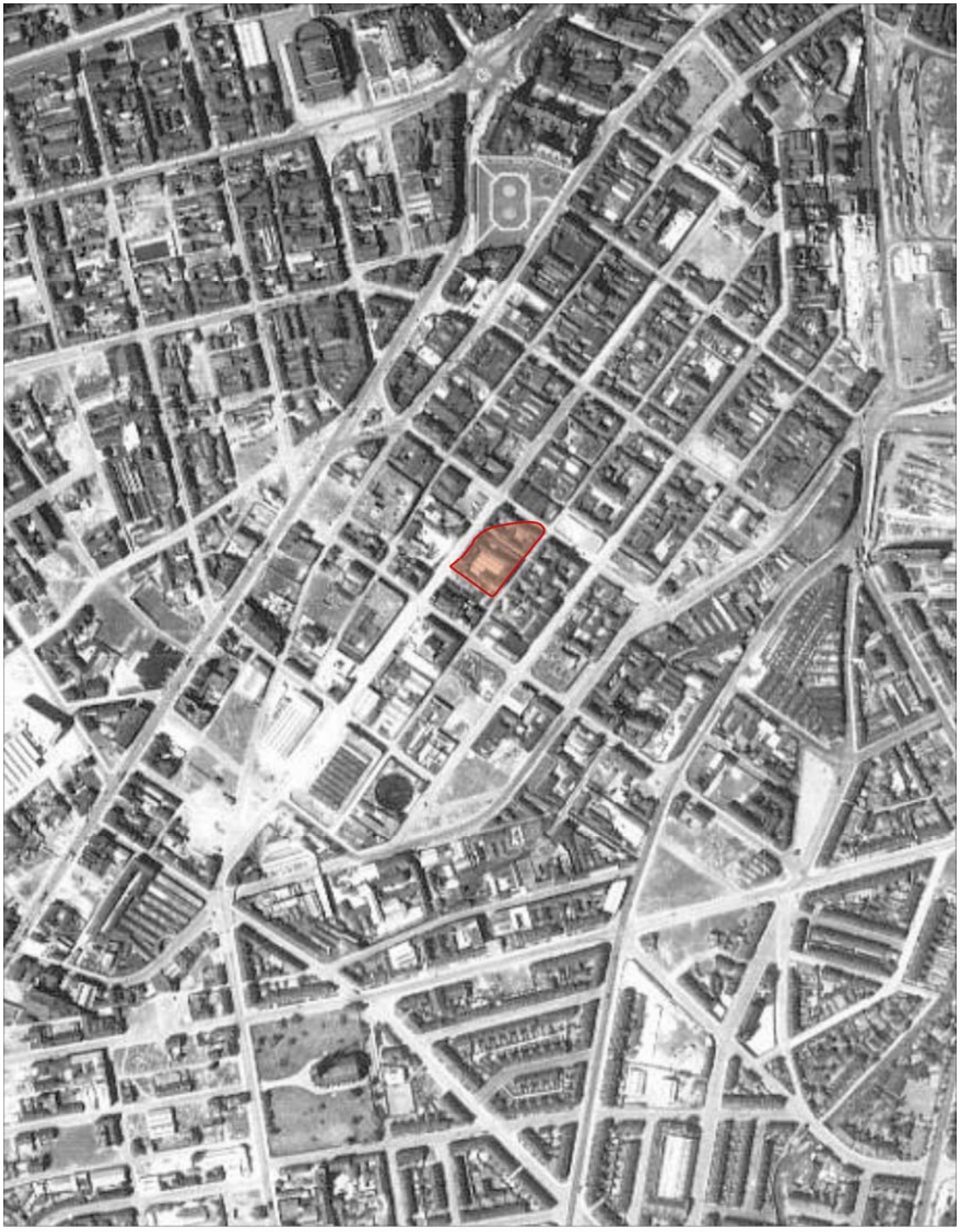


Goad Fire Insurance Plans updated to 1934 showing names and nature of business, and the construction of the Wallace and Trinity Works.



Ordnance Survey 1935

Development Area



Ordnance Survey 1948

Development Area

Ordnance Survey 1961

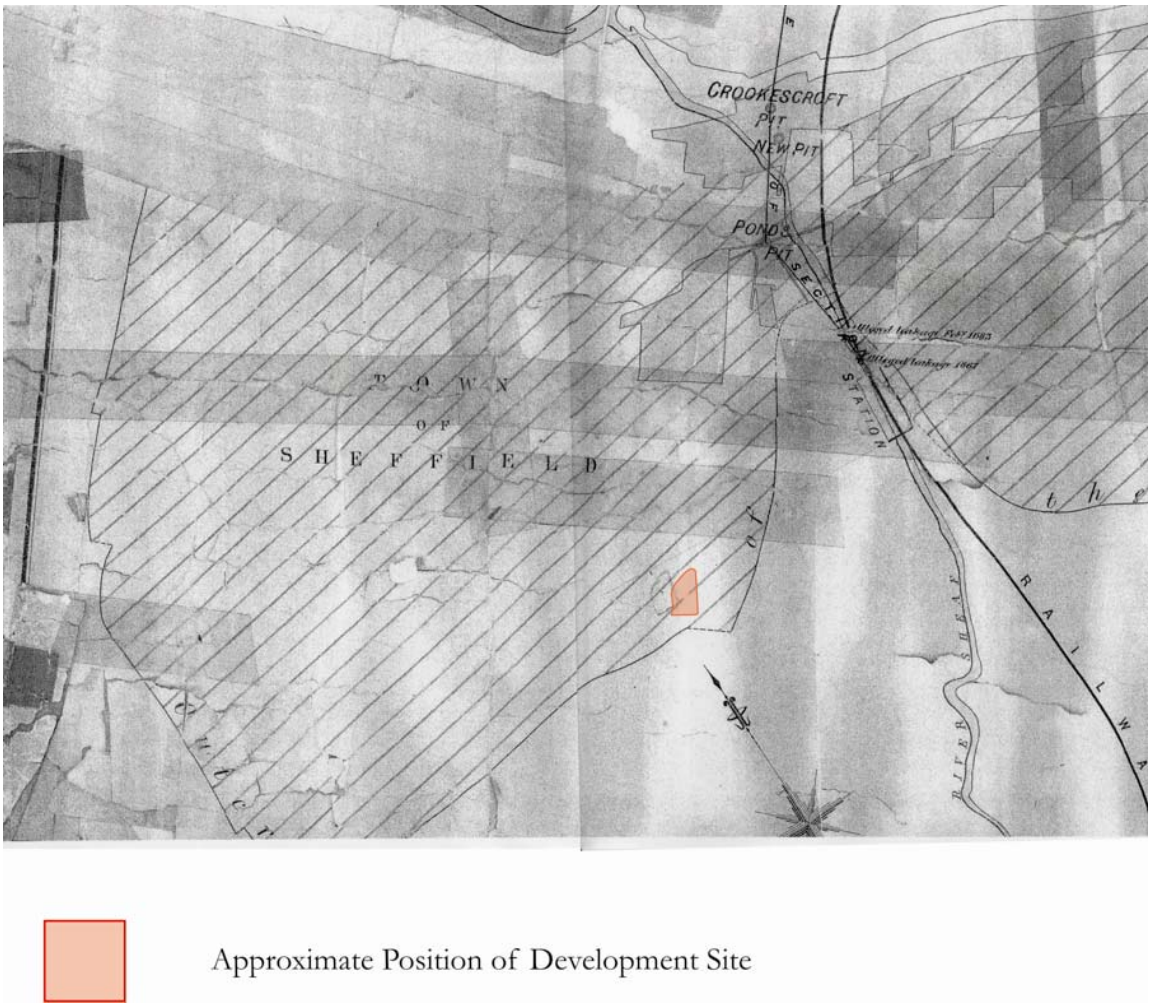
Development Area

Ordnance Survey 1970

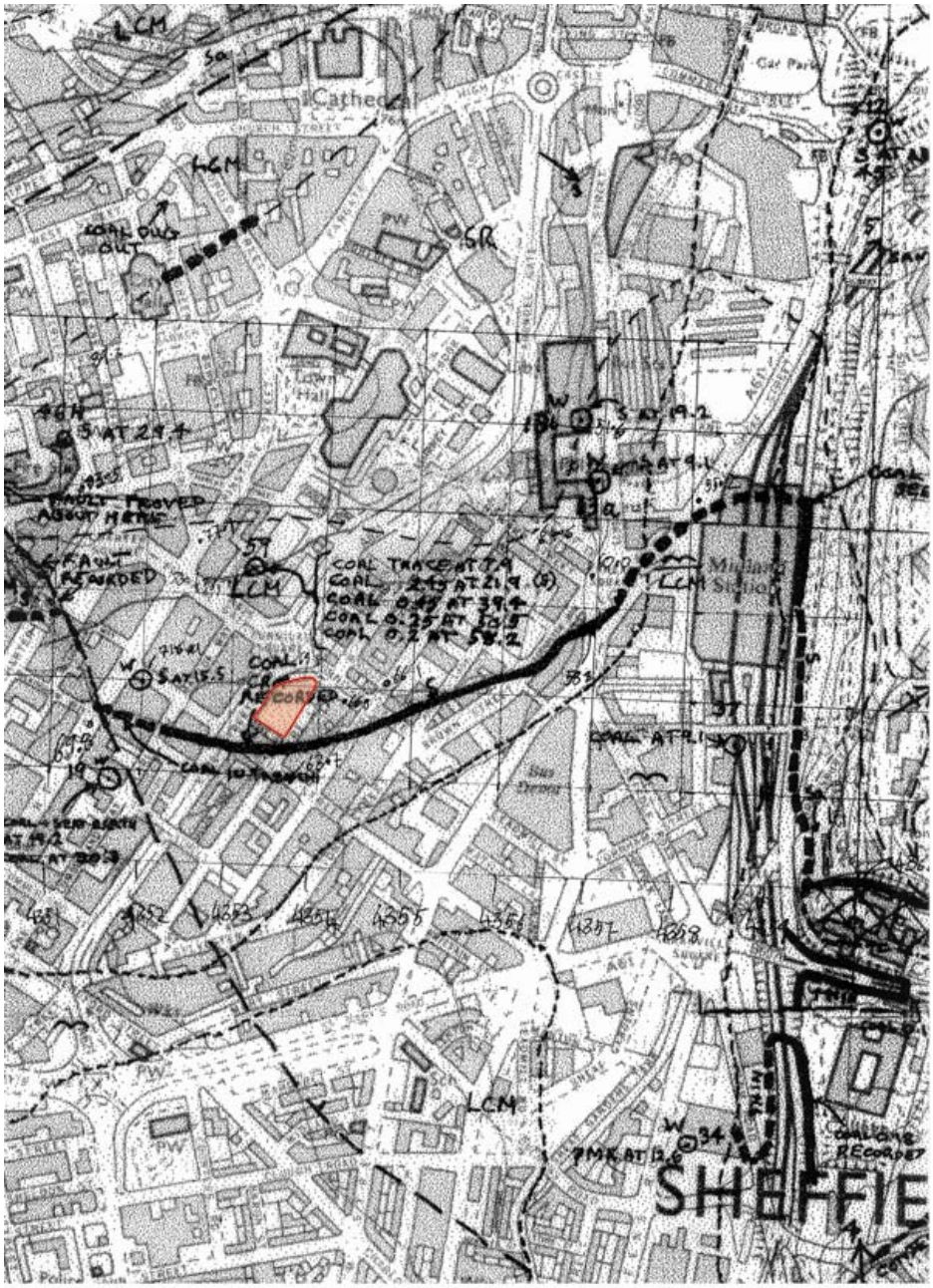
Development Area

Ordnance Survey 2005

Development Area

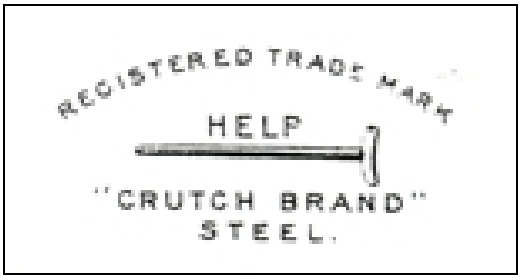


Coal mining survey provided by The Coal Authority (Ref A8 1:5,000 abandonment plan) and is entitled "The Duke of Norfolk & The Nunnery Colliery Co. Limited. v The Midland Railway Co. Plan Showing Old & Present Workings at the Plaintiff Co's. Pitts, 1883. The area highlighted with diagonal lines shows the area 'Old Workings above the level of the Manor Castle Pit, known to exist'.

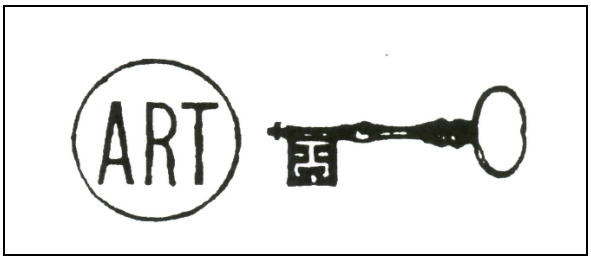


Map from the Coal Board records showing the positioning of coal seams in the area of the development site. One seam passes directly to the south of the site on this map, however geotechnical boreholing has indicated that this coal seam may actually pass directly through the site.

Appendix Five: Trademarks



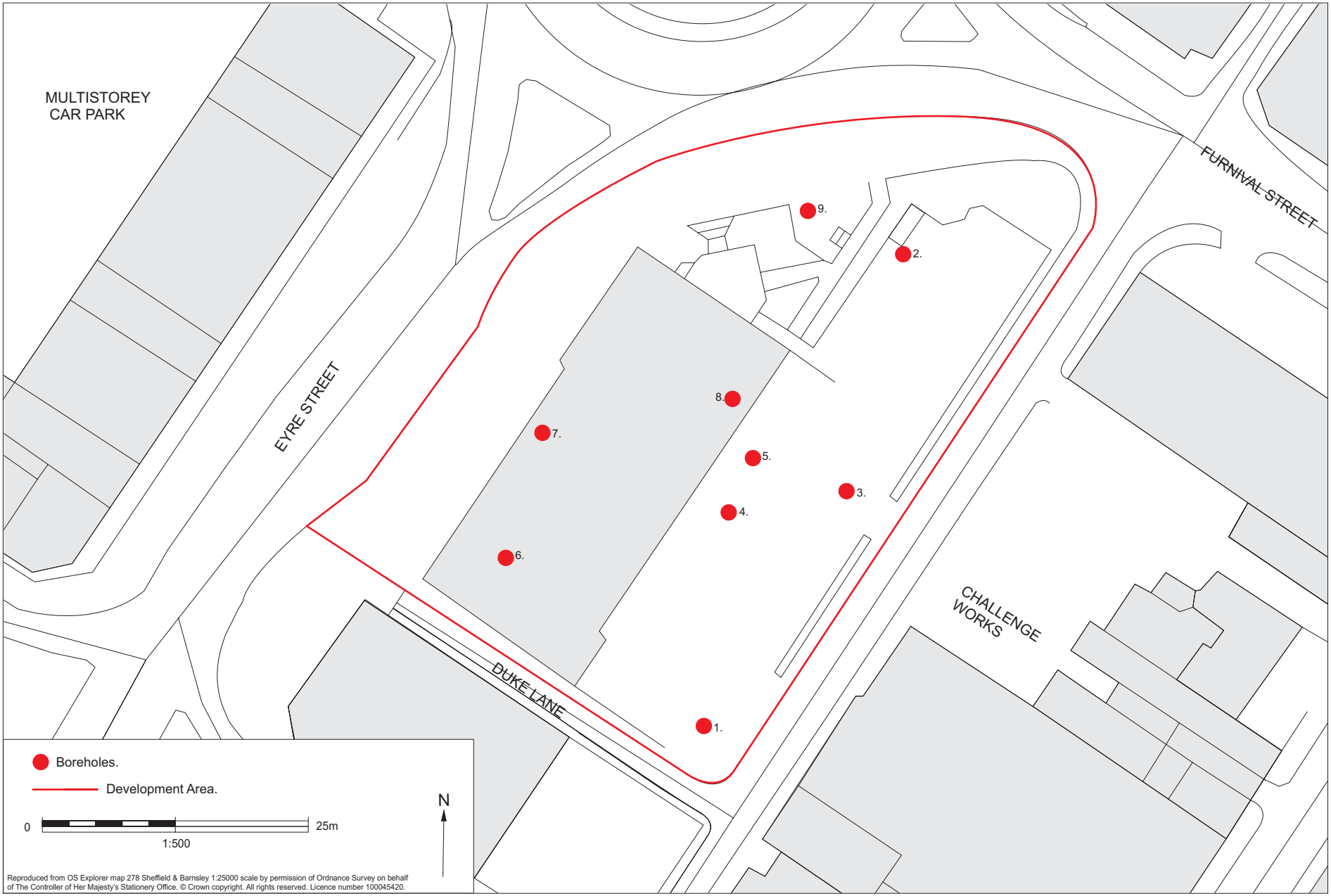
Mark of A. Blyde & Co. Ltd who ran the Wallace steelworks.



Marks of George Butler and Co. who worked from the Trinity Cutlery Works.

Appendix 6: Geotechnical Data

Summery of geotechnical data in the form of borehole logs supplied by Geotechnical and Environmental Associates.



Location of boreholes.

GEA Geotechnical & Environmental Associates
Tyttenhanger House
Coursers Road
St Albans
AL4 0PG

Site
Eyre Street, Sheffield

Number
BH1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Percussive opendrive lined sampler		66.23	McAleer & Rushe	J06060
	Location 435361 E 386746 N	**Dates** 17/07/2006	**Engineer** Ian Black Associates	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				66.13	(0.10) 0.10	Made Ground (tarmac)		
				65.83	(0.30)	Made Ground (pale brown and off white sandy gravel of broken limestone)		
				65.73	0.40 (0.10)	Made Ground (firm brown and grey sandy gravelly clay)		
					0.50 (0.50)	Made Ground (granite setts - driven to 1.0m)		
1.00-1.45	CPT N=23	DRY	14,6/4,7,6,6	65.23	1.00	Firm brown, orange-brown and pale grey slightly sandy clay with occasional sandstone cobbles with scattered coal fragments from 1.5m to 1.6m		
1.20	D1				(0.95)			
1.80	D2							
2.00-2.38	CPT 94/225	DRY	15,23/32,37,25	64.28	1.95	Moderately strong laminated pale brown silty fine grained SANDSTONE		
					(0.43)			
				63.85	2.38	Complete at 2.38m		

Remarks
Groundwater not encountered
Borehole terminated upon impenetrable sandstone at 2.38m
No recovery from 0.5m to 1.0m - driving granite sett

Scale (approx)	Logged By
1:50	MRP

Figure No.
J06060.BH1

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Eyre Street, Sheffield	**Number** **BH2**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Percussive opendrive lined sampler		68.98	McAleer & Rushe	J06060
	Location	**Dates**	**Engineer**	**Sheet**
	435383 E 386801 N	17/07/2006	Ian Black Associates	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				68.88	(0.10)	Made Ground (tarmac)		
					0.10			
				68.58	(0.30)	Made Ground (pale brown and off white sandy gravel of broken limestone)		
					0.40			
				68.23	(0.35)	Made Ground (firm brown, pale brown and pale grey mottled slightly sandy clay with occasional sandstone cobbles)		
					0.75			
0.90	D1				(0.45)			
1.00-1.45	CPT N=18		3,5/4,4,5,5	67.78	1.20	Made Ground (black gravelly sand of ash and coal fragments with occasional fragments of brick)		
				67.68	(0.10)			
1.50	D2				1.30	Made Ground (firm greyish brown sandy silty clay with scattered brick fragments)		
2.00-2.45	SPT N=26		2,2/4,5,7,10		(1.30)	Firm brown, orange-brown, pale brown and pale grey mottled sandy silty CLAY with scattered roots becomming stiff greyish brown sandy very silty CLAY		
				66.38	2.60	Stiff grey, pale brown and pale grey mottled sandy silty CLAY with scattered sandstone cobbles		
3.00-3.45	SPT N=24		2,2/4,4,7,9		(0.95)			
				65.43	3.55	Very stiff pale grey and orange-brown laminated silty CLAY with scattered mudstone fragments		
3.70	D3				(0.50)			
4.00-4.27	SPT 64/120		5,7/14,50	64.93	4.05	Moderately weak black thinly laminated black COAL		
4.20	D4				(0.22)			
				64.71	4.27	Complete at 4.27m		

Remarks
Groundwater not encountered
Borehole terminated upon impenetrable coal at 4.27m
50mm Diameter standpipe piezometer installed with response zone from 1.0m to 4.0m with bentonite seal above

Scale (approx)	**Logged By**
1:50	MRP

Figure No.
J06060.BH2

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Eyre Street, Sheffield	**Number** **BH3**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Percussive opendrive lined sampler		67.05	McAleer & Rushe	J06060
	Location	**Dates**	**Engineer**	**Sheet**
	435378 E 386774 N	17/07/2006	Ian Black Associates	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				66.95	(0.10) 0.10	Made Ground (tarmac)		
					(0.45)	Made Ground (pale brown and off white sandy gravel of broken limestone)		
				66.50	0.55			
				66.45	(0.05) 0.60	Made Ground (dark greyish brown sandy clay with scattered brick and slate fragments)		
0.90	D1				(0.50)			
1.00-1.45	CPT N=12		0,0/1,2,5,4	65.95	1.10	Made Ground (dark brown silty sand with scattered gravel and timber fragments)		
					(0.45)			
				65.50	1.55	Made Ground (firm greyish brown slightly clayey sand with scattered brick and occasional glazed pipe fragments)		
1.70	D2					Moderately weak black thinly laminated black COAL		
2.00-2.29	SPT 75/135		5,6/25,50		(1.15)			
				64.35	2.70			
						Complete at 2.70m		

Remarks
Groundwater not encountered
Borehole terminated upon impenetrable coal at 2.7m

Scale (approx)	**Logged By**
1:50	MRP

Figure No.
J06060.BH3

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Eyre Street, Sheffield	**Number** **BH4**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Percussive opendrive lined sampler		67.45	McAleer & Rushe	J06060
	Location 435363 E 386771 N	**Dates** 17/07/2006	**Engineer** Ian Black Associates	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				67.35	(0.10) 0.10	Made Ground (tarmac)		
					(0.45)	Made Ground (pale brown and off white sandy gravel of broken limestone)		
				66.90	0.55 (0.25)			
0.70	D1			66.65	0.80	Made Ground (firm greyish brown sandy gravelly clay with abundant brick fragments)		
						Complete at 0.80m		

Remarks
Groundwater not encountered
Borehole terminated upon concrete obstruction at 0.8m - thought to possibly be former chimney base

Scale (approx)	**Logged By**
1:50	MRP

Figure No.
J06060.BH4

GEA Geotechnical & Environmental Associates Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Eyre Street, Sheffield		**Number** **BH5**
Excavation Method Percussive opendrive lined sampler	**Dimensions**	**Ground Level (mOD)** 67.55	**Client** McAleer & Rushe	**Job Number** J06060
	Location 435366 E 386777 N	**Dates** 17/07/2006	**Engineer** Ian Black Associates	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				67.45	(0.10) 0.10	Made Ground (tarmac)		
					(0.70)	Made Ground (pale brown and off white sandy gravel of broken limestone)		
				66.75	0.80 (0.30)	Made Ground (firm dark greyish brown sandy gravelly clay with scattered brick fragments and ash)		
1.00-1.45	CPT N=6		1,2/2,2,1,1	66.45	1.10			
1.20	D1				(0.60)	Made Ground (brick rubble in a matrix of firm greyish brown sandy gravelly clay)		
				65.85	1.70 (0.20)	Made Ground (firm dark greyish brown very sandy very gravelly clay with ash and abundant brick and concrete fragments)		
2.00-2.45	CPT N=83		4,3/2,6,25,50	65.65	1.90 (0.20)			
				65.45	2.10	Made Ground (brick fragments in a matrix of firm greyish brown sandy clay)		
2.50	D2				(0.90)	Moderately weak black thinly laminated black COAL		
				64.55	3.00	Complete at 3.00m		

Remarks
Groundwater not encountered
Borehole terminated upon impenetrable coal at 3.00m
50mm Diameter standpipe piezometer installed with response zone from 1.0m to 2.0m with bentonite seal above

Scale (approx)	**Logged By**
1:50	MRP

Figure No.
J06060.BH5

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Eyre Street, Sheffield	**Number** **BH6**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Percussive opendrive lined sampler		68.60	McAleer & Rushe	J06060
	Location	**Dates**	**Engineer**	**Sheet**
	435338 E 386766 N	18/07/2006	Ian Black Associates	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				68.44	(0.16)	Made Ground (concrete)		
					0.16	Made Ground (pale brown and off white sandy gravel of broken limestone)		
					(1.44)			
1.00-1.44	CPT 50/285		4,5/6,16,16,12					
				67.00	1.60	Driving sandstone cobble		
1.80	D1							
2.00-2.43	CPT 60*/130 N=62		25,35/18,15,14,15					
					(1.55)			
3.00-3.40	CPT 25*/95 N=90		19,6/24,26,19,21	65.45	3.15			
					(0.30)	Moderately weak black thinly laminated black COAL		
				65.15	3.45			
					(0.50)	Very weak pale grey and orange-brown laminated MUDSTONE		
3.80	D2			64.65	3.95			
4.00-4.20	CPT 50/45		23,39/50		(0.25)	Moderately strong thickly laminated pale brown silty fine grained SANDSTONE		
				64.40	4.20			
						Complete at 4.20m		

Remarks
Groundwater not encountered
Borehole terminated upon impenetrable sandstone at 4.2m
Sandstone cobble driven from 1.60m to 3.15m - No sample recovery over this depth

Scale (approx)	**Logged By**
1:50	MRP

Figure No.
J06060.BH6

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Eyre Street, Sheffield	**Number** **BH7**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Percussive opendrive lined sampler		68.60	McAleer & Rushe	J06060
	Location 435343 E 386780 N	**Dates** 18/07/2006	**Engineer** Ian Black Associates	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				68.45	(0.15) 0.15	Made Ground (concrete)		
						Made Ground (pale brown and off white sandy gravel of broken limestone)		
					(0.95)			
1.00-1.45	CPT N=6		1,2/1,2,1,2	67.50	1.10			
1.30	D1				(0.75)	Made Ground (soft pale brown and greyish brown mottled slightly gravelly sandy clay with occasional brick and sandstone cobbles)		
				66.75	1.85			
2.00-2.45	CPT N=0		0,0/0,0,0,0			Made Ground (soft pale greyish brown sandy clay with a thin band of black coal fragments at 2.65m to 2.70m)		
					(1.05)			
2.80	D2			65.70	2.90			
3.00-3.13	CPT 25*/85 50/45		16,9/50	65.55	(0.15)	Made Ground (brick fragments)		
3.10	D3			65.47	3.05 (0.08)	Moderately weak black thinly laminated black COAL		
					3.13	Complete at 3.13m		

Remarks
Groundwater not encountered
Borehole terminated upon impenetrable coal at 3.13m

Scale (approx)	**Logged By**
1:50	MRP

Figure No.
J06060.BH7

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Eyre Street, Sheffield	**Number** **BH8**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Percussive opendrive lined sampler		68.60	McAleer & Rushe	J06060
	Location 435365 E 386785 N	**Dates** 18/07/2006	**Engineer** Ian Black Associates	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				68.42	(0.18) 0.18	Made Ground (concrete)		
					(0.92)	Made Ground (pale brown and off white sandy gravel of broken limestone)		
1.00-1.45	CPT N=47		9,8/9,12,12,14	67.50	1.10			
1.20	D1			67.30	(0.20) 1.30	Made Ground (firm greyish brown, pale brown and orange-brown mottled sandy gravelly clay with occasional brick fragments)		
1.50	D2				(1.05)	"Stiff" pale brown and pale grey mottled slightly sandy silty CLAY with occasional gravel - (Desiccated Soil)		
2.00-2.45	CPT N=37		4,4/7,9,10,11					
2.10	D3			66.25	2.35			
2.40	D4			66.05	(0.20) 2.55	Very stiff pale grey laminated silty CLAY with abundant mudstone fragments		
					(0.56)	Moderately weak black thinly laminated black COAL		
3.00-3.11	CPT 75*/65 0/45		25,50/	65.49	3.11			
						Complete at 3.11m		

Remarks
Borehole terminated upon impenetrable coal at 3.11m
Groundwater not encountered

Scale (approx)	**Logged By**
1:50	MRP

Figure No.
J06060.BH8

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** Eyre Street, Sheffield	**Number** **BH9**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Percussive opendrive lined sampler		70.26	McAleer & Rushe	J06060
	Location	**Dates**	**Engineer**	**Sheet**
	435372 E 386806 N	18/07/2006	Ian Black Associates	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				70.21	(0.05)	Made Ground (concrete)		
					0.05			
				69.96	(0.25)	Made Ground (pale brown and off white sandy gravel of broken limestone)		
					0.30			
						Made Ground (firm greyish brown clayey gravelly sand with abundant concrete and brick fragments)		
					(1.10)			
1.00-1.43	CPT 50/280		9,9/6,6,24,14					
1.00	D1							
				68.86	1.40			
					(0.35)	Made Ground (brick fragments)		
				68.51	1.75			
1.80	D2				(0.15)	Stiff greyish brown and pale grey mottled slightly sandy silty		
				68.36	1.90	CLAY with occasional coal and mudstone fragments)		
2.00-2.15	CPT		17,52/			Driving Sandstone Cobble		
					(1.10)			
				67.26	3.00			
						Stiff pale brown and pale grey mottled slightly sandy silty CLAY with scattered sandstone, mudstone and coal fragments		
					(0.55)			
				66.71	3.55			
				66.61	(0.10)	Very stiff pale grey and orange-brown laminated silty CLAY with scattered mudstone fragments		
					3.65			
					(0.00)			
4.00	D3			66.16	3.65	Moderately strong very thinly bedded pale brown medium grained SANDSTONE		
					(0.45)			
					4.10	Stiff greyish brown, orange-brown, pale brown and pale grey mottled sandy silty CLAY with scattered coal and sandstone fragments		
					(1.15)			
						Very stiff pale grey and orange-brown laminated silty CLAY with scattered becoming abundant mudstone fragments		
5.00	D4							
				65.01	5.25			
					(0.25)	Moderately weak black thinly laminated black COAL		
				64.76	5.50			
						Complete at 5.50m		

Remarks
Sandstone cobble driven from 1.9m to 3.0m - No sample recovery over this depth
Groundwater not encountered
Borehole terminated upon impenetrable coal at 5.50m
50mm Diameter standpipe piezometer installed with response zone from 1.0m to 5.0m with bentonite seal above

Scale (approx)	**Logged By**
1:50	MRP

Figure No.
J06060.BH9

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