YORK ARCHAEOLOGICAL TRUST

MONK BRIDGE, WHITEHALL ROAD,

LEEDS, WEST YORKSHIRE

WATCHING BRIEF REPORT

by I.D. Milsted

REPORT NUMBER 2012/47

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YAT York Archaeological Trust

AOD Above Ordnance Datum

SUMMARY

A watching brief at the Monk Bridge iron works, Leeds during ground works to insert manholes and drains, identified possible evidence for the location of 19th century rail tracks associated with the Great Northern Railway in the form of an extensive deposit of stone interpreted as track ballast. This was sealed beneath 4-5m of probable 20th century ground make-up, consisting of re-deposited landfill and industrial ash. Beneath a 19th railway viaduct, some evidence for structures associated with the Monk Bridge iron works was suggested, along with a deposit of probable tap slag from a puddling furnace used as a ground make-up deposit.

1. INTRODUCTION

A watching brief was maintained at the former Monk Bridge iron works site at Whitehall Road, Leeds, between 06/09/12 and 25/09/12 (SE 2900 3320, Figure 1). The observed ground works comprised machine excavation for the insertion of drainage and manhole inspection chambers. The works were undertaken by Centum Construction Ltd on behalf of the land owner, Lend Lease. The specification was prepared by the West Yorkshire Archaeology Advisory Service (WYAAS) and is included in Appendix 5 of this report.

2. METHODOLOGY

The ground works comprised the excavation of three inspection chambers measuring 3m x 3m and three connecting service trenches up to 1m wide between the new chambers and an existing manhole (Figure 2). The maximum excavated depth reached 28.70m AOD, representing 5m below the highest point of the site, to the north-west of a nineteenth century railway viaduct (see section 3). Excavation to the north-west of the viaduct was by 9 tonne mechanical excavator, and the trench sides were braced with inter-connecting trench boxes at regular intervals during excavation (Plates 1-11). Observation and recording was conducted in accordance with the specification (Appendix 5) and standard YAT procedures; this was carried out from ground level during excavation because the material in section was extremely unstable. Once the bracing box was inserted, only deposits in plan could be seen; deposits at the base of the trenches were inspected by the archaeologist once the appropriate shoring was installed. One of the connecting drainage trenches was dug beneath an arch of the viaduct to a depth of 1.5m BGL/28.70m AOD using a 5 tonne mechanical excavator fitted with a breaker to remove concrete surfaces and piles. This trench will

connect with manhole 014 to the north-west of the viaduct (Figure 2) following ground reduction in a later phase of the development.

3. LOCATION, GEOLOGY AND TOPOGRAPHY

The site is located at SE 2900 3320, in the Holbeck district of the city of Leeds (Figure 1). The underlying superficial geology consists of alluvial deposits of clay, silt, sand and gravel associated with the River Aire, overlying bedrock of Grenoside Sandstone (http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html, as accessed on 01/11/12). The site occupies an area immediately south-west of the Leeds-Liverpool canal, between the A64 (M) Wellington Road to the north-west and Whitehall Road to the south-east. The site is bisected from south-west to north-east by the now defunct 19th century Grainger's railway viaduct. The ground level on the north-western half is, at c.33.80m AOD, 3.5m higher than on the south-eastern side at c.30.30m AOD. The lower ground level pertains beneath the arches of the viaduct. The north-west sides of the arches are completely bricked up, and retain the 3.5m of ground make-up deposits that create the ground level on the north-west side. The surfaces on both sides of the retaining wall are level.

4. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Archaeological, historical and place-name evidence suggests that although Leeds has only been certainly continuously occupied since the Medieval period, it may be the site of the Roman fort of *Cambodunum* and then the central settlement of the Anglian kingdom of Elmet, with the former regional name 'Loidis' gradually becoming applied to the settlement as the kingdom declined (Faull, 1981, 163).

This part of Leeds is within a Class III Site of Archaeological Interest, principally due to the nineteenth century industrial developments in the area, which are summarised in the WYAAS specification (Appendix 5). Leeds emerged as a centre for the wool trade from the 15th century, and by the late 18th century was a part of the increasingly mechanised textile industry in the region (Davies et al, 2011, 9). By the mid nineteenth century, Leeds was also becoming an important centre for the railways, and in particular for locomotive production. To the north-west of the site, a locomotive roundhouse, half-roundhouse and workshop range survive which date from construction of the Leeds and Thirsk Railway in 1849, later the Great Northern Railway (WYAAS). The viaduct was built in 1847 by Thomas Grainger to serve the new Leeds Central station (Davies *et al*, 2011, 23), forming the northern boundary

of the 1851 Monk Bridge iron works. From 1854, the developing rail networks in the Holbeck area encouraged a locomotive manufacturer, James Kitson, to acquire the Monk Bridge iron works and transform it into a major national producer of locomotives (Davies *et al*, 2003, 2). The enterprise expanded into bulk steel production from the 1880s and continued until the 1930s; after the Second World War, the company was bought by the Sheffield company Daniel Doncaster and Sons, and continued in specialist steel production until 2005 (Davies, ibid).

To the north of Grainger's viaduct, an extensive fan of rails connected the Leeds & Thirsk roundhouses and workshops with Leeds Wellington Street Station. These rails are clearly evident in all the nineteenth century maps and occupy the main area concerned in this watching brief (WYAAS; Figures 4,5 and Plate 17). There was no connection to the viaduct lines from either the northern Leeds & Thirsk depot or the Monk Bridge iron works, but these two establishments are thought to have been connected in some way through the viaduct arches (Davies *et al*, 2003, 23). Evidence for this connection may survive beneath later structures within the arches which post-date the ground raising of the northern side, although exactly how this connection operated with the fan of Great Northern rails immediately north of the viaduct is unclear, as is the date of the landscaping that produced the current topography.

5. RESULTS

5.1 NORTH OF GRAINGER'S VIADUCT

The area north of the railway viaduct was some 3.5m higher than that to the south, at c.33.80m AOD. The ground works in this area comprised three inspection chambers and two connecting drainage trenches (Figure 2). The chambers, numbered 011, 012 and 014 from west to east, measured 3m x 3m and were excavated to a depth of 5m BGL / 28.70m AOD. The connecting trenches were 1m wide and 5m deep, with an additional 2m wide and 1m deep ground reduction on the northern side to make the trench safe during the insertion of the shoring boxes.

The excavation produced an effective continuous section some 37m long through the deposits north of the viaduct. The connecting trenches were excavated in 3-4m long sections, resulting in a series of recorded sequences that had to be plotted together in post-excavation (Figure 3). The exposed strata were recorded from the surface because the depth of the excavation and instability of the deposits necessitated immediate shoring. Generally, only the upper 2-3m of each trench was visible before the box-shore was inserted;

from then onwards to the depth limit, deposit changes were recorded as they appeared during excavation and depths were measured using a survey staff and the known dimensions of the box. As is clear from the photographs, there were many fine layers of slightly differing ash, clay and crushed stone which have been rationalised into broad contexts across each recorded section to produce a coherent site sequence.

The earliest observed context, 20005, was very distinct from the rest of the sequence and consisted of a layer of clean, compacted red course-grained sandstone fragments up to 100m across (Plates 4, 6, 8, 10). This layer was observed across the entire site from c.30.80m AOD at the western end, dropping to 29.80m AOD to the east, and extended below the depth limit of the excavation at c.28.80m AOD. The manhole chambers, being wider than the drainage trenches, afforded a profile of deposit 20005, showing that it sloped steeply from north to south, from c.30m to c.28.5m AOD, suggesting that the excavation had clipped the southern edge of a banked structure (Plate 8). Despite the variations in height, which may partially be a result of truncation and also of the restrictions on accurate recording, 20005 was generally fairly level from west to east and is interpreted as possible *in situ* railway track ballast relating to the Great Northern lines shown on the 19th century maps (Figures 4,5). This is discussed further below in **5.3**.

The remaining deposits overlying the possible ballast all suggest dumped waste material imported to raise the ground level after the removal of the railway lines. Context 20004 consisted of a relatively discrete deposit of plastic, compact pale grey-brown clay up to 1m thick, the upper surface of which was observed at 31.30m AOD. This contained lenses of dark grey ash and was only observed within a 10m radius of the central manhole, 012 (Plate 2). Overlying this and observed across the entire site was 20003, a layer of loose, friable, dark grey ash up to 2.5m thick which contained pockets and lenses of clinker, coal and crushed brick (Plates 1, 5, 7-9, 11). This was encountered at around 32.30m AOD and on the basis of the tip-lines and composition was interpreted as a make-up deposit consisting of many dumps of very similar ash-rich material possibly obtained from the nearby locomotive works. Sealing this make-up was 20002, a site-wide layer of compact grey clay up to 0.50m thick that contained frequent fragments of possible paving flags and lenses of crushed sandstone and dark friable soil (Plate 1,5, 7-9, 11). The upper surface of this deposit was observed at c.32.80m AOD in the east, falling slightly to 32.30m AOD in the west and possibly represents an attempt to seal or consolidate the loose material below. Overlying 20002 was 20001, a 1m thick layer of banded grey, brown and black ashy soil which forms the current surface of the site and was interpreted as a final deposit of waste material imported to level the area, which had then been worked over by the extensive vegetation cleared prior to commencement of ground works. 20001 produced the only securely stratified

artefacts from this area, which consisted of discarded domestic 19th ceramics that may have been re-deposited from land-fill (Appendix 2).

5.2 BENEATH GRAINGER'S VIADUCT

The central manhole, 012, was positioned to articulate with a drainage trench beneath one of the viaduct arches to connect the system described above with that already installed in the area south of the viaduct. The differing ground levels described in section **2** necessitated the extreme depth of excavation north of the viaduct to reach the correct level for the existing drains.

The trench beneath the viaduct was 1m wide and up to 1.6m deep (Figure 2, Plates 12-16). The area below the arch was poorly lit and the deposits fairly unstable, which limited recording opportunities.

The earliest deposit, 10003, consisted of an extensive layer of crushed coal, clinker and slag up to 1.2m deep that was observed at c.30.00m AOD across the entire trench. At the depth limit of 28.80m AOD, a few patches of stiff yellow-brown clay were observed, but it is not clear if these represent a lower deposit or merely a lens within 10003. 10003 was interpreted as a make-up deposit and is notable for a high quantity of large, basin shaped slag objects up to 0.40m across (Plate 14). Samples of these have been assessed and interpreted as fragments of tap-slag from a puddling furnace (Appendix 4), a key element of the wrought iron manufacturing process that is known from the Monk Bridge iron works. The date of deposition is unknown, but 10003 is interpreted as a ground make-up deposit, so it is possible that these artefacts have been re-deposited (see section **5.3**).

Overlying 10003 was 10002, a layer of machine-made bricks laid as a floor that was 0.13m thick and formed a surface at 30.13m AOD. This may relate to the buildings known to have occupied the sub-arch spaces from the mid nineteenth century (see **5.3**) but were not a part of the last structure in this area as in several places they were badly disturbed by the piles and foundations of probable 20th century structural activity. At a point 6m north of the southern side of the arch, a possible wall-stub, 10004, was observed on a south-east – north-west alignment (Figure 2, Plate 16), but due to the width of the trench it was not clear if this was *in situ* as it was close to a modern pile and could have been either disturbed by this or re-deposited within its construction backfill. This structure was constructed of firebricks, some of which were retained for dating as they displayed identifiable stamps (Appendix 3). These provided a likely date range of c.1889 to 1941, suggesting that 10004, and also 10002 as the wall appeared to form part of this layer, date from the later phases of the iron works. This is discussed in **5.3**.

Overlying 10002 was a concrete surface, 10001, which was up to 0.25m thick and formed a level floor at c. 30.35m AOD. This incorporated two H-section steel piles and two ridges on either side of the arch that probably carried the walls of a 20th century building (Plate 12). The outline of this building's gable was visible on the brick wall that seals the northern side of the arch and retains the make-up deposits described in **5.1**. It seems likely that the 20th century building is contemporary with the arch blocking and possibly the post-railway ground make-up to the north of Grainger's viaduct.

5.3 DISCUSSION

The possible track ballast 20005 identified north of Grainger's viaduct probably relates to the extensive 'fan' of rail lines seen to develop from the 1849. An embankment beneath these lines is clearly visible on Benjamin Davies' map of 1858 (Figure 4), whilst by 1906 (Figure 5), the proximity of these lines to the northern edge of the viaduct, suggested by deposit 20005, is clear. No trace of the lines themselves, nor of any pins or fixings associated with them, was found, suggesting that they were taken up prior to the deposition of deposits 20001-20004, and that the possible ballast has been truncated. However, a height of c.30.80m AOD is suggested for the tracks, placing them level with the latest surfaces beneath the viaduct. This is suggested by plate 17, although no evidence to link the iron works to the Great Northern lines was identified.

Although it is not clear when the railway lines were removed, it is possible that this occurred alongside the blocking of the viaduct arches, suggested below to date to after the Second World War. The overlying ground make-up deposits contained relatively few artefacts, but all were 19th century in date and could easily have been in use into the 1900s prior to disposal (Appendix 2). It seems likely, given the ash and cinder throughout deposits 20001-20004, that land-fill was used to make up the ground.

The deposits identified below the arch are of interest as they possibly relate directly to activity in the Monk Bridge iron works. The tap-slag within deposit 10003 has been identified as deriving from a puddling furnace, which was an integral part of the forging process known to have occurred during the 'Kitson' period from 1855 (Davies *et al*, 2011, 34 and Appendix 4). Similar deposits were observed during previous excavations on the Monk Bridge site, and it is possible that the slag was being removed in readily transportable 'basins' on an internal railway and being dumped away from the furnace (Dr Rod Mackenzie, Appendix 4). Deposit 10003 is interpreted as a levelling deposit as it seems to support the floor 10002, and is very mixed with other waste materials; it may be that it has been re-deposited from elsewhere, although further work in a much wider area would be need to confirm this. Tap slag from puddling furnaces is rarely stratified, however, and deposit 10003 is therefore of potential

significance to the interpretation both of the 19th century forging processes, and the disposal techniques employed at Monk Bridge.

Floor 10002, with the ephemeral wall 10004, may relate to structures known to have been present beneath the arches from the 1850s onwards. The arch is identified as K1.10 in Davies *et al* Figure 30 (p129) and further work may be able to identify and characterise this building. It had clearly been truncated by the floor of a 20th century structure, 10001, which articulated with the wall blocking the northern side of the arch and interpreted as 20th century in date. It is possible that this structure may relate to the taking-over of Monk Bridge by Daniel Doncaster & Sons after the Second World War (Davies *et al*, 2011, 4).

6. INDEX TO SITE ARCHIVE

The site archive is currently being processed by YAT and when completed will be passed to Leeds Museum with the accession code LEEDM.D.2012.0036.
The site archive consists of:
13 pages from site notebook
3 section drawings on drawing film
Black and white photographs with register prepared as per specification 9.2
Digital photographs on CD with register prepared as per specification 7.1.8
1 box of artefacts

A full index shall accompany the site archive upon transfer to Leeds Museum

7. ACKNOWLEDGEMENTS

Research and author	I.D. Milsted
Illustrations	I.D. Milsted
Editor	M.R. Stockwell

8. BIBLIOGRAPHY

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Faull, M.L., and Moorhouse, S.A. (eds), 1981, *West Yorkshire: an Archaeological Survey to A.D. 1500*, West Yorkshire Metropolitan County Council, Wakefield

APPENDIX 1: FIGURES AND PLATES

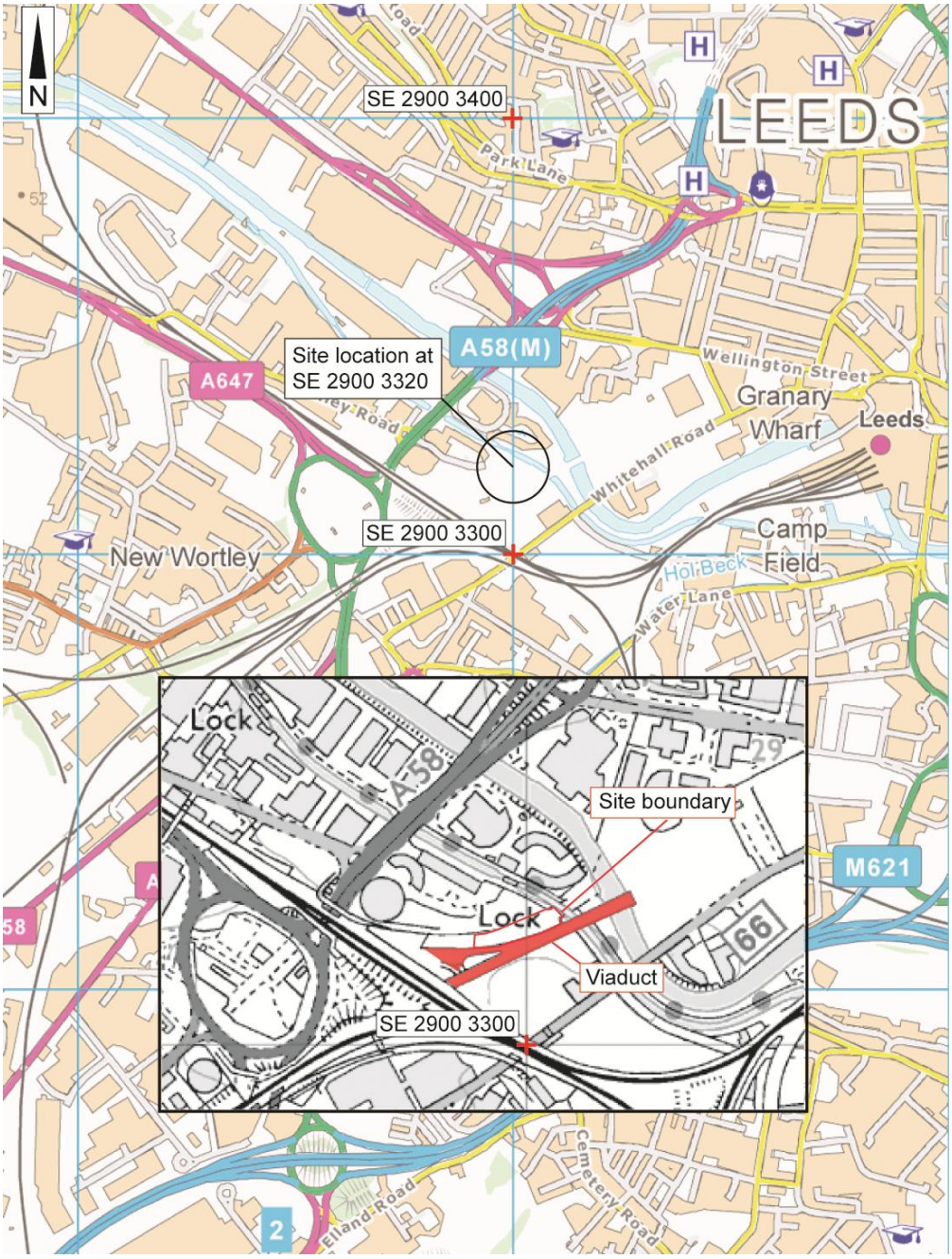

Figure 1 Site location

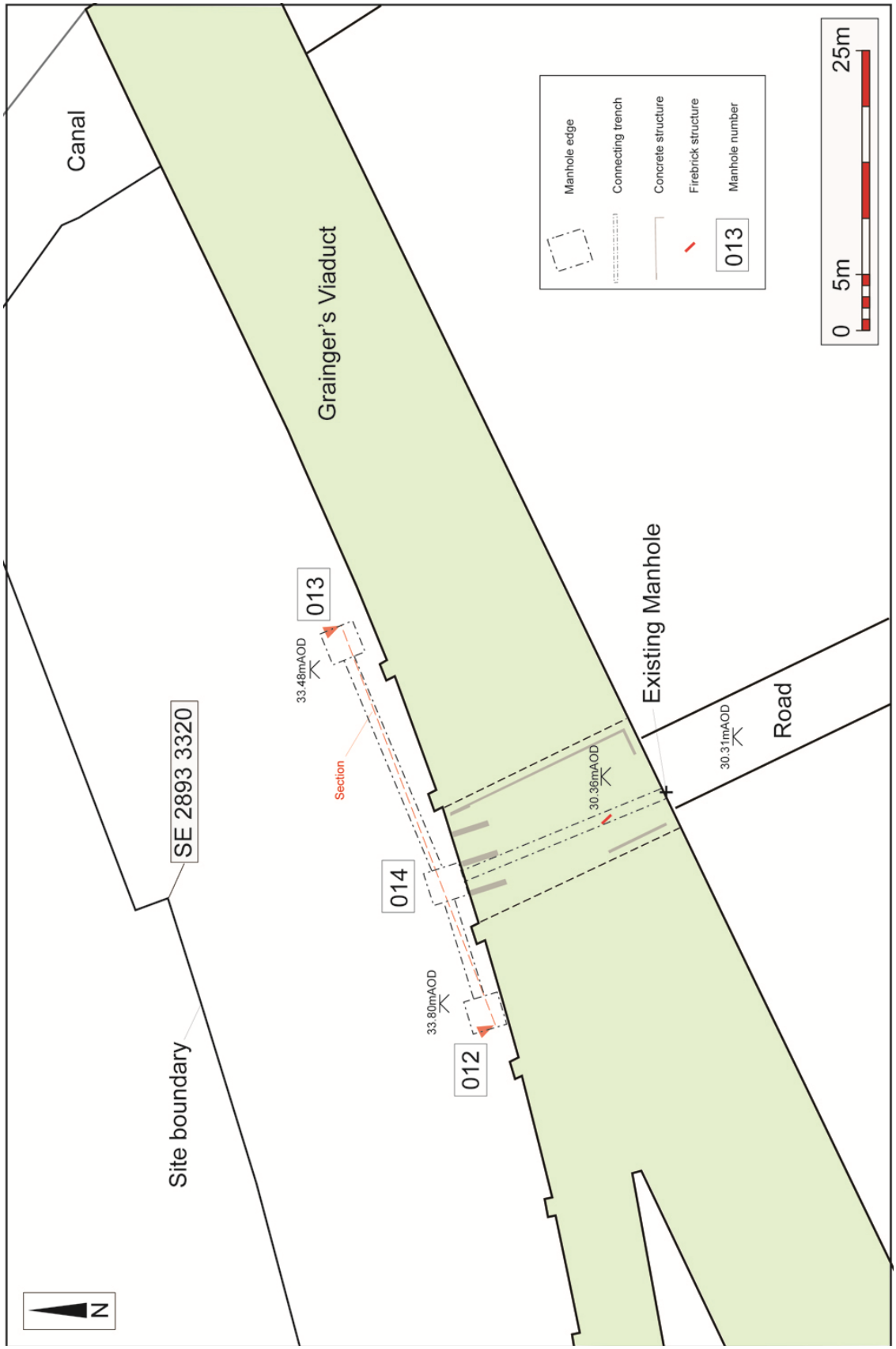

Figure 2 Site plan

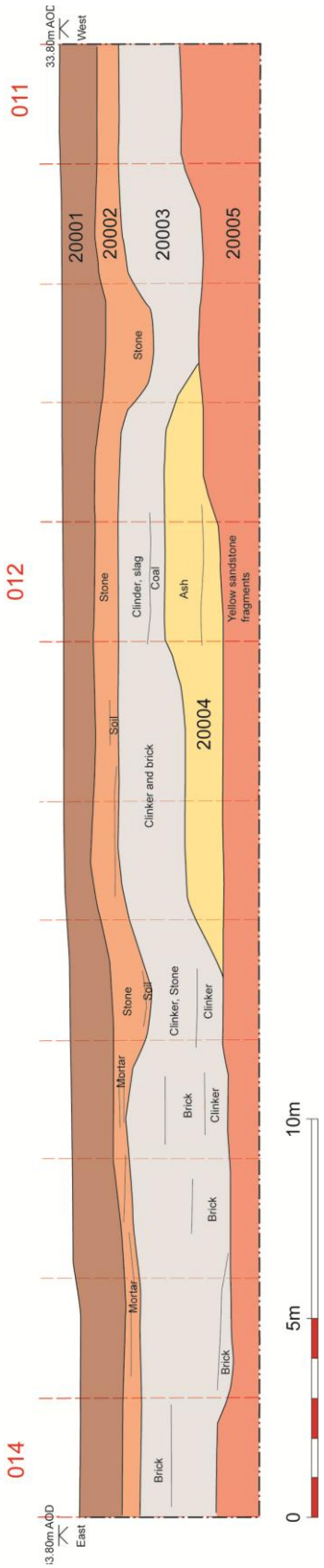

*Figure 3 North facing section through manholes 011, 012 and 014 and trenches, showing main inclusions within contexts described in section **5.1***

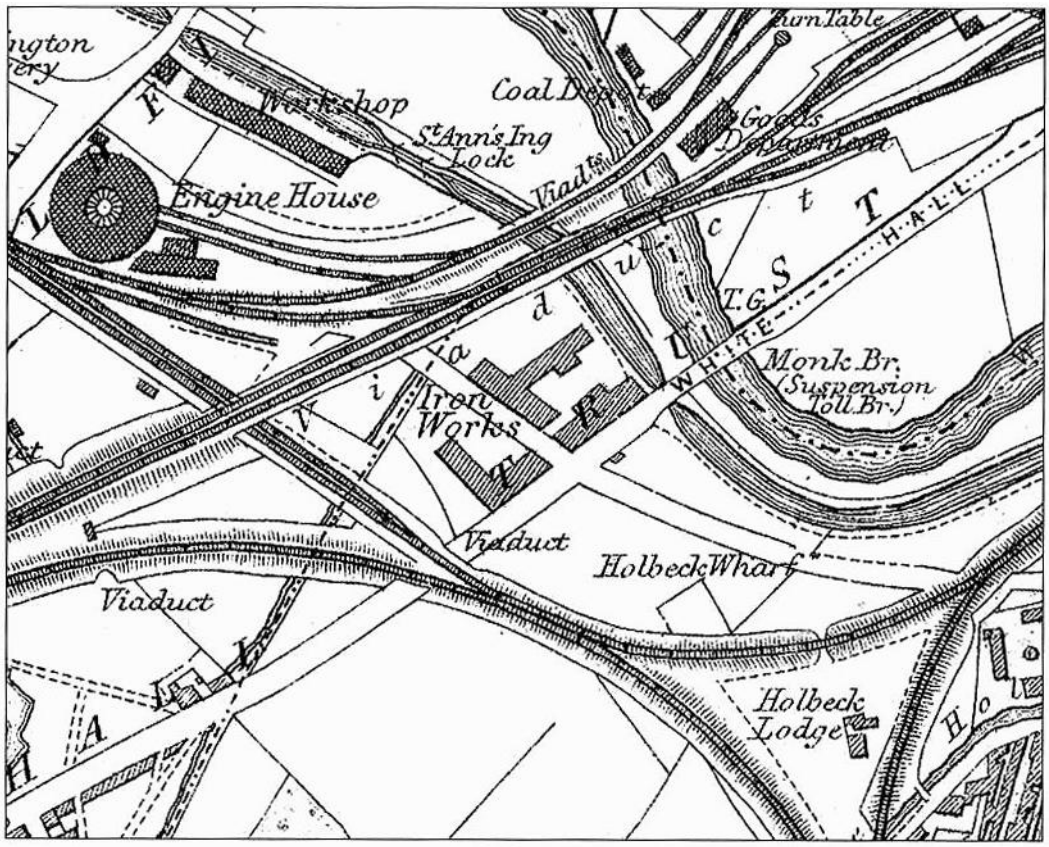

Figure 4 1858 Benjamin Davies map of Leeds (From Davies et al*, 2011, p28)*

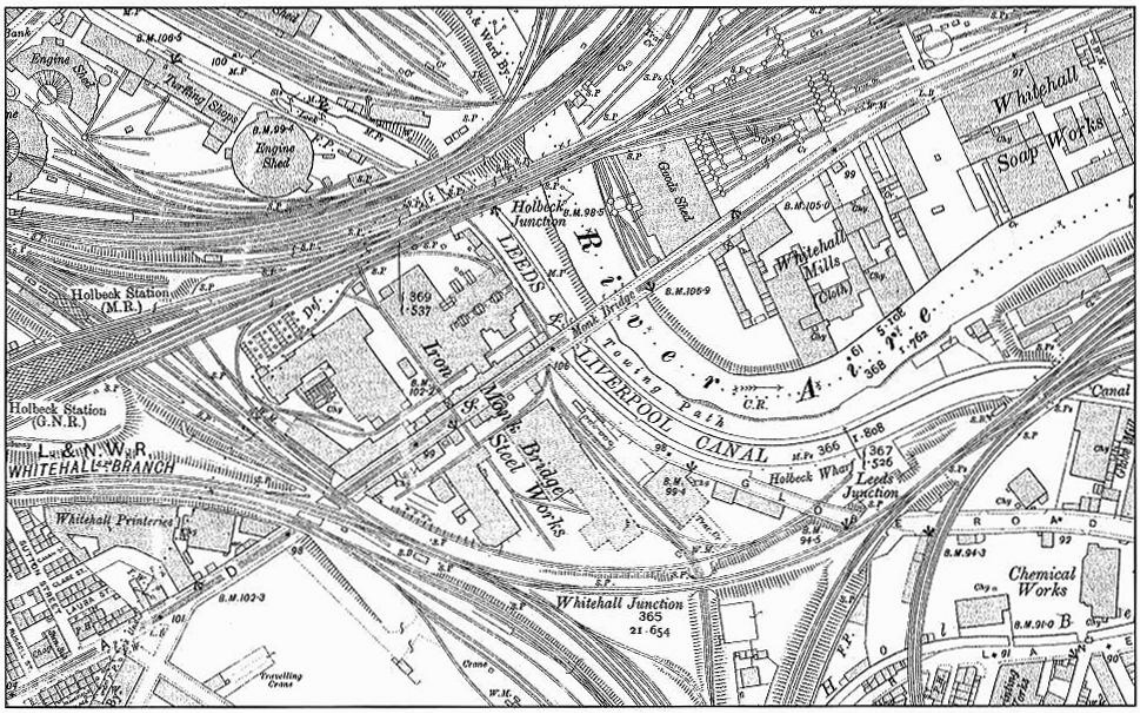

Figure 5 1906 Ordnance Survey map (From Davies et al*, 2011, p75)*

Plate 1 Upper 3m of manhole 012, looking west, showing arch-blocking wall

Plate 2 Deposit 20004 within manhole 012, looking west, at c.30.80m AOD

Plate 3 Deposit 20005 in manhole 012, looking west

Plate 4 Deposit 20001 in man hole 014, looking west

Plate 5 Deposits 20001 and 20002, with viaduct footings, in western drainage trench, looking south

Plate 6 Deposit 20005 at base of western drainage trench at c.29.80m AOD, looking west

Plate 7 Deposits 20001 and 20002 in manhole 011, looking west

Plate 8 Deposit 20005, showing slope from north to south, in manhole 011 looking west

Plate 9 Deposits 20001, 20002, 20003 in eastern drainage trench, looking east

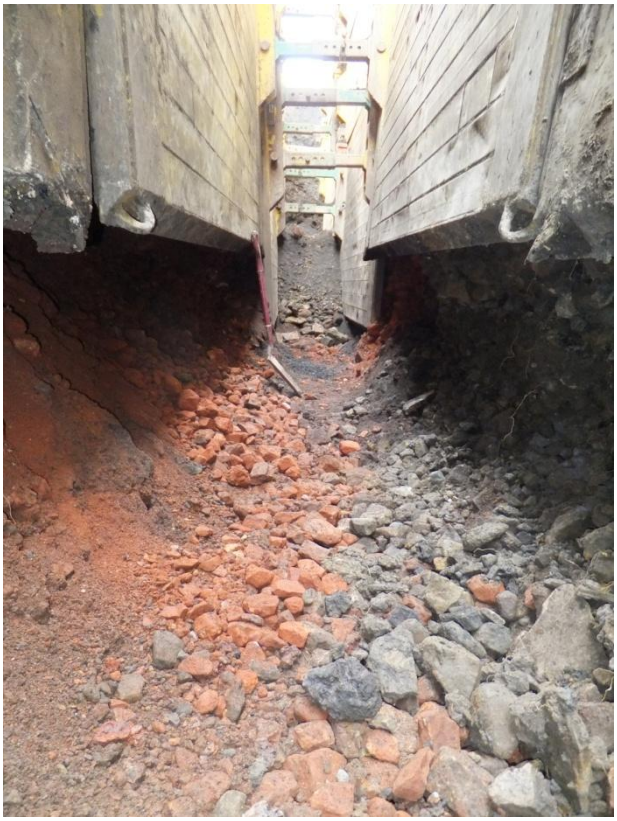

Plate 10 20005 at base of eastern connecting trench at c. 28.80m AOD, looking east

Plate 11 Upper 3m of deposits at junction of eastern drainage trench and manhole 011, looking south-east

Plate 12 Looking south under viaduct arch

Plate 13 Northern end of archway excavation, looking north

Plate 14 Section beneath viaduct arch, showing deposit 10003

Plate 15 Southern end of archway excavation, looking south-east

Plate 16 Possible disturbed wall, 10004, east at top of image

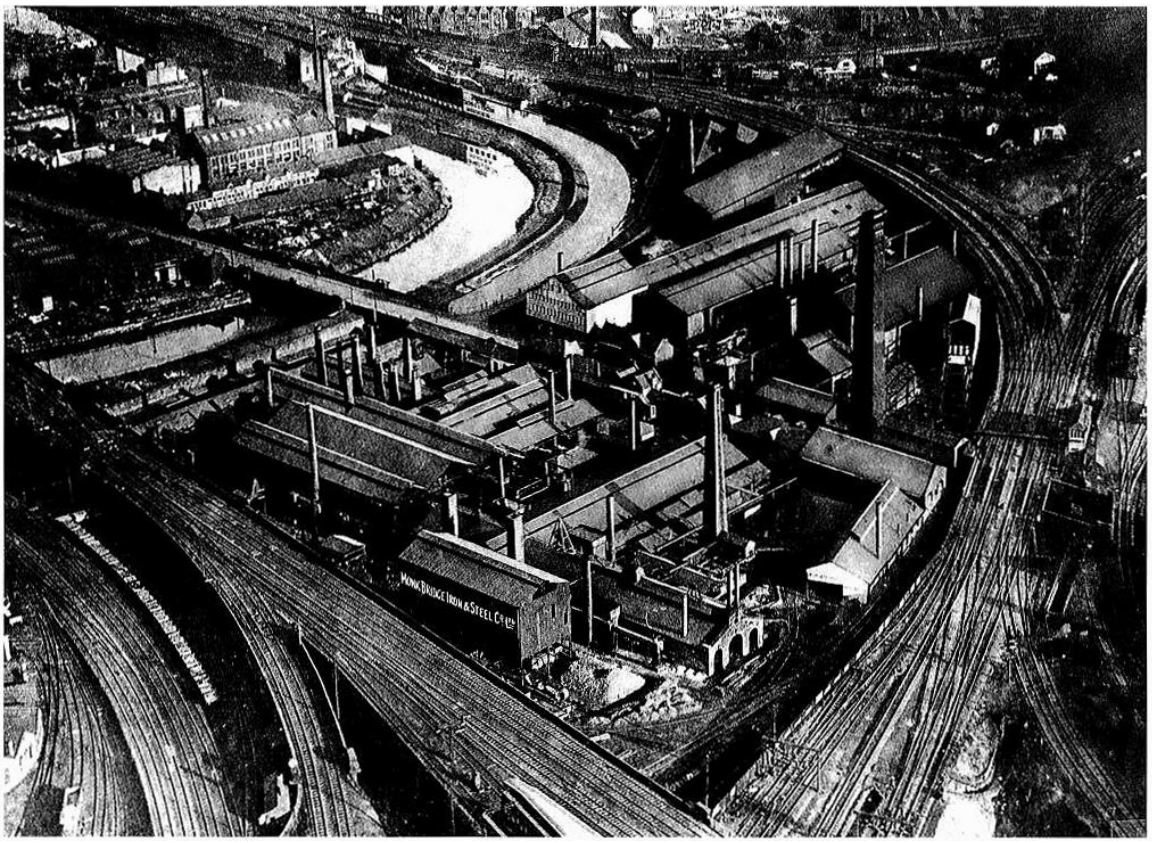

Plate 17 1921 aerial view of rail lines, viaduct and Monk Bridge iron works (From Davie et al*, 2011, p76*

APPENDIX 2: POTTERY BY A.J. MAINMAN

The pottery recovered from one context [20001] amounted to seven sherds in total (see Table 1). Sherds range from small (<5cm), to medium (<10cm) to large (>10cm) at their widest point. All sherds are most likely to be datable to the 19th century, though they could have been used for longer.

This assemblage appears to be domestic, containing storage and utility vessels (stoneware and earthenware) and tableware (transfer printed and banded slip wares).

No parallels have been found, in reference material on the Don Pottery, for the transfer printed design used on the tankard, but it may originate from the Leeds pottery. Further work might identify the pattern with a particular production centre and/or pattern book, but due to the small assemblage size and probable re-deposited nature of context 20001, there are no further recommendations.

Context	Find	Quantity	Dating	Details
20001	BF1	7	19TH CENTURY	1 English stoneware flagon rim and shoulder with handle attached at the neck large 1 banded slipware jug base with lower handle attachment and blue stripe decoration 2 transfer printed dish small to medium 1 transfer printed tankard with scene with pillars and flowers 1 white earthenware bowl base with iron concretion large 1 transfer printed ware with circular sponge-like motifs obscured by iron concretion

Table 1 Pottery by context

APPENDIX 3: CBM BY J.M. MCCOMISH

Three modern machine made bricks were recovered from the Monk Bridge site, and recorded to a standard YAT methodology; all three of the bricks were retained. A description of each brick is given in Table 1. The bricks are mainly of use as dating evidence, and the dates of the three factories concerned are listed below.

The brick stamped HURLL originated from the Drumchapel works of P &M Hurll, in Glasgow, which was in operation from about 1903 to November 1941 (http://www.penmorfa.com/bricks/scotlandb.html).

The brick stamped LFC^{O}L^{D} was made by the Leeds Fireclay Company was resultant from a merger of several companies in 1889, including Joseph Cliff and Sons, Burmatofts Co, Edward Brook and sons, Oates and Green Ltd, W Ingham and Sons, Wortley Fireclay Co and Joseph Brooke and Sons. (http://www.secretleeds.com/forum/messages.aspx?ThreadID=1527 and http://brickfrog.wordpress.com/2011/05/23/wortley-fire-clay-company/ accessed on 02/03/12). The company had a factory called the Burmantofts' Works, The company was famous in the late nineteenth and early twentieth century for the production of glazed clay known as Burmantofts Faience and terra-cotta. It was located on Torre Road. The company closed in 1957. (http://www.leodis.net/searchResults.aspx?LOCID=9999&DECADE=0&YEAR=&KEYWORDS=%20Leeds%20Fireclay%20Company&KEYWORDS2=&KEYWORDS3=&ANDOR2=&ANDOR3=&RECSPAGE=5&VIEW=1&CURRPAGE=1 accessed 02/03/12).

The Brick stamped Hollins was made by Hollins and Co. at the Port Vale tilery at Longrpot, Stoke on Trent, which was in operation from the 1800's to c.1955, though it passed through the hands of several owners (http://www.thepotteries.org/brickworks/midland.htm accessed on 06/10/12).

Weight	Dimensions	Description
3850	227x110x76	Machine made brick, no frogs. Makers stamp on one bed, with letters 20mm high, the stamp reads HURLL.
3900	230x117x78	Machine made firebrick. Rectangular frog with rounded corners 167x60x3mm in size on one bed. Within the frog is a makers stamp reading LFC^{O}L^{D} with the larger letters 3mm high and the superscript O and D being 11mm high.
4400	230x115x59	Machine made firebrick, no frogs. Rectangular makers stamp on one bed 125x13mm in size containing the letters HOLLINS.

Table 2 Description of the bricks from the site.

APPENDIX 4: METALWORKING DEBRIS BY R.S. CUBITT

A recent watching brief on the site observed numerous large round blocks of slag. Three fragments of such blocks with a total weight of 7.5kgs were collected from context 10003. These have been identified by Dr Rod Mackenzie as fragments of tap slag from a puddling furnace. They have been tapped into a round vessel or tub which gives the blocks their shape

Puddling is used in the production of wrought iron. It is a process by which pig iron from coke-fuelled blast furnaces was converted into iron that could be successfully forged (Bayley et al. 2001,13). This process was a key feature of production at the Monk Bridge ironworks in the Witham and Kitson periods, dating from 1851 -1942 (Davies et al. 2011, 34).

Similar blocks of slag were observed in a nearby location in a previous excavation at the site. It was proposed that the slag was tapped into tippable 'slag tub' wagons that were taken away when full, possibly by narrow gauge railway, and tipped/dumped elsewhere (Mackenzie pers comm.).

These fragments should be retained for future study. Puddling slag from stratified levels are rare anyway. These fragments are particularly significant given that the debris from the earlier excavation of the site is missing (Davies et al. 2011, 168).

I am grateful to Dr Rod Mackenzie for his assistance in identifying these fragments.

REFERENCES

Bayley, J., D.Dungworth & S.Paynter 2001 *Archaeometallurgy*. English Heritage

Davies, G., M.Stenton, R.Fitzgerald & R.Kinchin-Smith. 2011 *Monk Bridge Ironworks*. York Archaeological Trust.

APPENDIX 5: WATCHING BRIEF SPECIFICATION BY WYAAS

Specification For Archaeological Watching Brief at Doncaster Monkbridge, Whitehall Road Leeds
Planning Permission 06/02880/OUT
(SE 28997 33195)

Specification prepared at the request Mr Stephen Woodward of Lend Lease on behalf of Leeds City Council.
(Planning Permission 06/02880/OUT)

1 SUMMARY

1.1 A limited amount of archaeological work consisting of a watching brief is proposed to identify and record any archaeological remains which are revealed and/or disturbed during groundworks this mid 19th century locomotive depot. This specification has been written by the West Yorkshire Archaeology Advisory Service (WYAAS), the holders of the West Yorkshire Historic Environment Record to allow the applicant to discharge an archaeological condition placed on planning consent 06/02880/OUT.

NOTE: The requirements detailed in paragraphs 6.1.1 to 6.1.5 inclusive, 8.3 and 8.4 are to be met by the archaeological contractor prior to the commencement of fieldwork by completing and returning the attached form to the WY Archaeology Advisory Service.

2 SITE LOCATION AND DESCRIPTION

2.1 LOCATION
(Grid ref. SE 28997 33195) The site lies to the south-east of the present Wellington Road (A64M) a listed locomotive roundhouse (National Heritage List for England 1,255,725), half roundhouse (National Heritage List for England 1,255,724) and railway workshops (National Heritage List for England 1,255,717); north of a listed viaduct (National Heritage List for England 1,255,720) and south west of the Leeds Liverpool Canal including St. Ann's Ing Lock (National Heritage List for England 1,255,723). The site lies within a Class III Site of Archaeological Interest (West Yorkshire Historic Environment Record PRN 5162)

2.2 DESCRIPTION
Part of the site is currently in use as a grade car park while the southern edge, against the listed viaduct, is unused.

3 PLANNING BACKGROUND

The site owners through their agents Lend Lease (1st Floor, Cornwall House, 31 Lionel Street, Birmingham. B3 1AP, contact Mr Stephen Woodward. 0771 121 214 1535) have obtained planning consent (Planning Application No. 06/02880/OUT) for the construction of a multi storey, multi function development with associated car parking and landscaping. The WYAAS (as Leeds City Council's archaeological advisor) has prepared this specification in order to allow the owners to meet the terms of an archaeological condition (No. 45) which has been placed on the consent.

4 ARCHAEOLOGICAL INTEREST
4.1 HISTORICAL BACKGROUND
Leeds had a complex and dynamic system of competing railways during the later 19th century which developed and changed in response to the formation and amalgamation of various private companies, their customers' demands and the development of larger rolling stock. This situation resulted in numerous locomotive depots, goods yards, stations, viaducts and bridges being constructed.

The development site lies to the south-east of a locomotive roundhouse, half roundhouse and workshop range constructed as a locomotive depot and engineering for the Leeds and Thirsk Railway in 1849 and operated as a depot until 1902. A third locomotive roundhouse was built in 1871 and demolished in the late 1960s. Historic maps show the site lies in the location of this roundhouse and a "fan" of tracks associated with the depot and main line access to Leeds Wellington Street Station. During the mid 19th century this line crossed the Leeds Liverpool Canal and River Aire via a wooden bridge to the north-east of the site.

Although the Leeds and Thirsk Railway was a relatively short lived venture and was amalgamated into the Great Northern Railway by August 1854 the scale and architectural presence of its locomotive depot are striking evidence of the confidence and capital invested during the "railway madness" of the mid century. Evidence of the operation, development and refinements of the associated track system and the later engine house are considered worthy of further study.

4.2 IMPACT OF PROPOSED DEVELOPMENT

Evidence of the site's railway history may be revealed and destroyed during the implementation of the approved scheme.

5 AIMS OF THE PROJECT

5.1 The aim of the watching brief is to identify and record the presence/absence, extent, condition, character and date (as far as circumstances permit) of any archaeological features and deposits which are disturbed or exposed as a result of groundworks (foundations, levelling and service trenches).

5.2 This work will mitigate the destruction of buried archaeological remains through 'preservation by record'.

6. GENERAL INSTRUCTIONS

6.1 HEALTH AND SAFETY

6.1.1 The archaeologist on site will naturally operate with due regard for Health and Safety regulations. In this case, where archaeological work is carried out at the same time as the work of other contractors, regard should also be taken of any reasonable additional constraints that these contractors may impose. This work may require the preparation of a Risk Assessment of the site, in accordance with the Health and Safety at Work Regulations. The West Yorkshire Archaeology Advisory Service and its officers cannot be held responsible for any accidents or injuries that may occur to outside contractors engaged to undertake this watching brief while attempting to conform to this specification. Any Health and Safety issues which may hinder compliance with this specification should be discussed with WYAAS at the earliest possible opportunity (see section 12.2).

6.2 CONFIRMATION OF ADHERENCE TO SPECIFICATION

6.2.1 Prior to the commencement of any work, the archaeological contractor must confirm adherence to this specification in writing to WYAAS, or state (with reasons) any proposals to vary the specification. Unauthorised variations are made at the sole risk of the contractor (see para. 12.2 below). Modifications presented in the form of a re-written specification/project design will not be considered by WYAAS.

6.3 CONFIRMATION OF TIMETABLE AND CONTRACTORS' QUALIFICATIONS

6.3.1 Prior to the commencement of any work, the archaeological contractor must provide WYAAS in writing with:

- · a projected timetable for the site work
- · details of the staff structure and numbers
- ·names and CVs of key project members (the project manager, site supervisor, any proposed specialists, sub-contractors etc.)

6.3.2 All project staff provided by the archaeological contractor must be suitably qualified and experienced for their roles. The timetable should be adequate to allow the work to be undertaken to the appropriate professional standard, subject to the ultimate judgement of WYAAS.

6.4 NOTIFICATION AND MONITORING

6.4.1 The watching brief will be monitored as necessary and practicable by WYAAS in its role as curator of the county's archaeology. WYAAS should be provided with as much notice as possible in writing (and certainly not less than one week) of the intention to start the watching brief. A copy of the archaeological contractor's risk assessment of the site should accompany the notification.

6.4.2 The museums officer named in paragraph 11.1 should be notified in writing of the commencement of fieldwork at the same time as WYAAS.

7. FIELDWORK METHODOLOGY

7.1 An archaeologist should be present on site during the excavation of new footings and service trenches. The archaeologist should view the area as it is being dug and any trench sections after excavation has been completed. Where archaeology is judged to be present, the excavated area should be rapidly cleaned and the need for further work assessed. Where appropriate, any features and finds should then be quickly hand excavated, sampled if appropriate, and recorded.

7.1.2 Any features/deposits of archaeological interest should be accurately located on a site plan and recorded by photographs, scale drawings and written descriptions sufficient to permit the preparation of a report. Section drawings (at a minimum scale of 1:20) must include heights O.D. Plans (at a minimum scale of 1:50) must include O.D. spot heights for all principal strata and any features.

7.1.3 The actual areas of ground disturbance (even if no archaeological remains are present) should be recorded on a suitable base map/development plan and the stratigraphic sequence and the depth of the excavations will be briefly recorded. If archaeological remains are identified, their location is to be accurately tied into the National Grid and located on an up-to-date 1:1250 O.S. map base.

7.1.4 Excavated soil should be searched as practicable for finds. All finds, except unstratified 20th century material, should be collected and retained for processing.

7.1.5 All securely stratified contexts should be sampled for environmental analysis and scientific dating. Additional 'spot' samples should be taken if suitable material is encountered during the watching brief.

7.1.6 The intention of the archaeological watching brief is not to unduly delay the work of other contractors on site, however, a degree of flexibility is also expected of the developer in order that the archaeologist can fulfil the terms of this specification (see 8.1 below). The archaeologist shall not excavate any area beyond those scheduled for destruction by the development.

7.1.7 If, in the professional judgement of the archaeologist on site, the watching brief reveals below-ground conditions which indicate that potentially archaeological levels are absent, the archaeologist should contact WYAAS to discuss reducing or curtailing the requirements. The work may only be curtailed with the prior agreement of WYAAS and written confirmation will be provided by WYAAS.

7.1.8 Note that conventional black and white print photography is still required and constitutes the permanent record. Digital images will only be acceptable as an alternative to colour slide photography if each image is supplied in three file formats (as a RAW data file, a DNG file and as a JPEG file). The contractor must include metadata embedded in the DNG file. The metadata must include the following: the commonly used name for the site being photographed, the relevant centred OS grid coordinates for the site to at least six figures, the relevant township name, the date of photograph, the subject of the photograph, the direction of shot and the name of the organisation taking the photograph. Images are to be supplied to WYAAS on gold CDs by the archaeological contractor accompanying the hard copy of the report.

7.2 USE OF METAL DETECTORS ON SITE

7.2.1 Spoil heaps are to be scanned for both ferrous and non-ferrous metal artefacts using a metal detector capable of making this discrimination, operated by an experienced metal detector user (if necessary, operating under the supervision of the contracting archaeologist). Modern artefacts are to be noted but not retained (19th century material and earlier should be retained.)

7.2.2 If a non-professional archaeologist is to be used to carry out the metal detecting, a formal agreement of their position as a sub-contractor working under direction must be agreed in advance of their use on site. This formal agreement will apply whether they are paid or not. To avoid financial claims under the Treasure Act a suggested wording for this formal agreement with the metal detectorist is: "In the process of working on the archaeological investigation at [location of site] between the dates of [insert dates], [name of person contributing to project] is working under direction or permission of [name of archaeological organisation] and hereby waives all rights to rewards for objects discovered that could otherwise be payable under the Treasure Act 1996."

8. UNEXPECTEDLY SIGNIFICANT OR COMPLEX DISCOVERIES

8.1 Should there be, in the professional judgement of the archaeologist on site, unexpectedly significant or complex discoveries made that warrant more detailed recording than possible within the terms of this specification, then the archaeological contractor is to urgently contact WYAAS with the relevant information to enable the matter to be resolved with the developer.

8.2 The terms of the Treasure Act, 1996 and later amendments must be followed with regard to any finds, which might fall within its purview. Any such finds must be removed to a safe place and reported to the local coroner as required by the procedures laid down in the 'Code of Practice'. Where removal cannot be effected on the same working day as the discovery, suitable security measures must be taken to protect the finds from theft.

9. POST-EXCAVATION ANALYSIS AND REPORTING

9.1 On completion of the fieldwork, any samples shall be processed and all finds shall be cleaned, identified, analysed, dated (if possible), marked (if appropriate) and properly packed and stored in accordance with the requirements of national guidelines. Finds of 20th century date should be quantified and summarily described, but can then be discarded if appropriate. All finds of 19th century or earlier date should be retained and archived.

9.2 A fully indexed field archive shall be compiled consisting of all primary written documents, plans, sections, and fully labelled photographs/slides. Standards for archive compilation and transfer should conform to those outlined in Archaeological Archives – a guide to best practice in creation, compilation, transfer and curation (Archaeological Archives Forum, 2007). Photographic prints should be mounted in appropriate archivally-stable sleeves. Labelling should be on the back of the print in pencil giving film and frame number only and on applied printed labels on the front of the appropriate photographic sleeve which should include:

· film and frame number
· date recorded and photographer's name
· name and address of site
· national grid reference
· specific subject of photograph.

A quantified index to the field archive should form an appendix to the report. The original archive is to accompany the deposition of any finds, providing the landowner agrees to the deposition of finds in a publicly accessible archive (see Section 10 below). In the absence of this agreement the field archive (less finds) is to be deposited in the West Yorkshire Historic Environment Record.

9.3 A fully illustrated report should be produced, which should include background information on the need for the project, a description of the methodology employed, and a full description and interpretation of the results, placing them in a local and regional, and if appropriate, national context. It is not envisaged that the report is likely to be published, but it should be produced with sufficient care and attention to detail to be of academic use to future researchers.

9.4 Location plans should be produced at a scale which enables easy site identification and which depicts the full extent of the areas covered by the watching brief (a scale of 1:50,000 is not regarded as appropriate unless accompanied by a more detailed plan or plans). Plans should be at an appropriate scale showing: areas excavated and the identified (and, where possible, predicted) archaeological features/deposits. Trench and feature plans must include O.D. spot heights for all principal strata and any features. Section drawings must include O.D heights and be cross-referenced to an appropriate plan.

9.5 All artefacts and environmental material will be analysed by a qualified and experienced specialist. Artefact analysis is to include the production of a descriptive catalogue. Finds critical for dating and interpretation should be illustrated.

9.6 Details of the style and format of the report are to be determined by the archaeological contractor, but should include a full bibliography, a quantified index to the site archive, details of the current and intended location of the archive and, as an appendix, a copy of this specification.

10. REPORT SUBMISSION AND DEPOSITION WITH THE HER

10.1 The archaeological contractor will supply a copy of the report to the client and another copy directly to the WYAAS within a period of one month following completion of fieldwork, unless a revised date has been agreed in writing with WYAAS. As a courtesy a digital copy should also be supplied to the English Heritage Regional Science Officer (Andy.Hammond@english-heritage.org.uk). Completion of this project and a recommendation from WYAAS to discharge the planning condition are dependant on receipt by WYAAS of a satisfactory report which has been prepared in accordance with this specification. Any comments made by WYAAS in response to the submission of an unsatisfactory report will be taken into account and will result in the reissue of a suitably edited report to all parties, within a timescale which has been agreed with WYAAS.

10.2 The report will be supplied on the understanding that it will be added to the West Yorkshire Historic Environment Record and will become publicly accessible once deposited with the WYAAS unless confidentiality is explicitly requested, in which case it will become publicly accessible six months after deposition.

10.3 Copyright -Please note that by depositing this report, the contractor gives permission for the material presented within the document to be used by the WYAAS, in perpetuity, although The Contractor retains the right to be identified as the author of all project documentation and reports as specified in the Copyright, Designs and Patents Act 1988 (chapter IV, section 79). The permission will allow the WYAAS to reproduce material, including for non-commercial use by third parties, with the copyright owner suitably acknowledged.

10.4 The West Yorkshire HER supports the Online Access to Index of Archaeological Investigations (OASIS) project. The overall aim of the OASIS project is to provide an online index to the mass of archaeological grey literature that has been produced as a result of the advent of large-scale developer funded fieldwork. The archaeological contractor must therefore complete the online OASIS form at http://ads.ahds.ac.uk/project/oasis/. Contractors are advised to contact the West Yorkshire HER officer prior to completing the form. Once a report has become a public document by submission to or incorporation into the HER, the West Yorkshire HER may place the information on a web-site. Please ensure that you and your client agree to this procedure in writing as part of the process of submitting the report to the case officer at the West Yorkshire HER.

10.5 The attached summary sheet should be completed and submitted to the WYAAS for inclusion in the summary of archaeological work in West Yorkshire published on WYAAS' website.

11. ARCHIVE DEPOSITION

11.1 Before commencing any fieldwork, the archaeological contractor must contact the relevant District museum archaeological curator in writing (copied to WYAAS) to determine the museum's requirements for the deposition of an excavation archive. In this case the contact is: Katherine Baxter, Leeds Museum Discovery Centre, Carlisle Road, Leeds LS10 1LB (Tel.:0113 214 1548; email: katherine.baxter@leeds.gov.uk.).

11.2 It is the policy of the Leeds Museum to accept complete excavation archives, including primary site records and research archives and finds, from all excavations carried out in the District, which it serves.

11.3 It is the responsibility of the archaeological contractor to endeavour to obtain consent of the landowner, in writing, to the deposition of finds with the Leeds Museum.

11.4 It is the responsibility of the archaeological contractor to meet the Leeds Museum's requirements with regard to the preparation of fieldwork archives for deposition.

12. GENERAL CONSIDERATIONS

12.1 AUTHORISED ALTERATIONS TO SPECIFICATION BY CONTRACTOR

12.1.1 If, on first visiting the site or at any time during the course of the recording exercise, it appears in the archaeologist's professional judgement that:

i) a part or the whole of the site is not amenable to recording as detailed above, and/or

ii) an alternative approach may be more appropriate or likely to produce more informative results, then it is expected that the archaeologist will contact WYAAS as a matter of urgency in order that the matter can be resolved in liaison with the developer and the Local Planning Authority.

12.2 UNAUTHORISED ALTERATIONS TO SPECIFICATION BY CONTRACTOR

12.2.1 It is the archaeological contractor's responsibility to ensure that they have obtained WYAAS's consent in writing to any variation of the specification prior to the commencement of on-site work or (where applicable) prior to the finalisation of the tender. Unauthorised variations may result in WYAAS being unable to recommend determination of the planning application to the Local Planning Authority based on the archaeological information available and are therefore made solely at the risk of the contractor.

12.3 TECHNICAL QUERIES

12.3.1 Similarly, any technical queries arising from the specification detailed above, should be addressed to WYAAS without delay.

12.4 VALID PERIOD OF SPECIFICATION

12.4.1 This specification is valid for a period of one year from date of issue. After that time it may need to be revised to take into account new discoveries, changes in policy or the introduction of new working practices or techniques.

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Issued by WYAAS July 2012