

**ARCHAEOLOGICAL MONITORING AT
THE FORMER GASWORKS, BRIGG,
NORTH LINCOLNSHIRE**

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PRE-CONSTRUCT ARCHAEOLOGY

**Archaeological Monitoring at Former Gasworks, Brigg,
North Lincolnshire**

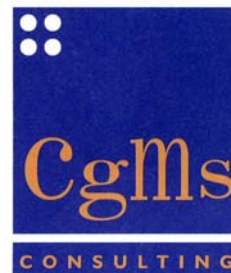
Central National Grid Reference: SE 9975 0735

Site Code: BGW 05

Commissioning Client:

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1. NON-TECHNICAL SUMMARY

- 1.1 This report details the results and working methods of an archaeological monitoring and recording exercise undertaken at the site of the former gasworks in Brigg, North Lincolnshire. The central National Grid Reference of the site is SE 9975 0735.
- 1.2 The archaeological investigations were commissioned by CgMs Consulting, on behalf of Tesco Stores Limited, and undertaken by Pre-Construct Archaeology Limited. The fieldwork took place between 18th July and 2nd August 2005.
- 1.3 The site lies on the eastern side of the Old River Ancholme and is of archaeological and palaeoenvironmental interest due to the discovery of a prehistoric log-boat at this location in the late 19th century. Initially, an archaeological evaluation was proposed, however, because of the potential Health and Safety risks associated with this former gasworks site, a more appropriate undertaking was deemed to be archaeological monitoring of geotechnical investigations, conducted under a strict Health and Safety regime.
- 1.4 The archaeological investigations involved monitoring the excavation of four test pits, nine trial trenches and eight boreholes. In addition, four piston samples were taken from alluvial deposits, in the approximate position of two of the test pits and two of the trial trenches.
- 1.5 The boreholes provided a profile across the glacial, post-glacial and Holocene alluvial deposits at the site. Mudstone, representing the solid geology of the area, was encountered at depths of up to 17.0m below existing ground level. Mudstone was overlain by glacial clays, up to 8.40m thick, and in turn this material was overlain by silty and sandy clays representing post-glacial alluvium. Close to the eastern edge of the Old River Ancholme, such deposits were encountered up to 3.0m below existing ground level and were up to 5.30m thick. Further to the northeast, alluvium was encountered at shallower depths, up to 2.20m below existing ground level, and was up to 5.90m thick.
- 1.6 A fragment of rope was recovered from alluvial material in a borehole in the eastern portion of the site, at a depth of c. 6.50m below existing ground level. Wood fragments were recovered from alluvium in another borehole, close to the Old River Ancholme, at a depth of c. 8.0m below existing ground level. This appeared to comprise fragments of roundwood, although there was no suggestion that it had been worked in any way. The depths at which these items were recovered indicate that they are likely to be of ancient origin.
- 1.7 The alluvial sequence within a borehole in the eastern portion of the site was overlain by a charcoal-rich silty deposit. While no dating evidence was recovered and the limited scope of the investigations made a definite interpretation impossible, the composition of this material and the absence of any modern material perhaps suggest that this deposit is of some archaeological significance.

1.8 In summary, therefore, the investigations broadly indicate that alluvial material at the site contains significant archaeological remains. However, the limited scope of the investigations mean that it is not possible to draw any firm conclusions regarding the date or character of such remains. The investigations encountered heavily contaminated alluvial deposits across the site; such contamination almost certainly derived from the former use of the site as a gasworks. The test pits and trial trenches also encountered deposits of 'made ground' and the remains of brick and concrete structures, these probably derived from the former gasworks. No archaeological features were observed in these areas and no artefactual material was recovered.

2. INTRODUCTION

2.1 General Background

- 2.1.1 An archaeological monitoring and recording exercise (hereafter watching brief) was undertaken at the site of the former gasworks in Brigg, North Lincolnshire. The site is situated to the immediate northwest of the historic town centre of Brigg and to the immediate east of the Old River Ancholme. The central National Grid Reference of the site is SE 9975 0735 (Figure 1).
- 2.1.2 The archaeological watching brief comprised the monitoring of geotechnical investigations, which comprised the excavation of four test pits, nine trial trenches and eight boreholes. In addition, four piston samples were taken from alluvial deposits; these being located in the approximate position of two of the test pits and two of the trial trenches.
- 2.1.3 The Sites and Monuments Record (SMR) Office of North Lincolnshire Museum (NLM) had stipulated that an archaeological watching brief was required during the geotechnical investigations. The watching brief was undertaken by Pre-Construct Archaeology Limited (PCA) and commissioned by CgMs Consulting on behalf of Tesco Stores Limited. The fieldwork was carried out between 18th July and 2nd August 2005.
- 2.1.4 A Project Design for the archaeological watching brief was compiled by PCA¹ and approved by NLM in advance of the investigations. The purpose of the watching brief was to record any archaeological remains encountered during the geotechnical investigations.
- 2.1.5 At the time of writing, the project archive is housed at the Northern Office of PCA, at Unit N19a, Turdale Business Park, Durham. The written, drawn and photographic records, along with the artefactual remains, will be ultimately deposited with the North Lincolnshire Museum, Oswald Road, Scunthorpe under the PCA site code BGW 05. The Online Access to the Index of Archaeological Investigations (OASIS) reference number is: preconst1-10714.

2.2 Site Location and Description

- 2.2.1 The site lies to the northwest of the historic town centre of Brigg. It is bounded by Riverside Surgery to the north, recreational ground and the Old River Ancholme to the west, a car park to the south and an access road to a Tesco supermarket to the east (Figure 2). The central National Grid Reference of the site is SE 9975 0735.
- 2.2.2 At the time of the fieldwork, the site was relatively level with a surface largely covered in rubble hardcore. A grassy bank ran along the southwestern edge of the site and the northernmost corner of the site was rough grassland. A fenced-off area in the southernmost portion of the site contained a low mound representing the remains of a former gas tank.

¹ PCA, 2005.

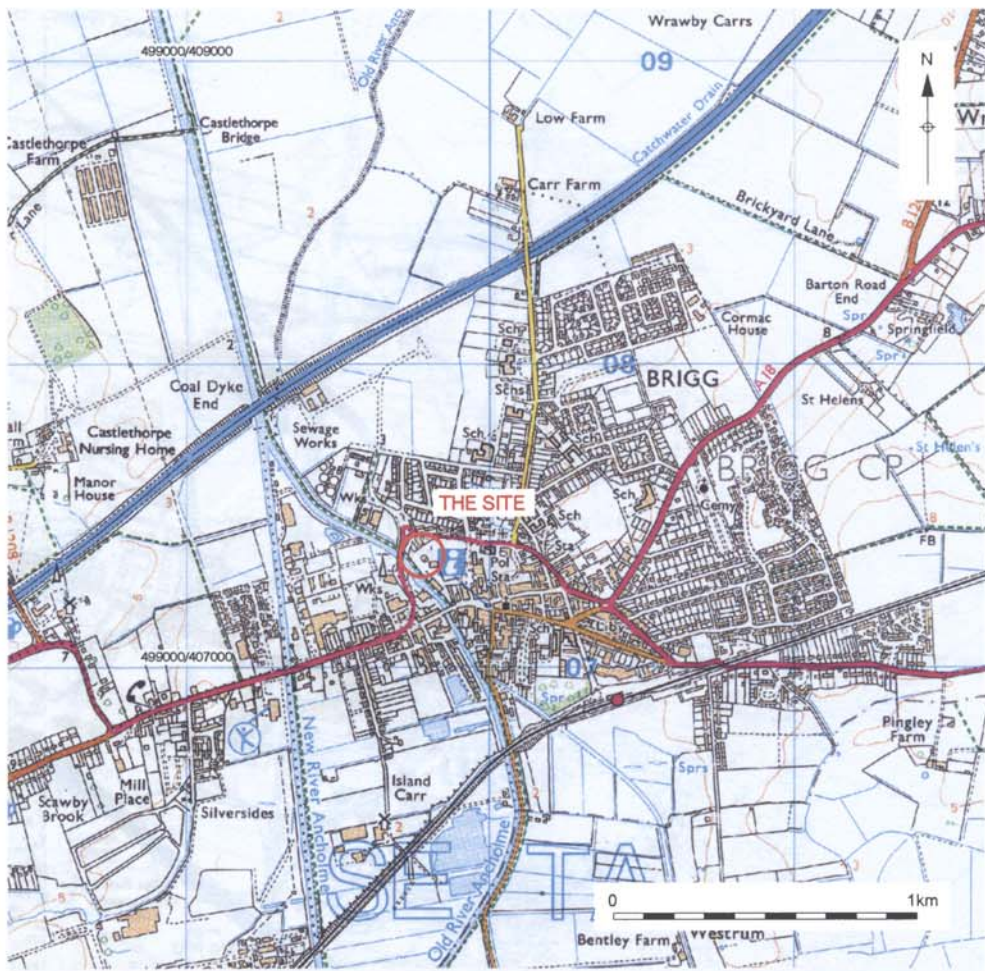


Figure 1. Site location
Scale 1:25,000

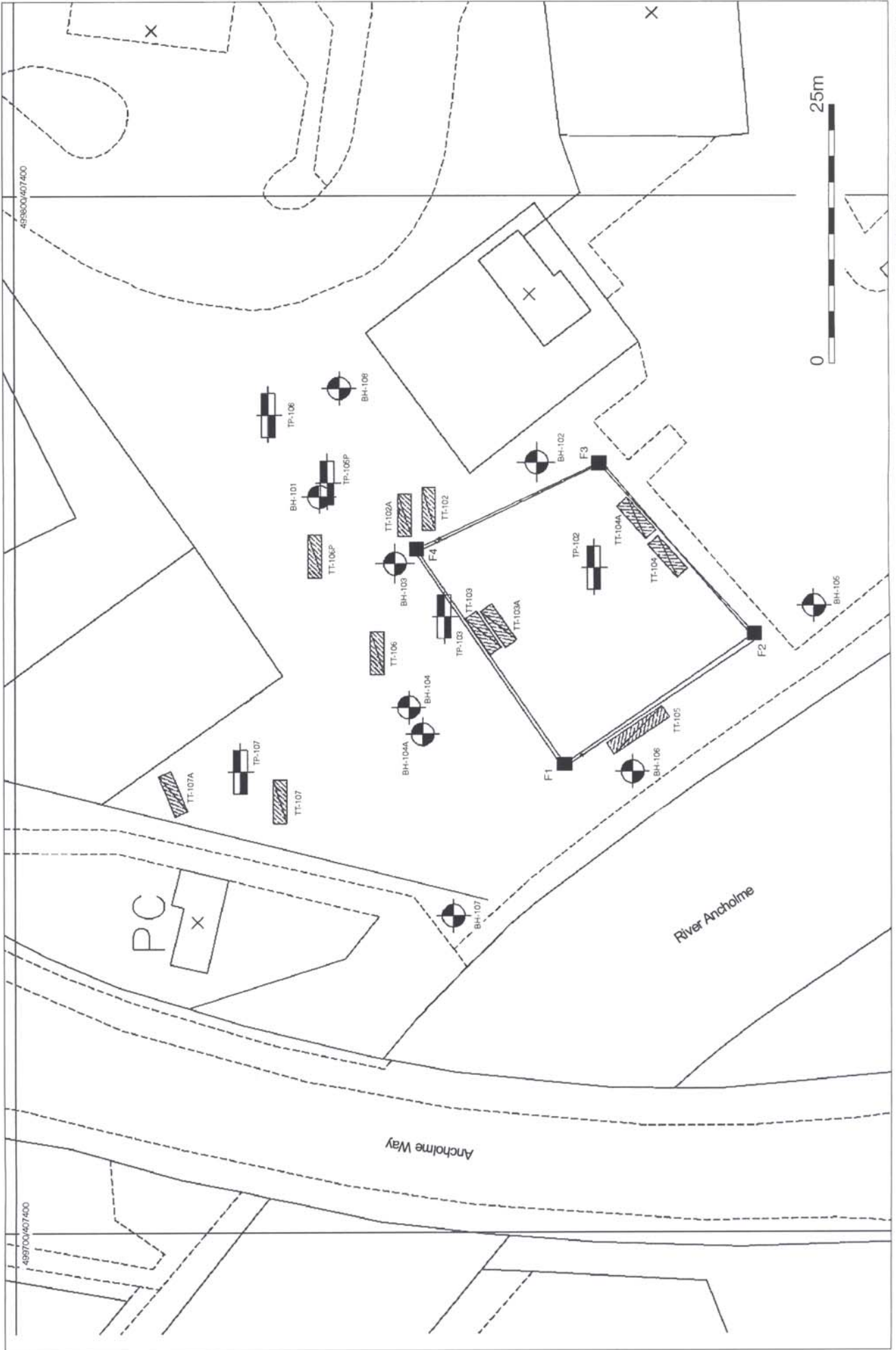


Figure 2. Areas of investigation
Scale 1:500

2.3 Geology and Topography

- 2.3.1 The solid geology of the area comprises the Ancholme Clay group, overlain by later Pleistocene glacial and Holocene post-glacial alluvial material, principally clay, sand and peat. The palaeoenvironmental sequence for the period of alluviation at Brigg has been thoroughly studied and has been documented, for example, in McGrail² and Dinnin.³
- 2.3.2 Brigg is situated on the eastern side of the River Ancholme, c. 14km south of its confluence with the River Humber. The town is located on a ridge of higher ground that extends west into the Ancholme valley towards the River Ancholme itself.
- 2.3.3 At the time of the investigations, the site was relatively level with the existing ground surface at c. 2.0m OD.

2.4 Planning Background

- 2.4.1 The archaeological watching brief on geotechnical site investigations was undertaken as part of a package of work, which also includes the preparation of an archaeological desk-based assessment, to meet the requirements of a conditional planning permission for the extension of an existing Tesco Store and the relocation of an existing Petrol Filling Station on the site.
- 2.4.2 In parallel with this watching brief, a desk-based assessment of the archaeological potential of the site has been prepared (CgMs forthcoming). These works are required because the site has a known high archaeological potential due to the discovery there of a prehistoric log boat, dated to the Late Bronze Age, in the late 19th century. In the mid-1990's, worked timbers and other artefactual material indicative of prehistoric activity were encountered during the excavation of a sewage pipeline across the site. An archaeological excavation in 1998 ahead of the insertion of a petrol tank on the site of the former stock market, immediately to the east of the site, encountered timber stakes, scatters of worked wood and debris dating to the Late Bronze Age, as well as yielding significant environmental data.
- 2.4.3 Initially, the SMR Office at NLM had requested an archaeological evaluation of the site. However, because of the potential Health and Safety risks associated with former gasworks sites, it was considered more appropriate to undertake archaeological monitoring of geotechnical investigations, which would be conducted under a strict Health and Safety regime, rather than - at this stage - an archaeological evaluation.

² McGrail (ed.), 1981.

³ Dinnin, 1995.

2.5 Archaeological and Historical Background

- 2.5.1 The site is of great archaeological and palaeoenvironmental interest due to the discovery there of a prehistoric log-boat in 1886. The recovered remains of the vessel were destroyed in Hull Museum during Second World War bombing, although enough survived to allow radiocarbon dating;⁴ fragments of the craft were dated to 1260-790 cal BC. In the mid-1990's, Lindsey Archaeological Services monitored the Brigg Resewerage Scheme, which involved a new pipeline through the former gasworks site. This encountered worked timbers and other artefactual evidence indicative of prehistoric activity.
- 2.5.2 In 1998, the Oxford Archaeology excavated a trench ahead of the insertion of a petrol tank for Tesco Stores Limited on the site of former stock market, immediately to the east of the gasworks site. This work encountered timber stakes, scatters of worked wood and debris dating from the Late Bronze Age (c. 1200-800 BC), as well as yielding significant palaeoenvironmental data.⁵
- 2.5.3 The area has produced further evidence of prehistoric exploitation of the riverine environment. Another Late Bronze Age log-boat found at Appleby, also on the Ancholme, five miles upstream of Brigg, has been dated to 1500-1040m cal BC. In addition, the Brigg 'raft', located 0.5km to the north-west of the current site, was first excavated and recorded in 1888 and was subsequently re-excavated by the National Maritime Museum in 1974 under the direction of Sean McGrail. The raft was of sewn plank construction and has been dated to the Bronze Age/Iron Age transition (c. 800-700BC).⁶ A substantial branch and plank trackway, found 120m south of the 'raft', was associated with two bronze spearheads, of Late Bronze Age type. This trackway extended across the encroaching estuarine clays of the River Ancholme.⁷

⁴ Alison Williams, pers. comm.

⁵ Mitchell and Bell, 2000.

⁶ McGrail, (ed.), *op. cit.*

⁷ Dudley, 1949.

3. AIMS AND OBJECTIVES

- 3.1 In broad terms, the archaeological monitoring aimed to establish the date, nature, extent and significance of archaeological remains, as evidenced by any buried deposits, structures and features and any artefactual and ecofactual evidence that they may contain.
- 3.2 Throughout the investigations, at each location, evidence was also sought for the following:
- the depth at which glacial deposits underlie the site;
 - the depth at which post-glacial alluvial deposits underlie the site;
 - the sequence of alluvial material at the site.
- 3.3 The monitoring work also sought to clarify the nature and extent of existing disturbance and intrusions (such as basements and other services) and hence assess the degree of archaeological survival.

4. ARCHAEOLOGICAL METHODOLOGY

4.1 Fieldwork

- 4.1.1 The archaeological investigations at the site of the former gasworks were undertaken in accordance with the relevant standard and guidance document of the Institute of Field Archaeologists (IFA).⁸ PCA is an IFA-Registered Organisation (RAO 23). The watching brief was undertaken between 18th July and 2nd August 2005.
- 4.1.2 The archaeological investigations involved monitoring the excavation of four test pits (TP 102, 103, 105 & 107), nine trial trenches (TT 102, 102a, 103, 103a, 104, 105, 106, 107 and 107a) and eight boreholes (BH 101-108). In addition, four boreholes were excavated to obtain piston samples from alluvial deposits. The four boreholes were located in the approximate positions of TPs 103 and 105, and TTs 102 and 106.
- 4.1.2 The test pits and trial trenches were excavated using a JCB 3CX excavator, employing a 0.75m wide toothed bucket. The dimensions of each are tabulated below.

Test Pit	Dimensions	Maximum depth
TP 102	3.50m NW-SE x 1.0m NE-SW	1.90m
TP 103	2.60m E-W x 1.20m N-S	1.40m
TP 105	0.80m N-S x 1.90m E-W	0.30m
TP 107*	3.10m N-S x 0.70m E-W	2.60m

* recorded as TP 104 on site

Table 4a: Dimensions of monitored test pits

Trial Trench	Dimensions	Maximum depth
TT 102	4.0m NE-SW x 0.80m NW-SE	1.0m
TT 102a	3.70m NW-SE x 0.80m NE-SW	0.80m
TT 103	2.50m NE-SW x 1.05m NW-SE	0.80m
TT 103a	1.60m NE-SW x 2.30m NW-SE	0.80m
TT 104	7.10m NE-SW x 3.50m NW-SE	1.10m
TT 105	3.50m NW-SE x 2.30m NE-SW	0.30m
TT 106	5.0m NW-SE x 4.10m NE-SW and 2.10m NE-SW	1.0m
TT 107	2.50m E-W x 0.80m N-S;	0.85m
TT 107a	4.0m N-S x 2.50m E-W	0.70m

Table 4b: Dimensions of monitored trial trenches

⁸ IFA, 1994.

- 4.1.3 The work was carried out under archaeological supervision. Machine excavation in test pits and trial trenches was undertaken in controlled spits of c.100mm, to the upper interface of post-glacial alluvial deposits. This interface was examined and recorded.
- 4.1.4 The test pits and trial trenches were backfilled immediately on completion of the geotechnical and archaeological investigations.
- 4.1.5 Excavation of the boreholes was undertaken using a Pilcon Wayfarer 150 Shell and Auger Rig. The work was carried out under archaeological supervision. Eight of the boreholes reached a depth of between 10.0m and 17.0m below existing ground level. Boreholes excavated to obtain piston samples measured between 4.10m and 5.50m deep. Where possible, core and piston samples were examined by the archaeologist. Borehole 104 was relocated (as Borehole 104A) when it encountered an obstruction at a depth of 2.40m.
- 4.1.6 All excavation and recording was undertaken in accordance with recognised archaeological practice and following the methodology set out in PCA's '*Field Recording Manual*'.⁹
- 4.1.7 Archaeological and natural deposits were recorded on *pro forma* sheets. Plans were drawn at a scale of 1:20. A brief photographic record of the work was compiled using SLR cameras.

4.2 Post-excavation

- 4.2.1 The project's stratigraphic data is represented by the written, drawn and photographic records. Post-excavation work involved checking and collating site records, grouping contexts and phasing the stratigraphic data. A written summary of the findings was then compiled, as described below in Section 5.
- 4.2.2 The artefactual material from the site comprised two fragments of rope. This material has been packaged according to relevant guidelines.
- 4.2.3 The organic material recovered from the site comprised a small assemblage of wood fragments. Three bulk sediment samples were taken from deposits and retained for future analysis if considered necessary.
- 4.2.4 Survival of all materials from archaeological fieldwork depends upon suitable storage. The complete project archive, comprising written, drawn, and photographic records (including all material generated electronically during post-excavation), and all finds will be packaged for long term curation. The depositional requirements of the receiving body, in this case North Lincolnshire Museum, Oswald Road, Scunthorpe will be met in full.

⁹ PCA, 1999.

5. RESULTS

5.1 Test Pit 102

- 5.1.1 Test Pit 102 was sited to investigate the central area of a tank associated with the former gasworks. The test pit measured 3.50m NW-SE x 1.0m NE-SW and was excavated to a depth of up to 1.90m.
- 5.1.2 The earliest deposit recorded was a layer, up to 0.10m thick, comprising loosely compacted mid yellowish brown sand mixed with liquid tar.
- 5.1.3 It was overlain by up to 0.80m of 'made ground' largely comprising silty clay (40%) and concrete blocks and brick frags (60%).
- 5.1.4 The uppermost 1.0m of Test Pit 103 comprised a very mixed deposit of 'made ground' containing modern refuse. Present ground level occurred at a highest level of 2.77m OD.

5.2 Test Pit 103

- 5.2.1 Test Pit 103 was located in the central portion of the site and measured 2.60m east-west x 1.20m north-south and was up to 1.40m deep.
- 5.2.2 The earliest deposit recorded comprised soft mid grey silty clay encountered at a depth of 1.40m below present ground level. The composition of this material indicates that it may be re-deposited alluvial material, the depth at which it was encountered suggests that this material was probably not *in situ*. It was overlain by a layer of soft mid grey silty clay containing frequent brick fragments, heavily contaminated with hydrocarbons. This deposit was up to 0.70m thick and probably represents re-deposited alluvial material mixed with modern inclusions and contaminants.
- 5.2.3 A layer of 'made ground', 0.40m thick, overlay the aforementioned deposit and largely comprised greyish brown silty clay containing frequent brick fragments.
- 5.2.4 The uppermost deposit recorded comprised a layer of rubble hardcore, up to 0.30 thick. Present ground level was at 2.55m OD.

5.3 Piston Sample, Test Pit 103

- 5.3.1 A piston sample was taken between 3.10m and 4.10m below the existing ground level in the approximate location of Test Pit 103. The earliest deposit encountered comprised soft mid grey silty clay, recorded from a depth of 3.35m below existing ground level. This deposit is interpreted as being alluvial in origin and was at least 0.75m thick, continuing below the depth of the sample. This material was overlain by a deposit comprising very soft mid grey silty clay with occasional rootlets, recorded from a depth of 1.30m below the existing ground level, and up to 2.05m thick.

- 5.3.2 The upper portion of the piston sample was similar to that recorded in TP 103; a 0.70m thick layer of probable re-deposited alluvium was overlain by 'made ground' and rubble hardcore, with a combined thickness of 0.70m.

5.4 Test Pit 105

- 5.4.1 Test Pit 105 was located in the eastern portion of the site and measured 0.80m north-south x 1.90m east-west. The test-pit was abandoned at a depth of 0.40m due to the presence of a water pipe and electricity cable.
- 5.4.2 The services were overlain by a deposit of hardcore, comprising silty sand (60%) mixed with sub-angular gravel, up to 0.40m thick. Present ground level was at 2.49m OD.

5.5 Piston Sample, Test Pit 105

- 5.5.1 A piston sample was taken in the approximate location of Test Pit 105 between 4.50m and 5.50m below the existing ground level.
- 5.5.2 The earliest deposit recorded comprised a layer of alluvium encountered at a depth of 2.50m below the existing ground level. It comprised soft mid brownish grey silty clay with occasional dark grey organic patches and was recorded for a maximum thickness of 3.0m.
- 5.5.3 It was overlain by a deposit comprising very soft dark grey silty clay recorded from a depth of 1.80m below the existing ground level and 0.70m thick.
- 5.5.4 The alluvium was overlain by a layer of 'made ground', up to 1.40m thick, comprising soft dark grey silty clay with frequent gravel and silty clay lumps.
- 5.5.5 A layer of hardcore, up to 0.40m thick, was the uppermost deposit recorded.

5.6 Test Pit 107

- 5.6.1 Test Pit 107 (recorded as TP 104 on site) was located in the northern portion of the site and measured 3.10m north-south x 0.70m east-west and was up to 2.60m deep. It was located to investigate the central area of a tank associated with the former gasworks.
- 5.6.2 A concrete surface was recorded at a depth of 2.60m below the existing ground level and is interpreted as the base of the tank associated with the former gasworks.
- 5.6.3 The surface was overlain by a substantial deposit of 'made ground', up to 1.80m thick, comprising a very mixed deposit containing brick, slag, concrete and sub-angular limestone fragments. This deposit is likely to have been dumped in order to backfill the tank and stabilise the ground.
- 5.6.4 The uppermost 'made ground' deposits comprised light-mid brownish yellow sand, up to 0.25m thick, overlain by light grey, sub-angular limestone, concrete fragments and gravel, 0.35m thick.

- 5.6.5 A layer of topsoil, 0.20m thick, formed the existing ground level in Test Pit 107 and was at 2.85m OD.

5.7 Trial Trenches 102 and 102a

- 5.7.1 Trial Trench 102 measured 4.0m NE-SW x 0.80m NW-SE x 1.0m deep and was located to investigate the western edge of the easternmost tank associated with the former gasworks.
- 5.7.2 The earliest deposit recorded comprised a layer of broken asbestos tiles, encountered at a depth of 1.0m below the existing ground level. Excavations did not continue below this point and a new trench, Trial Trench 102a, was excavated immediately to the north.
- 5.7.3 In Trial Trench 102, the asbestos tiles were overlain by a deposit of 'made ground' comprising brick, concrete, timber and sandstone fragments (80%) with dark grey silty sand (20%), up to 0.80m thick. The uppermost deposit recorded comprised a layer of hardcore consisting of compact mid greyish brown sandy gravel and occasional brick fragments, up to 0.20m thick. Present ground level was at 2.51m OD.
- 5.7.4 Trial Trench 102a measured 3.70m NW-SE x 0.80m NE-SW and was up to 0.80m deep.
- 5.7.5 The earliest deposit recorded in Trial Trench 102a comprised a layer of 'made ground', up to 0.50m thick. This was overlain by up to 0.30m of rubble hardcore recorded at a highest level of 2.52m OD.

5.8 Piston Sample, Trial Trench 102

- 5.8.1 A piston sample was taken in the approximate location of Trial Trench 102, between 4.50m and 5.50m below the existing ground level.
- 5.8.2 The earliest deposit recorded was observed at a depth of 4.75m below existing ground level and comprised soft mid greyish brown silty clay with occasional plant remains, with a maximum thickness of 0.75m. This deposit is interpreted as being alluvial in origin.
- 5.8.3 The alluvium was overlain by a 50mm thick deposit of soft black silty clay, containing frequent gravel and contaminated with hydrocarbons. This was overlain by a similar but far more substantial soft black silty clay, also contaminated with hydrocarbons. This was encountered from a depth of 3.0m below the existing ground level and measured up to 1.70m thick. Both deposits are considered to be of modern origin.
- 5.8.4 A layer of 'made ground', comprising brick, concrete and plastic (40%) with grey clayey sand (60%) was recorded from a depth of 0.30m below the existing ground level and was up to 2.70m thick. A 0.30m thick layer of hardcore formed the uppermost deposit.

5.9 Trial Trenches 103 and 103a

- 5.9.1 Trial Trench 103 was located to investigate the northern limit of the southernmost tank associated with the former gasworks. The trench measured 2.50m NE-SW x 1.05m NW-SE and was up to 0.80m deep.

- 5.9.2 The earliest deposit encountered comprised soft mid bluish grey silty clay contaminated with hydrocarbons. This layer was recorded at a depth of 0.80m below the existing ground level and its composition indicates that it was alluvial in origin, although the depth at which it was observed suggests that this material is not *in situ* and it is likely to be re-deposited material.
- 5.9.3 This deposit was overlain by a layer 'made ground' up 0.40m thick comprising light yellowish brown sand. A service trench truncated this deposit along the western edge of the trench.
- 5.9.4 The uppermost deposit in Trial Trench 103 comprised a layer of sub-angular gravel (70%) with greyish brown clayey silt (30%), up to 0.40m thick. Present ground level was at 2.57m OD.
- 5.9.5 Trial Trench 103a was located to the immediate south-west of Trial Trench 103 and measured 1.60m NE-SW x 2.30m NW-SE x up to 0.80m deep.
- 5.9.6 The earliest deposit recorded was similar to the basal deposit encountered in Trial Trench 103, a layer of probably re-deposited alluvium contaminated with hydrocarbons observed at a depth of 0.80m below the existing ground surface.
- 5.9.7 An area of masonry, measuring 0.45m NE-SW x 0.12m NW-SE x up to 0.20m high, truncated the alluvium along the western edge of the trench. The masonry comprised two courses of unfrogged red bricks (220mm x 120mm x 80mm) bonded with hard light grey mortar. It is interpreted as being associated with the gasworks tank, possibly part of a buttress.
- 5.9.8 The masonry was overlain by a 0.40m thick layer of light yellowish brown sand. The uppermost deposit comprised a layer of sub-angular gravel (70%) with greyish brown clayey silt (30%), up to 0.40m thick. Present ground level was at 2.49m OD.

5.10 Trial Trench 104

- 5.10.1 Trial Trench 104 was located in the southern portion of the site and positioned to investigate the southern edge of a tank associated with the former gasworks. The trench was L-shaped in plan and measured a maximum of 7.10m NE-SW x 3.50m NW-SE x 2.0m deep.
- 5.10.2 The earliest deposit encountered comprised a layer of 'made ground', comprising grey silty clay contaminated with hydrocarbons. This was observed from a depth of 0.80m below the existing ground level and was exposed for a maximum thickness of 1.20m.
- 5.10.3 A brick wall was located along the side of the trench, and a concrete slab, 0.15m thick, was recorded overlying the 'made ground', along the northwestern edge of the trial trench. This is likely to represent a capping of the gasworks tank, however there was no evidence for the outer surface of the tank wall, suggesting that the concrete slab overhung the tank.
- 5.10.4 The uppermost deposits comprised a layer of 'made ground', yellowish brown sand with brick rubble, up to 0.45m thick, overlain by a layer of topsoil, 0.30m thick. Present ground level was at 2.81m OD.

5.11 Trial Trench 105

- 5.11.1 Trial Trench 105 was located in the western portion of the site and measured 3.50m NW-SE x 2.30m NE-SW x up to 0.70m deep.

- 5.11.2 A concrete slab was recorded extending across the trench, at a depth of 0.70m below existing ground level. The slab was overlain by a layer of 'made ground' comprising greyish brown silty clay with brick inclusions up to 0.70m thick. Present ground level was at 3.26m OD.

5.12 Trial Trench 106

- 5.12.1 Trial Trench 106 was located in the central northern portion of the site and was 'F'-shaped in plan and measured 5.0m NW-SE x 4.10m NE-SW x 2.10m NE-SW. It was excavated to a maximum depth of 1.0m.
- 5.12.2 The earliest deposit recorded at the northwestern end of the trench at a depth of 0.80m below existing ground level, comprised firm mid grey silty clay. This deposit was probably redeposited alluvial material.
- 5.12.3 A layer of 'made ground', up to 0.40m thick, was recorded overlying the redeposited alluvium. This comprised firm mid grey and dark grey silty clay, which contained frequent brick and slag fragments. It was overlain by a layer of grey sub-angular gravel, up to 0.80m thick. A layer of rubble hardcore 0.20m thick was the uppermost deposit recorded. Present ground level was at 2.66m OD.

5.13 Piston Sample, Trial Trench 106

- 5.13.1 A piston sample was taken between 4.0m and 5.0m in the approximate location of TT 106. The earliest deposit recorded comprised greyish brown clayey sandy silt, at least 50mm thick, interpreted as being of alluvial origin, observed at a depth of 4.90m below existing ground level. This was overlain by a 0.90m thick alluvial deposit comprising brownish grey silty clay observed at a depth of 4.0m below existing ground level.
- 5.13.2 The alluvium was overlain by a 1.30m thick layer of 'made ground', comprising small and medium sized sub-angular gravel (60%) with greenish grey clayey sand (40%). This was overlain by a 1.10m thick deposit of 'made ground', comprising small sub-angular gravel (30%) and greyish brown silty clay (70%). The uppermost deposit recorded comprised sub-angular stones (70%) with grey silty sand (30%), up to 1.60m thick.

5.14 Trial Trenches 107 and 107a

- 5.14.1 Trial Trench 107 was located in the northern portion of the site and measured 2.50m east-west x 0.80m north-south x 0.85m deep. The earliest deposit recorded comprised a layer of 'made ground', observed at a depth of 0.60m below existing ground level. It comprised brick rubble (80%) with greyish brown silty clay (20%). It was overlain by a 0.20m thick layer of 'made ground', comprising yellow angular gravel. The uppermost deposit recorded consisted of a layer of topsoil, up to 0.40m thick. Present ground level was at 2.70m OD.

- 5.14.2 Trial Trench 107a was located to the north of Trial Trench 107. It was L-shaped in plan measuring up to 4.0m north-south x 2.50m east-west x 0.70m deep. The earliest deposit recorded was located in the northern portion of the trench, 0.70m below existing ground level. This comprised greyish brown silty clay with occasional rootlets, which may represent 'made ground' or re-deposited alluvial material.
- 5.14.3 A curving brick wall, generally aligned NE-SW, truncated the aforementioned deposit and was observed at a depth of c. 0.40m below existing ground level. The wall was constructed from red unfrosted bricks (220mm x 120mm x 80mm) bonded with a hard light grey mortar. The wall measured 1.70m NE-SW, being truncated on its western side, x 0.46m NW-SE and was exposed for a height of 0.48m, five courses being exposed. The wall is interpreted as the edge of a tank associated with the former gasworks.
- 5.14.4 The wall was overlain by a 0.70m thick layer of 'made ground', comprising grey sub-angular gravel and concrete fragments. A layer of topsoil formed the uppermost deposit recorded in Trial Trench 107a. Present ground level was at 2.86m OD.

5.15 Borehole 101

- 5.15.1 Borehole 101 was located in the eastern portion of the site and reached a maximum depth of 15.0m. The earliest deposit recorded comprised degraded mudstone - hard greenish grey clay - observed at a depth of 15.0m below the existing ground level. This deposit represents the Ancholme Clay group solid geology of the area. This material was overlain by a 8.10m thick deposit of stiff, greenish grey, slightly laminated, clay, observed from a depth of 6.90m below existing ground level, and likely to represent later Pleistocene glacial deposits.
- 5.15.2 Glacial clay was overlain by a layer of very soft dark grey silty clay, up to 4.10m thick and observed from a depth of 2.80m below the existing ground level. This deposit is broadly interpreted as Holocene post-glacial alluvial material. A very soft, dark grey, silty clay containing occasional inclusions of brick fragments, up to 0.40m thick overlay the alluvium. This deposit may represent a further alluvial layer, with the brick introduced intrusively by compression into the soft alluvium by later activities, or may represent a redeposited alluvium.
- 5.15.3 The aforementioned deposit was overlain by a layer of 'made ground' comprising greyish brown silty clay with frequent ash and brick inclusions, up to 1.90m thick. A layer of grey silty sand (50%) and brick rubble (50%), up to 0.30m thick, representing further 'made ground' overlaid this. The uppermost deposit comprised a layer of rubble hardcore up to 0.20m thick. Present ground level was at 2.52m OD.

5.16 Borehole 102

- 5.16.1 Borehole 102 was located in the southeastern portion of the site and reached a maximum depth of 15.50m below the existing ground level. The earliest deposit recorded was degraded mudstone comprising hard mid greenish grey clay, observed at a depth of 15.50m below existing ground level. This was overlain by a 7.0m thick layer of stiff mid greenish grey clay, recorded from a depth of 7.50m below existing ground level. These deposits are interpreted as glacial material.

- 5.16.2 Three layers of alluvium overlay the glacial deposits. The earliest of these comprised soft mid to dark grey silty clay, up to 1.60m thick, overlain by soft mid grey silty clay, up to 2.50m thick. The uppermost alluvial deposit comprised soft mid grey silty clay, which contained some inclusions of decayed plant matter. This was recorded from a depth of 2.30m below existing ground level and was up to 0.70m thick.
- 5.16.3 A layer of very soft dark grey sandy clay, mottled with black patches representing hydrocarbon contaminants, overlay the uppermost alluvial layer. This deposit was up to 0.30m thick and is likely to represent a contaminated alluvial layer or a layer of re-deposited alluvium.
- 5.16.4 The alluvial deposits were overlain by two deposits of 'made ground'. The earliest of these comprised brown sand mixed with grey clay, up to 1.0m thick, overlain by a 0.80m thick deposits comprising mixed yellow and brown sand containing frequent inclusions of small and medium sized sub-rounded and sub-angular stones. The uppermost deposit recorded comprised a layer of topsoil up to 0.20m thick. Present ground level was at 2.54m OD.

5.17 Borehole 103

- 5.17.1 Borehole 103 was located in the central portion of the site and reached a maximum depth of 10.0m. The earliest deposit recorded comprised stiff mid greenish grey clay, exposed for a maximum thickness of 2.90m. This deposit was observed at a depth of 7.10m below existing ground level and probably represents a later Pleistocene glacial deposit.
- 5.17.2 The aforementioned deposit was overlain by an alluvial deposit recorded from a depth of 4.60m below existing ground level. This comprised very soft dark grey clay. Material identified as rope was recovered from this deposit at a depth of c. 6.50m below existing ground level. It was not possible to determine the age of this rope, but it did not appear to be modern, and the depth at which it was recovered suggests it may have been of ancient origin.
- 5.17.3 The alluvium was overlaid by a 4.30m thick layer of 'made ground', comprising brick rubble and small and medium sized sub-angular stones (60%) with brownish grey silty clay (40%). The uppermost deposit in this borehole comprised a 0.30m thick layer of rubble hardcore. Present ground level was at 2.58m OD.

5.18 Boreholes 104 and 104a

- 5.18.1 Borehole 104 was located in the western central portion of the site and reached a maximum depth of 2.40m, with further investigation being impossible due to an obstruction. The earliest deposit encountered was a layer of 'made ground', recorded from a depth of 0.30m below existing ground level. This comprised small sub-angular stones and grit (70%) with grey clayey sand (30%), and it was exposed for a maximum thickness of 2.10m thick. A layer of 0.30m thick hardcore formed the uppermost deposit.
- 5.18.2 Borehole 104a was located to the south-west of Borehole 104 and reached a maximum depth of 10.50m. The earliest deposit recorded comprised stiff mid greenish grey clay, observed from a depth of 8.0m below existing ground level. This deposit is interpreted as being of glacial origin.

- 5.18.3 Natural glacial clay was overlain by a 4.60m thick layer of alluvium, comprising soft mid grey clay, recorded from a depth of 3.50m below existing ground level. This was overlain by a 1.30m thick deposit of alluvium comprising soft greyish brown clay, encountered from a depth of 2.20m below existing ground level. Frequent plant remains were noted within this deposit between 2.20m and 2.50m below ground level.
- 5.18.4 The alluvium was overlain by two layers of 'made ground', the earliest of which comprised brick fragments and sub-angular gravel (70%) with brownish grey clayey sand (30%), 1.50m thick. The upper deposit comprised small sub-angular gravel and chalk fragments (70%) with brownish grey clayey sand (30%), 0.70m thick. Present ground level was at 2.81m OD.

5.19 Borehole 105

- 5.19.1 Borehole 105 was located in the southernmost portion of the site and reached a maximum depth of 17.0m. The earliest exposed deposit comprised degraded mudstone - hard greenish grey clay, - observed at a depth of 17.0m below existing ground level. This was overlain by stiff greenish grey clay, 8.40m thick, interpreted as a glacial deposit.
- 5.19.2 Glacial clay was overlain by a 5.10m thick alluvial deposit comprising very soft dark grey clay, which contained occasional plant remains, encountered from a depth of 2.70m below present ground level.
- 5.19.3 The alluvium was overlain by a 1.0m thick 'made ground' layer, comprising grey silty sand with frequent ash and brick fragments. This was overlain by a 0.50m thick layer of 'made ground' comprising a mixed deposit of brown sand and gravel with fragments of slag, brick, ash and concrete. The 'made ground' was overlain by a 50mm thick sandstone slab, which may represent a surface or the base plate for a wall foundation. A brick wall built with unfrosted red bricks (220mm long x 100mm thick) was bonded to and overlaid the sandstone slab. A total of four courses of brick were visible, measuring 0.43m high. This structure is interpreted as being associated with the former gasworks. The uppermost deposits comprised a concrete surface and make-up layer, overlain by tarmac. The maximum combined thickness of 'made ground' recorded was 3.50m and present ground level in this area was at 3.10m OD.

5.20 Borehole 106

- 5.20.1 Borehole 106 was located at the western limit of the site and reached a maximum depth of 10.0m. The earliest deposit encountered comprised a layer of stiff mid greenish grey clay, recorded from a depth of 8.30m below existing ground level. This layer is interpreted as a glacially derived deposit.
- 5.20.2 A layer of alluvium, recorded from a depth of 3.0m below existing ground level, overlay the natural glacial clay. This comprised soft mid to dark grey silty clay, up to 5.30m thick. A layer of soft dark grey silty clay, with occasional brick fragments, overlay the alluvium. This deposit may represent an alluvial deposit, with the brick being introduced intrusively, by compression, or it may represent re-deposited material.

- 5.20.3 Two layers of 'made ground' formed the uppermost deposits recorded in Borehole 106, these comprised greyish brown silty clay with frequent brick rubble, 1.70m thick, overlain by brick rubble (40%) with brown silty sand (60%), up to 1.0m thick. Present ground level was at 2.72m OD.

5.21 Borehole 107

- 5.21.1 Borehole 107 was located in the westernmost part of the site, again close to the Old River Ancholme, and reached a maximum depth of 10.0m. The earliest deposit recorded comprised stiff mid greenish grey clay, interpreted as a glacially derived deposit, encountered from a depth of 8.0m below existing ground level
- 5.21.2 The natural clay was overlain by alluvial material, the earliest of which comprised soft mid brownish grey silty clay, 0.40m thick. A small quantity of wood fragments was recovered towards the base of the deposit at a depth of 7.90m-8.0m below existing ground level. The wood appeared to be fragments of round wood, although there was no evidence to indicate that it had been worked in any way. The depth at which the wood was recovered indicates that the material could be of ancient origin. This alluvial deposit was overlain by a 100mm thick layer of firm mid greyish brown clayey silt, in turn overlain by soft brownish grey silty clay up to 4.80m thick and encountered from a depth of 2.70m below existing ground level.
- 5.21.3 Two layers of 'made ground' formed the uppermost deposits recorded in Borehole 107. The earliest of these comprised brick rubble (60%) with greyish brown silty clay (40%), 1.80m thick. The uppermost layer of 'made ground' comprised sub-angular gravel (70%) with brownish grey clayey sand (30%). Present ground level was at 2.55m OD.

5.22 Borehole 108

- 5.22.1 Borehole 108 was located in the easternmost portion of the site and reached a maximum depth of 10.0m. The earliest deposit comprised stiff greenish grey clay, observed from a depth of 7.40m below existing ground level. This deposit is interpreted as a glacially derived deposit.
- 5.22.2 Three alluvial deposits overlaid natural glacial clay. The earliest of these comprised a 0.50m thick layer of firm mid brownish grey clay, which was overlain by soft mid brown silty clay, 1.30m thick. The uppermost alluvial deposit was observed from a depth of 3.0m below existing ground level and comprised soft mid brownish grey clayey silt, 2.60m thick.
- 5.22.3 The alluvium was overlain by a 1.30m thick deposit comprising friable mid greyish brown clayey silt, with frequent inclusions of charcoal fragments. This deposit was observed from a depth of 1.70m below existing ground level. The composition of this deposit suggests that it may be of some archaeological significance. No dating evidence was retrieved from the deposit and the limited scope of works makes a firm interpretation impossible.
- 5.22.4 The uppermost deposit comprised a layer of 'made ground' consisting of grey sub-angular gravel (70%) with silty sand (30%) containing frequent inclusions of brick fragments. Present ground level was at 2.57m OD.

6. CONCLUSIONS

- 6.1 The test pits and trial trenches were sited to examine various structures associated with the former gasworks. Deposits of 'made ground' were observed along with, in some cases, portions of brick and concrete structures. No archaeological features of note were observed in these areas and no artefactual material was recovered.
- 6.2 The boreholes provided important information about geological, glacial and post-glacial strata at the site and have been used to compile profiles through deposits at the site (Figure 3). A summary of the findings is set out in Table 6a, below:

	Mudstone depth bgl	Glacial clay depth bgl	Glacial clay thickness	Alluvium depth bgl	Alluvium thickness	Made ground thickness
BH101	15.0m -12.48m OD	6.90m -4.38m OD	8.10m	2.80m -0.28m OD	4.10m	2.40 or 2.80m +2.52m OD
BH102	15.50m -12.46m OD	7.50m -4.96m OD	7.0m	2.0m +0.54m OD	5.50m	2.0m +2.54m OD
BH103	Not exposed	7.10m -4.52m OD	2.90m (max exposed)	4.60m -2.02m OD	2.50m	4.60m +2.58m OD
BH104a	Not exposed	8.0m -5.19m OD	2.50m (max exposed)	2.20m +0.61m OD	5.90m	2.20m +2.81m OD
BH105	17.0m -13.90m OD	8.60m -5.50m OD	8.40m	2.70m +0.40m OD	5.10m	3.50m +3.10m OD
BH106	Not exposed	8.30m -5.58m OD	1.70m (max exposed)	3.0m -0.28m OD	5.30m	3.0m +2.72m OD
BH107	Not exposed	8.0m -5.45m OD	2.0m (max exposed)	2.70m -0.15m OD	5.30m	2.70m +2.55m OD
BH108	Not exposed	7.40m -4.83m OD	2.60m (max exposed)	3.0m -0.43m OD	4.70m	3.0m +2.57m OD

Table 6a: Profile of deposits at the site from borehole data

- 6.3 Degraded mudstone, representing the Ancholme Clay group solid geology of the area, was encountered in three of the boreholes. This deposit was observed at a depth of 17.0m below ground level (-13.90m OD) in BH 105, adjacent to the present course of the River Ancholme and the most southerly area investigated, sloping up to a highest level of 15.0m below ground level (-12.48m OD) in BH 101 in the north-east.
- 6.4 Mudstone was overlain by clay deposits, representing later Pleistocene glacial deposits, which varied in thickness from 8.40m in BH 105 to 7.0m in BH 102. The level at which these deposits were encountered sloped up from a height of -5.58m OD in BH 106, adjacent to the present course of the River Ancholme, to -4.38m OD in BH 101, in the eastern part of the site.

- 6.5 Alluvial deposits, generally comprising silty and sandy clays, which have been interpreted in other investigations in the vicinity as Holocene post-glacial alluvial material, were encountered in all of the boreholes, overlying the glacial deposits, where these were exposed. Alluvium was encountered at a depth of 2.70m to 3.0m below present ground level in BHs 105, 106 and 107, these sited along the eastern edge of the Old River Ancholme (-5.50m OD, -5.58m OD and -5.45m OD, respectively). The maximum thickness of the alluvial material in these boreholes was between 5.10m to 5.30m. Alluvial deposits in BHs 102 and 104, to the north-east of the river, were encountered at a slightly higher level below ground level, 2.0m and 2.20m (-4.96m OD and -5.19m OD), respectively, and also exhibited an increase in thickness, 5.50m to 5.90m. Alluvium was encountered at a depth of 4.60m below present ground level (-4.52m OD) in BH 103 and was only 2.50m thick, suggesting that alluvial material may have been truncated in that area.
- 6.6 In the northeastern portion of the site, the thickness of alluvial deposits decreased slightly to 4.70m in BH 108 and 4.10m in BH 101, where they were encountered at depths of 3.0m and 2.80m below ground level (-4.83m OD and -4.38m OD), respectively.
- 6.7 A fragment of material identified as rope was recovered from an alluvial deposit in BH 103, in the central eastern part of the site, at a depth of c. 6.50m below present ground level (-3.92m OD). It was not possible to ascertain the age of this material, but the depth of recovery perhaps suggests that it is of ancient origin. A small quantity of wood fragments was recovered from alluvium in BH 107, at a depth of c. 8.0m below existing ground level (-5.45m OD). This wood appeared to comprise fragments of roundwood, but there was no evidence to indicate that it had been worked in any way. The depth at which the wood was recovered also suggests that it is likely to be of ancient origin.
- 6.8 The upper part of the alluvial sequence in BH 102, at a depth of 2.30m to 3.0m below existing ground level, contained some decayed organic material. Frequent plant remains were observed within the upper part of the alluvial sequence in BH 104a, at a depth of 2.20m to 2.50m below existing ground level. Occasional plant remains were observed throughout the alluvial sequence in BH 105.
- 6.9 The alluvial sequence within BH 108, towards the northeastern corner of the site, was overlain by a thick clayey silt deposit, with frequent fragments of charcoal, encountered at a highest level of +0.86m OD. No dating evidence was recovered from this deposit and the limited scope of the investigations makes any firm interpretation impossible. However, the composition of this material and the absence of any modern material perhaps suggest that this deposit may be of some archaeological significance.
- 6.10 In summary, therefore, the archaeological investigations recorded evidence to suggest that alluvial material underling the site may contain significant archaeological remains. A further important finding is that that the investigations identified the presence of contaminated alluvial deposits across the site, with the source of the hydrocarbons observed likely to have been the former gasworks.

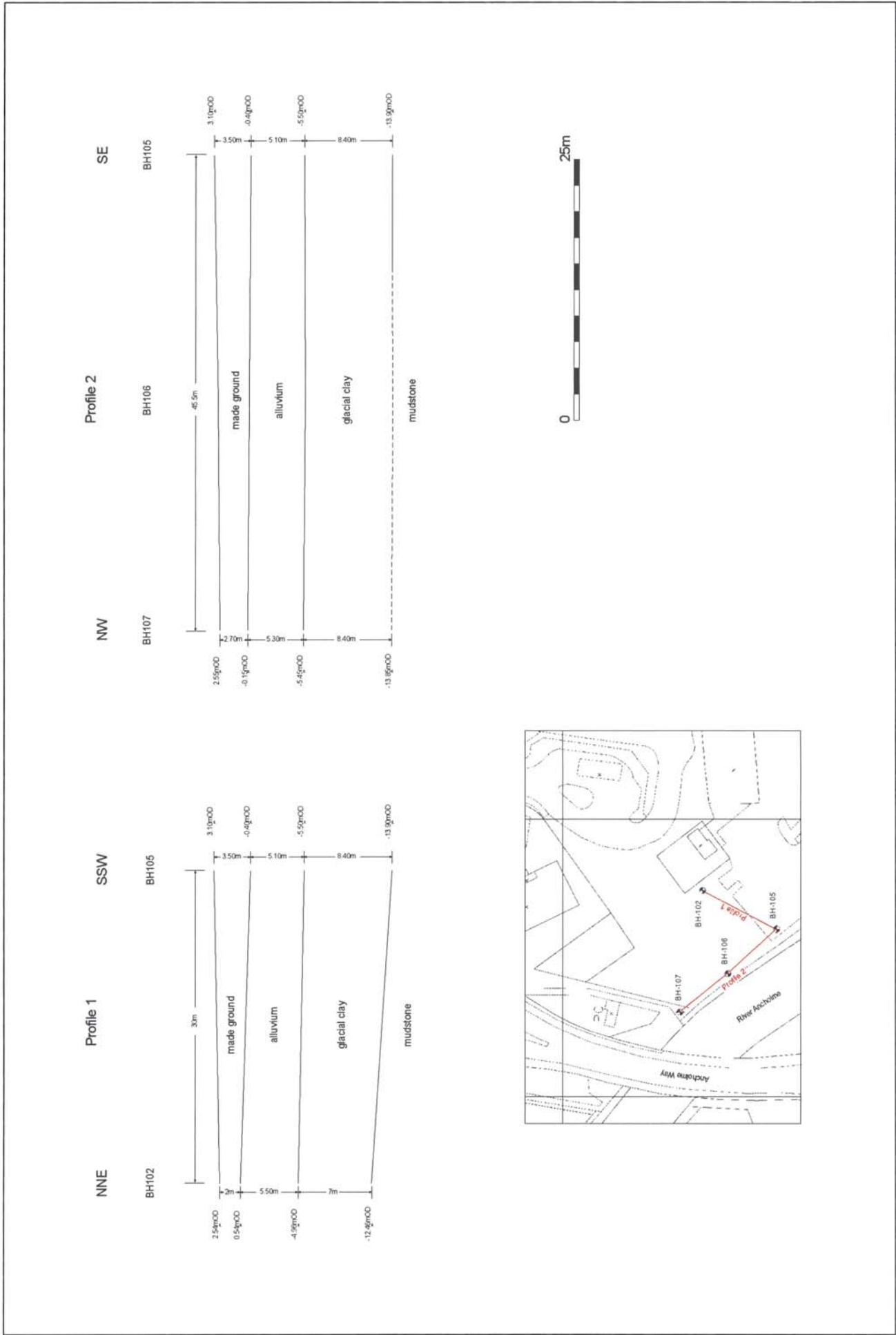


Figure 3. Profiles through deposits
Scale 1:500

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