

wardell-armstrong.com

ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING, QUARRYING AND MINERAL ESTATES
WASTE RESOURCE MANAGEMENT



PERSIMMON HOMES WEST MIDLANDS

**FORMER DYSON THERMAL TECHNOLOGIES,
HARTSHILL, STOKE-ON-TRENT**

ARCHAEOLOGICAL EVALUATION REPORT

March 2017

your earth our world



Wardell Armstrong

2 The Avenue, Leigh, Greater Manchester WN7 1ES, United Kingdom
Telephone: +44 (0)1228 564820 Fax: +44(0)1228 560025 www.wa-archaeology.com



DATE ISSUED: March 2017
JOB NUMBER: ST15977
ACCESSION NUMBER: 2017.LH.12
OASIS REFERENCE: wardella2-279153
PLANNING APPLICATION REF: SOT/54871
REPORT VERSION NUMBER: 001

PERSIMMON HOMES WEST MIDLANDS

Former Dyson Thermal Technologies, Hartshill, Stoke-on-Trent

Archaeological Evaluation Report

PREPARED BY:	EDITED BY:	APPROVED BY:
Kevin Horsley	Martin Railton	
		
Project Supervisor	Senior Project Manager	

This report has been prepared by Wardell Armstrong with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The report is confidential to the Client and Wardell Armstrong accepts no responsibility of whatever nature to third parties to whom this report may be made known.

No part of this document may be reproduced without the prior written approval of Wardell Armstrong.



Wardell Armstrong is the trading name of Wardell Armstrong LLP, Registered in England No. OC307138.

Registered office: Sir Henry Doulton House, Forge Lane, Etruria, Stoke-on-Trent, ST1 5BD, United Kingdom

UK Offices: Stoke-on-Trent, Cardiff, Carlisle, Edinburgh, Greater Manchester, London, Newcastle upon Tyne, Sheffield, Taunton, Truro, West Bromwich. International Offices: Almaty, Moscow

DESK BASED ASSESSMENTS
ARCHAEOLOGICAL EVALUATION
ARCHAEOLOGICAL EXCAVATION
GEOPHYSICAL SURVEY
TOPOGRAPHIC AND LANDSCAPE SURVEY
HISTORIC BUILDING RECORDING
EIA AND HERITAGE CONSULTANCY

CONTENTS

CONTENTS.....	1
SUMMARY.....	3
ACKNOWLEDGEMENTS.....	4
1. INTRODUCTION.....	5
1.1 Project Circumstances and Planning Background.....	5
1.2 Project Documentation.....	5
2. METHODOLOGY.....	6
2.1 Standards and guidance.....	6
2.2 Documentary Research.....	6
2.3 The Field Evaluation.....	6
3. BACKGROUND.....	9
3.1 Location and Geological Context.....	9
3.2 Historical and Archaeological Background.....	9
3.3 Map Regression.....	11
3.4 Previous Archaeological Work.....	12
4. ARCHAEOLOGICAL EVALUATION RESULTS.....	13
4.1 Introduction.....	13
4.2 Results.....	13
4.3 Archaeological Finds and Environmental Sampling.....	18
5. FINDS.....	19
5.1 Introduction.....	19
5.2 CBM.....	19
5.3 Slag.....	21
5.4 Conclusions.....	21
5.5 Statement of Potential.....	21
6. CONCLUSIONS.....	22
6.1 Interpretation.....	22
6.2 Survival.....	23
8. BIBLIOGRAPHY.....	24
APPENDIX 1: TRENCH DESCRIPTIONS.....	27
APPENDIX 2: PLATES.....	34
APPENDIX 3: FIGURES.....	42

PLATES (APPENDIX 2)

Plate 1: Hartshill Brick & Tile Co., Ltd. Advertisement, from the 1907 Staffordshire Sentinel, taken from The Potteries (2017b)

Plate 2: Caddick's Spoutfield Brick Works on Shelton New Road, opposite Hartshill Brick & Tile Co., which is visible in the bottom left of the photo, probably dating from between 1937-1952 according to the positions of the brick kilns.

Plate 3: Brick kiln {105}, looking SW, 2x1m scales

Plate 4: Oblique shot of the truncated WSW-facing elevation of kiln base {105} and central downdraught flue {117}, looking SE, 1x1m scale

Plate 5: WSW-facing elevation of downdraught flue {117}, looking ENE, 1x1m scale

Plate 6: S-facing elevation of brick feature {108}, looking N, 1x0.50m scale

Plate 7: Later brick manhole or service access base {121}, looking ESE, 1x1m scale

Plate 8: Brick structures {203} and {206} within extended Trench 2, looking SW, 2x1m scales

Plate 9: Possible chimney base {203}, looking SW, 1x0.50m scale

Plate 10: Brick recovered from kiln base {105}, 1x0.30m scale

Plate 11: Brick recovered from demolition layer (200), 1x0.30m scale

Plate 12: Brick recovered from demolition layer (201), 1x0.30m scale

Plate 13: Brick recovered from demolition layer (201), 1x0.30m scale

Plate 14: Brick recovered from possible chimney base {203}, 1x0.30m scale

Plate 15: Cross-section and plan of a downdraught kiln firing (after Brunskill 1990, 30)

FIGURES (APPENDIX 3)

Figure 1: Site Location

Figure 2: Trench Location Plan

Figure 3: First Edition Ordnance Survey Map, 1880 (*25 inches to 1 mile scale*)

Figure 4: Second Edition Ordnance Survey Map, 1900 (*25 inches to 1 mile scale*)

Figure 5: Third Edition Ordnance Survey Map, 1924 (*25 inches to 1 mile scale*)

Figure 6: Fourth Edition Ordnance Survey Map, 1937 (*25 inches to 1 mile scale*)

Figure 7: Ordnance Survey Map, 1950 (*25 inches to 1 mile scale*)

Figure 8: Aerial photograph, 1963

Figure 9: Ordnance Survey Map, 1970 (*25 inches to 1 mile scale*)

Figure 10: Trench 1 plan

Figure 11: Trench 1 sections

Figure 12: Trench 2 plan

Figure 13: Trench 2 section

SUMMARY

Wardell Armstrong (WA) was commissioned by Persimmon Homes West Midlands, to undertake an archaeological evaluation by trial trenching at Former Dyson Thermal Technologies, Hartshill, Stoke-on-Trent, ST4 6EP (NGR: SJ 86426 46170). The evaluation was undertaken in accordance with a written scheme of investigation (WSI) produced by Wardell Armstrong in response to a brief prepared by Jonathan Goodwin, Planning Archaeologist at Stoke-on-Trent City Council.

The archaeological excavation was undertaken over six days between the 20th of February and the 1st of March 2017 and consisted of the investigation of four trenches of varying sizes totalling 120m² of excavation within the proposed development site. The four trenches were positioned to target the below ground remains of 19th and 20th century brickworks in places where demolition and remediation was thought not to have taken place.

Archaeological remains were identified in two trenches, whereupon further investigation was undertaken to reveal the extent of the surviving archaeology, comprising 150m² of further excavation. Trench 1 contained the partial remains of a late 19th/early 20th century circular downdraught brick kiln, which had been badly truncated through later works, within a brick surfaced yard with possible walls. Trench 2 contained the remains of a circular brick feature thought to be the base of a former chimney associated with the downdraught kiln process, alongside a possible brick surface.

ACKNOWLEDGEMENTS

Wardell Armstrong (WA) thanks Persimmon Homes (West Midlands) for commissioning the project, and for all their assistance throughout the work. WA also thank Jonathan Goodwin, Planning Archaeologist at Stoke-on-Trent City Council for his assistance.

Wardell Armstrong also thanks the Paul John Group, for their help during this project.

The evaluation was supervised by Kevin Horsley, who also wrote the report, with the assistance of Jaime Megan Levell, Eleonora Montanari and Ben Moore. Finds assessment was by Sue Thompson. The report was illustrated by Helen Phillips and Adrian Bailey. The project was managed by Martin Railton who also edited the report.

1. INTRODUCTION

1.1 Project Circumstances and Planning Background

1.1.1 In February 2017 Wardell Armstrong (WA) undertook an archaeological evaluation at the Former Dyson Thermal Technologies, Hartshill, Stoke-on-Trent, ST4 6EP (centred on national Grid reference SJ 86426 46170; Figure 1). It was commissioned by Persimmon Homes West Midlands, hereafter referred to as 'the client', in relation to a proposed residential development at the site for which planning consent has been granted by Stoke-on-Trent City Council (Planning Application Reference: SOT/54871).

1.1.2 The proposed development is thought to contain the remains of late 19th and early 20th century kilns associated with a series of former brickworks, the heritage significance of which may be affected by the proposed development.

1.2 Project Documentation

1.2.1 The project conforms to a brief prepared by Jonathan Goodwin, Planning Archaeologist for Stoke-on-Trent City Council (Stoke-on-Trent City Council 2017). A written scheme of investigation (WA 2017a) was then produced to provide a specific methodology based on the brief for a programme of archaeological trial trench evaluation. This was approved by the planning archaeologist prior to the fieldwork taking place. This is in line with government advice as set out in Section 12 of the National Planning Policy Framework (NPPF 2012).

1.2.2 This report outlines the work undertaken on site, the subsequent programme of post-fieldwork analysis, and the results of this scheme of archaeological evaluation.

2. METHODOLOGY

2.1 Standards and guidance

2.1.1 The archaeological evaluation was undertaken following the Chartered Institute for Archaeologists' *Standard and Guidance for archaeological field evaluation* (CIfA 2014a), and in accordance with the Wardell Armstrong fieldwork manual (WA 2017b).

2.1.2 The fieldwork programme was followed by an assessment of the data as set out in the *Standard and Guidance for archaeological field evaluation* (CIfA 2014a) and the *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* (CIfA 2014b).

2.2 Documentary Research

2.2.1 A Heritage Statement was prepared by Mayfield CA Ltd., which set out the archaeological and historical background of the site, and provided an assessment of the significance of all known and potential heritage assets up to 500m radius of the area of investigation (Johnson 2017). Readers are directed to this report for details.

2.3 The Field Evaluation

2.3.1 The evaluation comprised the excavation of four trenches of varying lengths; Trench 1 being 18m long, Trench 2 being 10m long, Trench 3 being 12m long and Trench 4 being 20m long, all with a width of 2m, across the proposed development area totalling 120m² of excavation in total. The four trenches were positioned to target the below ground remains of 19th and 20th century brickworks in places where demolition and remediation was thought not to have taken place. The general aims of these investigations were:

- to establish the presence/absence, nature, extent and state of preservation of archaeological remains and to record these where they were observed
- to establish the character, date and distribution of those features in terms of cuts, soil matrices and interfaces
- to assess the impact of the application on the archaeological site
- to recover artefactual material, especially that useful for dating purposes
- to recover palaeoenvironmental material where it survives in order to understand site and landscape formation processes

And specifically to:

- to obtain samples of industrial residues, manufactured products and waste deposits, where identified, for scientific analysis and dating
- to determine levels of disturbance to any archaeological deposits/structures from later industrial practices and remediation

2.3.2 Deposits considered not to be significant were removed by a 360° tracked mechanical excavator with a 2m toothless ditching bucket, under close archaeological supervision. The trial trenches were subsequently cleaned by hand. All possible features were inspected and selected deposits were excavated by hand to retrieve artefactual material and samples. Once completed all features were recorded according to the WA standard procedure as set out in the WA Excavation Manual (WA 2017b).

2.3.3 All finds encountered were retained on site and returned to the WA Carlisle office where they were identified, quantified and dated to period. A *terminus post quem* was then produced for each stratified context under the supervision of the WA Finds Officer, and the dates were used to help determine the broad date phases for the site.

2.3.4 On completion of this project, the finds were cleaned and packaged according to standard guidelines (*ibid*). Please note, the following categories of material will be discarded after a period of six months following the submission of this report, unless there is a specific request to retain them (and subject to the collection policy of the relevant depository):

- unstratified material;
- modern pottery;
- material that has been assessed as having no obvious grounds for retention.

2.3.5 On completion the evaluation trenches were reinstated by backfilling the excavated material to a safe and suitable level as per the requirements of the client, following discussions with the planning archaeologist.

2.3.6 A full professional archive has been compiled in accordance with the project specification, and the Archaeological Archives Forum recommendations (Brown 2011). The archive will be deposited with The Potteries Museum & Archive, Stoke-on-Trent, with copies of the report sent to the Stoke-on-Trent HER, available upon request. The archive can be accessed under the accession number 2017.LH.12.

2.3.7 Wardell Armstrong supports the Online Access to the Index of Archaeological Investigations (OASIS) project. This project aims to provide an on-line index and access to the extensive and expanding body of grey literature, created as a result of developer-funded archaeological work. As a result, details of the results of this project will be made available by WA as a part of this national project. The OASIS reference for the project is: wardela2-279153.

3. BACKGROUND

3.1 Location and Geological Context

3.1.1 The site is located at National Grid Reference SJ 86426 46170, and is situated to the north of Hartshill, to the north-west of Stoke-on-Trent and east of Newcastle-under-Lyme in Staffordshire (Figure 1). Shelton New Road (B5045) bounds the north side of the site. The area of investigation lies at a height of c.127m aOD (above Ordnance Datum) with the ground sloping down gently to the east.

3.1.2 The site is approximately 3.8 hectares in size and comprises a sub-rectangular parcel of former industrial land which had been previously occupied by Dyson Thermal Technologies (Figure 2). The former buildings belonging to these works have recently been demolished, with much of the site being remediated to an approximate depth of 2m below the current ground level in preparation for re-development.

3.1.3 The underlying solid geology within the area of investigation is mapped as mudstone, sandstone and conglomerate of the Etruria Formation, deposited during the Carboniferous Period approximately 307 to 313 million years ago. The presence of Etruria Marl on the site has been exploited for approximately 300 years for the ceramic industry in this region (Johnson 2013, 1). The present day site topography is a result of previous industrial uses, with the presence of marl pits and workings to the south and west on land now occupied by Hartshill Park.

3.1.4 The natural substrate observed during the current phase of works comprised a mid-reddish brown fine sandy clay which is consistent with the mapped geologies above.

3.2 Historical and Archaeological Background

3.2.1 A Heritage Statement has previously been produced to assess the known historical and archaeological background of the site and the surrounding landscape to a distance of 500m (Johnson 2013). It is not intended to repeat that information here and what follows is a brief overview, for further details please refer to the original document.

3.2.2 No designated or non-designated heritage assets were identified within the proposed development area.

3.2.3 The heritage statement concluded that there was a reasonable likelihood that buried archaeological remains relating to the ceramic industry of the 19th and 20th centuries, principally updraught kilns from the former brickworks, may be present within the proposed development site.

- 3.2.4 **Prehistoric and Roman (up to c. AD 410):** Although no known prehistoric evidence is recorded in the vicinity of the study area, it is highly likely that the area was occupied to some extent during this period. The origins of Stoke-on-Trent are not known for certain, though the site lies in close proximity to a supposed roman road which connected the Roman forts at Rocester, in the east-south-east, to Middlewich, via Chesterton in the north-west. During excavations in nearby Trent Vale in 1929-34 and again in 1955-58, the remains of a kiln and workshop dating to AD 43-69 was discovered (Mountford *et al* 1968). The kiln was producing a wide range of ceramic material, probably for the nearby fort at Chesterton, including flagons, bowls, lamp-holders, cheese-presses, jars and other kitchenware (BBC 2016), highlighting that pottery production has been a part of the local economy in this part of Staffordshire since Roman times.
- 3.2.5 **Early Medieval to Medieval (c. AD 410-1540):** The Domesday Book only mentions Burslem and Fenton of the six principal towns within the Stoke-on-Trent city area, although the entry for Caverswall makes note of a church at *Stoche*, which is usually translated from the Old English as ‘holy place’ (Morris 1977). The origins of the ceramics industry in Staffordshire dates back to at least the 15th century, with pottery wasters having been recovered from below the Burslem Art College (Johnson 2013, 5).
- 3.2.6 **Post-Medieval to Modern (AD 1540-present):** By the 17th century, the area was producing pottery on an industrial scale, with the naturalist Robert Plot writing that Burslem was the centre of the industry (Plot 1686). The area is renowned for its production of ceramic bottles and fine earthenware, but the origins of the brick and tile industry is less clear. It is likely that there was at least tile production as early as the 13th century (Johnson 2013).
- 3.2.7 Several brickworks were founded in the Hartshill area from the mid-19th century, following the purchase of land and extension of a branch line of the North Staffordshire Railway between Stoke-on-Trent and Newcastle-under-Lyme (opened in 1852), which was eventually extended further to become known as the Market Drayton Branch (NSRSG 2017).
- 3.2.8 Trade directories between 1851 and 1940 provide evidence for the ownership of the site. The site was known as “Birks and Wain, Hartshill” (Johnson 2013). However, by 1876 the company was listed as “Birks Bros, Hartshill, Stoke-on-Trent”, becoming the “Hartshill Brick & Tile Company, Stoke-on-Trent” (Plate 1).

- 3.2.9 The Hartshill site follows a trend of major expansion, seen in other brickworks in the area such as at Caddick's Spoutfield Brick Works situated on the opposite bank of the railway (Plate 2). The Hartshill Brick & Tile Co. name is broadly retained until the Birks brothers sold the brickworks to the Platt family in c.1921, when the site is recorded as "Platt Daniel & Sons, Hartshill". The Platt family also then sell the site to "Diamond Clay" in c.1937 when the marl had apparently been exhausted, and kiln furniture was then produced using clay brought in from Scotland by rail (*ibid*, 6).
- 3.2.10 In 1953, Diamond Clay Co. Ltd., became a subsidiary of Ceramic Holdings Ltd., and also acquired Dougall & Sons Ltd., Firebrick Manufacturers, Bonnybridge, though both continued to trade separately (Scottish Brick History 2017a).
- 3.2.11 Since the 1950s, the site was almost comprehensively upgraded, initially by Diamond Clay, and more recently by Dyson Ltd. with the removal of much of the original structures in recent times.

3.3 Map Regression

- 3.3.1 Historic mapping of the site shows the development of the site throughout this time up to the present day. The earliest cartographic evidence obtained for the Heritage Statement was an 1832 map by Thomas Hargreaves, which shows the site as undeveloped agricultural land (*ibid*). However, by 1880, the First Edition 6" Ordnance Survey map (Figure 3) shows a cluster of buildings in the north-west of the site, a marl pit to the south, and a group of eight circular kilns around a central chimney, known simply as "Brick & Tile Works". A railway bounded the north of the site, where Shelton New Road now runs.
- 3.3.2 By the time of the 1900 Second Edition 6" Ordnance Survey map (Figure 4), the quarrying for marl had evidently extended across the southwest portion of the site, with a further smaller marl pit opening to the east of the original brickworks. A further four circular kilns were then added to the original eight, and a new group of five circular kilns had been erected, again around a central chimney, to the east, presumably associated with extraction from the smaller marl pit.
- 3.3.3 The eastern cluster of kilns sees continued development on the 1924 Ordnance Survey map (Figure 5) with the addition of a large rectangular building in close proximity, and another circular kiln to the north-east of this cluster, perhaps sharing an additional chimney with the kiln to its immediate south. The company is here named as "Hartshill Brick & Tile Works". The 1937 Ordnance Survey map (Figure 6) suggest that there was

a small reduction in brick and tile production with the loss of several kilns across the works, but by the 1950 Ordnance Survey map (Figure 7), it appears many of the kilns across the now “Potter’s Accessories Works” have been replaced with larger circular kilns, particularly across the centre and east of the site.

- 3.3.4 One of these new, larger kilns was constructed over the now redundant marl parts to the south of the site. These larger kilns appear to have free-standing walls lassoing around the kilns, presumably in an effort to regulate air flow into the kilns.
- 3.3.5 Although unclear, aerial photography taken in 1963 appears to show many of the circular kilns still standing across the site (Figure 8) and the Ordnance Survey map of 1970 (Figure 9) suggests that although some of the kilns have been demolished, several were still in use. This is still the case in 1974 (Johnson 2013), though it is not known whether the remaining circular kilns were still in use or not.

3.4 Previous Archaeological Work

- 3.3.6 No previous archaeological works have been undertaken within the development area.

4. ARCHAEOLOGICAL EVALUATION RESULTS

4.1 Introduction

4.1.1 The evaluation was undertaken between the 20th of February and 1st March 2017, with four trenches excavated across the proposed development site (Figure 2). The trenches were placed to target potential below ground remains of former 19th and 20th century brick, tile and pottery works. All four trenches were placed to investigate areas of the proposed development area which may not have been subject to recent demolition and remediation, and to record the survival of structures observed on historic Ordnance Survey maps in those areas.

4.1.2 Trenches 1 and 2 were positioned to the northeast of the site in the location of two respective arrangements of circular kilns identified through map regression on Ordnance Survey maps dating from 1900 to 1937. Trench 3 was positioned approximately 35m south of Trenches 1 and 2, targeting a circular kiln first shown on the 1950 Ordnance Survey map and which was still standing in 1974. Trench 4 was located just west of the centre of the proposed development works, targeting the site of four rectangular kilns, possibly associated with the potter's accessories works first depicted on the 1950 Ordnance Survey map, and again still standing in 1974 (Johnson 2013). The four trenches were positioned taking into account the knowledge of recent demolition and partial remediation of the site (Stoke-on-Trent City Council 2017, 1) and the presence of an existing sewer which runs across the centre of the site from west to east.

4.2 Results

4.2.1 The natural substrate horizon was observed in Trench 1 (**101**), Trench 3 (**302**) and Trench 4 (**401**), though only from a distance due to the loose and unstable ground. However, the natural substrate was a firm, sticky, mid reddish brown fine sandy clay observed at a maximum height of 124.61m aOD to the west end of Trench 4, sloping gently down in an easterly direction to a height of 122.39m aOD in the west end of Trench 1, and 123.67m aOD in the east end of Trench 3.

4.2.2 **Trench 1:** Trench 1 was aligned east to west and was 2m wide and 18m long, to a maximum depth of 2.35m. It was positioned to target the potential locations of two circular kilns, the easternmost present on Ordnance Survey maps from 1900 to 1937 (Figures 4-6), possibly replaced by a larger circular kiln by the time of the 1950 Ordnance Survey map (Figure 7) which was still standing in 1974 (Johnson 2013, 9),

and the second kiln immediately east of it, present on Ordnance Survey maps from 1900 to 1924 (Figures 4-5).

- 4.2.3 A thin layer of heavily compacted crushed demolition material **(100)** was removed to a maximum depth of 0.30m across the entire trench to reveal an archaeological horizon at a height of 124.85m aOD, visible only in the east portion of the trench. Approximately 5.5m from the east end of the trench, deeper demolition and remediation, composed of loose mixed demolition material **(110)** of the ground had been undertaken at some point prior to the current remediation works, removing all archaeology down to the natural substrate **(101)** at a depth of approximately 2.30m from the top of the archaeological horizon. It was then determined that further archaeology may survive around this eastern fringe of the proposed development area, so a 12m extension of the trench to the north was undertaken.
- 4.2.4 The extended trench area revealed the severely truncated remains of a circular brick kiln structure **{105}**, a central downdraught flue **{117}** and the partial remains of brick surfaces **{102}**, **{108}** and **{115}** surrounding the kiln (Plate 3 and 4), and what follows is a narrative of the archaeology in this trench from the earliest deposit (Figure 10).
- 4.2.5 Immediately above the natural substrate **(101)** was a thick compacted demolition layer **(122)** comprising loose, mixed mid greyish brown gravelly sandy silt containing frequent bricks, tiles, CBM fragments and charcoal. This layer contained bricks and tile contemporary with the subsequent construction of the brick kiln **{105}**. The first stage of the construction of the kiln was cut into this layer. A sub-circular cut **[116]** measuring approximately 2m in diameter and to a depth of 1.25m, was then filled with the vertical downdraught flue chamber **{117}** (Figure 11).
- 4.2.6 The downdraught flue chamber **{117}** consisted of an external circular brick wall of headers, bonded with a reddish brown sandy mortar, 1.5m in diameter, with a separate internal loosely stacked brick structure of interlocking stretchers, visibly heat affected, measuring 0.50m in diameter (Plate 5). A weakly cemented yellowish brown clayey sand **(119)** had then been used to fill the void between the external and internal skins of bricks. This had presumably been done following the disuse of the kiln to simply consolidate ground level. There were visible small voids still apparent through the internal brick structure, though clayey sand had been poured there also.
- 4.2.7 Although severely truncated by later remediation, the downdraught flue exit could be identified in section as heading in a south-west direction, though nothing of the exit

flue remained. The cut **[116]** had then been backfilled with compacted demolition rubble **(118)**, similar to **(122)**.

- 4.2.8 Following the installation of the central flue, the kiln base **{105}** was apparently constructed (Figure 10 and Figure 11). A layer of crushed and compacted demolition material **(109)**, an average of 0.09m thick, was then used as bedding for the brick floor of the kiln, sealing the cut **[116]** and backfill **(118)**. Radial courses of stretcher bricks, up to two courses high, remained of the brick floor in places, loosely bonded with red sandy mortar, again badly truncated. The outer radial bricks were seen to alternate into headers, though whether or not this was simply decorative, or a functional element of the kiln base construction, could not be answered.
- 4.2.9 The partial remains of an outer wall of red brick, a brick and a half thick, had then been constructed on a bed of dark grey coarse sand lime mortar which was interpreted as the external wall of the kiln. Part of the kiln, though seemingly abutting the external wall, was the base of a single fire box visible to the east side. The fill of this fire box was a thin heavily cemented mid reddish grey sandy ash **(103)** with frequent inclusions of charcoal and crushed CBM. The kiln base floor was observed to be sloping gently inwards towards the central flue, with the maximum height of the external walls at 124.86m aOD sloping down to 124.62m aOD.
- 4.2.10 The visible area of the kiln base measured 7.5m long by 3.6m wide. Knowing the centre of the draught flue, and the external face of the kiln base, it could be postulated that the diameter of the kiln base was approximately 8.40m, with up to an additional 2.40m for a fire box either side of the kiln.
- 4.2.11 A layer of heavily cemented material **(104)**, comprising a mid-orangey brown metalised surface of crushed CBM and mortar containing frequent charcoal fragments and ash, not dissimilar to the contents of the fire box **(103)**, was observed covering an area of 2m in length by 0.80m in width, immediately north of the external face of the fire box. It had replaced bricks removed from this area and was probably a replacement of the former surface.
- 4.2.12 To the immediate east of the fire box and external face of the kiln, was a brick surface **{102}** comprising random courses of stretchers and headers with an apparent bordering line of bricks running roughly south to north and curving slightly to the north-west. Later truncation had removed the continuation of this surface, though it

- possibly linked up with the line of bricks aligned east to west **{108}**, north of the kiln base, which also bordered a brick surface **{115}**, measuring 4.20m long by 1.10m wide.
- 4.2.13 Beyond the northern extent of the kiln base **{105}**, the ground had been levelled with a loose dark grey ashy gravel **(114)**, at a height of 124.50m aOD. It should be noted that **(114)** was similar to the levelling layer **(205)** observed in Trench 2 into which structures had been constructed.
- 4.2.14 Immediately above **(114)**, was a further levelling layer of light grey lime mortar **(113)** and a reddish brown clay **(112)** bedding deposit for, and entirely sealed by, linear brick feature **{108}** (Plate 6, Figure 10). This feature comprised a brick surface, one course high, measuring 0.34m wide and extended 4.35m west to east with a possible turn to the south-east, bonded with a dark grey gritty mortar. This relatively complex construction perhaps indicates that **{108}** was formerly the base of a wall, though no mortar belonging to higher courses of brick were observed.
- 4.2.15 Following the demolition of the brick kiln **{105}/{117}**, a later brick feature **{121}** was constructed close to the former centre (Plate 7), though investigation into the relationship between the two structures showed that the positioning of **{121}** was probably coincidental and did not function as a later adaptation of the central flue, as was initially hypothesised.
- 4.2.16 A linear cut **[106]**, measuring approximately 3.4m in length and 0.90m in width, truncated the kiln base from its centre, aligned north-northeast to south-southwest, removing the remaining brick and bedding layer. Into this, a roughly rectangular brick and cement structure **{121}** was constructed, measuring 1.00m by 0.80m, standing four brick courses high, at a height of 0.32m and elevation of 124.31m aOD. A central chamber measured 0.46m by 0.36m.
- 4.2.17 Around the structure **{121}**, the foundation cut had been backfilled with demolition rubble **(120)**, probably comprising material directly relating to the former flue and kiln base. A possible bedding layer of dark grey sandy gravel **(107)** containing frequent crushed CBM and small stones, which was also noted filling the central chamber, had then filled the remainder of the cut **[106]**. The function of the structure was unknown, though it was likely the base of a small manhole or access chamber for a service, the pipe or cable of which had since been removed during recent demolition (Figure 10).

- 4.2.18 **Trench 2:** Trench 2 was aligned east to west and was 2m wide and 10m in long, and to a depth of 1.45m. It was positioned in the location of a linear arrangement of three circular kilns, first shown on the 1900 OS map (Figure 4). Following an extension of the evaluation trench, two distinct brick features were identified (Plate 8, Figure 12).
- 4.2.19 Compacted tipping deposits were observed at a height of 123.48m aOD. The earliest of these deposits was a dark grey sandy gravel **(208)**, sealed by an orangey brown sandy clay **(207)** and a further dark grey sandy gravel **(205)**, of which this horizon was mostly composed (Figure 13).
- 4.2.20 To the south of the trench, a sub-circular foundation cut **[202]** was observed at a height of 123.90m aOD, measuring approximately 2.30m in diameter and extending to a maximum depth of 0.27m into the levelling deposits. A foundation of strongly cemented sandy gravel **(204)** with frequent small pebbles, 0.10m thick, had then been added as a bed, into which a circular brick structure **{203}** had been constructed, interpreted as the base of a former chimney (Plate 9, Figure 13).
- 4.2.21 The badly truncated circular structure **{203}** comprised a radial wall of header bricks of up to three courses, to a maximum height of 0.34m, measuring 1.90m in diameter. The yellowish brown header bricks alternated between traditional rectangular bricks, and wedge shaped ones to create a flush circumference, bonded with a light yellow sandy mortar. A sample wedge-shaped brick was retained (see Finds, Section 5). The internal base of the structure was constructed of a single layer of stretcher bricks aligned north-west to south-east, again bonded with a yellow sandy mortar. The foundation cut **[202]** had then been packed with a clayey sand **(204)**.
- 4.2.22 Approximately 2.20m north-east of the circular structure, and possibly contemporary, was a loose unconsolidated surface of random bricks **{206}**. A thin bed of reddish brown sand had been applied to the levelling deposit **(205)** in some places. It is likely that this functioned as a further hard-standing levelling layer, and as a way to make use of the surplus brick wasters, as all the bricks appeared to be over-fired or damaged in some way (Figure 12).
- 4.2.23 Sealing these brick features was a thick layer of demolition material **(201)**, being the same as **(110)**, to a depth of 1.40m. This was interpreted as belonging to a relatively recent process of remediation. This was then sealed by a thinner layer of remediation **(200)** belonging to the current phase of works.

- 4.2.24 **Trench 3:** Trench 3 was aligned east to west being 2m wide and 12m long, to a maximum depth of 2.40m. It was positioned over a single kiln first shown on the 1950 Ordnance Survey map (Figure 7) and known to be still standing on the site until 1970s (Figure 9). It had been constructed over a former marl pit shown on earlier Ordnance Survey maps of the site (Figures 4-7).
- 4.2.25 A recently compacted layer of mid pinkish grey gravel and clay (**300**) had been applied as a sub-base to this corner of the site to a maximum height of 125.97m aOD. This was removed to a maximum depth of 0.40m to reveal a single deposit of loose, mixed demolition material (**301**) with included brick, CBM and industrial waste fragments throughout to a depth of approximately 2.30m below current ground level to reveal the natural substrate (**302**). This layer represented the recent remediation of the site.
- 4.2.26 No archaeological features or deposits were encountered in this trench.
- 4.2.27 **Trench 4:** Trench 4 was aligned east-north-east to west-southwest and was 2m wide and 20m long, to a maximum depth of 1.65m. It was positioned over the location of four rectangular kilns, possibly associated with potter's accessory works first depicted on the 1950 Ordnance Survey map (Figure 7) over the location of an earlier circular kiln shown on the 1937 Ordnance Survey map (Figure 6).
- 4.2.28 The trench was opened to reveal a single identifiable layer of firm, sticky, mid reddish brown fine sandy clay (**400**) containing lenses of crushed CBM and demolition material. It was clear that this deposit represented the recent remediation of the site to a depth of 1.65m below the current ground level, where it became a clean, firm, mid reddish brown sandy clay natural substrate (**401**).
- 4.2.29 No archaeological features or deposits were encountered in this trench.

4.3 Archaeological Finds and Environmental Sampling

- 4.3.1 A small selection of bricks and ceramic material were retained for dating and for the identification of provenance during the works, with a subsequent analysis following in Section 5. No environmental samples were obtained during the groundworks.

5. FINDS

5.1 Introduction

5.1.1 A total of 18 artefacts, weighing 5951g, were recovered from three deposits during the archaeological evaluation.

5.1.2 All finds were dealt with according to the recommendations made by Watkinson & Neal (1998) and to the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* (CIfA 2014b). All artefacts have been boxed according to material type and conforming to the deposition guidelines recommended by Brown (2011), EAC (2014).

5.1.3 The material archive has been assessed for its local, regional and national potential and further work has been recommended on the potential for the material archive to contribute to the relevant research frameworks.

5.1.4 The finds assessment was compiled by Sue Thompson.

5.1.5 Quantification of bulk finds by context is visible in Table 1 below.

Context	Quantity	Weight(g)	Material	Comments
{105}	1	3600	CBM	Brick - NS BRICK CO, HARTSHILL
(107)	2	280	Slag	
(107)	11	335	CBM	Fragments of tile?
(200)	1	3970	CBM	Brick - hard purple fabric
(201)	1	3720	CBM	Brick - BERRY HILL BRICK WORKS, STOKE ON TRENT
(201)	1	3600	CBM	Brick - DOUGALL- Wedge shaped
{203}	1	3440	CBM	Brick - Wedge shaped
Total	18	18945		

Table 1: Finds recovered during archaeological evaluation

5.2 Ceramic Building Material (CBM)

5.2.1 Five complete bricks were collected as examples of building materials used and produced on the site at Hartshill (Table 1). All of the bricks are machine made, and in moderate to good condition.

5.2.2 The brick recovered from structure **{105}** is a mid-orange fabric (Plate 10), which is hard fired but crumbles easily when damaged. It measures 230 x 110 x 80mm. It has a shallow frog with the maker's mark of N S BRICK CO/HARTSHILL. The Hartshill

brickworks is well recognised, and in 1898 a range of bricks, tiles and “all kinds of terracotta goods” was being advertised (Grace’s Guide 2017).

- 5.2.3 It has been suggested that the NS may stand for North Staffordshire, and relate to a brickworks between North Street and the old Market Drayton railway line (Old Bricks 2017). This is not confirmed however, and a 1908 advertisement for the Hartshill brickworks does specify North Staff. The Hartshill Brick and tile Co was listed in Kelly’s directory between 1880 and 1916 at Sheldon New Road, Hartshill, after which it was registered at Stoke Old Road, Stoke.
- 5.2.4 The brick sample taken from context **(200)** measures 230 x 110 x 75mm. This brick is hard fired and a purplish fabric with some damage to the edges. It has a shallow frog with square corners but no maker’s mark (Plate 11).
- 5.2.5 One of the bricks from context **(201)** is marked BERRY HILL BRICK WORKS STOKE ON TRENT, and measures 230 x 110 x 76mm (Plate 12). It is a yellowy buff fabric which has oxidised to a mid-orange surface. The Berry Hill brickworks were associated with Berry Hill Colliery situated between Fenton and Hanley, and were operating from the 1870s until the 1970s (The Potteries 2017a). This example probably dates to the early 20th century.
- 5.2.6 The second brick recovered from context **(201)** is a white fabric, stamped with the maker’s mark DOUGALL (Plate 13). This is wedge shaped along its width, measuring 227 x 113 and a maximum of 77mm wide with a minimum of 50mm. It is likely that this brick would have been used to create an arched doorway. The Dougall brickworks were Scottish, from Bonnybridge in Stirlingshire, operating from the 1870s. In 1962 they were bought by J & J Dyson Ltd (Scottish Brick History 2017b).
- 5.2.7 Another wedge shaped brick was taken as an example of structure **{203}**. This is a hard buff fabric, and is the only brick to retain traces of a soft sandy mortar (Plate 14). It is shaped along its length, measuring 230 x 77mm, and a maximum 114 x 90mm in width. No markers mark is present and the brick is flat with no frog. It is likely that it was locally made.
- 5.2.8 Eleven ceramic fragments were recovered from context **(107)**. All fragments are of the same mid-orange gritty fabric and measure 13mm wide. A partial stamp of the number 7 was noted on one piece. All pieces are flat although two show signs that they had a lipped edge. It is likely that they represent tile fragments.

5.3 Slag

Two lumps of slaggy material were recovered from **(107)**. Both pieces are very light weight, and dark grey in colour.

5.4 Conclusions

5.4.1 The finds assemblage is 19th – 20th century in date. With the exception of the one Scottish brick, all materials are likely to be locally produced. Further work on the brick assemblage is probably not necessary.

5.4.2 It would be possible to identify the industrial processes involved in the production of the slag, however, as it was recovered from backfill deposits, it is not necessarily related to the site production processes, and further analysis is probably unwarranted.

5.5 Statement of Potential

5.5.1 The bricks are locally made, for local building works, and are therefore of local interest.

5.5.2 As the tile and slag fragments were recovered from backfill deposits they are unlikely to be of archaeological interest. The finds will therefore not be retained.

6. CONCLUSIONS

6.1 Interpretation

- 6.1.1 Archaeological remains were found in two trenches, with the remains of structures dating to the late 19th and 20th centuries. The remains were concentrated in the northeast fringe of the site where demolition and remediation had not taken place. The survival of the archaeological features was very poor, having been removed in part by historic and more recent development groundworks.
- 6.1.2 In Trench 1, the severely truncated remains of a single circular downdraught brick kiln were preserved with some surrounding brick surfaces. Remediation along the south-west side of the kiln allowed a profile of the central downdraught flue within the floor of the kiln. Enough of the downdraught flue base survived to indicate the route of an exit flue to the south-west. It can be suggested that the possible chimney base observed in Trench 2 was contemporary with this exit flue, based upon the similarity in bricks and the fact that it lies in roughly the correct direction, however, any physical or direct connection between the two structures can only be theorised.
- 6.1.3 The downdraught flue itself is unusual in that there appears to be a second central well within the original to which only one explanation is likely. It has been suggested that the central well was adapted in an attempt to better regulate the draw of heat and gases from the firing chamber (pers comm Goodwin 2017). The distinct lack of vitrification or blackening to the internal walls of the original flue well indicates that it must have been altered soon after construction. The later, narrower, well was installed in a loosely stacked manner with much of the void in-filled with sand and clay. Unlike the outer well wall, these bricks were blackened and partially vitrified in places. It is then unclear how the draw of hot air then exited the flue, whether by the original route to the south-west, through small gaps in the stacked bricks, or via a new exit flue in another direction, since lost.
- 6.1.4 Downdraught kilns (Plate 15) generally consist of a cylindrical low-domed firing chamber fed by a number of fire boxes, or ash pits, inserted into the external wall. The kiln was loaded and unloaded via an opening in the external wall. Heat was then drawn through the firing chamber down through a subterranean flue and issued from a separate free-standing chimney (Brunskill 1990, 30). The form, size and construction of the kiln at the former Hartshill site is similar to other downdraught kilns excavated in other parts of the country, for example at the former Eclipse Brickworks in Crook, County Durham (ASUD 2004) and at the former Coleorton Pottery on Nottingham Road in Lount, Leicestershire (Higgins 2014). A wide variety of roughly similar downdraught kilns were constructed, each producing a unique firing method for the

manufactures individual needs and tastes, as is the case with the adaptation of the central flue to control the flow of hot air in this instance.

- 6.1.5 A later manhole or small service access chamber had then been installed roughly over the centre of the kiln, further damaging the downdraught flue chamber and removing a large portion of the kiln base across its north-east extent. It is possible that it was a later flue exit, though it was unknown how it would function as such given the damage to the central firing chamber in installing it. The small structure is therefore more likely related to the later factory buildings post-1970s, and not to the functioning of the brick kiln which was evidently demolished at this time.
- 6.1.6 Very little can be concluded about the badly truncated remains of the chimney base in Trench 2, beyond its probable function. Comparing it with what can be identified through map regression (see Figures 3-9), all of the chimneys constructed on the site appear to be square in shape and not circular, though this could be a simple drawing technique to differentiate kiln from chimney perhaps. Irrespective of its function, remediation of this part of the site had removed any opportunity to understand its relationship to the surrounding former structures, and further extension of this trench was limited by an existing sewer to the immediate south and east. The purpose of the partial brick surface to the north east of the chimney base probably related to levelling and consolidating the ground for construction, though again, this can only be inferred.
- 6.1.7 The brick kiln was constructed using bricks purpose-made for its construction by the same company. The stamp on the bricks, namely "N S BRICKS Co HARTSHILL" indicates that it probably belonged to the period that the company was listed as being owned by Hartshill Brick and Tile Company, Hartshill, Stoke (later abridged to Hartshill Brick & Tile Co.) between the years 1900 to c.1921 (Johnson 2013, 6).
- 6.1.8 It is also of interest that bricks from the Scottish Dougall brickworks were recovered from the site, considering the direct link created by the combined acquisition of the Dougall and the Hartshill (Diamond Clay) works during the early 1950s. It is presumed that the appearance of these specialist firebricks indicates further adaptation and construction of the kilns in this part of the site in the latter half of the 20th century.
- 6.2 **Survival**
- 6.2.1 The significance of the remains excavated at the proposed development site are low, with only a very small portion of the kiln base surviving. It has been determined through archaeological investigation that the remaining portion of the kiln was of a downdraught type, which were introduced as improvements on earlier, less efficient up-draught kilns of the later 19th century.

8. BIBLIOGRAPHY

- ASUD (2004), *Former Eclipse Brickworks, Crook, Co. Durham: Archaeological Watching Brief*, Archaeological Services University of Durham
- Brown, D H (2011), *Archaeological Archives: A Guide to Best Practice in Creation, Compilation, Transfer and Curation*, Archaeological Archives Forum
- Brunskill, R W (1990), *Brick Building in Britain*. London
- CIfA (2014a), *Standard and Guidance for Archaeological Evaluations*, Chartered Institute of Field Archaeologists, Reading
- CIfA (2014b), *Standards and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials*. Institute for Archaeologists, Reading
- Europae Archaeologia Consilium (EAC) (2014), *A Standard and Guide to Best Practice for Archaeological Archiving in Europe*, EAC Guidelines 1: Belgium
- Goodwin, J (2017), *Personal Communication*, email to K. Horsley, dated 13th March 2017
- Higgins, T (2014), *An Archaeological Excavation at Coleorton Pottery, Nottingham Road, Lount, Leicestershire*. University of Leicester Archaeological Services, Report No. 2014-054
- Johnson, S (2013), *The Former Dyson Site, Shelton New Road, Stoke-on-Trent, Heritage Statement*. Unpublished report, Mayfield CA Ltd.
- Morris, J (1977), *The Domesday Survey: Staffordshire*.
- Mountford, A R, Gee, J & Simpson, G (1968), 'The Excavation of an Early Neronian Pottery-Kiln and Workshop at Trent Vale, Stoke-on-Trent', in *North Staffordshire Journal of Field Studies* Vol. 8, 19-38.
- NPPF (2012), *National Planning Policy Framework: Archaeology and Planning*. Department for Communities and Local Government
- Plot, R (1686), *The Natural History of Staffordshire*
- Stoke-on-Trent City Council (2017), *Brief and Specification for an Archaeological Evaluation at Former Dyson Thermal Technologies, Shelton New Road, Hartshill, Stoke-on-Trent*. Unpublished Report
- WA (2017a), *Written Scheme of Investigation for an Archaeological Evaluation: Former Dyson Thermal Technologies, Hartshill, Stoke-on-Trent*. Unpublished Report, Wardell Armstrong
- WA (2017b), *Excavation Manual*. Unpublished internal document, Wardell Armstrong

Watkinson, D E & Neal, V (1998), *First Aid for Finds*, RESCUE, The British Archaeological Trust:
London

Websites

BBC (2016), 'Stoke-on-Trent: Did the Romans make pottery there?', *BBC News Website Article*, <http://www.bbc.co.uk/news/uk-england-stoke-staffordshire-37495715> (last accessed 17th March 2017)

BGS 2017, *Geology of Britain Viewer*, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>, British Geological Survey, (last accessed 14th March 2017)

NSRSG (2017), North Staffordshire Railway Study Group, <http://www.nsrsg.org.uk> (last accessed 14th March 2017)

Planning Application Reference: SOT/54871, Stoke-on-Trent City Council <http://www.stoke.gov.uk/ccm/navigation/planning> (last accessed 14th March 2017)

Old Bricks (2017), <http://www.penmorfa.com/bricks/england17.html>, "Old Bricks – history at your feet" (last accessed 10th March 2017)

Grace's Guide (2017), <http://www.gracesguide.co.uk/File:lm18980722BN-Hats.jpg>, Grace's Guide to British Industrial History (last accessed 10th March 2017)

The Potteries (2017a), <http://thepotteries.org/brickworks/berryhill.htm>, The Potteries (last accessed 10th March 2017)

The Potteries (2017b), http://www.thepotteries.org/advert_wk/101.htm, The Potteries (last accessed 14th March 2017)

Scottish Brick History (2017a), <http://www.scottishbrickhistory.co.uk/james-dougall-sons-ltd>, Scottish Brick History: Scotland's Brick Manufacturing Industry (last accessed 14th March 2017)

Scottish Brick History (2017b), <http://www.scottishbrickhistory.co.uk/dougall-5-2/>, Scottish Brick History: Scotland's Brick Manufacturing Industry (last accessed 10th March 2017)

APPENDIX 1: TRENCH DESCRIPTIONS

Trench 1

Length: 18m Width: 2m (extended 12m) Orientation: E-W

Minimum Depth: 0.15m Maximum Depth: 2.35m

Context Number	Context Type	Description	Depth/Thickness	Discussion
(100)	Deposit	Loose, mixed crushed demolition material.	c.0.30m	Overburden
(101)	Natural Substrate	Firm, mid reddish brown fine sandy clay.	-	Natural substrate observed from distance at a depth of c.2.30m
{102}	Masonry	Brick surface laid in a random coursing on a sandy mortar bed, covering an area approximately 4m in length by 2.6m wide.	-	Brick surface abutting base of brick kiln {105} to the immediate east.
(103)	Deposit	Heavily cemented mid reddish grey sandy ash, containing frequent inclusions of crushed CBM and building material, measuring 1.20m in length and approximately 1m wide.	-	Concreted ashy material within a brick-built ash pit as part of kiln {105}, and located to the immediate ESE.
(104)	Deposit	Heavily cemented mid orangey brown, metallated surface of crushed CBM and building material, containing frequent charcoal and ash, measuring 2m in length by 0.8m in width.	-	Concreted metallated surface, mostly composed of similar material to (103), of which it also seals.
{105}	Masonry	Severely truncated kiln base, composed of concentric patterns of laid brick and sandy mortar, comprising the partial remains of the kiln base and a single fire box, measuring 7.5m in length and 3.6m wide.	0.12m	Brick-built base of a former brick downdraught kiln.
[106]	Cut	Sub-linear cut aligned roughly NNE-SSW, measuring, 0.9m wide and 3.4m in length and to a maximum depth of 0.35m. A gradual top break of slope into a	0.35m	Cut for a later brick and concrete manhole {121}, containing packing fill (107). Only the very base is visible, with the majority of it truncated through later remediation.

		varying sharp to gradual break of slope onto a shallow, fairly flat base.		
(107)	Fill	Heavily compacted dark greyish brown sandy gravel, with frequent charcoal fragments and flecks, crushed CBM and small stones, measuring 3.4m in length and 0.9m wide, to a maximum depth of 0.35m	0.35m	Fill of cut [106], sealing manhole/service access {121}.
{108}	Masonry	Truncated brick surface border or brick wall base, aligned roughly E-W, comprising a single course of bricks in varying coursing, measuring 0.34m (1 ½ bricks) wide and extending 4.35m in length to a depth of 0.11m, bonded with a dark grey gritty mortar.	0.11m	Brick-built feature aligned E-W, immediately north of kiln base {105}, and possibly associated with {102}.
(109)	Deposit	Friable, mid reddish brown, crushed CBM and clay or unknown length and +2m wide, to a depth of 0.09m.	0.09m	Crushed demolition material used as bedding layer for kiln base {105}.
(110)	Deposit	Very loose, mid greyish brown gravelly sand with frequent brick, metal, CBM fragments and stones <0.10m in size, measuring 10.34m and +2m in width, to a maximum observed depth of 2.30m	2.30m	Remediation layer from previous demolition work.
(111)	Deposit	Heavily compact, dark grey tarmac, measuring +2m in length and 1.9m wide to a thickness of 0.10m	0.10m	Tarmac sealing part of {105} and ash pit (103) towards south-east portion of exposed feature.
(112)	Deposit	Firm, sticky, mottled mid reddish brown clay with occasional gravel throughout, measuring a visible 0.67m in width to a thickness of 0.10m	0.10m	Mixed foundation/bedding layer immediately beneath brick coursing {108}.
(113)	Deposit	Heavily compacted, light grey gravelly lime mortar, measuring 0.64m wide and a thickness of 0.06m	0.06m	Foundation/levelling layer sealing (114) and sealed by (112).

(114)	Deposit	Loose dark grey ashy gravel with frequent inclusions of charcoal and occasional crushed fragments of CBM and industrial material, measuring an area of approximately 2.94x1.50m to an unknown depth.	-	Probably a levelling layer composed of crushed industrial material, sealed by (113) beneath brick coursing {108}. Possibly the same as (205).
{115}	Masonry	Badly truncated brick surface in a single random course random laid on a soft mid reddish brown sandy mortar bed, covering an observed area of 4.20x1.10m to a maximum depth of 0.12m.	0.12m	Brick surface found north of brick kiln {105} and bordered by brick coursing {108}.
[116]	Cut	Sub-circular (presumed) cut, measuring c.2m in diameter and to an observed depth of 1.25m, with a sharp top break of slope into vertical sides, ending in an unknown base.	1.25m	Cut for brick-built downdraught system {117} located to, and sealed by, kiln base {105} and bedding layer (109).
{117}	Masonry	Circular vertical brick flue wall, with the external flue wall, bonded with a mid-reddish brown sandy mortar, measuring 1.5m in diameter. The internal flue structure is built of brick and unconsolidated, stacked in over-lapping stretchers, measuring approximately 0.50m in diameter.	1.25m	Circular downdraught flue within centre of kiln base {105}, sealed by packing fill (118), and possibly (119) internally, and later truncated by manhole/service access {121}.
(118)	Deposit	Loose, mixed demolition rubble with frequent inclusions of brick, tile and industrial waste fragments, measuring 2m in diameter and to a depth of 0.90m	0.90m	Backfill/packing material within cut [116] around external flue wall of {117}.
(119)	Deposit	Weakly cemented, mid yellowish brown clayey sand, becoming sandier towards base, with very occasional CBM and	0.80m	Backfill deposit between external and internal flue walls, possibly after disuse of the flue/kiln, or as part of the flue's construction.

		brick fragments, measuring approximately 0.90m in diameter and 0.80m in depth.		
(120)	Deposit	Moderately compacted mixed demolition rubble, covering an area of 1.30x1.00m, and to a maximum depth of 0.35m.	0.35m	Demolition layer, probably belonging to the reduction of the kiln {105} and more specifically, the flue {117} prior to the installation of {121}.
{121}	Masonry	Brick built base of possible manhole or service access, comprising four courses of bricks in header coursing and bonded with a light grey cement, measuring 1m in length and 0.8m in width to a maximum depth of 0.32m.	0.32m	Rectangular brick manhole or service access. Base of feature within cut [106] and packed with (107).
(122)	Deposit	Loose, mixed, mid greyish brown gravelly sandy silt and demolition rubble including frequent bricks, tiles, CBM and industrial waste, measuring 0.95m in depth.	0.95m	Demolition and rubble layer sealed by kiln base {105} and draught flue {117}.

Trench 2

Length: 10m Width: 2m (extended 5m) Orientation: E-W
Minimum Depth: 1.10m Maximum Depth: 1.40m

Context Number	Context Type	Description	Depth/Thickness	Discussion
(200)	Deposit	Moderately compact, light grey crushed gravel with frequent inclusion of modern demolition material.	0.28m	Recent remediation layer.
(201)	Deposit	Loose, mixed demolition material with frequent inclusions of brick, fragments of CBM and industrial waste, measuring approximately 1.40m in depth.	1.40m	Earlier demolition layer. Probably the same layer as (110) in Trench 1.
[202]	Cut	Sub-circular cut, measuring	0.27m	Foundation trench cut for possible chimney base

		approximately 2.30m in diameter and to an observable depth of 0.27m, with a sharp top break of slope into gradual concave sides to gradual break of slope into a roughly flat base.		{203}, filled by concrete base deposit (209) and packed with (204).
{203}	Masonry	Circular vertical brick-built base of possible chimney, comprising a remaining three courses of bricks laid in alternating header and chamfered header bond bordering an internal brick surface, all bonded with soft yellow sandy mortar, measuring 1.90m in diameter and to a maximum depth of 0.34m.	0.34m	Circular brick built base of possible chimney. Possibly associated (and contemporary) with brick kiln {105} and downdraught flue {117}.
(204)	Deposit	Moderately compact mid orangey brown, clayey sand, becoming sandier with depth, measuring 2.30m in diameter, with an internal width of 0.16m, to a depth of 0.27m	0.27m	Packing fill of foundation trench [202], around possible chimney base {203}.
(205)	Deposit	Loose dark grey silty clayey gravel with frequent inclusions of charcoal and crushed CBM fragments, measuring a visible area of 5x3m and to an observed depth of 0.40m	0.40m	Probably levelling layer of ashy gravelly material into which {203} and {206} are constructed. Possibly the same as (114).
{206}	Masonry	Brick surface laid in a random bond on a very thin and loose mid reddish brown sandy bed, measuring 1.20m in length and 1m in width to a maximum depth of 0.08m	0.08m	Unconsolidated brick surface which is probably contemporary with {203}.
(207)	Deposit	Moderately compact mid orangey brown sandy clay with occasional flecks of charcoal, measuring 0.45 in length and 0.18m in width to a maximum depth of 0.30m.	0.30m	Backfill deposit which is indicative of tipping and levelling of layers prior to construction of {203} and {206}, sealed by (205).

(208)	Deposit	Loose, dark grey silty sandy gravel with occasional flecks of charcoal and lime mortar, measuring a visible 0.78m in length and 0.38m in width to a maximum depth of 0.25m	0.25m	Backfill deposit which is indicative of tipping and levelling of layers prior to construction of {203} and {206}, sealed by (207).
(209)	Deposit	Strongly cemented, hard mid orangey brown sandy gravel with frequent inclusions of stones <0.50m in size, measuring approximately 1.90m in diameter and 0.10m in thickness.	0.10m	Concrete foundation to possible chimney base {203} within cut [202].

Trench 3

Length: 12m Width: 2m Orientation: E-W
Minimum Depth: 1.15m Maximum Depth: 2.40m

Context Number	Context Type	Description	Depth/Thickness	Discussion
(300)	Deposit	Moderately compact, mixed mid pinkish grey gravelly clay, observed throughout the trench, measuring to a maximum depth of 0.40m	0.40m	Recently applied hardcore and clay sub-base surface.
(301)	Deposit	Loose, mixed demolition material with frequent inclusions of brick, fragments of CBM and industrial waste, measuring approximately 2m in depth.	2m	Recent layer of remediation.
(302)	Natural substrate	Firm, mid reddish brown fine sandy clay.	-	Natural substrate observed from distance at c.2.40m from current ground level.

Trench 4

Length: 20m Width: 2m Orientation: ENE-WSW
Minimum Depth: 1.10m Maximum Depth: 1.65m

Context Number	Context Type	Description	Depth/Thickness	Discussion
(400)	Deposit	Firm, sticky, mid reddish brown sandy clay with occasional lenses of gravel and crushed CBM fragments throughout, measuring to a maximum depth of 1.65m	0.28m	Recent remediation layer.
(401)	Natural substrate	Firm, mid reddish brown clay.	-	Natural substrate, observed at distance at an approximate depth of 1.65m at western end of trench.

APPENDIX 2: PLATES



HARTSHILL BRICK & TILE Co.,
(LIMITED).

Telephone 23 Newcastle.

Telegrams: "HARTSHILL, STOKE-ON-TRENT."

Passenger Station, Stoke-on-Trent.

GARDEN BORDER TILES.

BLUE WALL COPINGS.

RED BUILDING BRICKS, BLUE BUILDING AND PAVING BRICKS. TILES—ROOFING AND PAVING. BUFF ADAMANT CLINKERS. RED AND BUFF CHIMNEY POTS.

STOKE-UPON-TRENT.

Hand Graphic Text:
Finger 1: RED
Finger 2: VARIOUS TINTS
Finger 3: BROWN
Finger 4: TOMPOZ-2B
Palm: HARTSHILL (NORTH-STAFF) HAND-MADE SANDY-FACED ROOFING TILES RUSTIC DURABLE ALSO BEST PRESSED TILES BUFF ADAMANT CLINKERS GARDEN BORDER TILES BLUE VITRIFIED BRICKS RED, BLUE & BUFF QUARRIES RIDGE TILES & FINIALS

Plate 1: Hartshill Brick & Tile Co., Ltd. Advertisement, from the 1907 Staffordshire Sentinel, taken from *The Potteries* (2017b)

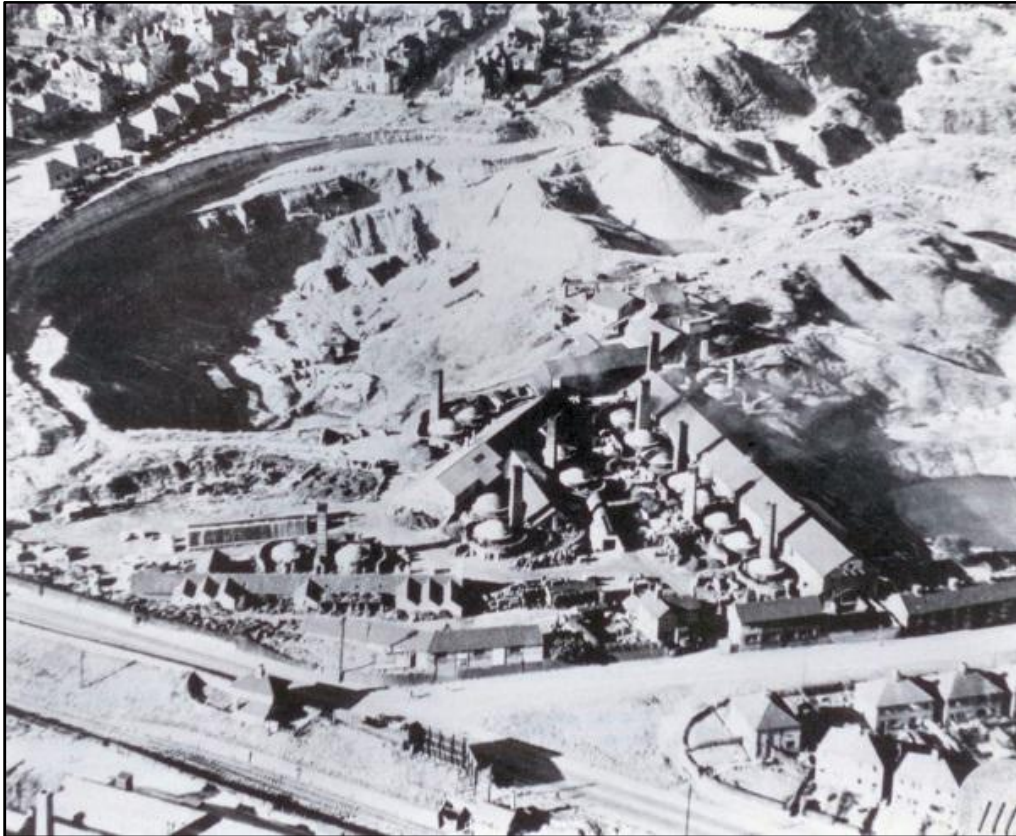


Plate 2: Caddick's Spoutfield Brick Works on Shelton New Road, opposite Hartshill Brick & Tile Co., which is visible in the bottom left of the photo, probably dating from between 1937-1952 according to the positions of the brick kilns.



Plate 3: Brick kiln {105}, looking southwest, 2x1m scales



Plate 4: Oblique shot of the truncated west-southwest-facing elevation of kiln base {105} and central downdraught flue {117}, looking SE, 1x1m scale



Plate 5: WSW-facing elevation of downdraught flue {117}, looking ENE, 1x1m scale



Plate 6: South-facing elevation of brick feature {108}, looking N, 1x0.50m scale



Plate 7: Later brick manhole or service access base {121}, looking ESE, 1x1m scale



Plate 8: Brick structures {203} and {206} within Trench 2, looking southwest, 2x1m scales



Plate 9: Possible chimney base {203}, looking SW, 1x0.50m scale



Plate 10: Brick recovered from kiln base {105}, 1x0.30m scale



Plate 11: Brick recovered from demolition layer (200), 1x0.30m scale



Plate 12: Brick recovered from demolition layer (201), 1x0.30m scale



Plate 13: Brick recovered from demolition layer (201), 1x0.30m scale

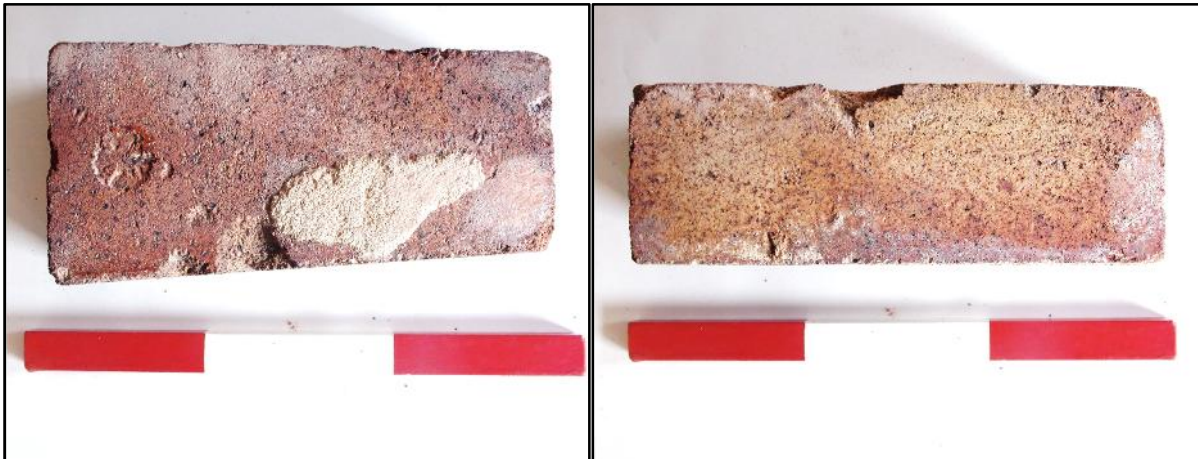


Plate 14: Brick recovered from possible chimney base {203}, 1x0.30m scale

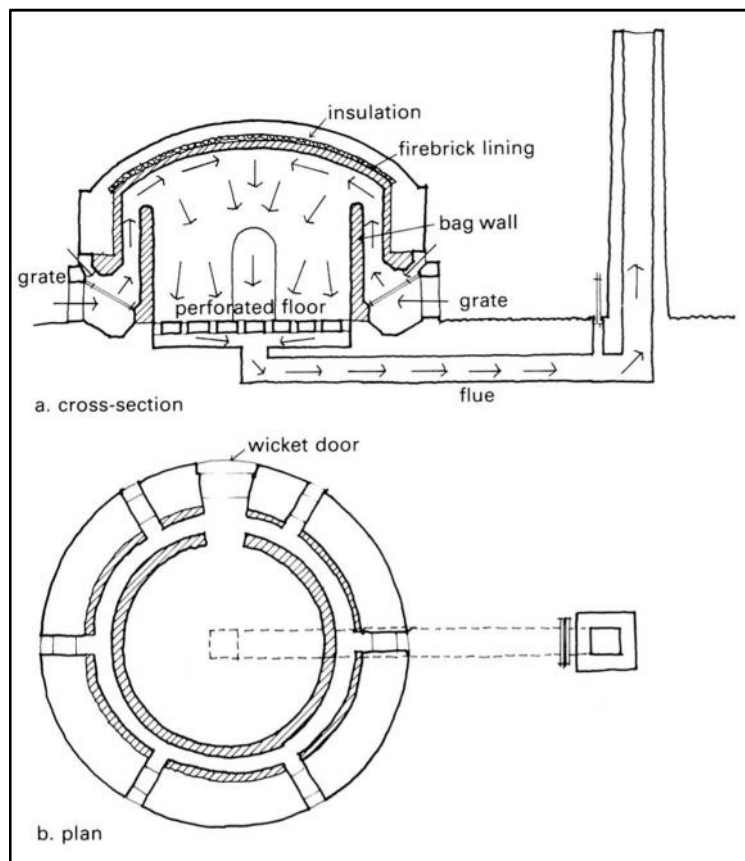
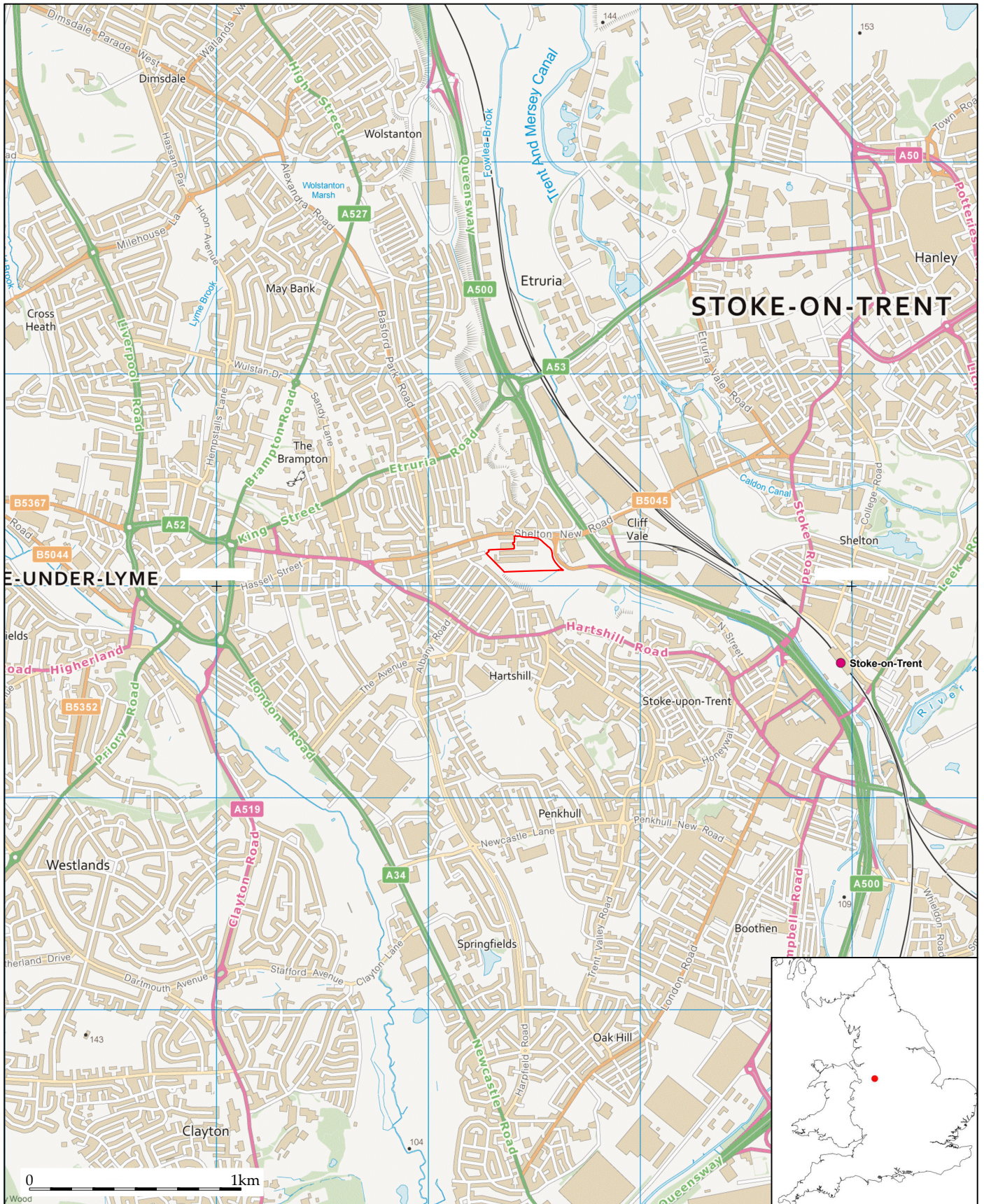


Plate 15: Cross-section and plan of a downdraught kiln firing (after Brunskill 1990, 30)

APPENDIX 3: FIGURES




Wardell Armstrong
2017

PROJECT: Former Dyson Thermal Technologies, Hartshill, Stoke-on-Trent

CLIENT: Persimmon Homes West Midlands

SCALE: 1:25,000 at A4


DRAWN BY: AB

CHECKED BY: AB


DATE: March 2017

REPORT No: ST15977

KEY:

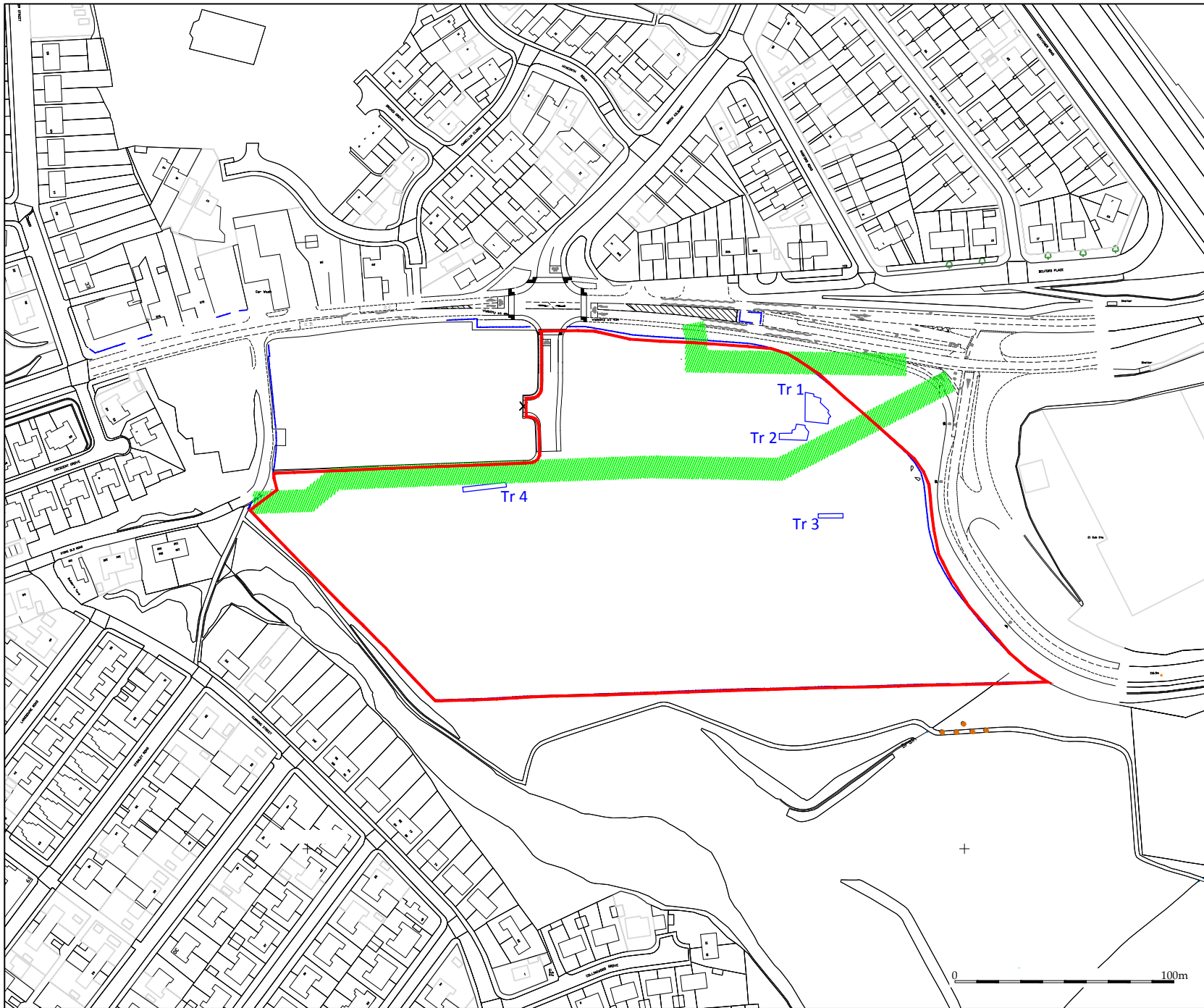


Site location



Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright. All rights reserved. Licence number 100058076

Figure 1: Site location.



Wardell Armstrong
2017

PROJECT:
Former
Dyson Thermal Technologies,
Hartshill, Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands




SCALE: 1:2,500 at A4

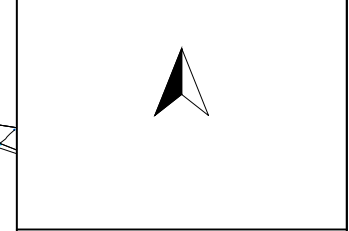
DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:

-  Site boundary
-  Evaluation trench
-  Investigation area



REPORT No:
ST15977

Figure 2: Trench location plan.



Wardell Armstrong
2017

PROJECT:
Former
Dyson Thermal Technologies,
Hartshill, Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands



SCALE: 1:2,500 at A4

DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:

-  Site boundary
-  Evaluation trench



REPORT No:
ST15977

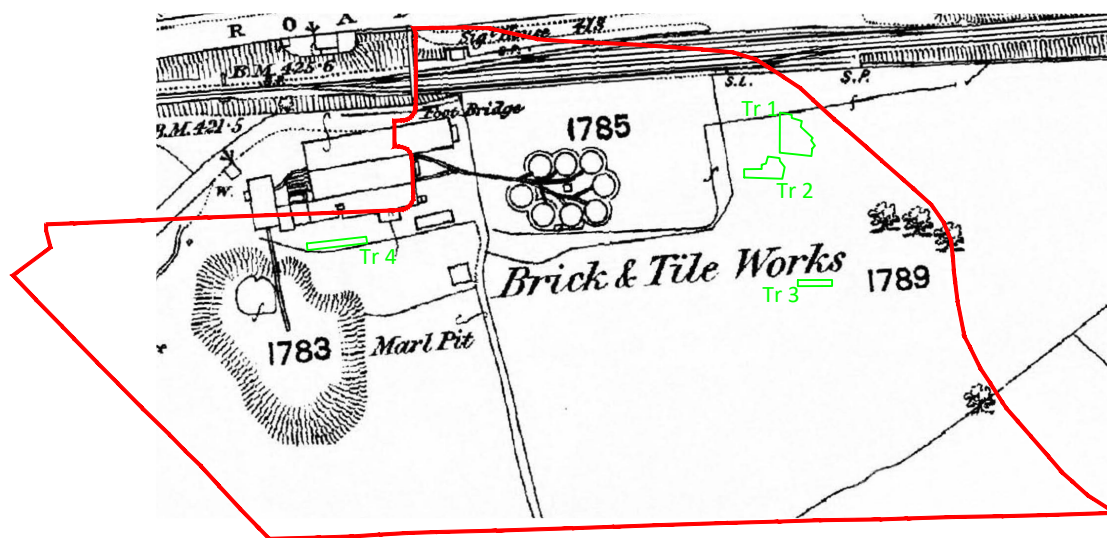


Figure 3: First Edition Ordnance Survey Map, 1880 (25 inches to 1 mile scale).



Wardell Armstrong
2017

PROJECT:
Former
Dyson Thermal Technologies,
Hartshill, Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands



SCALE: 1:2,500 at A4

DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:

-  Site boundary
-  Evaluation trench



REPORT No:
ST15977

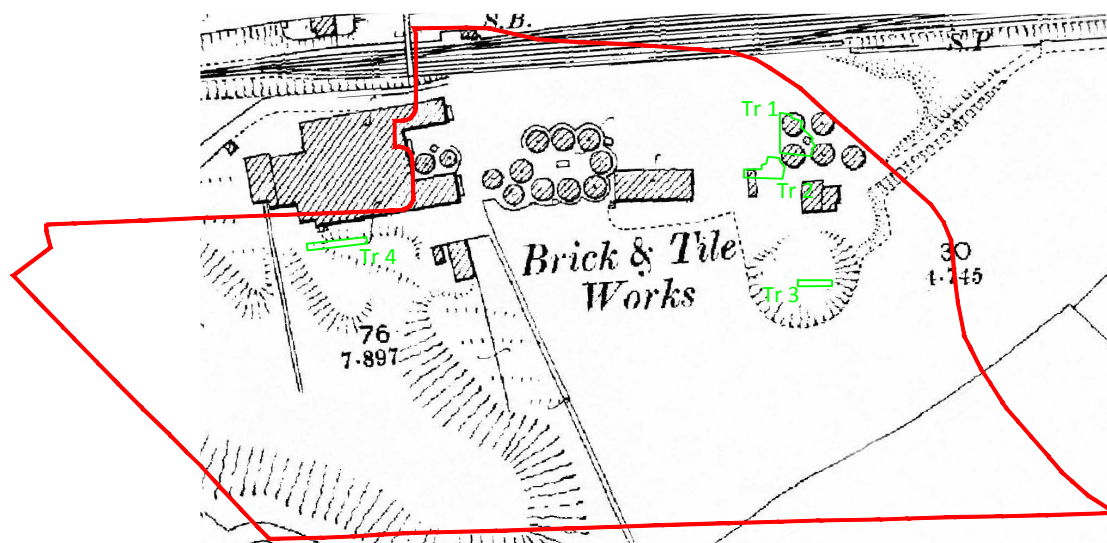


Figure 4: Second Edition Ordnance Survey Map, 1900 (25 inches to 1 mile scale).



Wardell Armstrong
2017

PROJECT:
Former
Dyson Thermal Technologies,
Hartshill, Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands



SCALE: 1:2,500 at A4

DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:

-  Site boundary
-  Evaluation trench



REPORT No:
ST15977

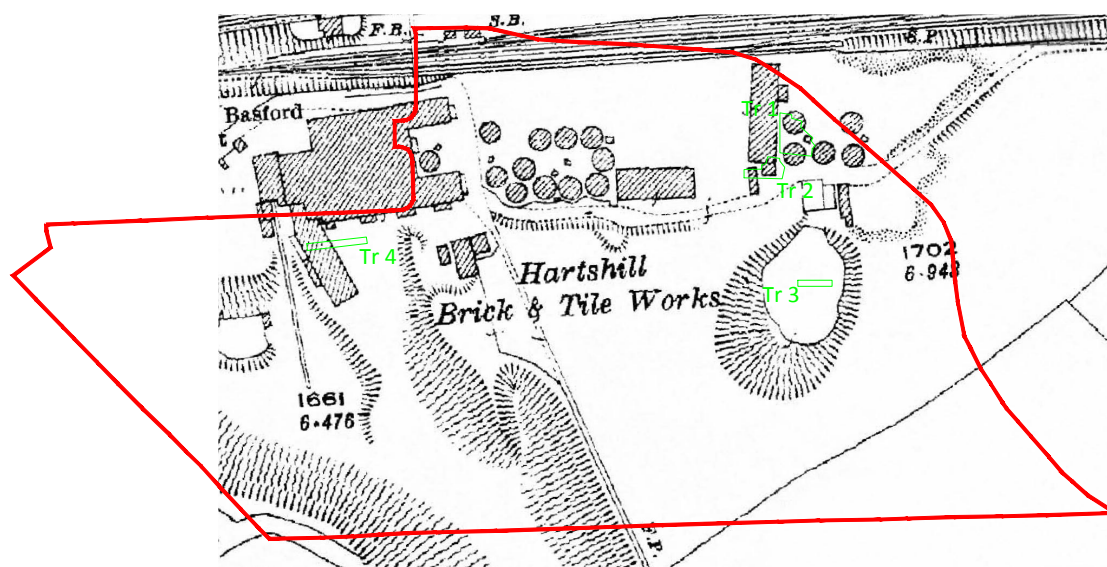


Figure 5: Third Edition Ordnance Survey Map, 1924 (25 inches to 1 mile scale).



Wardell Armstrong
2017

PROJECT:
Former
Dyson Thermal Technologies,
Hartshill, Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands

SCALE: 1:2,500 at A4

DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:

-  Site boundary
-  Evaluation trench



REPORT No:
ST15977

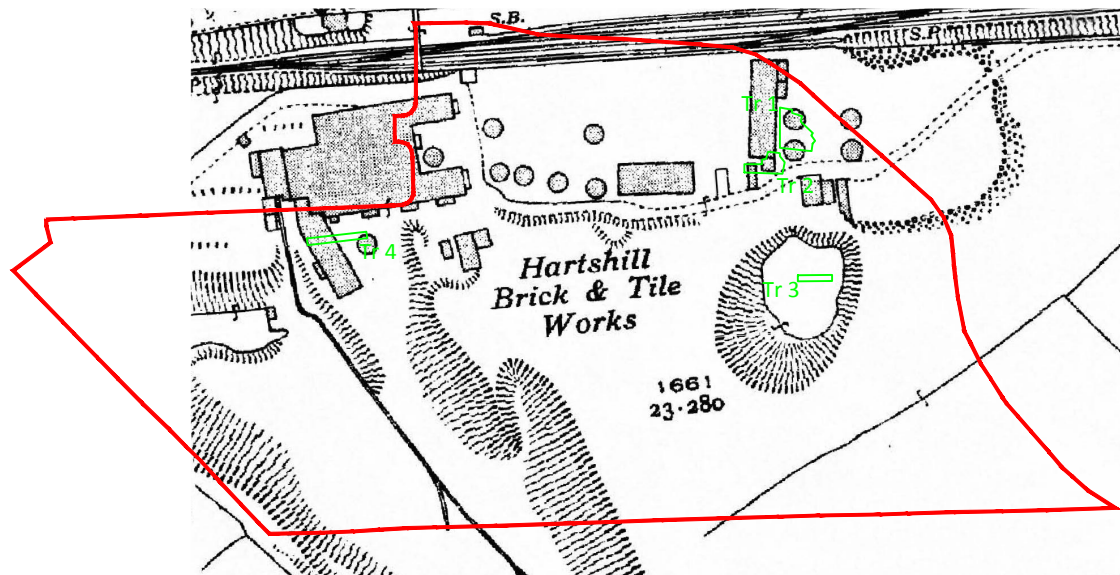


Figure 6: Fourth Edition Ordnance Survey Map, 1937 (25 inches to 1 mile scale).



Wardell Armstrong
2017

PROJECT:
Former
Dyson Thermal Technologies,
Hartshill, Stoke-on-Trent



CLIENT:
Persimmon Homes
West Midlands

SCALE: 1:2,500 at A4

DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:
 Site boundary
 Evaluation trench



REPORT No:
ST15977

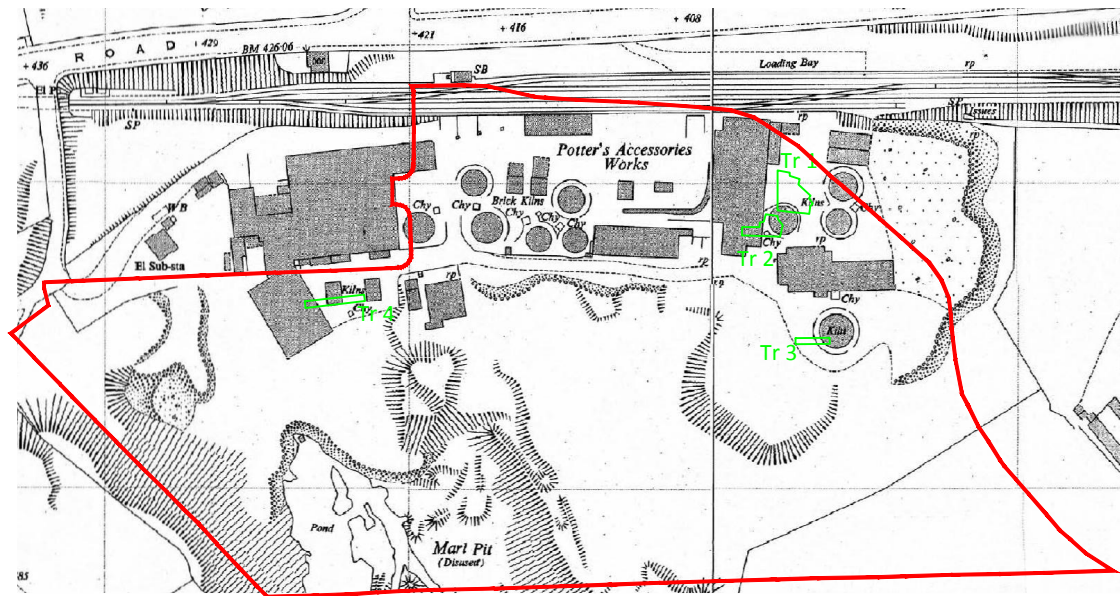


Figure 7: Ordnance Survey Map, 1950 (25 inches to 1 mile scale).



Wardell Armstrong
2017

PROJECT:
Former
Dyson Thermal Technologies,
Hartshill, Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands



SCALE: 1:2,500 at A4

DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:

-  Site boundary
-  Evaluation trench



REPORT No:
ST15977

Figure 8: Aerial photograph, 1963.



Wardell Armstrong
2017

PROJECT:
Former
Dyson Thermal Technologies,
Hartshill, Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands

SCALE: 1:2,500 at A4

DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:

-  Site boundary
-  Evaluation trench



REPORT No:
ST15977

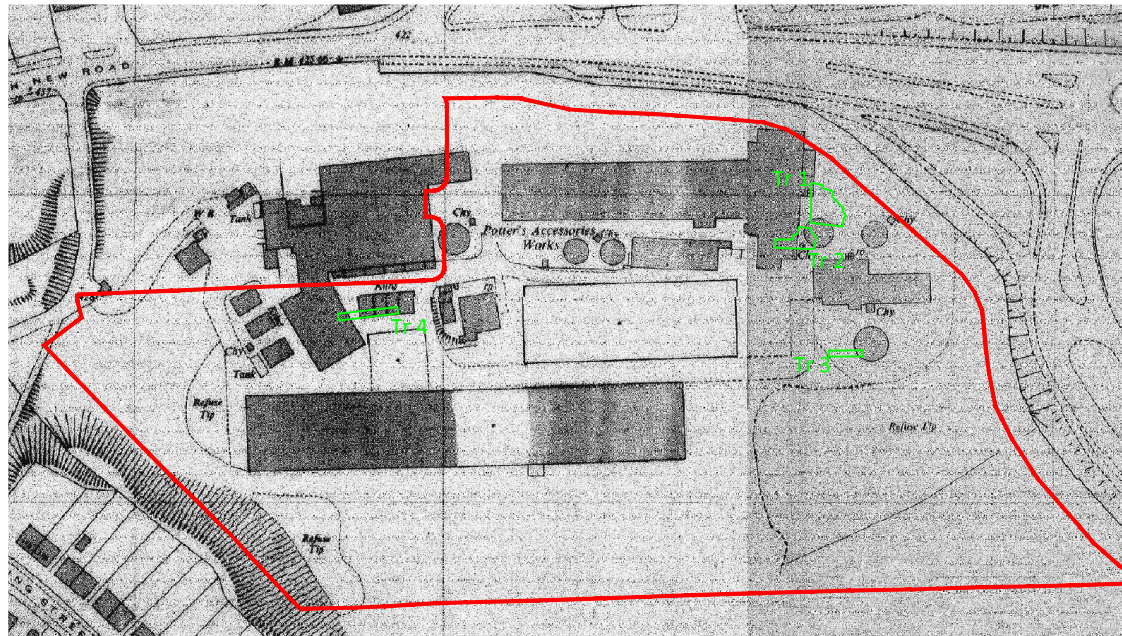
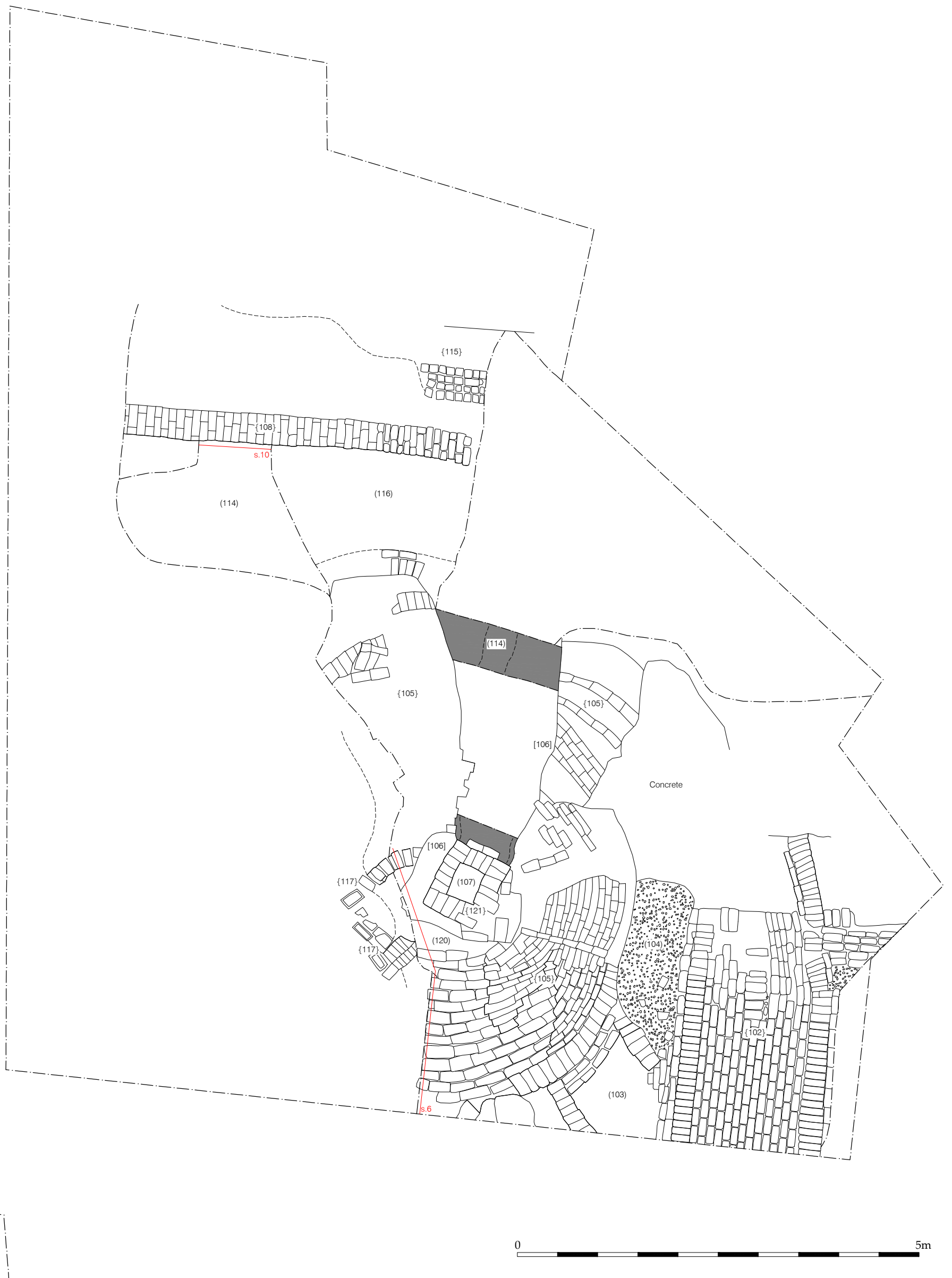


Figure 9: Ordnance Survey Map, 1970 (25 inches to 1 miles scale).



Wardell Armstrong
2017

PROJECT: Former Dyson Thermal Technologies, Hartshill,
Stoke-on-Trent
CLIENT: Persimmon Homes West Midlands
SCALE: 1:50 at A3
DRAWN BY: HP
CHECKED BY: AB
DATE: March 2017
REPORT No: ST15977

KEY:





-  Content number
-  Section location
-  Littoe cavation
-  Hand excavated portion



Figure 10: Trench 1 plan.

PROJECT:
Former Dyson Thermal
Technologies, Hartshill,
Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands




SCALE: 1:20 at A4

DRAWN BY: HP

CHECKED BY: AB

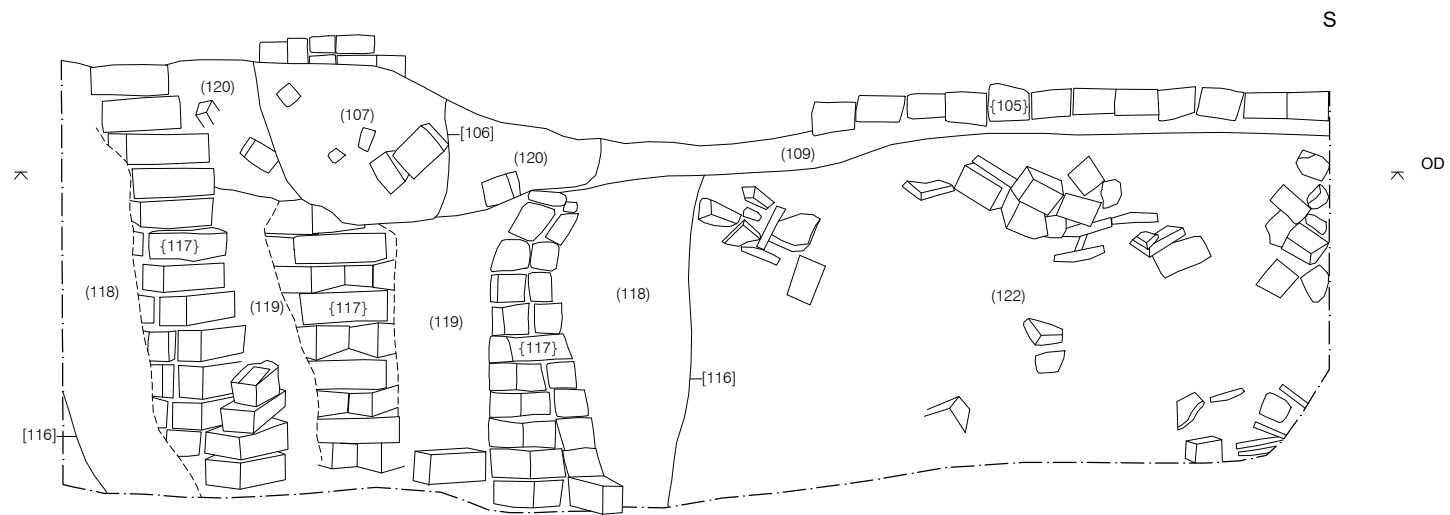
DATE: March 2017

KEY:

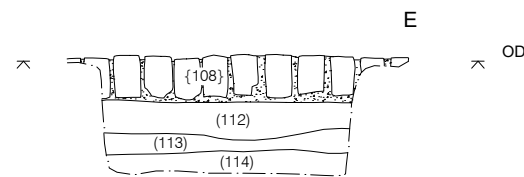
-  Contour number
-  Height OD
-  Litho excavation

REPORT No:

ST15977



Section North-South elevation of trench and litho excavation



Section East-West profile of trench

0  1m

Figure 11: Trench 1 sections.



Wardell Armstrong
2017

PROJECT:
Former Dyson Thermal
Technologies, Hartshill,
Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands





SCALE: 1:50 at A3

DRAWN BY: HP

CHECKED BY: AB

DATE: March 2017

KEY:

	Contour number
	Section location
	Lithology
	Hand excavated portion



REPORT No:
ST15977

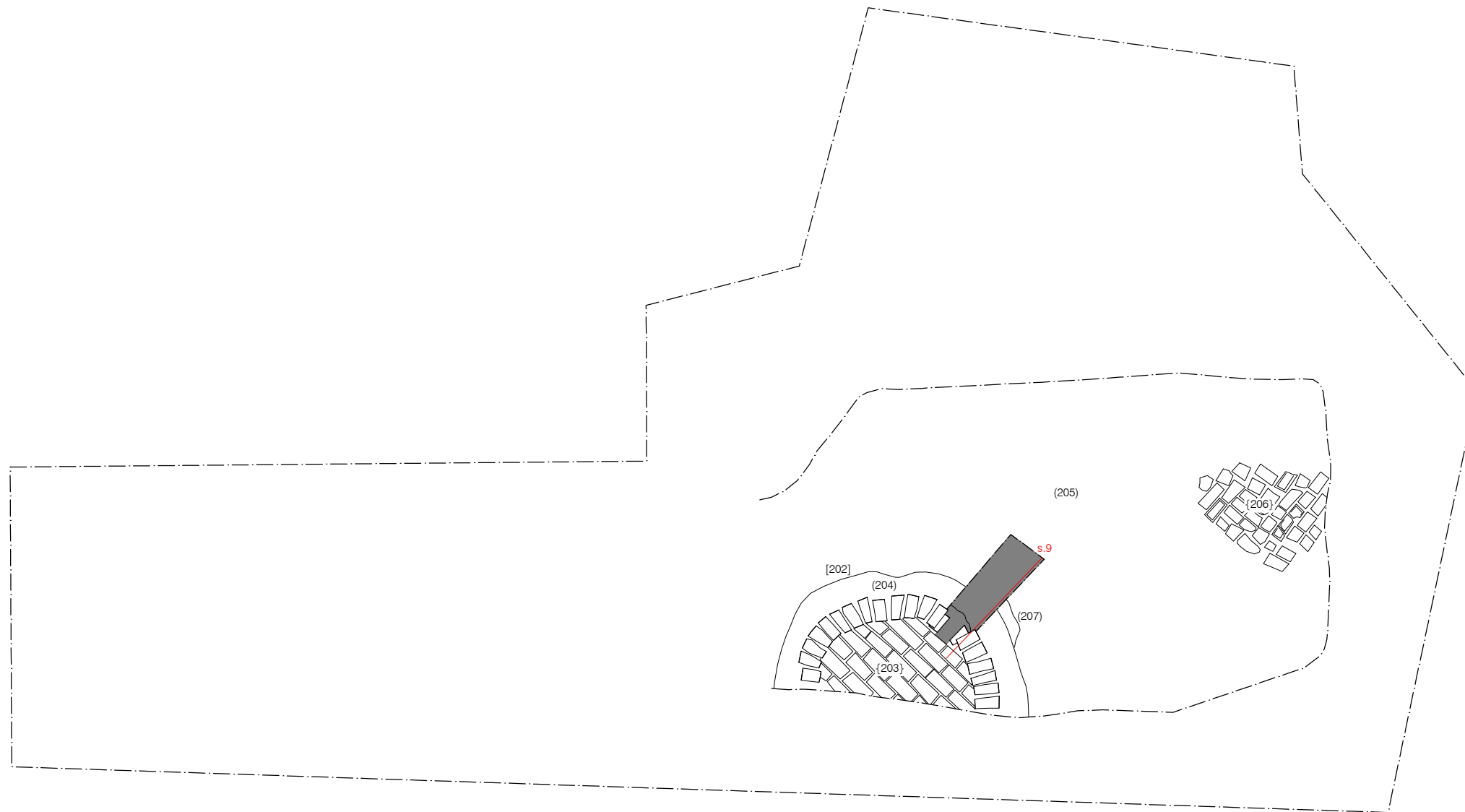


Figure 12: Trench 2 plan.



Wardell Armstrong
2017

PROJECT:
Former Dyson Thermal
Technologies, Hartshill,
Stoke-on-Trent

CLIENT:
Persimmon Homes
West Midlands


SCALE: 1:20 at A4

DRAWN BY: HP

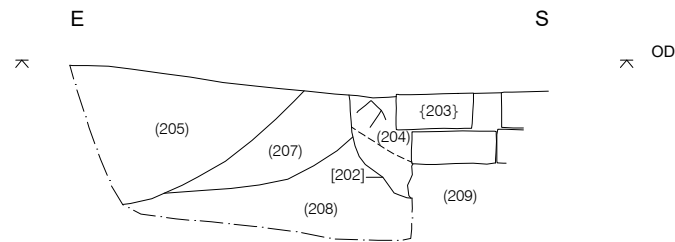
CHECKED BY: AB

DATE: March 2017

KEY:

	Conte t nu ber
	Hei ht OD
	Li t h o e cavation

REPORT No:
ST15977



Section orth e t acin ection o



Figure 13: Trench 2 section.

wardell-armstrong.com

STOKE-ON-TRENT
Sir Henry Doulton House
Forge Lane
Etruria
Stoke-on-Trent
ST1 5BD
Tel: +44 (0)178 227 6700

BIRMINGHAM
Two Devon Way
Longbridge Technology Park
Longbridge
Birmingham
B31 2TS
Tel: +44 (0)121 580 0909

CARDIFF
22 Windsor Place
Cardiff
CF10 3BY
Tel: +44 (0)292 072 9191

CROYDON
Suite 8 Suffolk House
College Road
Croydon
Surrey
CR0 1PE
Tel: +44 (0)208 680 7600

EDINBURGH
Suite 3/1 Great Michael House
14 Links Place
Edinburgh
EH6 7EZ
Tel: +44 (0)131 555 3311

GREATER MANCHESTER
2 The Avenue
Leigh
Greater Manchester
WN7 1ES
Tel: +44 (0)194 226 0101

LONDON
Third Floor
46 Chancery Lane
London
WC2A 1JE
Tel: +44 (0)207 242 3243

NEWCASTLE UPON TYNE
City Quadrant
11 Waterloo Square
Newcastle upon Tyne
NE1 4DP
Tel: +44 (0)191 232 0943

SHEFFIELD
Unit 5 Newton Business Centre
Newton Chambers Road
Thornccliffe Park Chapeltown
Sheffield
S35 2PH
Tel: +44 (0)114 245 6244

TAUNTON
Suite E1 Victoria House
Victoria Street
Taunton
Somerset
TA1 3JA
Tel: +44 (0)182 370 3100

TRURO
Baldhu House
Wheal Jane Earth Science Park
Baldhu
Truro
TR3 6EH
Tel: +44 (0)187 256 0738

International offices:

ALMATY
29/6 Satpaev Avenue
Hyatt Regency Hotel Office
Tower, 7th Floor Almaty
Kazakhstan
050040
Tel : +7(727) 334 1310

MOSCOW
Office 4014
Entrance 2
21/5 Kuznetskiy Most St.
Moscow
Russia
Tel: (495)626-07-67

**Wardell Armstrong
Archaeology:**

CUMBRIA
Cocklakes Yard
Carlisle
Cumbria
CA4 0BQ
Tel: +44 (0)122 856 4820

your earth our world

