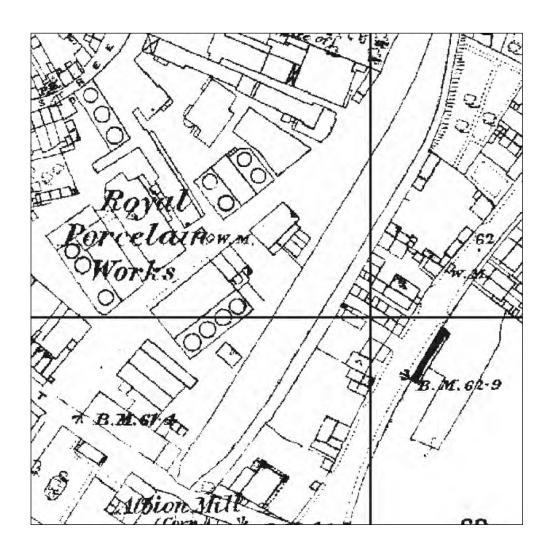


Archaeological Excavation Report



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Archaeological Excavation Report

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Archaeological Excavation Report

Summary

Wessex Archaeology was commissioned by CgMs Consulting to undertake an archaeological excavation, in advance of proposed residential development by Berkeley Homes, on the site of the former Royal Porcelain Works at Severn Street, Worcester, Worcestershire. This phase of archaeological excavation was to take place in the current Berkeley compound to the north of Mill Street. The development was centred on National Grid Reference (NGR) 385140, 254202. The proposed excavation area was to measure 15m by 15m, and was targeted on the possible location of the range of four bottle kilns depicted on the 1884 OS map. The excavation area was within the footprint of a proposed residential building.

The archaeological excavation identified the poorly preserved remains of the kilns evident on the 1884 Ordnance Survey map of the Site. With the exception of concrete pads no upstanding structural remains associated with the kilns survive. The pads were c. 8.6m in diameter, 0.3m thick and were a concretion of grey ashy mortar with predominantly crushed firebrick in the matrix. Excavation revealed that both pads were constructed at the same time and the concretion of material was seamless between the join of the two structures. The kilns themselves had truncated a drain, constructed from unfrogged red brick, as well as a northwest to southeast aligned ditch. Both of these features are likely to be post-medieval in date.

All of the pads had suffered demolition damage prior to excavation and there was evidence for 20th century truncation across the excavation area. This is supported by cartographic evidence which shows the kilns had been removed by the early 1960s. A large quantity of 19th to 20th century ceramic material was uncovered, particularly from the eastern corner of the Site.

The excavation has been successful in providing an exact location and assessment of the level of preservation of the bottle kilns identified on the 1884 Ordnance Survey Map. The excavation also demonstrated that the proposed development area has been badly disturbed and that the kilns only survive as concrete bases with no upstanding structures remaining. Due to the poor preservation of the kilns nothing can be said of the specific construction methods or form of the kilns.

The ceramic material recovered constitutes a good cross section of typical industrial waste from a ceramic factory and would have been dumped as such shortly after it was created. There is ample diagnostic evidence to prove that this waste came from the Royal Worcester factory and there is no shard that can be identified that has come from an of the other Worcester ceramic factories. Other than a lack of Royal Worcester Parian or Glazed Parian examples, which represent a large percentage of production in the 1850 - 1940, a good cross section of the types of predictable ceramic and associated waste was found. Hardly any decorated ware was found and it is likely that the material was disposed of not far from where it was created in the manufacturing process.

The archive is currently held at the offices of Wessex Archaeology in Sheffield, under Wessex Archaeology project code 110320. The archive will be deposited with Worcester City Art Gallery and Museum under an accession number to be determined. An OASIS form will be submitted at the time of deposition.



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Acknowledgements

This project was commissioned by CgMs Consulting on behalf of Berkeley Group PLC, and Wessex Archaeology is grateful to Cathy Patrick in this regard. The archaeological works were monitored by James Dinn and Sheena Payne-Lunn (Archaeological Officers for Worcester City Council).

The archaeological excavation was carried out by Neil Dransfield, Mike Howarth and Callum Bruce between the 5th and 10th of August, 2015. The finds were assessed by Lorraine Mepham and Harry Frost (Former curator of the Museum of Royal Worcester).

The report was compiled by Chris Swales, with the illustrations produced by Alix Sperr. The project was managed for Wessex Archaeology by Chris Swales.



Archaeological Excavation Report

1 INTRODUCTION

1.1 Project background

- 1.1.1 Wessex Archaeology was commissioned by CgMs Consulting to undertake an archaeological excavation, in advance of proposed residential development by Berkeley Homes, on the site of the former Royal Porcelain Works at Severn Street, Worcester, Worcestershire. This phase of archaeological excavation was to take place in the current Berkeley compound to the north of Mill Street. The development was centred on National Grid Reference (NGR) 385140, 254202 and is hereafter referred to as 'the Site' (Figure 1).
- 1.1.2 The proposed excavation area was to measure 15m by 15m, and was targeted on the possible location of the range of four bottle kilns depicted on the 1884 OS map. The excavation area was within the footprint of a proposed residential building. A Written Scheme of Investigation (WSI) was produced by Wessex Archaeology outlining the strategy and methodology for the work (Wessex Archaeology 2015a). The WSI was approved by James Dinn of Worcester City Council (WCC) who also monitored the fieldwork. All work was undertaken in line with industry best practice (CIfA 2014a-d, HE 2015).
- 1.1.3 This report presents a brief description of the methodology employed, as well as the results of the archaeological excavation.

1.2 The Site

- 1.2.1 The Site is currently in use as part of the site compound for Berkeley Homes, the principal developer of the proposed residential development of the former Royal Porcelain Works. It is bounded to the east by the Worcester and Birmingham Canal, to the south by Mill Street. The remainder of the Site is bounded by upstanding buildings, the Exhibition House to the west and the Parian House to the north.
- 1.2.2 The Site is broadly level at around 20m above Ordnance Datum (aOD). The underlying geology of the Site comprises mudstone of the Sidmouth Mudstone Formation with recorded superficial deposits of sand and gravel (BGS 2015).

2 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 The Site has been the subject of previous archaeological work including a desk-based assessment (Sherlock and Feryok 2004) and archaeological evaluation (Thames Valley Archaeological Services (TVAS) 2007). The immediate vicinity of the Site has also been subject to previous archaeological work including a desk-based assessment (CgMs 2013),

1



- a geophysical survey (ArchaeoPhysica 2004), archaeological monitoring and evaluation events (Archaeology 2006a; 2006b, TVAS 2007; 2009, Worcestershire Archaeology 2013, Wessex Archaeology 2014; 2015b).
- 2.1.2 The following information is summarised from the Desk-Based Assessments (DBA) compiled by Archenfield Archaeology (Sherlock and Feryok 2004) and CgMs (CgMs 2013), the results from Thames Valley Archaeological Services (TVAS 2007) evaluation of the Site, and Wessex Archaeology's previous, evaluation and watching brief reports (Wessex Archaeology 2014; 2015b).

2.2 Summary

Prehistoric

2.2.1 There is limited evidence for prehistoric activity within the vicinity of the Site. A Bronze Age axe was found during demolition works on the castle motte approximately 150m north-west of the Site, and a number of pits, a posthole and possible defensive features dating to the Iron Age were identified during archaeological work at King's School approximately 200m north-west of the Site. Although the Site is situated on the gravel terrace on the east bank of the River Severn and would have been a favourable location for prehistoric settlement it is thought that subsequent activity, not least the development of the porcelain works within the Site, is likely to have significantly truncated any prehistoric remains. It is therefore unlikely that archaeological features of this date will be encountered during excavation.

Romano-British

2.2.2 The Roman town at Worcester is thought to have been established in the late 40s or 50s AD, possibly developing from an earlier military camp. The core of the Roman settlement was centred on Cathedral Close, approximately 350m north of the Site, and appears to have been focused within a defensive circuit. Excavations immediately outside this circuit at St Albans School, approximately 200m west of the Site, revealed a cemetery, containing inhumation and cremation burials, possible agricultural features and the remains of a possible defensive ditch system. Further occupation remains, including a ditch, associated features and an inhumation burial were recovered during excavations on the site of the Dyson Perrins Museum, located approximately 150m north of the Site. To the immediate north-west of the Site a gully dated to the 1st to 2nd century AD was identified during an evaluation following demolition works. The Site is situated to the south of the main focus of Roman activity in Worcester although there is a moderate potential for the presence of archaeological remains dating to this period.

Anglo-Saxon

2.2.3 Settlement at Worcester appears to have contracted following the end of Roman occupation, with the main focus of Saxon occupation within a defended enclosure. The southern boundary of the settlement is assumed to have been reused for the medieval castle fortifications and is located approximately 150m north-west of the Site. A mid-10th century suburb to the south of the Saxon settlement is thought to have developed and has been identified in excavations to the north of Dyson Perrins Museum and at Willow Street, approximately 150m north and west of the Site respectively. It has also been suggested that the medieval Church of St Peter the Great was established during the late Saxon period.

Medieval and Post-Medieval

2.2.4 Excavations by Wessex Archaeology in 2014 approximately 150m north-east of the Site identified fragmentary remains of the foundations of the medieval Church of St Peter the Great demolished in 1837, although it had largely been truncated by the later Victorian



church built in 1838 and itself demolished in 1976 (Wessex Archaeology 2015). The excavations also identified the course of the medieval city wall running on a south-west to north-east alignment before turning slightly to a south-north alignment. Further excavations and cartographic evidence has shown that the city wall turns to an east-west alignment to the north of the Site. There is currently no known evidence of medieval occupation outside the city walls and place name evidence for the Site's position within Diglis suggests that the Site was situated within a low lying meadow prone to flooding during the medieval period (CgMs 2013).

- 2.2.5 The 16th century saw land along Frog Lane, now Severn Street, divided into plots with housing built along the street front and the land to the south towards the Site being let out as market gardens (Sherlock and Feryok 2004). In the mid-17th century, the Civil War led to alterations to the city defences to the north of the Site, including a series of fortified redoubts linked by a system of trenches and ramparts. These improvements were demolished by the Parliamentarians in 1651 following the defeat of the Royalist garrison. Previous archaeological evaluations in proximity of the Site have to date failed to identify any features relating to these defensive works (CgMs 2013).
- 2.2.6 The Birmingham and Worcester Canal, which forms the eastern boundary of the Site, was constructed in 1815.
- 2.2.7 Industrial ceramics have been manufactured in Worcester since Dr John Wall founded a company in Warmstry Slip near the river Severn in 1751. Dr. Wall's first apprentice is reputed to have been Robert Chamberlain Snr. who left that factory in 1783. Porcelain production began on Severn Street in 1783 when Robert Chamberlain started manufacture. This separate competitive porcelain factory quickly developed and a new entrance in Severn Street was created, this factory extended towards Mill Street during the 19th century. The Chamberlain factory amalgamated with the former Dr. Wall Factory in 1840 (then known as Flight Barr & Barr) and the entire business was consolidated on the Chamberlain Factory site in Severn Street in that year. After further managerial changes the firm restyled itself in 1862 as 'The Worcester Royal Porcelain Co. Ltd' a name it retained until the late 20th century although its products were retailed as 'Royal Worcester' from 1862 to the closure of the factory in 2009.
- 2.2.8 Robert Chamberlain's grave marker was recovered during excavation at the Church of St Peter the Great in 2014 (Wessex Archaeology 2015b). The factory at Severn Street saw several phases of expansion between 1840 and 1876 following the merger with Flight and Barr in 1840 to form the Royal Porcelain Company. Historic mapping indicates that the Site remained undeveloped until the late 19th century, when the 1884 edition of the Ordnance Survey (OS) depicts a range of four bottle kilns (Figure 1). The building is depicted on subsequent editions of the OS, although the kilns are not specifically noted, and they had been removed by the early 1960s when the building was depicted as an outline. The recently demolished building has been considered as at least the frame of the original kiln house, although heavily remodelled internally, however, there are discrepancies within the map data to definitively establish whether this was the original building (TVAS 2007). An evaluation trench was excavated within the Site by Thames Valley Archaeological Services which identified a wall foundation and two concrete plinths supporting walls. No evidence for the kilns depicted on the 1884 OS map was uncovered although the trench was not ideally placed to confirm or refute the presence of any surviving kiln structures (TVAS 2007).

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3 AIMS AND OBJECTIVES

3.1 General

- 3.1.1 The general aims of the project were:
 - to identify any archaeological remains present;
 - to accurately record the location and stratigraphy of areas excavated;
 - to record all archaeological remains disturbed by the proposed groundworks;
 - to determine the extent, condition, character, importance and date of any archaeological deposits encountered;
 - to provide information that will enable the archaeological remains to be placed within their local, regional and national contexts;
 - to integrate the results into the wider cultural and environmental context and with specific research aims;
 - to recover artefacts disturbed by the works; and
 - to produce an accurate and comprehensive record and report of any archaeological deposits disturbed by the works.

3.2 Specific

- 3.2.1 The specific aims of the project were:
 - to establish whether there were any surviving remains of the pottery kilns depicted on the first edition OS map in this location;
 - to establish the character and operation of any surviving pottery kilns;
 - to establish the survival or otherwise of additional archaeological remains in the area of the proposed development; and
 - to identify any threat to the survival of significant archaeological remains by the forthcoming development and if necessary seek an alternative construction design to allow preservation in situ.

4 FIELDWORK METHODOLOGY

4.1 General

4.1.1 The proposed excavation area was to measure 15m by 15m, and was targeted on the possible location of the range of four bottle kilns depicted on the 1884 OS map. The excavation area was within the footprint of a proposed residential building. Health and Safety considerations relating to the depth of overburden required the excavation area to be stepped inwards. As a result, the excavation area at the base of the trench was reduced to c. 13.5m by 13.5m. The excavation was carried out in accordance with the agreed WSI (Wessex Archaeology 2015) and current industry standards (CIfA 2014a-d, HE 2015).

4.2 Machine excavation

- 4.2.1 The location of all trenches will be scanned using a CAT to check for uncharted services.
- 4.2.2 Overburden was removed using a mechanical excavator fitted with a toothless ditching bucket, working under the continuous direct supervision of a suitably experienced archaeologist. Material was be separated by type, and stored on Site at a safe distance from the excavation, down to the level of the upper archaeological horizon.

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- 4.2.3 The trench was excavated to a safe depth and was stepped at a maximum of 1.2m per step due to the very loose overburden.
- 4.2.4 All spoil was scanned for artefacts, which were recorded and retained unless of clearly modern (i.e. late 20th or early 21stcentury) origin.
- 4.2.5 Excavated material was neatly stockpiled at a safe distance from the trench edge. Following the completion of all hand excavation and recording by Wessex Archaeology all equipment was removed from Site and the excavation area was returned to Berkeley Homes.

4.3 Sample excavation and recording

- 4.3.1 Surfaces were cleaned as necessary to allow inspection and to define the extent of any archaeological features and deposits. Archaeological features were hand excavated, and care was taken not to compromise the integrity of archaeological features or deposits, which may be deemed suitable for preservation by record or preservation *in situ*. However, excavation was sufficient to understand and record the full stratigraphic sequence, down to naturally occurring deposits, if possible.
- 4.3.2 As anticipated, the majority of archaeological features identified were structures relating to the pottery works, rather than cut features. These were be excavated sufficiently to fulfil the aims of the excavation.
- 4.3.3 Written and drawn records were made of the stratigraphy within the trench. Full written and drawn records of all excavated contexts were made in accordance with best archaeological practice. Unexcavated archaeological deposits were recorded to the maximum extent possible.
- 4.3.4 All archaeological features were related to the Ordnance Survey datum and to the National Grid. Survey was undertaken using a GNSS system to an accuracy of 0.02m. Particular attention was taken to record the levels of structures and archaeological remains to ascertain any truncation that would be caused by the developments proposed impact depth.

4.4 Recording

- 4.4.1 All archaeological deposits were recorded using Wessex Archaeology's *pro forma* recording system. This written record is hierarchically based and centred on the context record. Each context record fully describes the location, extent, composition and relationship of the subject and will be cross-referenced to all other assigned records. Context numbers used in the excavation were not repeated.
- 4.4.2 Each excavated context appears on at least one detailed plan at 1:50 or 1:20 scale and one section at 1:10 and co-ordinated on to the overall Site plan. A full photographic record was maintained consisting of 35mm monochrome prints and digital images. The photographic record illustrates both the detail and the general context of the principal features.

4.5 Finds

- 4.5.1 All finds were treated in accordance with relevant industry guidance (UKIC 2001; MGC 1991; English Heritage 2005, 2006a), and the requirements of WCC.
- 4.5.2 All artefacts from excavated contexts were retained (except unstratified modern material) and taken to Wessex Archaeology offices in Sheffield for further work.



- 4.5.3 All artefacts were (as a minimum) washed, weighed, counted and identified.
- 4.5.4 All artefacts were recorded by context, with summary listing of artefacts by category to provide simple quantification. Artefacts were analysed and reported by specialists. Pottery reports will refer to the appropriate type series.

4.6 Environmental samples

4.6.1 No deposits suitable for environmental sampling were identified during the course of the excavation.

5 ARCHAEOLOGICAL RESULTS

5.1 Introduction

5.1.1 The following section provides a summary of the information held in the Site archive, with a full list of context numbers and context descriptions within the excavation area contained in **Appendix 1**.

5.2 Geology

5.2.1 The underlying natural geology was a mixed light yellowish grey and light brown gleyed clay (118). The deposit was encountered at a depth of 14.6m above Ordnance Datum (aOD), 1.74m below ground level (bgl).

5.3 Made ground

- 5.3.1 Overlying the natural clay was a 0.4m thick layer mid yellow brown silty clay (**103**) which contained the occasional fragment of brick and small charcoal and coal fragments (**Figure 4**).
- 5.3.2 The deposit was homogeneous in character and thickness across the exposed area with a level upper surface. The inclusion of some brick rubble in the matrix implied that the deposit was a consolidated ground surface, possibly connected to surfaces or buildings prior to the construction of the brick kilns prior to 1884. A small sherd of 19th to early 20th century pottery was recovered from the deposit along with an animal bone.

5.4 Archaeological features (lower archaeological horizon)

- 5.4.1 The excavation uncovered a 3m long section of northwest to southeast aligned ditch (112) in the eastern corner of the Site which cut through clay 103 (Figure 3 and 4, Plate 1). The ditch measured 0.7m wide by 1.06m deep and contained a 0.8m deep mixed clay lower fill (116) containing bone, ceramic building material (CBM) and metal objects. Fragments of clay pipe uncovered in the fill dated the infill to the post-medieval period. The ditch was finally capped with a mixture mid brown and light bluish grey clay (119) to consolidate the land surface.
- 5.4.2 A brick lined drain (111) was uncovered in the southern corner of the Site running east-southeast to west-northwest (Figure 2, Plate 2). The drain cut through clay 103 and was constructed of unfrogged bricks, bonded by a black ashy mortar indicating a 19th century date. The west-northwest end was clearly truncated by cut 102 for concrete pad 101 (see section 5.5).

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5.5 The kiln foundations (upper archaeological horizon)

- The upper archaeological horizon was dominated by two circular concreted pads (101 and 108/109), which appeared to be contained within a shallow depression cut 102 (Figure 2 and 3, Plates 3, 4 and 5). The pads were interpreted as the foundation bases for the circular brick oven kilns evident on the 1884 Ordnance Survey Map of the Site (Figure 1). Pad 101 was more fully exposed and measured 8.6m in diameter and up to 0.3m thick towards the centre (Figures 2-4). The pad consisted of a concretion of grey ashy mortar with predominantly crushed firebrick in the matrix (Plate 5). A large quantity of china was included in the matrix implying production waste from elsewhere prior to the construction of the brick oven kilns.
- 5.5.2 A second circular pad (108/109) was partially exposed at the northeast edge of the Site. Excavation revealed that 101 and 108/109 were constructed at the same time and the concretion of material was seamless between the join of the two structures (Figure 2). This pad appeared to overlie the upper fill of ditch 112.
- 5.5.3 The two pads were aligned southwest to northeast which matches the orientation of the brick oven kiln structures evident on 1884 Ordnance Survey Map.
- Two smaller concreted pads were also uncovered during the excavation (**Figure 2**). Pad **107** was located to the immediate north of pad **101** and may have supported external walling associated with the kiln building. Pad **110** was located to the southeast side of pad **101**. This pad was roughly rectangular in plan and may have been associated with outer walling/structure to the oven itself. All of the pads had suffered demolition damage prior to excavation.
- 5.5.5 A 0.2m thick black gritty silty clay (104) was evident around the southwest and eastern edges of the Site (Figure 4). The soil overlay clay 103 but no physical relationship between this and the pads had survived demolition. A large quantity of china was uncovered (Plate 6), particularly from the eastern corner of the Site (see Section 6).
- 5.5.6 This upper archaeological horizon was reached at 15.28m aOD, 1.06m bgl.

5.6 Demolition

- 5.6.1 An area of disturbance (114) was uncovered along the southwest edge of the Site (Figures 3 and 4). Excavation revealed that the cut was late in the sequence, truncating both pad 101 and soil 104. The backfill (119) consisted of a highly mixed brown and blue clay with brick fragments, stone and coal.
- 5.6.2 A vertical sided machine trench (113) was also uncovered through soil 104 (Figure 3, Plate 7) A plastic Coca Cola bottle was recovered from the lower fill (115).
- 5.6.3 The Site had been subjected to ground reduction (105) prior to the excavation and made ground consisting of hardcore and crushed brick rubble (106), over 1.2m thick, overlay the Site (Plate 3).

6 ARTEFACTUAL EVIDENCE

6.1 Introduction

6.1.1 The excavation produced a moderate amount of finds, consisting largely of pottery and associated ceramics (kiln furniture). The pottery, and other datable finds (clay tobacco



pipes) are post-medieval. The quantification of finds by context and by material type is given in **Table 1**.

Table 1: All finds by context (number / weight in grammes)

					Other
Context	Animal Bone	Clay Pipe	Iron	Pottery	Ceramic
101				167/2832	
103	1/168			1/5	2/94
104				49/3440	
108				25/351	
113					5/48
116	3/20	5/12	2/38		
Unstrat.					3/392
Total	4/188	5/12	2/38	242/6628	10/534

6.2 Other finds

6.2.1 Apart from pottery and associated ceramics, other finds were very sparse (**see Table 1**), and were recovered only from layer **103** and fill **116**. They comprised four pieces of animal bone (including a sawn cattle humerus from layer **103**), two heavily corroded iron nails (undated), and five fragments of clay pipe, four of which conjoin to form a partial bowl of 18th century type.

7 ROYAL WORCESTER POTTERY

7.1 Introduction

- 7.1.1 The ceramic material recovered constitutes a good cross section of typical industrial waste from a ceramic factory and would have probably been dumped as such shortly after it was created. There is ample diagnostic evidence to prove that this waste came from the Royal Worcester factory and there is no shard that can be identified that has come from any of the other Worcester ceramic factories. Only one earthenware shard was found, this was probably of Staffordshire origin and not being industrial waste it was likely to be domestic breakage. Therefore the remainder of the excavated material was 100% related to the former Worcester Royal Porcelain Co. Ltd more commonly known as Royal Worcester.
- 7.1.2 There follows a list of the ceramic bodies produced on the Severn Street Factory Site during the period 1788 2009 for whilst the firm styled itself a 'porcelain' factory a number of ceramic bodies were created there. For completeness it is important that those highlighted in red were found not in the excavation area under consideration.

Hybrid Hard Paste & Regent Porcelain

7.1.3 Translucent grey bodies produced roughly between 1788-1820 for the manufacture of tablewares and ornamental ware which were glazed and decorated on site throughout.



Parian Known as 'Royal Worcester Ivory Porcelain'

7.1.4 A fine compact translucent porcelain body resembling ivory it was produced in glazed versions for tablewares and ornamental wares and also unglazed chiefly for ornamental ware due to its resemblance to statuary marble. It was introduced in the 1850's and ceased during W.W. II.

Bone China, later known as 'Royal Worcester Bone China' after 1862

7.1.5 A translucent, white body invented by Josiah Spode c. 1796 and introduced at Chamberlains Worcester c. 1820 and manufactured until 2009 for the manufacture of tablewares for fine dining and ornamental ware which were glazed and decorated on site. Some circular shapes in bone china could become unstable during the firing process and bone china rings known as 'setters' were made to hold these items true during the firing process. Bone china shrinks one seventh during the firing process and the bone china item and setter would shrink in unison to avoid distortion.

Vitreous (a type of ironstone) known as 'Royal Worcester Vitreous'

7.1.6 A tough, dense grey body hardly translucent introduced by Royal Worcester in the 1870's production ceased in 1918. For the manufacture of durable glazed tablewares for everyday use in homes, institutions hotels etc. decoration was often modest and inexpensive this body was very rarely used for ornamental items.

Hard Porcelain

- 7.1.7 A fine true porcelain body of high mechanical strength developed in 1914 at the request of the Government. This ceramic came in three categories but all appear to have been made from the same recipe. This body was rarely used for ornamental items but was in production until the closure of the factory in 2009.
 - Laboratory Porcelain sometimes known as Royal Worcester Silax
 - Oven to Tableware basically the same body but more thickly potted produced table and cookwares for everyday use this body was ovenproof, freezerproof, dishwasherproof and microwaveproof.
 - Hotelware a robustly made tableware with thickened rims to strengthen it for heavy usage.
- 7.1.8 Due to the firing sequence of porcelain vitrifying during the glaze firing (the opposite of bone china) Porcelain shapes had to be more robust as they had to be self supporting without the assistance of ceramic rings, hence their absence from the excavation.

Fireclay

7.1.9 A dense opaque material containing 'grog' that being a ground up pre-fired ceramic material. It was made into all manner of kiln furniture for repeated use until it became unstable or broke. It included props, and saddles for supporting flatware during the firing process it was also made into saggar boxes to protect ware from flames in the kiln. Fireclay was used throughout the period 1788 – 2009 it was always retained on site and no records survive to show that it was manufactured for sale by the company.

Porcelain Grinding Balls

7.1.10 Unglazed Porcelain balls used in a rotating Mill to assist in the grinding of raw materials or more likely in the rectification process to polish fired biscuit ware prior to glazing.



7.2 Methodology

- 7.2.1 All of the examined ceramic material was recovered from deposits **101**, **103**, **104**, **108** and **113**. During the identification process the material was sub-divided into ceramic types and bagged separately by type:
 - Deposit 101 is subdivided into bags 1-14
 - Deposit 103 is subdivided into bags 15-16
 - Deposit 104 is subdivided into bags 17-26
 - Deposit 108 is subdivided into bags 27-33
 - Deposit 113 is retained in bag 34

Table 2: Royal Worcester Porcelain by ceramic type

Bag	Ceramic Type
number	30.3
1	Royal Worcester vitreous body flat ware sections, rims, biscuit
2	Royal Worcester vitreous body flat ware sections, foot rims, biscuit
3	Royal Worcester vitreous body large oval meat plate sections biscuit
	Royal Worcester vitreous body identifiable shards biscuit
	a. section of an oval fish drainer
	b . section of an oval vegetable dish base with remains of a handle terminal see
4	image 2 for a complete Royal Worcester vitreous example in this shape.
	c. section of an oval baking dish
	d . section of a distorted vegetable dish lid
	e. section of unusual surface moulding
5	Royal Worcester vitreous body glazed
	Royal Worcester vitreous body printed patterns
	a . is a fired biscuit shard with its pattern printed in underglaze blue and ready
	for glazing. The pattern is known as 'Royal Lily' it had been introduced at
	Worcester c. 1760, continued and was produced sporadically during the whole
6	of the 20 th century but mainly prior to the 1930's this piece being in vitreous
0	body predates 1918. see image 3 for a complete Royal Worcester vitreous
	example in this shape
	b . a glazed underglaze blue shard of a the rim border of the Royal Worcester
	version of the standard willow pattern for a complete Royal Worcester
	vitreous example date coded for 1909
7	Royal Worcester vitreous body stained wasters these are probably stained by
,	iron in the ground rather than by some manufacturing process
8	Royal Worcester bone china flat ware sections biscuit
9	Royal Worcester bone china flat ware sections foot rims biscuit
	Royal Worcester bone china identifiable shards biscuit
10	a. Cylindrical dressing table container section, the top ridge indicates this
10	would have been intended to have a lid
	b. Section of a pedestal egg cup fragment



	 c. Section of a pedestal footed vegetable dish d. Section of a jug known in the factory records as a 'Churn jug' see image 6 for a complete Royal Worcester bone china example in this shape. e. Section of a 'Prince' shape Breakfast cup foot rim f. Section of a 'Warmstry Flute' shape saucer g. Section of a teacup with the remains of a 'Sevres' style handle h. Section of a teacup i. Section of a teacup footrim
11	Royal Worcester bone china glazed wasters mostly saucer fragments and a collapsed handled dish section
12	Royal Worcester bone china rings/setters biscuit including two sections of a flat 'bat' probably used for supporting a figurine
13	Royal Worcester fireclay kiln furniture/props
14	Staffordshire? blue printed earthenware probably the remains of a workman's mug
15	Plaster of Paris, probably fragments of working moulds.
16	Royal Worcester bone china glazed painted underglaze blue
17	Royal Worcester porcelain flat ware Hotelware plate sections glazed. The edges of these plates have a deliberately thickened edge to make them more resistant to breakage Royal Worcester porcelain Hotelware was the natural successor to the Royal Worcester vitreous body
18	Royal Worcester porcelain hollow ware shards glazed Oven to Tableware in the 'Severn' shape designed by Neal French a & b are sections with handles are the remains of a two handled cream soup cup which was intended to have had a saucer for a complete Royal Worcester porcelain 'Oven to tableware' example in this shape c & d are the remains of an oval entree dish one is a section of the lid with bar handle and the other is the top rim of the base with an unglazed area where the lid fits for a complete Royal Worcester porcelain 'Oven to tableware' example in this shape e is a section of the lid of a circular casserole
19	Royal Worcester porcelain 'Oven to Tableware egg coddlers glazed. This was one of Royal Worcester's most popular giftware items. The shape with metal screw fitting cover was first introduced by the Grainger factory in Worcester in the late 19 th century. Royal Worcester made these in quantity in their Oven to Tableware porcelain from the 1950's until 2009 in at least 3 sizes. These are the medium size, they were known by the factory workers as 'Premier Eggs'
20	Royal Worcester porcelain 'Oven to Tableware ramekins glazed, three of these examples are complete and also bear the circular green mark on their base 'ROYAL WORCESTER FIREPROOF. MADE IN ENGLAND. Shape 48. Size – 00
21	Royal Worcester porcelain 'Laboratory ware' glazed a. Section of large cylindrical vessel it bears a very small underglaze green factory mark conspicuously on its top rim. ROYAL WORCESTER. MADE IN ENGLAND 9 This small mark was reserved for laboratory ware and was always on full view as seen here and not placed beneath an article b. Section of a small crucible



	c. Section of a cylindrical filter funnel Examples of these may be seen in the Museum of Royal Worcester, Severn Street, Worcester
22	Royal Worcester bone china flat ware plate sections biscuit
23	Royal Worcester bone china rings / setters biscuit including one complete example
24	Gimson refractory saddle in sections used to support Bone chine plates during firing and having impressed marks GIMSON. PARAGON. NO 847309. 7F
25	Royal Worcester fireclay saggar box rim section
26	Royal Worcester porcelain grinding balls. These are complete and were used in quantity in various sizes for polishing biscuit bone china and sometimes for grinding raw materials in a rotating grinding mill
27	Royal Worcester vitreous body flat ware biscuit
28	Royal Worcester vitreous flat ware glazed including one example of Hotel ware with a 'double fine line edge' painted in underglaze blue. This modest pattern would be typically crested with the name of the institution that had ordered it
29	Royal Worcester bone china flat ware biscuit
30	Royal Worcester bone china flat ware glazed
31	Royal Worcester porcelain glazed ramekin
32	Royal Worcester fireclay kiln furniture / spacers
33	Royal Worcester bone china rings / setters biscuit
34	Royal Worcester fireclay kiln furniture / spacers

7.3 Dating

7.3.1 Virtually every piece of Royal Worcester produced was coded with both the month and the year usually both impressed and also by enamel transfer from 1862. Unfortunately not one single shard had such a date code. Similarly only two shards bore patterns and whilst these were immediately identified they were two of the most popular patterns Royal Worcester produced which covered a wide date range. Dating of the shards was therefor based on the types of ceramic body in context with known shapes of which there were few. To compound the problem the majority of wasters were flatware or kiln furniture which supply no diagnostic evidence for dating.

Table 3: Dating of Royal Worcester ceramics by context

Context number	Date
101	1870-1918
103	Undateable
104	1950-1970
108	1870-1970
113	Undateable

7.4 Discussion

7.4.1 The excavations are surprising in that they have not yielded one single shard of Royal Worcester Parian or Glazed Parian which formed a large percentage of production in the



- 1850 1940 period which overlaps with the calculated date of the excavated material. Otherwise a good cross section of the types of predictable ceramic and associated waste were found.
- 7.4.2 Surprisingly, hardly any decorated ware was found however and this is in marked contrast to other ceramic excavations. It is likely that that the material from this excavation was probably disposed of not far from where it was created in the manufacturing process, rather closer to the Biscuit and Glost kilns than other manufacturing departments.
- 7.4.3 It is futile to try and calculate or compare quantities of one ceramic material to another. Porcelain potting weights being considerably higher than those of Bone China and Royal Worcester Vitreous being different again.

7.5 Recommendations

7.5.1 The excavated material does not add anything to our knowledge of Royal Worcester Porcelain or the site on which it was found. However there is a very strong case for retaining the various items of kiln furniture both in fireclay and the bone china setters and supports, as this material was always discarded and provides a valuable insight into how the various ceramic bodies were produced at Royal Worcester during the period suggested.

8 DISCUSSION

8.1 Summary

- 8.1.1 The archaeological excavation has identified the poorly preserved remains of the kilns evident on the 1884 Ordnance Survey Map of the Site. With the exception of concrete pads 101, 108/109, 107 and 110 no upstanding structural remains associated with the kilns survive. Pads 101, 108/09 measured c. 8.6m in diameter, 0.3m thick and were a concretion of grey ashy mortar with predominantly crushed firebrick in the matrix. Excavation revealed that both pads were constructed at the same time and the concretion of material was seamless between the join of the two structures. The kilns themselves had truncated a drain, constructed from unfrogged red brick, as well as a northwest to southeast aligned ditch. Both of these features are likely to be post-medieval in date.
- 8.1.2 All of the pads had suffered demolition damage prior to excavation and there was evidence for 20th century truncation across the excavation area. A large quantity of 19th and 20th century ceramic was uncovered, particularly from the eastern corner of the Site.
- 8.1.3 An area of disturbance (114) was uncovered along the southwest edge of the Site. Excavation revealed that the cut was late in the sequence, truncating pad 101. A vertical sided machine trench (113) was also uncovered with a plastic Coca Cola bottle recovered from the lower fill. The Site had been subjected to ground reduction (105) prior to the excavation and made ground consisting of hardcore and crushed brick rubble (106) over 1.2m thick overlay the Site.
- 8.1.4 An evaluation trench was excavated within the Site by Thames Valley Archaeological Services (2007) which identified a wall foundation and two concrete plinths supporting walls at a depth of 0.8m bgl. The current excavation failed to identify these features which may indicate a very recent truncation of the Site.



8.2 Conclusions

- 8.2.1 The excavation has been successful in providing an exact location and assessment of the level of preservation of the bottle kilns identified on the 1884 Ordnance Survey Map. The excavation has demonstrated that the proposed development area has been significantly impacted on by previous development episodes, and that the kilns only survive as concrete bases with no upstanding structures remaining. Due to the poor preservation of the kilns nothing can be said or the specific construction methods of form of the kilns.
- 8.2.2 The ceramic material recovered constitutes a good cross section of typical industrial waste from a ceramic factory and would have been dumped as such shortly after it was created. There is ample diagnostic evidence to prove that this waste came from the Royal Worcester factory and there is no shard that can be identified that has come from an of the other Worcester ceramic factories. Other than a lack of Royal Worcester Parian or Glazed Parian examples, which represent a large percentage of production in the 1850 1940, a good cross section of the types of predictable ceramic and associated waste was found. Hardly any decorated ware was found and it is likely that the material was disposed of not far from where it was created in the manufacturing process.

9 STORAGE AND CURATION

9.1 Museum

9.1.1 It is recommended that the project archive resulting from the excavation be deposited with Worcester City Art Gallery and Museum. The Museum has agreed in principle to accept the project archive on completion of the project under an accession number to be determined. Deposition of any finds with the Museum will only be carried out with the full agreement of the landowner.

9.2 Archive

9.2.1 The complete Site archive, which will include paper records, photographic records, graphics, artefacts, ecofacts and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material by Worcester City Art Gallery and Museum and in general following nationally recommended guidelines (SMA 1995; UKIC 2001; Brown 2011; ADS 2013).

9.3 Discard policy

9.3.1 Wessex Archaeology follows the guidelines set out in Selection, Retention and Dispersal (SMA 1993), which allows for the discard of selected artefact and ecofact categories which are not considered to warrant any future analysis. Any discard of artefacts will be fully documented in the project archive.

9.4 Security copy

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



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11 APPENDICES

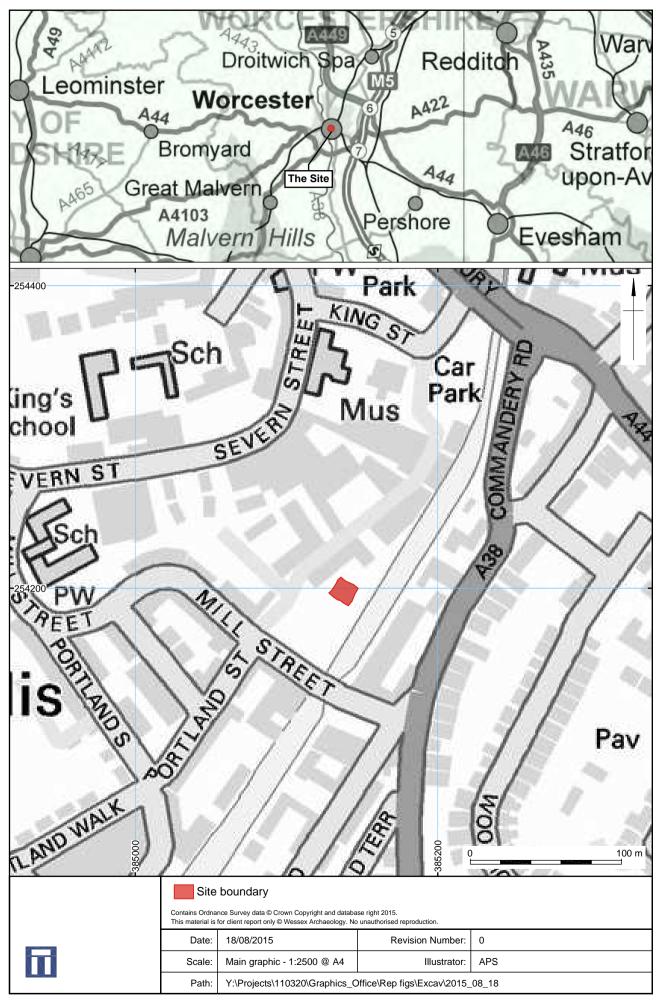
11.1 Appendix 1: Context descriptions

Trench No. 1	15m by 15m (Max depth 1.76m bgl)	Trench top: 16.34m aOD
Context	Description	Depth (m) aOD
101	Structure: Concrete base pad for kiln	15.28m
102	Cut: Construction cut for kiln 101	15.28m
103	Layer: Natural brown clay	14.58m
104	Layer: Black silty clay made ground	15.28m
105	Cut: Modern disturbance caused by on site demolition firm	15.30m
106	Layer: Modern hardcore fill of cut 105	16.34 – 15.30m
107	Structure: Concrete base pad for kiln structure	15.28m
108	Structure: Concrete base pad for kiln	15.28m
109	Structure: Concrete base pad for kiln	15.28m
110	Structure: Concrete base pad for kiln structure	15.28m
111	Structure: Unfrogged red brick drain located in SE corner of site	15.25m
112	Cut: SW-NE aligned ditch	14.66m
113	Cut: Modern disturbance caused by bucket of excavator	15.25m
114	Cut: Area of probable C20th disturbance	14.54m
115	Fill: Backfill of modern disturbance caused by bucket of excavator	14.54m
116	Fill: Secondary fill of SW-NE aligned ditch	14.66m
117	Fill: Fill of area of probable C20th disturbance	14.54m
118	Layer: Natural brown clay	1458m
119	Fill: Tertiary fill of SW-NE aligned ditch	14.66m

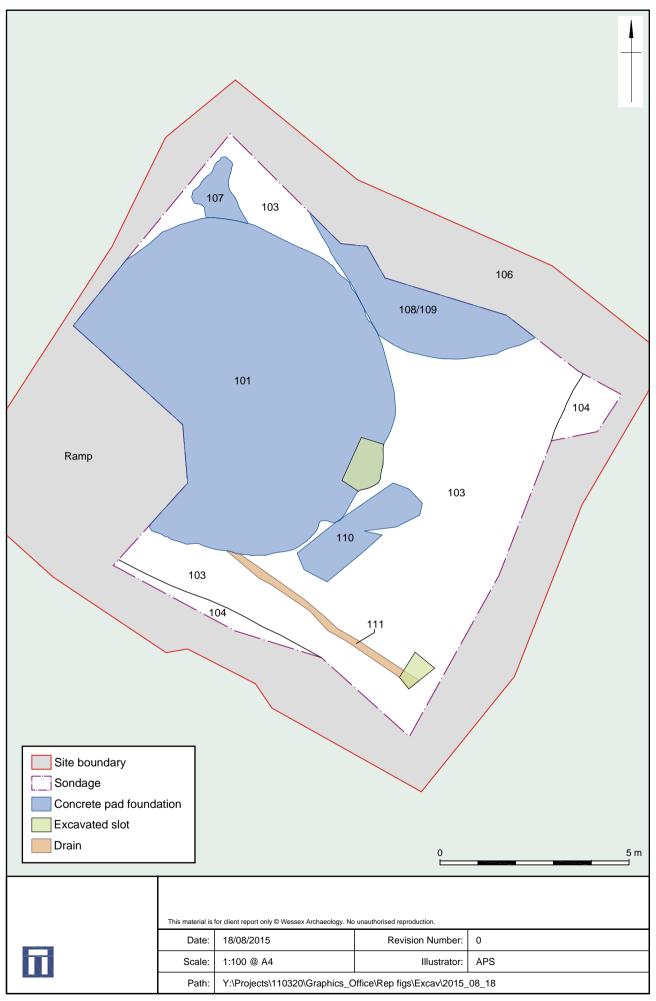


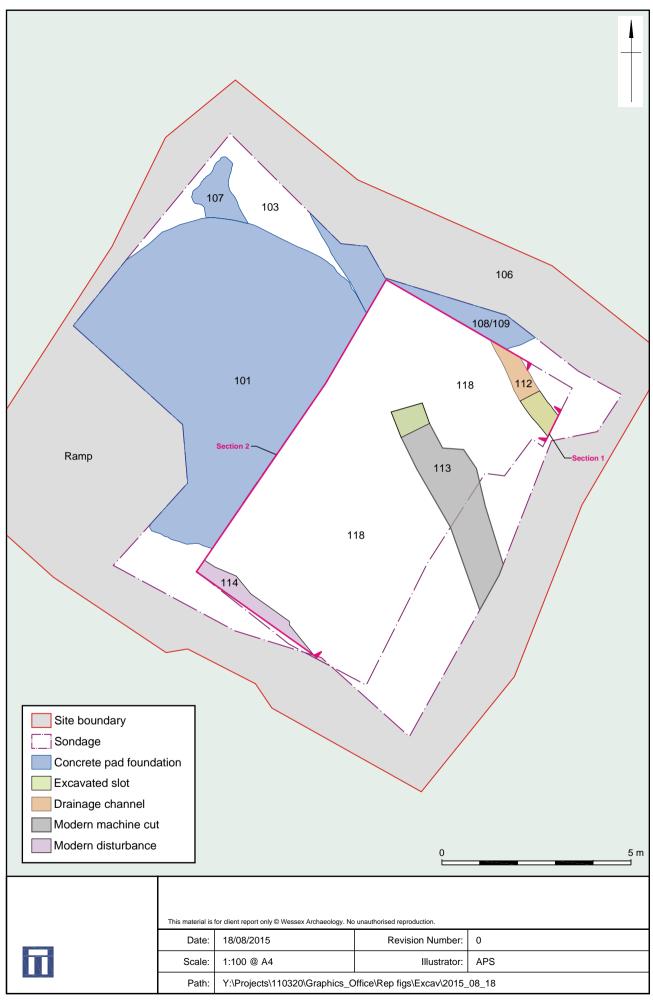
11.2 Appendix 2: OASIS form

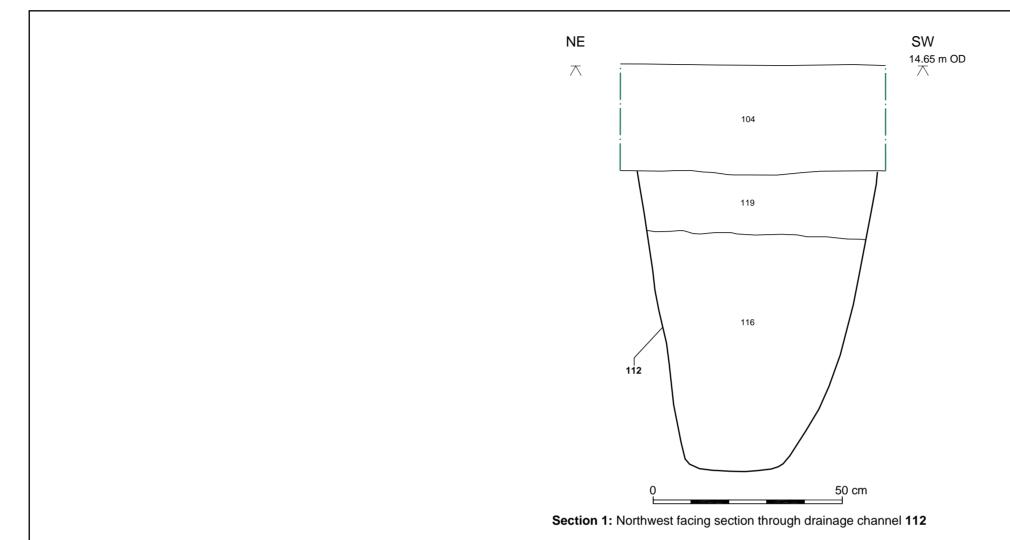
18 110320.01

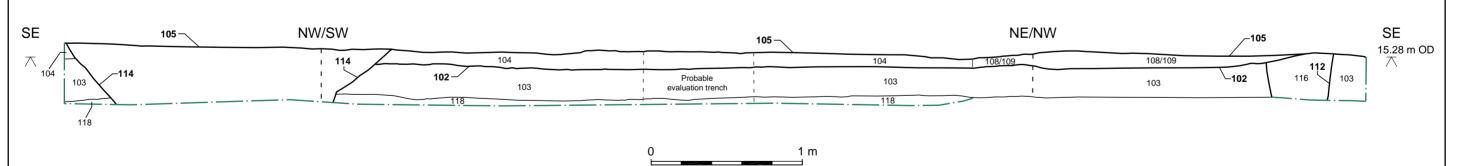


Site location Figure 1









Section 2: Southeast facing section through kiln base 101 and 108/109

Sections Figure 4



Plate 1: Section through ditch 112



Plate 2: Brick lined drain 111

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Plate 3: Overview of excavation area, post excavation



Plate 4: Detail shot of make-up of kiln bases

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Plate 5: Cross section of kiln bases



Plate 6: Deposit 104, containing dump of ceramics

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Plate 7: Modern machine trench 113

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