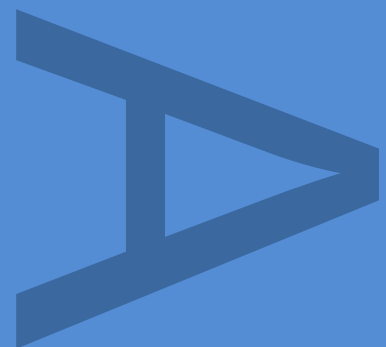


**THE GREAT PAGODA, ROYAL
BOTANIC GARDENS, KEW,
LONDON BOROUGH OF RICHMOND
UPON THAMES**

**PHASE II ARCHAEOLOGICAL
EVALUATION**

PCA REPORT NO: R12205

AUGUST 2015




PRE-CONSTRUCT ARCHAEOLOGY

DOCUMENT VERIFICATION

THE GREAT PAGODA, ROYAL BOTANIC
GARDENS, KEW

PHASE II ARCHAEOLOGICAL EVALUATION

Quality Control

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**An Archaeological Evaluation at The Great Pagoda
(Phase II), Royal Botanic Gardens, Kew, London
Borough of Richmond upon Thames, TW9 3AB**

Site Code: KEWP14

Central National Grid Reference: TQ 18471 76076

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August 2015

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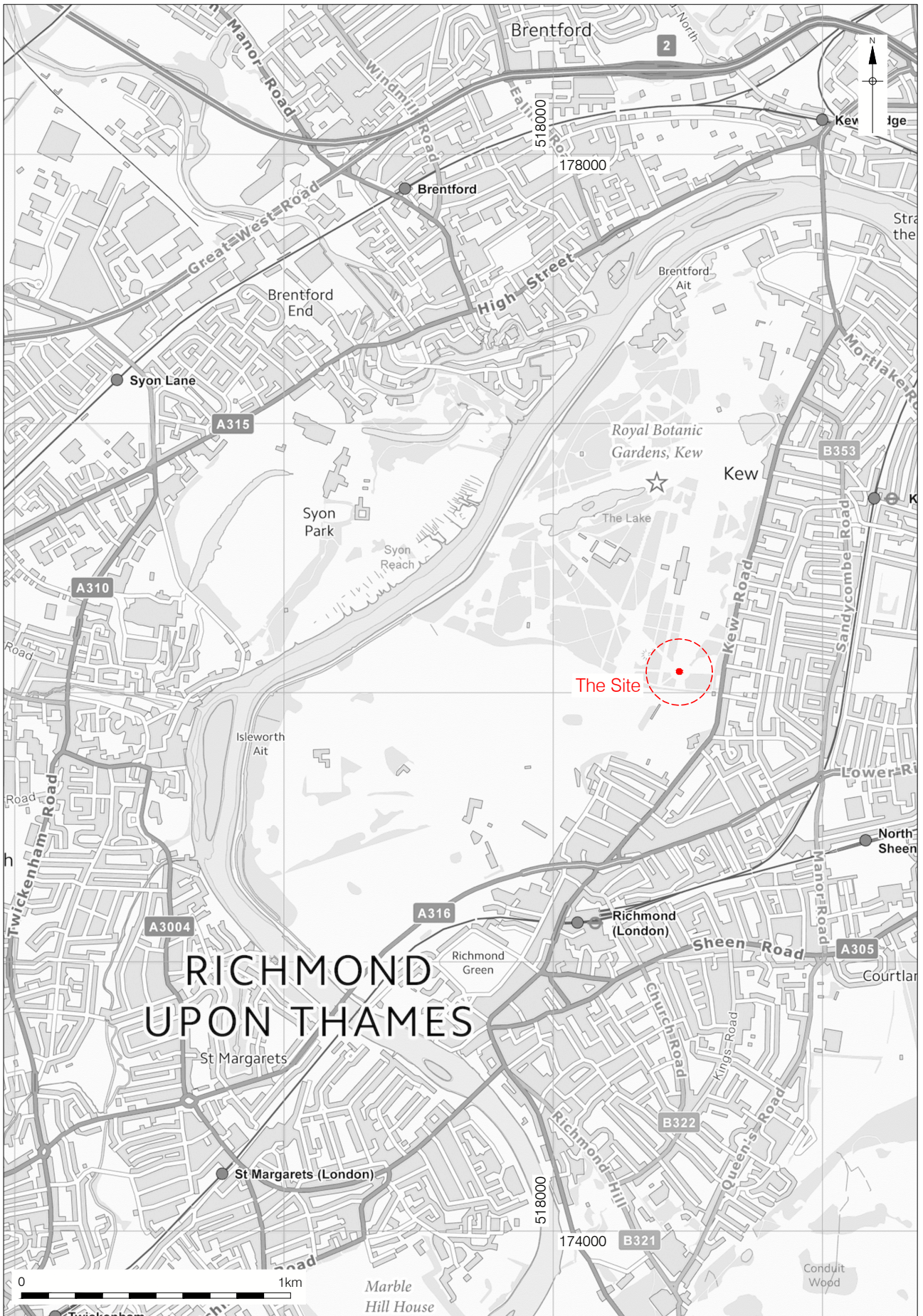
1 ABSTRACT

- 1.1 This report details the results of an archaeological evaluation undertaken at The Great Pagoda, Royal Botanic Gardens, Kew, London Borough of Richmond upon Thames, TW9 3AB. The evaluation was commissioned by Historic Royal Palaces as part of initial investigation works prior to further conservation, and took place between the 10th and 13th of August 2015. This followed earlier investigations which took place between the 24th and 25th of March 2014. These have previously been reported in Haslam, 2014. The Pagoda is located in the south eastern corner of Kew Gardens.
- 1.2 An evaluation comprising two trenches was undertaken, with one trench located at the base of the stairwell within the structure itself (Trench 1) and one trench located beneath the canopy of the pagoda (Trench 2).
- 1.3 The external evaluation trench was located on the north side of the Pagoda, opposite the northern arched headed doorway. It was excavated in an attempt to find a series of steps and/or other architectural features depicted by Sir William Chambers in an elevation of the Pagoda dating to c. 1761, as well as any evidence for a possible earlier column alignment depicted on the same drawing. The Chambers image appears to show the former ground level surrounding the Pagoda at a lower height than the modern ground surface, with a series of three access steps situated on four sides of the octagonal Pagoda base. The Chambers drawing also appears to suggest that the timber columns were closer to the main structure than the extant column line.
- 1.4 The internal trench was excavated in order to investigate the ground make up beneath the floor surface and to examine the foundations of the stairwell. The internal trench was located on the south-eastern corner of the timber stairwell.
- 1.5 Both evaluation trenches were sealed by flagstones which were underlain by modern make-up deposits. In Trench 1 a sandy deposit lay beneath the make-up and is believed to have been associated with later renovations to the Pagoda. At the base of the trench a firm mortar deposit was observed and interpreted as part of the Pagoda construction process. Running along the northern edge of Trench 1 was the brick plinth base for the stairwell. This extended into the eastern limit of excavation, possibly indicating that the base was in fact a square structure as opposed to octagonal like the stairwell and the Pagoda itself. The direct relationship between the mortar deposit and the plinth base could not be identified.
- 1.6 The earliest deposit encountered in Trench 2 was the natural sandy gravel. This was sealed by a sequence of two historic soil horizons which pre-dated the Pagoda and contained clay tobacco pipe dating to between 1700 and 1740. Cutting the uppermost of the two deposits was the construction cut for the Pagoda. At the northern end of the trench, excavation around column base C1 revealed the base to comprise a brick

plinth which was six courses deep. This was capped by a stone block on which the column stood.

2 INTRODUCTION

- 2.1 This report details the results and working methods of an archaeological evaluation (Phase II) undertaken by Pre-Construct Archaeology Ltd at The Great Pagoda, Royal Botanic Gardens, Kew, London Borough of Richmond upon Thames, TW9 3AB. The evaluation took place between the 10th and 13th of August 2015.
- 2.2 A total of two evaluation trenches were excavated during the investigations. Trench 1 was excavated internally and was located adjacent to the south-east corner of the stairwell. Trench 2 was external and was situated beneath the canopy on the north side of the Pagoda. Both of the trenches were sealed by flagstones which had been lifted prior to the archaeological investigations. The Pagoda itself is located in the south-eastern corner of Kew Gardens with Hoxton Lane situated to the south, the Japanese Gateway & Landscape to the west, the Pavilion Restaurant and Temperate House to the north and the Lion Gate on Kew Road to the east.
- 2.3 A Health and Safety Risk Assessment (Bradley 2015) was prepared prior to the fieldwork commencing.
- 2.4 The National Grid Reference of the site is TQ 18471 76076.
- 2.5 The project was monitored for the client by Lee Prosser (Curator - Historic Royal Palaces) and Patricia Les (Head of Building Conservation - Historic Royal Palaces). Rob Umney (Conservation Building Surveyor - Historic Royal Palaces) also assisted with the coordination of the project. The fieldwork was project managed by Tim Bradley and was supervised by the author, Alexis Haslam, both of Pre-Construct Archaeology Limited.
- 2.6 The site archive will be deposited with the Historic Royal Palaces archive at Hampton Court under a Site Code to be issued by Historic Royal Palaces.



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Figure 1
Site Location
1:20,000 at A4

3 PLANNING BACKGROUND

- 3.1 On the 27th of March 2012 the Department for Communities and Local Government issued the National Planning Policy Framework (NPPF). Section 12 of this policy framework is entitled 'Conserving and Enhancing the Historic Environment' and replaces Planning Policy Statement 5 (PPS5), which had previously been adopted in March 2010. PPS5 replaced the earlier Planning Policy Guidance Note 16 (PPG16). As such, Section 12 provides guidance for planning authorities, property owners, developers and others on the preservation and investigation of archaeological remains.
- 3.2 In considering any planning application for development, the local planning authority will be guided by the policy framework set by government guidance, in this instance NPPF Section 12, by current Structure and Local Plan policy and by other material considerations.

ARCHAEOLOGY IN THE LONDON BOROUGH OF RICHMOND UPON THAMES AND THE DEVELOPMENT MANAGEMENT PLAN

- 3.3 The relevant Local Development Framework is provided by the Development Management Plan which was adopted in November 2011. This plan contains policy statements in respect of protecting the buried archaeological resource. The site is subject to the Council's Archaeology Policy:

Policy DM HD 4

Archaeological Sites

The Council will seek to protect, enhance and promote its archaeological heritage (both above and below ground), and will encourage its interpretation and presentation to the public. It will take the necessary measures required to safeguard the archaeological remains found, and refuse planning permission where proposals would adversely affect archaeological remains or their setting.

4.3.18 Archaeology can include industrial sites, buildings, machinery, artifacts, air raid shelters and modest domestic buildings. The preservation of archaeological remains is a material consideration when determining planning applications. As set out in PPS 5, there is a presumption in favour of preservation in-situ, where the remains are of national importance. While it is desirable to treat all remains in this manner, it is recognised that it may not always be practical to do so.

4.3.19 However, regardless of their status, established procedures of consultation

and evaluation as set out in PPS 5 and other advice must be followed in preparing development proposals. Prospective developers should make an initial assessment of whether the site is known or likely to contain archaeological remains by consultation with the appropriate specialist bodies, normally English Heritage and the Greater London Archaeological Advisory Service. The Proposals Map identifies scheduled ancient monuments. The Archaeological Constraints map (Map 1) identifies areas with archaeological potential where sites of importance could exist, but not all sites of archaeological importance will necessarily be on the constraints map; developers should check the latest known information with English Heritage.

4.3.20 The Council wishes to endorse the spirit of the Code of Practice already established by The British Archaeologists and Developers Liaison Group and developers are also referred to advice published by English Heritage.

3.4 The Pagoda itself is a Grade 1 Listed Building and is therefore subject to the Council's policies regarding Listed Buildings and Scheduled Ancient Monuments:

Policy DM HD 2

Conservation of Listed Buildings and Scheduled Ancient Monuments

The Council will require the preservation of Listed Buildings of special architectural or historic interest and Ancient Monuments and seek to ensure that they are kept in a good state of repair by the following means:

- 1. consent would only be granted for the demolition of Grade II Listed Buildings in exceptional circumstances and for Grade II* and Grade I Listed Buildings in wholly exceptional circumstances following a thorough assessment of their significance;**
- 2. retention of the original use for which the listed building was built is preferred. Other uses will only be considered where the change of use can be justified, and where it can be proven that the original use cannot be sustained;**
- 3. alterations and extensions including partial demolitions should be based on an accurate understanding of the significance of the asset including the structure, and respect the architectural character, historic fabric and detailing of the original building. With alterations, the Council will normally insist on the retention of the original structure, features, material and plan form or features that contribute to the significance of the asset. With repairs, the Council will expect retention and repair,**

rather than replacement of the structure, features, and materials of the building which contribute to its architectural and historic interest; and will require the use of appropriate traditional materials and techniques;

- 4. using its legal powers to take steps to secure the repair of Listed Buildings, where appropriate;**
- 5. protecting the setting of Ancient Monuments and Listed Buildings where proposals could have an impact;**
- 6. taking a practical approach towards the alteration of Listed Buildings to comply with the Disability Discrimination Act 2005 and subsequent amendments, provided that the building's special interest is not harmed, using English Heritage advice as a basis.**

4.3.6 Listed Buildings and Ancient Monuments make a major contribution to the borough's heritage and the Council has a statutory duty to protect them. The borough's three Ancient Monuments are: The Brew House, Bushy Park; Hampton Court Palace; and Kew Palace; These come under the jurisdiction of the Department of Culture, Media and Sport for planning control purposes. There are currently over 1,600 Listed Buildings in the borough, generally the Council has power to grant listed building consent for demolition or works to these; with some categories this is subject to approval by English Heritage.

4.3.7 PPS 5 sets out a general presumption in favour of the conservation of such buildings and harm or loss should be wholly exceptional. Any such proposals would be subject to the tests within HE 9.2 of PPS 5. Generally, the original use for which historic buildings were designed and built should be continued because it will have the least impact on their character or appearance. However, there may be cases where a change of use may be the only viable way to keep them in active use. Where this is the case, the onus will be on the applicant to justify the new use, and to demonstrate on balance that it will be compatible with the fabric, exterior, interior and the setting of the historic building, and will not detract from other evidential, historic, aesthetic or communal heritage values, in line with HE 9.5 of PPS 5.

4.3.8 The character of historic buildings and their contribution to the townscape can be severely diminished through insensitive alteration, extension or neighbouring development, or through neglect and dilapidation. When considering proposals for works to, or within the settings of, Listed Buildings or Ancient Monuments, special attention will be paid to:

1. conserving original architectural features such as windows, doors, chimney stacks, walls and gates;

2. the scale, proportions, design and materials of new proposals in relation to the existing heritage asset;
3. retaining original or historic garden or landscape features;
4. the effect of development on the setting of the historic heritage asset;
5. detriment to the significance of the heritage asset.

4.3.9 Detailed guidance contained within the PPS 5 Practice Guide, Guidance on Alterations to Listed Buildings, will be followed in considering suitability of proposals. Legislation places upon those who own or manage Listed Buildings an obligation to ensure that they are properly maintained and where appropriate the Council will use its powers to ensure that this is done, particularly if the asset is on the Heritage at Risk register.

4.3.10 Various bodies make loans or give grants for the repair or replacement of original features using traditional or sympathetic materials or requiring the use of specialist materials and craftsmanship, and the Council may be able to assist owners to secure such assistance.

4.3.11 The Disability Discrimination Act 2005 does not just require physical access for disabled people, but also equal access to services. It is recognised that there may be difficulties in altering a Listed Building to meet modern day access standards and that sometimes a compromise is required. However, it must be demonstrated that any works of alteration to improve the accessibility of a listed building does not harm its special interest. The English Heritage Guidance "Easy Access to Historic Buildings" is recommended as a practical guide and is available free of charge from www.english-heritage.org.uk.

4.3.12 Applications for alterations and extensions to Listed Buildings need to be to a high standard of accuracy and detail. Drawings should therefore include sufficient information to convey the exact nature of the proposals and of the existing building and should include survey drawings and plans, elevations and sections at 1:100. Further drawings at 1:20 or full size may be required in certain cases. The Council has also produced supplementary planning guidance on the repair and maintenance of historic buildings. Further advice can be obtained from "A Stitch in Time" available free of charge from www.ihbc.org.uk.

3.5 Since 2003 the Royal Botanic Gardens at Kew have been classed as a Unesco World Heritage Site:

Policy DM HD 5

World Heritage Site

The Council will work with others, to protect, promote, interpret, sustainably use, conserve and where appropriate enhance the Royal Botanic Gardens Kew World Heritage Site and its setting including the buffer zone by conserving its Outstanding Universal Value, integrity, authenticity and significance. Development proposals should not cause adverse impact to the World Heritage Site or its setting that would compromise its Outstanding Universal Value, integrity, authenticity and significance, and give appropriate weight to the World Heritage Site Management Plan.

4.3.21 The Royal Botanic Gardens Kew was inscribed on the UNESCO World Heritage Site List in 2003, in recognition of its outstanding and internationally significant universal value. In accordance with Planning Policy Statement 5: Planning for the Historic Environment (2010), the outstanding international importance of the World Heritage Site is a key material consideration to be taken into account by the Council when determining planning applications and listed building consents. The site should be protected for the benefit of future generations and development proposals affecting the site or its buffer zone will require careful scrutiny for their likely effect on the site or its setting.

4.3.22 The Royal Botanic Gardens, Kew World Heritage Site Management Plan (2003) and subsequent updates provides a framework for the activities that take place in the site whilst ensuring that these activities do not conflict with the need to protect the qualities which make Kew Gardens such a special and unique place.

3.6 The Royal Botanic Gardens comprise Conservation Area 63, as designated by the London Borough of Richmond Upon Thames.

4 GEOLOGY AND TOPOGRAPHY

- 4.1 The Geological Survey of Great Britain (South London – Sheet 270) shows the site as lying upon Quaternary River Terrace 1. These gravels were most probably deposited during the Saalian or Wolstonian stadial between 380,000 and 130,000 BP. They are often capped by alluvial deposits along with Aolian or wind-blown sandy brickearths.
- 4.2 The Pagoda is situated within the south-eastern corner of Kew Gardens, a relatively flat parcel of land which is cradled in a wide meander of the River Thames. The area has been cultivated for almost 300 years as a botanical and ornamental garden, with the gardens themselves comprising paths, listed buildings, glasshouses and modern structures in the form of laboratories and amenities.

5 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Prehistoric

- 5.1 The early environment of the Thames Valley is well researched, principally due to the preservation of extensive undisturbed deposits. This has established that following the retreat of the ice sheets some 13,000 years ago, the Thames formed a braided river system with tundra-type vegetation which gradually yielded to colonisation by herbaceous plants and grasses on an open steppe. It was at this point that the first Palaeolithic hunters probably began to exploit the area, although evidence for the period is problematic. Many finds, which exclusively comprise stone tools, are often found as redeposited material, while the brickearth deposits over much of the area post-date the period and have thus obscured almost all primary contexts. A single flake has been recovered to the east within the Royal Botanic Gardens, but remains the only point of reference for a wide area.
- 5.2 The Mesolithic period (c.10,000-7000 BC) was probably one of greater activity. Pine and birch forests appeared, followed by mixed deciduous woodland as the climate became warmer. Mesolithic people hunted extensively along the Thames but lived an itinerant lifestyle. This nomadic movement coupled with a small population has left only the most ephemeral evidence. Occupation evidence is known from High Street, Brentford, with a flint-working site at Kew Bridge, but no evidence has been found within the immediate area of the site.
- 5.3 Along the Thames, the Neolithic period (7000 – 2500 BC) is characterised by a decline in elm and other woodland species coupled with an expansion of cereal cultivation, suggesting that localised areas were cleared for permanent occupation and agriculture. The wide meander which the Royal Botanic Gardens occupies is practically devoid of sites, although occupation is attested in Brentford and stone tools have been recovered at Kew Pond and from the river at Kew Bridge.
- 5.4 Cultivation and development seems to have continued or even expanded into the Bronze Age, with the extensive utilisation of the river environment for food, transport and even for religious or ritual purposes. The earliest surviving evidence of permanent landscape features in the area have been dated to this time, although are confined to the north of the river. Scattered pottery to the east suggests that some occupation took place, while a founders' hoard to the south and implements to the east indicate that there is still much to be found from the period.
- 5.5 The Iron Age (c.700 BC – 1st century AD) is poorly known throughout the London region, and corresponds to a regeneration of some woodland species in the pollen record. Environmental evidence is still under-represented but it has been suggested that frequent and extensive inundation by the Thames discouraged or even drove off any pre-existing occupation in the area. A few ditches and pits have been discovered

during evaluations to the north of the river, but otherwise the record is practically blank.

Roman

- 5.6 Roman London is perhaps one of the best-known urban areas of the Roman Empire, yet even at a slight distance from the city walls the archaeological evidence diminishes. The heavy clays probably discouraged agriculture and large settlement, although extensive woodland may also be inferred by the widespread presence of tile and pottery manufactories which needed almost inexhaustible supplies of wood for charcoal. Immediately to the north of the river the road from *Calleva* (Silchester) to London was laid out in the 1st century, and roadside settlement in one form or another would be expected. Such settlement appears largely absent however. Even casual finds of scattered pottery or coins are not widely distributed across the western part of Greater London, suggesting a general paucity of activity.

Saxon

- 5.7 When the region emerges into the historical record in the 7th century a series of large rural estates can be discerned, peppered with royal or ecclesiastical centres of some importance. These large villas often formed the basis for later expansion into towns and cities. The lands around Kew formed part of the great royal estate of Kingston, although archaeological finds in the vicinity have illuminated the earliest Saxon development in the area. A collection of 6th or 7th century weapons has been recovered from the Thames at Brentford, which probably lay at the first fording site up-river from the City. Scramasaxes and swords, spears, a shield boss and other items form part of a highly important assemblage for the region, though the collection was discovered in the 19th century and its context is lost. At Strand-on-the-Green to the north of Kew Bridge, pottery has been found, while axes and spears have also been recovered from the Thames at the bridge site.

Medieval

- 5.8 From its earliest records, Kew or Cayho (from the Old English: a neck of land by a landing place – Weinreb *et al* 2008, 456) lay within the great royal patrimony of Kingston, which also included Maldon, Thames Ditton, Richmond and Petersham. Though it may have been an early estate, no village or nucleated settlement is recorded until after the 14th century, reinforcing its primary agricultural, and peripheral nature. Field names in the area suggest the existence of heath and woodland, although a survey of the manor of Sheen taken in 1314 (PRO SC11/638)

records large messuages or properties owned by tenants such as Richard of Cayho, Alice of Cayesho and John le Clerke of Cayesho, suggesting that a pattern of dispersed farmsteads or a small, discrete hamlet was in existence at this time. A short distance to the south, the royal palace of Sheen was to spring up in the 14th century, followed shortly by a Carthusian monastery, which in turn meant a substantial development of the landscape with deer parks and the squeezing of the agricultural land available for local farming tenants.

Post-medieval

- 5.9 The proximity of Kew to Sheen and the Court meant that it became fashionable as a place of residence for the nobility, reinforced by the convenience of the river as the main route of transportation. Princess Katherine, daughter of King Edward IV (1461-1483) is the first notable person recorded as living at Kew, and many others followed.
- 5.10 It seems that houses were built as part of a speculative venture. One Thomas Byrkes divided a freehold into small plots for sale, and even sponsored the licensing of a chapel of ease for local, more convenient worship. Thereafter a number of prominent residences, all ringing the river devolved into the hands of noble families or individuals, including the Earls of Devon, Henry Norris, John Dudley and Charles Brandon, Duke of Sussex, with his wife, Mary, widow to King Louis XII of France.
- 5.11 The tenure and development of these properties is complex, and has not been completely deciphered (Cloake 2001), as many disappeared into obscurity within a relatively short space of time. Several survived however, and Kew itself continued to develop, even after the destruction of Richmond Palace and the monastery. Several families of note, including the Portman family built up consolidated estates from the various fragmented land-holdings, and the purchase of a lease by Queen Caroline in 1729 gave Kew a new social cachet which ensured success and development.
- 5.12 The subsequent development of the gardens is attested as early as 1678 when John Evelyn mentioned both the orangerie and myrtetum whilst visiting Sir Henry Capel (Weinreb *et al* 2008, 711). It was however under Frederick, Prince of Wales, and his wife Augusta that the gardens really began to evolve. In 1731 Frederick leased the White House and the grounds from the Capel family, an area which forms the northern part of the present gardens. He introduced a pleasure garden to the grounds and following his death Augusta continued with further improvements. Under the guidance of Lord Bute and the head gardener, William Aiton, she created a botanic garden of 9 acres in 1759 (Weinreb *et al* 2008, 711). The successors of Frederick and Augusta ensured the continuing prosperity of Kew in the 18th century, both as a place of recreation and an aristocratic residence. The Green developed, and became popular with French émigrés after the French Revolution, developing into an idyllic

village environment, which was greatly favoured by George III and his consort Queen Charlotte. Kew itself, always an adjunct of Richmond and Kingston was finally made into a separate parish in 1769.

- 5.13 The western part of the gardens was attached to the now vanished Richmond Lodge, a residence of George II and the grounds had been laid out by his wife, Queen Caroline under the guidance of Charles Bridgeman. At around c. 1770 the grounds of the lodge were altered and improved by Lancelot 'Capability' Brown after the property had passed to George III. It was under George II that the Lodge grounds and gardens were united (Weinreb et al 2008, 711). The abandonment of Kew as a royal residence after 1818 resulted in a certain level of decline which, coupled with the rise of industrial blight in nearby Brentford, meant that the gardens were all but abandoned by the 1830's. In 1840 the gardens were handed over to the nation as a result of a Royal Commission which led to the establishment of the Royal Botanic Gardens (Prosser 2013, 9). The gardens were opened to the public in 1899 by Queen Victoria. The last quarter of the 19th century also witnessed an unprecedented expansion of suburban development at the fringes of the gardens, with the arrival of the railway, and the development of suburban life as London expanded to incorporate the formerly rural parish. In 2003 the gardens were designated as a World Heritage site by UNESCO.

The Great Pagoda

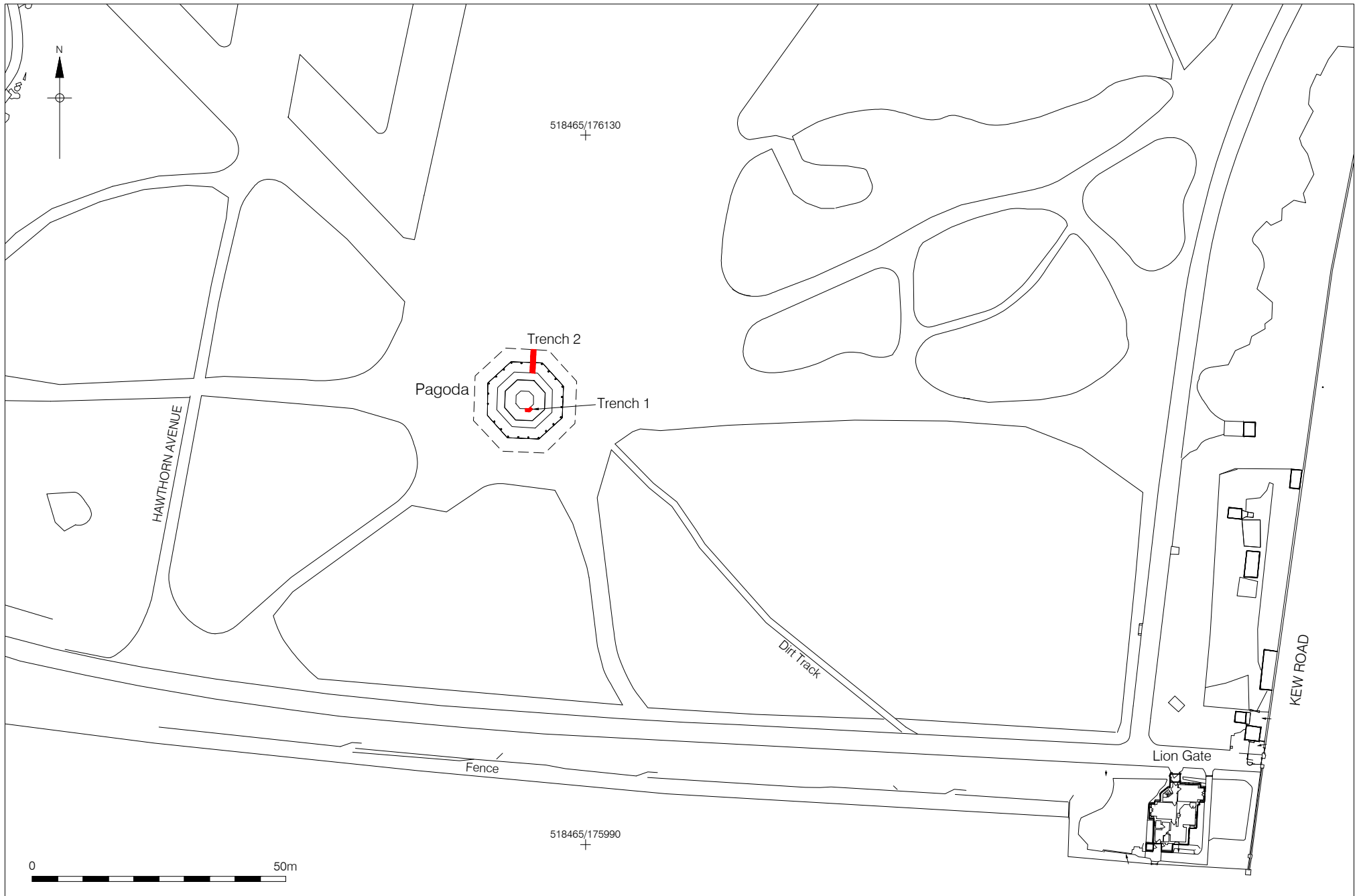
- 5.14 Based upon the Porcelain Pagoda at Nanking (Prosser 2013, 25), the Great Pagoda at Kew was designed by Sir William Chambers and was constructed within 6 months during the winter of 1761-1762 (Prosser 2013, 26). Construction of the building itself is likely to have been funded from the privy purse of Princess Augusta or of the King himself (Prosser 2013, 16) and according to Horace Walpole cost £12,000 (Prosser 2013, 26). Despite the importance of pagodas within Taoist and Buddhist theology, in Europe these structures came to represent the exotic nature of East Asia and were erected as ornamental buildings in the 'Chinoiserie' style. The Great Pagoda at Kew is no exception and was built as a folly; designed to amuse the eye, reflect the sophistication of royal patronage and to act as a prospect tower which afforded dramatic views from the top (Prosser 2013, 4).
- 5.15 The Pagoda is constructed of brick on an octagonal profile, rising through ten stories to a finial at a height of 163 feet (50m). It is punctuated at each level by glazed doors and timber balconies beneath roofs of grey slate. The brickwork is all by the noted bricklayer Solomon Brown, laid in a Flemish bond of yellow/pink fabric with fine Georgian struck jointing. The lowest roof is slightly swept at the eaves, and is supported by a colonnade of 24 slender columns. The Pagoda sits on a large plinth of

radiating Portland flags, and was once raised as a single step from the surrounding area (Prosser 2013, 11).

- 5.16 When first built, the Great Pagoda is believed to have been roofed with glazed or enamelled iron slates, with a total of 80 gilded or painted iridescent dragons individually positioned at the hips of each roof (Prosser 2013, 26). One of the earliest depictions in painting also suggests that balustrade was painted white. Change appears to have occurred quickly however, and in 1784 a coppersmith and tiler were employed to slate the roofs. It may have been during this episode of renovation that the dragons were removed (Prosser 2013, 26). Notably in February 1789 King George III, whilst suffering from his illness, attempted to ascend the Pagoda and had to be forcibly restrained by his attendants from doing so (Prosser 2013, 26).
- 5.17 Following the death of George III in 1820 the Pagoda, along with the rest of the estate was neglected. By the time the Royal Botanic Gardens were established in 1840 it was in desperate need of repair. The architect, Decimus Burton, who was working on the Palm House at the time, drew up a number of sketches and proposals, yet the estimated cost of £3,500 was deemed too dear. Some work was clearly undertaken however, as analysis of the paint suggests that it dates to this period and technical analysis implies that at least the lower two roof tiers were substantially reconstructed in the mid 19th century (Prosser 2013, 27).
- 5.18 The Pagoda was repainted in 1895 and the terminal pole was replaced in 1915. It was during this period that most of the existing red and vermilion colour schemes were first applied. During the Second World War permission was granted for the Royal Aircraft Establishment Armament Research Department to conduct model bomb dropping experiments. Holes were cut in each floor in order to facilitate the dropping of test bombs into a box of sand at the base of the tower. Research was completed in 1945 and the building was returned to the Royal Botanic Gardens. The building is believed to have again been repainted in 1953. In 1978 the Pagoda was again the subject of a restoration project but the plans did not proceed and a new coat of paint was deemed sufficient (Prosser 2013, 28). Although the building was accessible during 1960's and 1970's it has been largely closed since the 1980's. In 2006 it was briefly opened up to the public during the summer season but has not been so since (Prosser 2013, 13).

6 ARCHAEOLOGICAL METHODOLOGY

- 6.1 In accordance with the Risk Assessment (Bradley 2015), two evaluation trenches were excavated. One of these Trench 2 was located externally on the north side of the Pagoda beneath the canopy, and was excavated in an attempt to identify a series of steps/other architectural or structural features associated with the Great Pagoda. The steps are depicted on William Chambers' elevation of 1761. This trench was also excavated in order to determine the location, form, extent, date, character, condition, significance and quality of any surviving archaeological remains. Trench 1 was situated on the inside of the Pagoda on the south-eastern corner of the stairwell. This was excavated in order to investigate the ground make up beneath the floor surface and to examine the foundations of the stairwell and the potential for an earlier alignment of columns.
- 6.2 Prior to excavation, the flagstones sealing both trenches were lifted by a subcontractor appointed by Historic Royal Palaces. The trenches were then hand excavated with the use of hand tools. Prior to excavation both evaluation trenches were CAT scanned.
- 6.3 The trenches were hand cleaned, examined and recorded in both plan and section.
- 6.4 The single context recording system was used for recording, developed out of the Department of Urban Archaeology Site Manual. Plans were recorded at a scale of 1:20, and sections were recorded at a scale of 1:10.
- 6.5 The trenches was tied in to the Pagoda off architectural plans which were provided prior to the evaluation taking place. A Bench Mark with a value of 7.57m OD was located on the Pagoda itself and was used to level the evaluation trench.
- 6.6 Digital photographs were taken where relevant.
- 6.7 No unusual health and safety issues were encountered during the evaluation. The steps for which Trench 2 had been excavated were not identified, although the construction cut for the Pagoda itself was revealed. Once natural deposits had been reached excavation ceased. In Trench 1, the presence of a solid mortar surface at c. 0.60m down prevented further excavation from taking place. Following direction from Historic Royal Palaces the trenches were left open following the completion of works. When the site was vacated by Pre-Construct Archaeology Limited Trench 2 was surrounded by sealed Heras fencing panels with a 'Danger, Deep Excavations' sign still in place.



Survey Provided by Client

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Figure 2
Trench Location
1:1,100 at A4

7 ARCHAEOLOGICAL PHASE DISCUSSION

7.1 TRENCH 1

Phase 3 – Pagoda Construction

- 7.1.1 Trench 1 was located inside the Pagoda and abutted the south-eastern corner of the stairwell. Dog-legged in plan, it measured 1.29m from east to west and 0.98m from north to south. At the base of the trench, a compact dark grey white mortar deposit [8] was observed along the southern limit of excavation. Containing occasional fragments of brick and tile, this deposit measured 0.39m from north to south and 1.20m from east to west at between 6.78m OD and 6.80m OD. Due to the compact nature of this horizon and the limited size of the trench it was decided to cease excavation at this point.
- 7.1.2 Extending along the northern edge of the trench was a substantial brick structure [7]. Interpreted as the plinth base for the stairwell, [7] extended 1.29m from east to west and 0.48m from north to south as seen at 7.36m OD. Constructed from red and purple fabric frogged bricks which were bonded with a white lime mortar, this structure was not fully revealed but extended up to at least eight courses in depth. Given the limited size of the trench the specific coursing / bond of [7] could not be identified. It did continue into both the western and eastern limits of excavation however which may indicate that, rather than following the octagonal shape of the Pagoda and the associated stairwell, the plinth may in fact be square.
- 7.1.3 The precise relationship between [7] and [8] could not be discerned. The gap between the two contexts did however present the possibility that the base [7] cut mortar surface [8], which was most probably associated with the construction of the Pagoda's main walls.

Phase 4 - Modern

- 7.1.4 Sealing [8] and abutting [7] was very soft dark grey brown silty sand [6]. Extending up to 0.53m in thickness at 7.25m OD, this deposit contained occasional fragments of brick, tile and charcoal and was interpreted as an infill / levelling layer. CBM recovered from this horizon has been dated to between 1700 and 1850. It was sealed by a modern make-up layer [+] which was in turn overlain by the modern flagstones at 7.40m OD.



Plate 1 – Mortar deposit [8] in Trench 1. Looking west



Plate 2 – Brick Base [7] beneath Pagoda stairwell. Looking north

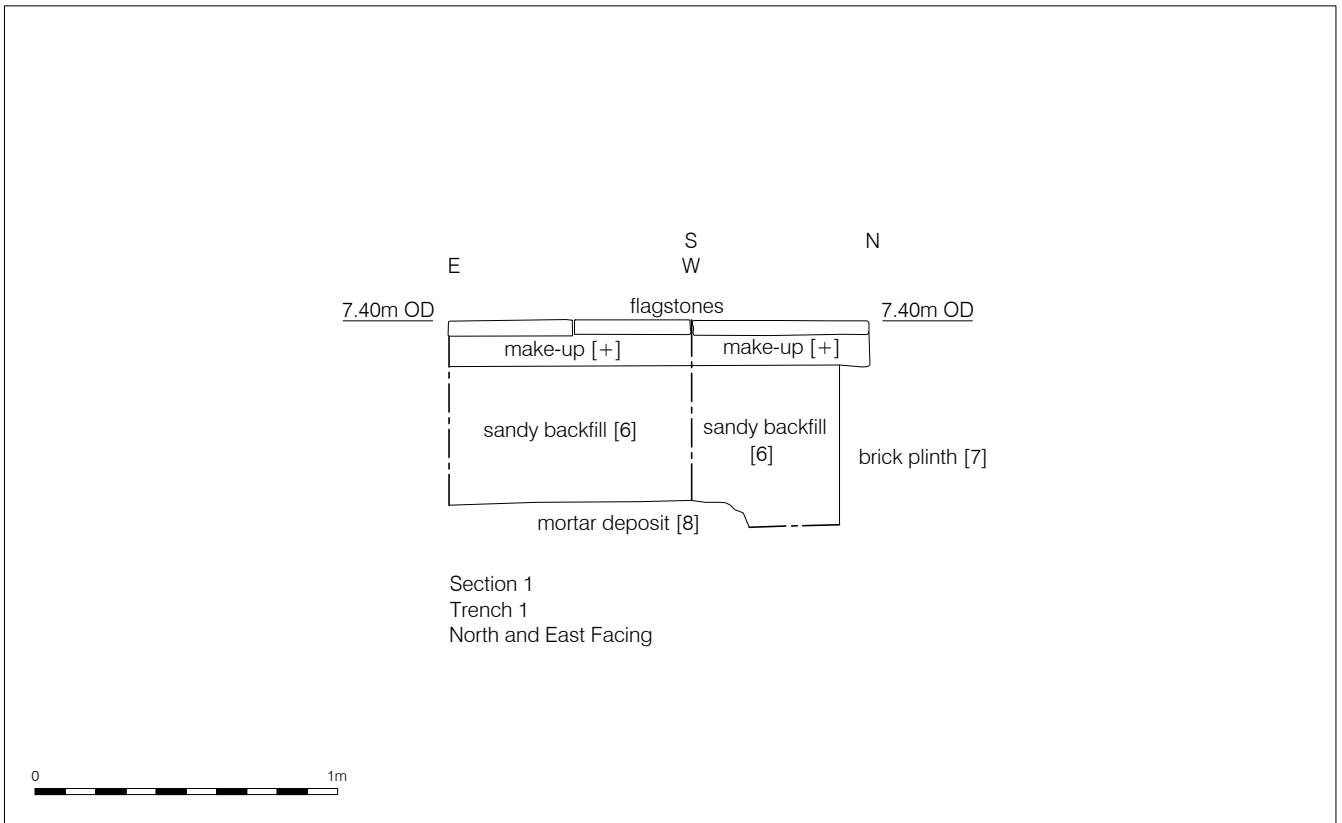


Figure 3
Trench 1 Plan and Section
1:25 at A4

7.2 TRENCH 2

Phase 1 - Natural

7.2.1 Trench 2 was located on the outside of the Pagoda beneath the canopy. It was situated on the eastern side of the northern entrance and extended 3.36m from north to south and 0.96m from east to west. The earliest deposit encountered at the base of the trench was the natural gravel and sand [16]. This was observed at the southern end of the trench at the base of a sondage and was recorded at a highest level of 5.99m OD.

Phase 2 – Historic Soil (18th century)

7.2.2 Sealing [16] was [11], a soft to loose deposit of mid orange brown silty sand. Extending up to 0.88m in thickness this deposit contained occasional charcoal flecks and was recorded at a highest level of 7.01m OD. Clay tobacco pipe recovered from this context has been dated to between 1700 and 1740.

7.2.3 Overlying [11] was [10], a loose deposit of light orange brown silty sand which contained occasional small pebbles and occasional charcoal flecks. This deposit measured up to 0.21m in thickness at 7.20m OD and contained CBM dating to between 1450 and 1700+.

Phase 3 – Pagoda Construction

7.2.4 Cutting into [10] along the southern end of the trench was construction cut [13]. Measuring 0.28m from north to south, this cut was not fully excavated. It was filled by [12], a loose deposit of light grey to yellow brown silty sand which contained occasional small pebbles. Recorded at a highest level of 7.19m OD, [13] extended up to at least 1.05m in depth. Both [12] and [13] were directly associated with the Pagoda, with [13] representing the main construction cut for the structure.

7.2.5 Following an on-site conversation on August the 12th it was decided to excavate around the base of one of the Pagoda columns (Column C1) at the northern end of the trench. Although a distinct construction cut was not apparent, the base of the column [14] is believed to have post-dated [10]. Recorded at a highest level of 7.12m OD, [14] was not fully revealed, but appeared to form a square base that then returned to the east and into the limit of excavation. As seen it measured 0.16m from north to south and 0.54m from east to west and was constructed from red and purple fabric frogged bricks which were bonded with a white lime mortar. The full depth of the column base was exposed and it extended up to a maximum of six courses in depth. Resting directly on top of [14] was the stone base [15] of the column itself. This base measured 0.30m by 0.30m and was 0.28m in depth at 7.40m OD.

Phase 4 - Modern

7.2.6 Abutting [15] and sealing [12] was [9], a layer of loose silty sand which was 0.12m thick at 7.30m OD. This deposit was directly sealed by the Pagoda flagstones at 7.36m OD.



Plate 3 – Construction cut [13] TR 2. East view



Plate 4 – Layer [11] TR 2. South view



Plate 5 – Brick column base [14] for column

[15] TR 2. North view

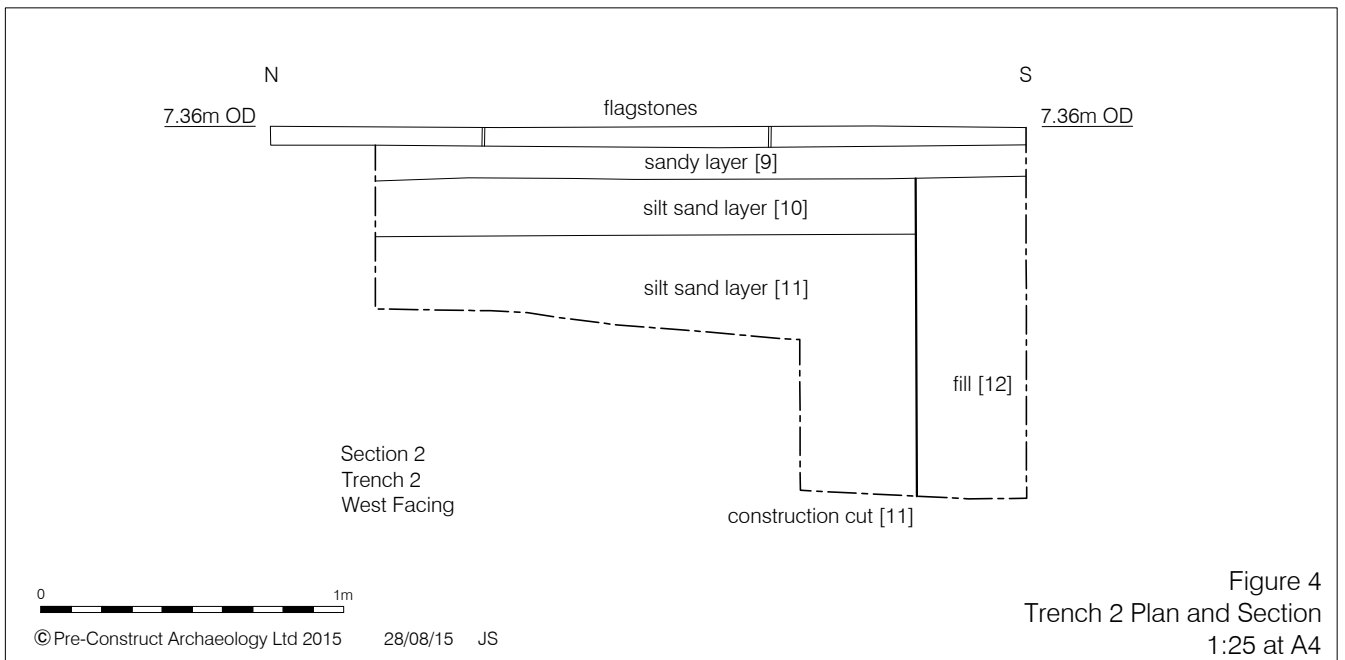
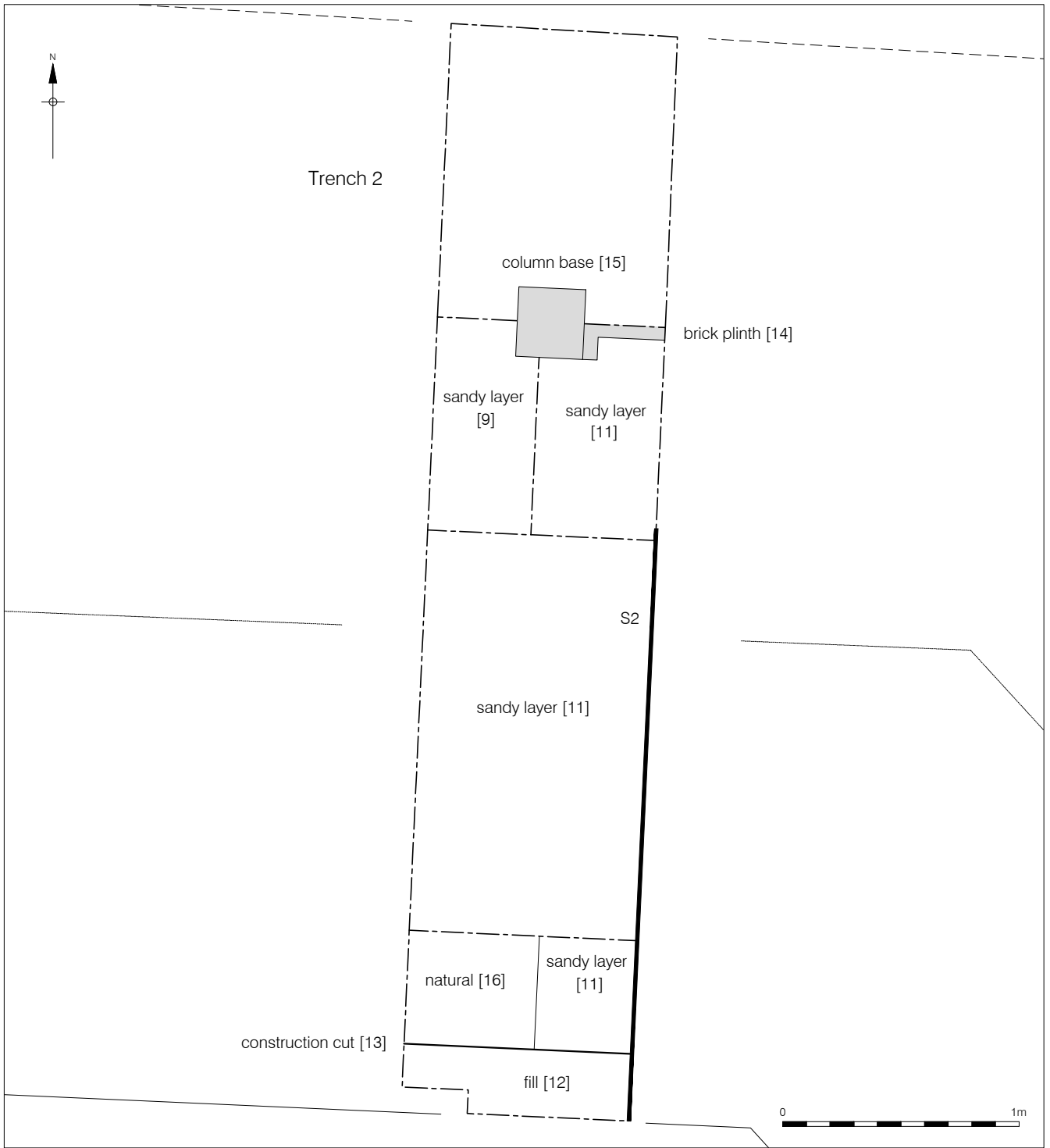


Figure 4
Trench 2 Plan and Section
1:25 at A4

8 INTERPRETATION AND CONCLUSIONS

- 8.1 One of the principal objectives of the archaeological evaluation was to determine whether or not the steps depicted on William Chambers' elevation of c. 1761 as descending from four sides of the pagoda base were still extant. Trench 2 was also excavated in an attempt to find evidence of an earlier alignment of column bases again depicted on the Chambers plan. The steps were not identified during the evaluation, which suggested that they had either been removed when the ground level was raised up, or that rather than being positioned in front of the open doorways they were alternatively situated on the sides of the Pagoda occupied by the deep blind recesses. No evidence of the earlier columns was discovered either, suggesting that they may simply have functioned as shallow timber support struts, or may not have been constructed as depicted in the Chambers drawing.
- 8.2 In Trench 1 a mortar spread was revealed at the base of the trench. This is likely to relate to the construction of the Pagoda itself. On the north side of the trench the brick plinth base for the internal stairwell was also revealed. The fact that this base continued into the eastern limit of excavation may well indicate that the plinth is in fact square, as opposed to the octagonal layout of both the Pagoda stairwell and the Pagoda. The direct relationship between the plinth and the mortar deposit could not be identified.
- 8.3 Further objectives of the evaluation were to determine the presence or absence of archaeological activity of any period. The earliest deposit encountered during the evaluation was the natural sands and gravels in Trench 2. This was overlain by two deposits of silty sand which pre-dated the Pagoda construction and which were interpreted as historic soil horizons. The lower of the two deposits [11] contained clay tobacco pipe dating to between 1700 and 1740 whilst the uppermost [10] was truncated by the Pagoda construction cut.
- 8.4 At the northern end of Trench 2, excavation around column C1 revealed the brick plinth for this base to be six courses deep. It was capped by a stone block which supported the base of the column.
- 8.5 The sandy deposit in Trench 1 and the make up for the flagstones in both of the trenches can be associated with later repairs and modifications to the upstanding structure.

9 ACKNOWLEDGEMENTS

- 9.1 Pre-Construct Archaeology would like to thank Historic Royal Palaces for commissioning the work. Particular thanks are extended to Lee Prosser (Curator - Historic Royal Palaces) and Patricia Les (Head of Building Conservation - Historic Royal Palaces) & Rob Umney (Conservation Building Surveyor - Historic Royal Palaces). Thanks are also expressed to Tony Cave, the Estates Operation Project Manager at Kew.
- 9.2 The author would like to thank Jennifer Wilson for all of her assistance on site. Thanks also to Jennifer Simonson for the illustrations, Tim Bradley for his project management and editing and Patrick Cavanagh for technical and logistical support.

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APPENDIX 1 – CONTEXT DESCRIPTIONS

Context	Phase	Type	Trench No.	Sec No.	Description
6	4	Fill?	TR 1	TR 1	Sandy Backfill
7	3	Masonry	TR 1	TR 1	Brick base for stairwell
8	3	Layer	TR 1	TR 1	Mortar layer
9	4	Layer	TR 2	TR 2	Sandy Layer
10	2	Layer	TR 2	TR 2	Silt sand layer
11	2	Layer	TR 2	TR 2	Silt sand layer
12	3	Fill	TR 2	TR 2	Fill of [13]
13	3	Cut	TR 2	TR 2	Construction cut for Pagoda
14	3	Masonry	TR 2	-	Brick plinth for column
15	3	Masonry	TR 2	-	Stone column base
16	1	Layer	TR 2	-	Natural sand and gravel

APPENDIX 2 - CERAMIC BUILDING MATERIALS

Kevin Hayward

Context	Fabric	Form	Size	Date range of material		Latest material dated		Spot date	Spot date with mortar
0 Trench 1	3101	Cherty light grey man made material charred when lit	20	1750	1900	1750	1900	1750-1900	No mortar
6	3032Y 3101; 2276	Well made yellow Brick; Hard brown gravel mortar; peg tile some early post medieval reused	4	1480	1900	1664	1900	1700-1850	1800-1950
10	2586; 3063	Late medieval early post medieval peg tile coarse moulding sand Glazed Flemish Floor Tile – silt fabric	3	1180	1800	1180	1800	1450-1700+	No mortar

Review

This small building material assemblage (27 fragments 1.527kg) from Kew Pagoda Richmond consists of a mixture of early and later post medieval ceramic building material. The earlier material from [10] consists of a glazed Flemish silty floor tile in the rarer fabric 3063 whose manufacture can be dated to between 1450 and 1600. This also has poorly made late medieval to early post medieval unglazed peg tile with coarse moulding sand in the iron oxide fabric 2586 which again suggests a Tudor date.

From [6] is a well made thick yellow brick which on first impression looks to be like an estuarine 3035 produced after 1780. But from building recording studies at Kew Palace (Sudds 2007) there have been numerous examples of early-mid 18th century yellow-skinned post great fire bricks; thus 3032Y bricks from the 1730 renovations including the Dutch House and The White House Kitchens and No.2 Kew Cottages (Sudds 2007). There are harder mortar types however (Roman and Portland-gravel mortar both patented during the early-mid 19th century) which suggests that this is a 19th century feature containing earlier post medieval material.

Finally, from an unstratified context in Trench 1 there are a group of 20 fragments. They are made out of a very fine light grey cloudy material which resembles chert as it also has a conchoidal fracture. In all probability this is cement based artificial stone, cast or faux stone (but not the much coarser, granular Coade stone). Examples of stone used specifically for garden ornamentation and rockeries include Blashfield, Austin & Seeley, Doulton and Pulham manufactured between the late Victorian period through to the early 20th century and later on Haddtonstone and Chilstone specifically for garden ornamentation (rockeries etc). One example is its use in the late 19th century Palm House at Caversham Court Gardens in Berkshire (Hayward pers. obs.) Its use at Kew should therefore be seen as not at all surprising.

Recommendations

The building material assemblage is of some interest as there are examples of 16th century glazed floor tile and roofing tile from [10] which could derive from the demolition of the first Kew Palace. The yellow brick from [6] is likely to be the yellow-skinned post great fire brick used extensively in early to mid 18th century restorations of the palace and in keeping with the 1762 construction date of the Pagoda. Of interest too are the unstratified examples of moulded artificial or faux stone. Although no precise date can be assigned to the form and fabric of the material (no detailed study of these materials has yet been undertaken) its presence fits neatly into the setting of Kew Gardens. With this in mind the entire assemblage should be retained.

Bibliography

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APPENDIX 3 – OASIS FORM

OASIS ID: preconst1-221080

Project details

Project name	The Great Pagoda (Phase II), Royal Botanic Gardens, Kew
Short description of the project	Pre-construct Archaeology undertook an archaeological evaluation at the Great Pagoda, Kew. This comprised two evaluation trenches with one located inside the pagoda (Trench 1) at the base of the stairwell, and one located outside (Trench 2). Trench 1 revealed a mortar spread at the base which is believed to have been associated with the construction of the pagoda. The brick plinth that supported the stairwell was also revealed. Trench 2 was excavated in an attempt to find steps present on an elevation dating to 1761. Situated on the north side of the pagoda this trench did not reveal the steps. The archaeological sequence comprised natural sands and gravels sealed by two deposits of 18th century garden soil. These were truncated by the construction cut of the Pagoda. An extant column base was also exposed.
Project dates	Start: 10-08-2015 End: 13-08-2015
Previous/future work	Yes / Not known
Type of project	Field evaluation
Site status	World Heritage Site
Current Land use	Other 5 - Garden
Monument type	PAGODA Post Medieval
Significant Finds	CLAY TOBACCO PIPE Post Medieval
Significant Finds	POTTERY Post Medieval
Significant Finds	ANIMAL BONE Post Medieval
Significant Finds	CBM Post Medieval
Methods & techniques	"Targeted Trenches"

Development type	Estate management (i.e. maintenance of existing structures and landscape by capital works and on-going maintenance)
Prompt	Scheduled Monument Consent
Position in the planning process	Not known / Not recorded

Project location

Country	England
Site location	GREATER LONDON RICHMOND UPON THAMES RICHMOND AND KEW The Great Pagoda (PH II), Royal Botanic Gardens, Kew
Postcode	TW9 3AB
Study area	4 Square metres
Site coordinates	TQ 18471 76076 51.470733847363 -0.294109884531 51 28 14 N 000 17 38 W Point
Height OD / Depth	Min: 5.99m Max: 5.99m

Project creators

Name of Organisation	Pre-Construct Archaeology Limited
Project originator	Historic Royal Palaces
Project design originator	Tim Bradley
Project director/manager	Tim Bradley
Project supervisor	Alexis Haslam
Type of sponsor/funding body	Royal Botanic Gardens / Historic Royal Palaces

Project archives

Physical Archive recipient	Archive	Historic Royal Palaces
Physical Contents		"Animal Bones","Ceramics","Metal"
Digital Archive recipient	Archive	Historic Royal Palaces
Digital Contents		"none"
Digital available	Media	"Text"
Paper Archive recipient	Archive	Historic Royal Palaces
Paper Contents		"Animal Bones","Ceramics","Metal"
Paper available	Media	"Context sheet","Correspondence","Photograph","Plan","Report","Section","Unpublished Text"

Project bibliography 1

Publication type		Grey literature (unpublished document/manuscript)
Title		An Archaeological Evaluation at the Great Pagoda (Phase II), Royal Botanic Gardens, Kew, London Borough of Richmond Upon Thames, TW9 3AB
Author(s)/Editor(s)		Haslam, A.
Date		2015
Issuer or publisher	or	Pre-Construct Archaeology Limited
Place of issue or publication		Brockley

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Entered on 18 August 2015

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