Archaeological watching brief at The Walled Garden, Blakeshall Lane, Wolverley, Worcestershire DY11 5XJ

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Introduction

An archaeological watching brief was carried out at The Walled Garden, Blakeshall Lane, Wolverley, Worcestershire, DY11 5XJ (SO 83040 79811; Fig 1) at the request of Mrs Anita Marles of Herlig Marles Ltd Architecture on behalf of her clients, Mr and Mrs Randle. This work was undertaken in compliance with a written scheme of investigation provided by Martin Cook BA MCIfA, (planning reference 19/0334/FUL). The written scheme of investigation was approved by Emma Hancox, Historic Environment Record Manager, Worcestershire Archives and Archaeology Service (activity reference WSM 72046) The programme of archaeological work was to comprise documentary research, a watching brief and a report.

Summary

An archaeological watching brief was carried out at The Walled Garden, Blakeshall Lane, Wolverley, Worcestershire, DY11 5XJ in anticipation of finding an ice house, shown as a circular feature on the tithe and early Ordnance Survey mapping. A circular brick structure approximately 8.6m in internal diameter was recorded. This fell far outside the typical range of dimensions for a provincial, non-commercial, ice house and other interpretations were sought. A number of possibilities were dismissed before settling on either a wool drying house or a pinery. There was insufficient evidence to accept one rather the other but either of these would have fitted into the estate of a gentleman farmer between the early 19th and early 20th century, who was also a Member of Parliament and a Justice of the Peace.

A summary will be published in West Midlands Archaeology.

The documentary material

Geology and topography

The search area sits within an undulating topography based on bedrock geology made up of sandstone and superficial geology made up of alluvium that follows the course of the River Stour, with further deposits of sand and gravel. The surrounding area is made up of former piecemeal and Parliamentary enclosure with riverside meadows and blocks of recent and ancient semi-natural woodland dispersed throughout the area. Settlement is generally nucleated with dispersed isolated farmsteads lining the sinuous roads. Within the search area is the nucleated row settlement of Wolverley. The village is surrounded by water meadow, field amalgamation, meadow, piecemeal enclosure, modern subdivision and recent and ancient semi-natural woodland. The search area also includes the Conservation Area of Wolverley.

Historic mapping

The earliest available mapping is the 1838 tithe map of Wolverley (Fig 2.1). This shows a circular structure to the north of The Walled Garden. The depiction on the tithe map seems to represent an open structure: it has no roof. There is a clear, if fainter, inner circle and there is the suggestion of an entrance on its northern side, although this may be due to a defect on the original map. The Ordnance Survey maps of 1883, 1902, 1924 and 1938 also show a circular structure, also to the north of The Walled Garden but in a slightly different place to that shown on the tithe map. The Ordnance Survey map of 1883 shows this structure as having a roof but by the time of the 1903 edition it appears to be an open structure.

The Worcestershire Historic Environment Record

There are a number of historic environment components possibly associated with or nearby the site. These are:

Historic buildings - the site itself
WSM 44992
The Walled Garden - 18th century octagonal walled garden. Recorded on both the 1838 Tithe Map and 1st edition Ordnance Survey

Historic buildings surrounding the site
WSM 04221
Dovecote – mid-18th century with late 20th century alterations, Listed Building (II) - 1100643
WSM 12702
Wolverley House - Country house, now flats. Mid-18th century with some mid-20th century extensions and late 20th century alterations, Listed Building (II*) - 1172767

WSM 45991
The Birches - early 19th century house with some late 20th century alterations, Listed Building (II) - 1100642

WSM 45994
Gate Piers, west of Wolverley House - five gate piers. Mid-18th century with some late 19th century alterations, Listed Building (II) - 1348358

WSM 53944
Woodfield Farm - partially extant 19th century (?) unlisted farmstead with converted buildings

WSM 66856
Wolverley Church of England Secondary School - formerly known as Wolverley High School, built 1930/31

Monuments adjacent to the site
WSM 12724
The Quarry, Woodhamcot – quarry medieval - 1066 AD to 1539 AD

Landscape components
WSM 06740
Woodhamcote medieval settlement - the lost hamlet of Woodhamcote existed about 1240. It may have been situated around Woodfield Farm or may have been the part of Wolverley lying north of Brettles Brook.

Other documentary material and commentary
There are no monuments or buildings listed as being associated with the Walled Garden (WSM 44992) in the Historic Environment Record. However, fairly cursory examination of a wider area of the historic mapping (Ordnance Survey 1:2500, 1902) suggests that the Walled Garden is probably linked with Wolverley House which, around the time of this mapping was the property and residence of Major Eric A Knight, M P, J P (VCH 1913). He was a relative of John II Knight (1765-1850) who lived at Wolverley House in the late 18th and early 19th century. Both were descended from Thomas Andrew Knight (1759-1838 who was a horticulturalist and botanist who served as the second president of the Royal Horticultural Society from 1811 to 1838. Thomas Knight lived at Downton Castle in Herefordshire where there is also an octagonal walled kitchen garden (see below **Pineapple house/hothouse).** It is possible that he influenced the design of the Walled Garden at Wolverley House **(see below Conclusion).**

Wolverley House is a large three-story Georgian house built of red brick with red sandstone quoins, a modillion cornice and a porch of the Doric order. Again, from the Ordnance Survey mapping, the extent of its gardens and pleasure grounds could be inferred and, although extensive, were narrow, looping around to the east and north of the house (Fig 14). In one place a bridge has been provided in order to provide uninterrupted and private access across a footpath. Similar estate bridges exist, or formerly existed, at Spetchley Hall (SO 894 539) and Croome Court (SO 886 453), both near Worcester, which provided similar private access to the more remote parts of the estate over public roads.

Both the tithe map and the Ordnance Survey mapping show a circular structure on the northern side of the Walled Garden, although in slightly different places. Although most tithe maps compare very favourably with the early Ordnance Survey mapping, accurate representation of features, especially buildings, was not their primary purpose and structures can sometimes be depicted somewhat schematically. The circular structure shown on the Ordnance Survey mapping is clearly that found during the watching brief. Its depiction as roofless on the 1902 edition suggests that it may have been

derelict by this time. Assuming that the depiction on the tithe map is accurate: a roofless, circular enclosure, an interesting possibility arises. It may be that this was a temporary structure associated with building activities in and around the Walled Garden. At Northampton (Williams 1979), and elsewhere, mortar mixers have been identified (Fig 20) where local but relatively long-lived building projects were underway. Some support for this may come from the analysis of the bricks (see below).

The fieldwork

General

Fieldwork took place on the 1st November 2019 and the 5th May 2020. It initially comprised monitoring of a number of text pits, undertaken for engineering purposes. Subsequently, the excavations for the footings of the extension were observed. A full description of the contexts is given in Appendix 1. Contexts are described in summary form below.

Description

The engineering test pitting

Six trial holes were excavated within and around the site of the proposed development (Figs 3.1 and 6). The general deposit sequence was demonstrated in trial holes 1, 2 and 3. A dark reddy-brown sandy loam (contexts 001 and 005) overlay a dark grey brown sandy clay (context 003) which in turn overlay a light reddy-brown slightly sandy clay (context 004). Additionally, trial hole 3 (Fig 3.1, Section 2) had a lens of light grey sandy mortar (context 002) immediately beneath the topsoil. The top of a curving wall was identified adjacent to trial hole 1 and its exterior face was exposed (Figs 3.1 and 5, context 008). It was constructed in English or English garden wall bond.

Trial hole 5 was occupied by a modern service trench (context 009) which accommodated a plastic pipe (part of context 010) which fed an adjacent septic tank.

Trial hole 4 had a slightly curving brick wall, four bricks thick, across its northern face (Figs 3.1 and 4, contexts 006 and 007; Section 1), overlain by the topsoil (context 005). The bricks measured 212mm (long) x 98mm (wide) x 45mm (deep). In imperial measurements this equates to $8^{11}/_{32}$ inch x $3^{55}/_{64}$ inch x $1^{49}/_{64}$ inch.

There was some evidence for a corner on the southern side of the wall. The other significant deposit was a fill of small fragments of glass, flower pot and bricks (context 007).

The footings

The area of the proposed development was initially stripped, approximately, to finished-floor level. This level was exposed across the entire area of the proposed development, and for some distance beyond. This was the depth at which curving brick walls had been encountered during the test pitting. Two significant lengths of these walls were uncovered (Figs 3.2, 7 and 8; contexts 011 and 013). The bricks measured 212mm (long) x 98mm (wide) x 45mm (deep). In imperial measurements this equates to $8^{11}/_{32}$ inch x $3^{55}/_{64}$ inch x $1^{49}/_{64}$ inch.

Parts of both of these contexts had been exposed in trial holes 1 and 4 but they had not been previously fully uncovered in plan. This enabled a more accurate plan of their location to be recorded (Fig 3.2) and a better estimation of the overall size of a circular structure to be obtained.

In between the circular structure and the wall of the Walled Garden other features were recorded. There was an extensive spread of very dark, ashy material (Fig 3.2; context 016). Features comprised the fragmentary remains of a cobbled surface (Figs 3.2 and 7; context 012) and a brick pier (Figs 3.2 and 9; context 014). A length of what was presumed to be a water supply pipe was exposed near the wall of the Walled Garden (Fig 3.2; context 015). Other, short, lengths of similar pipe were encountered from time to time during the stripping.

Finally, it was observed that a number of well-fired bricks (compared with those that formed the greater part of the wall of the Walled Garden) protruded from the face of the wall of the Walled Garden (Fig 3.2). This feature occurred on one face of the octagonal circuit only: that adjacent to the excavations for the proposed development. These bricks were in pairs (Fig 10) and a consistent number of brick courses apart. However, from east to west, each pair was one course lower than its neighbour to the east.

The finds: Appendix 4

Method of analysis

All hand-retrieved pottery finds were examined. They were identified, quantified and dated to period. A *terminus post quem* date was produced for each stratified context. The date was used for determining the broad date of phases defined for the site. All information was recorded on a *pro forma* Microsoft Access database.

Finds noted but not collected

A number of lengths of metal pipework were noted during the stripping. The bricks forming the circular structure were measured (see above and Appendix 1) but as they had no distinguishing features, such as manufacturer's names, etc, no example was collected.

The pottery

The assemblage recovered from the site totalled seven sherds of pottery weighing 108g (see Appendix 4, Table 1). Material came from the topsoil (context 001; Fig 17) and the fill of the main structure (context 007; Fig 18). Level of preservation was good, with finds displaying low levels of surface abrasion, as reflected in relatively higher average sherd weight of 15.4g.

All sherds were of late post-medieval and modern date.

Post-medieval

Two sherds of post-medieval red ware (fabric 78) were retrieved. The first was the small base fragment, likely from a jar, which was high-fired and decorated with a purplish black glaze characteristic of this ware type. The sherd could be dated late 17th-18th century (context 001).

The other sherd (context 007) was from a fairly substantial open vessel (310mm diameter) with a thickened rim and had a dark red iron slip on both surfaces. The walls are near upright, indicating it to have been a straight-sided bowl or large jar form. It is possible, given the context in which it was found, that this vessel was a flowerpot. Evidence from Castle Bromwich Hall, amongst other sites, has indicated that flowerpots of 18th and early 19th century date closely resembled the local domestic vessels, being made of the same orange or buff earthenware and commonly having a dark red/maroon slip reminiscent of those seen on Midlands Blackwares (Currie 1993, 238).

Modern

The only stratified sherd of modern date was identified as the rim of an unglazed earthenware flowerpot (context 007; fabric 101). The rim was of collared form, which had faint traces of white slip painted around the top and measured 330mm in diameter. The collared form and presence of white slip indicate mid19th century date for this sherd (Currie 1993, 239).

Remaining finds came from the topsoil (context 001) and consisted of two sherds from a porcelain bowl or dish with blue, hand-painted decoration (fabric 83), a sherd of late stoneware (fabric 81.4) and a fragment of unglazed flowerpot (fabric 101).

Significance

The assemblage includes a standard range of domestic pottery types for the period. However, the presence of the two probable flowerpot sherds from the fill of the large structure could aid interpretation of this feature (see below).

The bricks

General

Harrison (http://jaharrison.me.uk/Brickwork/Sizes.html) measured the dimensions of bricks in around 250 different buildings across the country (Fig 19; Geographical distribution of sample, including volume). The examples he chose were neither systematic nor random. He measured any interesting looking bricks that he came across and as the opportunity allowed, measuring the visible faces of what appeared to be typical bricks *in situ*. This is less accurate, and may give a smaller measurement, than the procedure described in BS EN 771-1 (BS 2015), but even allowing for that, he found that the variation between bricks in different buildings was significant.

Volume distribution - general
As a preliminary analysis, he calculated the volume for each brick and used this as a comparative metric (Fig 19; Geographical distribution of sample, including volume). The example from the Walled Garden was 0.935 litres, which fell into the smallest of his categories. He concluded that larger bricks tended to be found further north. With one exception, the example from the Walled Garden is as far north as its category (0.8 litres to 1.2 litres) reached.

Volume distribution – east to west and south to north
A more dramatic illustration was obtained by considering east to west and south to north variations separately (Fig 19; Brick volume against Ordnance Survey easting and northing). The variation is enormous but the trend line, shown red, indicates that the volume increases with distance north and west. In each case the example from the Walled Garden is an outlier on or near the extreme edge of the distribution.

Thickness distribution – general
Harrison considered that the thickness accounted for more of the size difference than either length or width. The thickness of the bricks that he measured ranged from 42mm to 90mm. (Fig 19; Geographical distribution against thickness). The example from the Walled Garden was 45mm, which fell into the smallest of his categories. He concluded that larger bricks tended to be found further north. Again, with one exception, the example from the Walled Garden is as far north as its category (40-50mm) reached.

Thickness distribution – east to west and south to north
Again, the most dramatic illustration was obtained by considering east to west and south to north variations separately (Fig 19; Brick thickness against Ordnance Survey easting and northing). The variation is even greater than that for volume but the trend line, shown red, indicates that the thickness increases with distance north and west. Again, the example from the Walled Garden is an outlier on or near the extreme edge of the distribution.

Dimensional variation width-length
Across the sample, there was quite a strong correlation between width and length (Fig 19; Dimensional variation width-length), as would be expected since, when laid in a wall, two headers and a layer of mortar should take the same space as a stretcher, ie the width should be just under half the length. The dotted line on the graph shows a ratio of 2:1 and the example from the Walled Garden lies closer to it than many of Harrison's samples.

Dimensional variation thickness-width
Across the sample there was more variation in thickness than in width, and very little correlation between them, as the graph (Fig 19; Dimensional variation thickness-width) shows. The example from the Walled Garden is an outlier on the extreme edge of the distribution.

Dimensional variation thickness-length
Across the sample thickness and length varied by similar amounts, but the proportional variation in thickness is much greater (a factor of 2.1 between extremes) than in length (a factor of 1.5 between extremes) and there was very little evidence of correlation between the two (Fig 19; Dimensional variation thickness-length). The example from the Walled Garden is an outlier on the extreme edge of the distribution.

Discussion
The bricks recorded at the Walled Garden frequently fell at the edge, often the extreme edge, of the distributions analysed by Harrison. Until the 16th or 17th centuries transporting bricks would have been very difficult, very time-consuming and very expensive (Reeder 1983). Even significantly later than this date, bricks were frequently made as close as possible to the site of the building for which they were intended and material available on or close to the site was commonly used.

Brickmakers were slow to adopt mechanization and this has often been ascribed to the brick tax which was first introduced in 1784, increased at various times and finally repealed in 1850 (Smith 1994). As late as 1867 Marx could write that:

…tile and brick making, in which industry the recently invented machinery … is used only here and

there…

and still later in the century Ward (1885), noted the 'extraordinary tenacity of life' shown by hand brickmaking. Many arguments were advanced in favour of and opposed to both hand and machine-made bricks. Most relevant though were probably doubts about the worth of the capital outlay for any but the largest construction works. The cost of moulding bricks was small in proportion to the total cost of brickmaking and for a small (or temporary) brickworks, the employment of machinery would result in no saving. To this might be added the possibility that in rural areas, the gathering and production of materials for future construction work might be an activity to which estate workers could be put at slack times of the agricultural year.

The bricks used in the construction of the circular feature recorded by this project and, by necessity the ones that were examined, would have always lain beneath the surface and showed no signs of weathering or other environmental stress. However, examination of the bricks forming the external walls of the Walled Garden itself revealed many examples which had spalled, sometimes revealing large inclusions. This lack of quality control, the inadequate firing and the unusual size of the bricks, taken together with a nearby feature that may have been a mortar mixer, suggest that the estate was undertaking a significant building project, possibly operated by people who were not professional builders.

Since the bricks were an uncommon size, and they bore no manufacturer's mark, identifying a likely date for them is fraught with difficulty. Chapman (2011) reporting in the journal of the British Brick Society reported on a collection of bricks that were also plain with no frogs, stamps or makers' marks, which she considered to have been produced locally for a specific purpose. These bricks too, had inclusions of small gravel in varying degrees of density. She included a table which gave the dimensions of the bricks, together with the date of the kiln's final firing:

Date of final firing	**size - mm**	**size - inches**
1750	220x 110 x 67	(8¾ x 4⅜ x 2 ⅝)
1825-60	215 x 115 x 60	(8½ x 4½ x 2⅜)
1870-1880	230 x 100 x 73	(9 x4 x 2⅞)
1885-1910	220-263 x 108 x 70	(8¾-10¼ x 4¼ x 2¾)

The measurements of the bricks at the Walled Garden were 212mm x 98mm x 45mm, none of which fit very comfortably with the dates/sizes above.

Discussion

Outline history and character of ice houses

The construction of structures in which to store ice has a long and complex history, stretching back to the ancient world (Richardson and Dennison 2017). There is some scarce evidence for late medieval ice houses in Britain, all apparently associated with monasteries, whilst later in the 16th century, a form of ice house appears to have been introduced into the grounds of estates associated with large houses (Beamon & Roaf 1990, 17). Nevertheless, the earliest well-documented ice houses or similar structures are all associated with the royal household (Ellis 1982, 2; Beamon & Roaf 1990, 18). Buxbaum (2014, 8) states that the earliest recorded purpose-built English 'snow well', lined with brick dates from 1619, when James I had one dug at Greenwich. In the 1660s, several 'snow wells' were dug in London, including five for the royal household. These were generally cone-shaped brick structures covered by a thatched roof above ground (Buxbaum 2014, 11).

Ice houses thus became very fashionable, but despite these early royal examples, they were still regarded as a luxury in the 1750s because of the high cost of construction. As building techniques improved and cheaper materials became available, more were built; by 1786, an ice house built in Inveraray, Scoland, took four months to construct. By the end of the 18th century, many landowners, including the aristocracy, had built ice houses (Beamon & Roaf 1990, 19). Ice was obtained from adjacent ponds and lakes, or alternatively shallow ponds were sometimes dug close to the ice house for the sole purpose of supplying it with clean ice during the winter. Ice was also imported from colder countries, with North America, Norway and Greenland being significant exporters of ice by the mid-19th century.

Design and situation

Ice houses associated with stately homes became common in the 19th century (Strafford and May 2016). The stored ice was used for the preservation of perishable foods, to cool drinks and to make popular cold desserts, such as jellies, blancmange, ice cream and sorbets. Ice houses could also be used for the storage of meat, and even for plants that required chilling prior to planting out (Loudon 1835, 613). Although there were various styles of ice house, the 'cup and dome' design (Fig 11; Rees 1819) was one of the most common (Strafford and May 2016). Cup and dome ice houses were deep cylindrical chambers excavated into the ground, usually tapering towards the base where there would be a drain to take away melt water. The 'cup and dome' form had several advantages (Richardson and Dennison 2017). It was structurally enormously strong, very effective in withstanding the underground stresses and had a high capacity for temperature regulation. The sloping sides encouraged the drainage of melt water into the sump. Ease of loading was also an important consideration, and the doors of these type of ice houses were built just below or into the springing line of the dome, so at least two thirds of the volume of the ice well was below the waist level of people standing in the passage. In this way, ice could be tipped down into the well from passage level, making it easier to fill than if ice had to be manually stacked or piled up. Others had a covered manhole structure in the roof of the dome or vault which could be used for loading. Straw was most commonly used as an insulating material, sometimes tied into bundles and placed between the side walls of the well and ice as it was being loaded; some wells were provided with a timber lining, held in place by iron pegs. When the ice house was full, the ice was covered with straw or reeds before the external door was shut. Due to the sloping sides of the well, any melting ice slid down the sides, compacting and consolidating under the weight of the ice above, so maintaining a minimum surface area and facilitating its continued frozen state. However, the main disadvantage of this form of structure remained the expense of construction (Dennison 1989; Beamon & Roaf 1990, 59, 61-62 &110-112).

There was much debate regarding the most suitable position for an ice house but the majority were built on sloping ground – a condition which naturally aided drainage – on the banks of landscaped lakes or ponds (Cole 2001). Because of the difficulties involved in the carrying of ice to these buildings, it was better to be nearer to the source of the ice than the house. Proximity to an estate road was also considered. Some were placed under trees to ensure added protection from sunlight. The architect John Papworth wrote in 1823 (Papworth 1823) that the appropriate place to build an ice house was:

…in a retired spot of the grounds and not far removed from water and yet sufficiently elevated to be secure from damps

The dimensions of cup and dome ice houses varied greatly, in proportion to the quantity of ice required or available. It was important for the ice house not to be much bigger than the expected quantity of ice to be stored, as the extra space would reduce the insulating properties of the structure; however, some ice houses had extra space so that they could store at least two years' worth of ice, in case of a warm winter (Loudon 1835, 611).

Commentary on the recorded deposits with regard to ice houses

The remarks on the history, character and design of ice houses raises questions regarding the interpretation of the recorded deposits. The projected internal diameter of the Wolverley structure is about 8.6m. A rapid internet search for comparative material resulted in Table 1 (Appendix 2) from which a histogram comparing the maximum internal diameter of ice house chambers was derived (Fig 12). This shows the greater number of ice house chambers fall within a diameter range of 2.5 to 3.9m with a smaller number starting at 4.0m and tailing off at 5.9m. No sophisticated statistical analysis is needed to show that the dimensions of the Wolverley structure lie far beyond these limits.

The geographical position of the Wolverley structure was also considered. Firstly, ice houses are often, but not always, built on or adjacent to slopes in order to enable a drain to be constructed to remove thawed water and so limit the deleterious effect this has on the remaining ice. Rees (*Cyclopaedia*: 1819; Fig 11) implies that a suitable gradient for such a drain is about 1 in 5. A rapid levelling traverse determined that the slope of the field is approximately 1 in 13, falling to the south-east (Fig 13). Assuming that the putative ice house at Wolverley has a typical depth of about 4m, the path to The Shortyard where any drain would have to terminate is nearly horizontal.

Secondly, if the Wolverley structure was an ice house, one question naturally arises: from where did it obtain its ice? An assessment of the gardens and pleasure grounds associated with Wolverley House was made above (Fig 14). Within this area, and indeed, for some distance without it, the only pool, which presumably occupies a former gravel pit (Barclay, Ambrose, Chadwick and Pharaoh 1997), lies at the north-eastern extremity of this woodland, adjacent to Debdale Farm (parcel number 588). It is true that the River Stour runs in the valley to the south and east of the wooded estate but rivers were not the first choice as a source of ice as still water, being more liable to freeze, was favoured.

Although Ellis (1982, 12) states that the distance between an ice house and the source of the ice was of little consequence, Beamon and Roaf (1990, 85) argue that in terms of siting, the majority of ice houses are placed closer to their ice source than to the house they served, as filling them was a uncomfortable and back-breaking operation. The main landscape lake, lacking in the case of Wolverley House, was often the source but there were sometimes specially-constructed shallow ice ponds nearer to the ice house which were commonly constructed on larger estates to provide a clean source of ice for the ice house. No such ponds are known at Wolverley although these ponds have often been lost.

None of the above actually precludes the Wolverley structure from being an ice house: it would just be a highly unusual example. However, the balance of probability lies with it not being an ice house, and other interpretations were sought.

Outline history and character of dovecotes

Another possibility is that the structure uncovered at The Walled Garden is a dovecote. A mid-18th century dovecote already exists adjacent to Wolverley House (WSM 04221, Listed Building (II) – 1100643). Multiple dovecotes in close association are not unknown but they are rare. A typical sectional elevation of a dovecote was depicted in Cooke (1920; Fig 15).

It is believed that dovecotes developed to solve a serious problem of food supply: how to feed livestock and therefore supply fresh meat through the winter (Cooke 1920). Historically, flocks and herds were fed through spring and summer and in autumn there was a universal slaughter, save for a few animals kept for breeding the following year. Doves (actually pigeons) could survive through the lean months and provide a never-failing supply of meat, at least for those who could afford a building in which to keep them. Dovecotes are therefore associated with the medieval and post medieval landowning aristocracy, both lay and secular and, in addition to a sustainable supply of meat, they also provided eggs, and manure. As such, the possession of a dovecote was a very valuable asset.

Although dovecotes were built by the Romans, no examples are known in England and none are recorded in Domesday Book. The tradition of dovecote construction in England is associated with the Norman aristocracy of the 11th century. From this period, the right to build and keep a dovecote was restricted to royalty and the ecclesiastical and lay nobility. From the 14th century ownership extended throughout the social hierarchy. A high-point of activity in the construction and use of dovecotes was seen in the 14th and 15th centuries. By the early 17th century ownership was being extended further and large numbers were erected by non-manorial landowners. A second high-point of activity was seen in the 17th century, by which time the ownership of a dovecote, as well as providing an alternative source of food, had also assumed a certain social significance.

After the 17th century many dovecotes became incorporated into farm complexes, either as isolated structures or within existing buildings. By the 18th century, their decorative potential was also recognised and many continued to be built in the architectural styles of the day. In addition to their functional purposes, dovecotes assumed an important architectural and aesthetic role and as such they continued to be built into the 20th century.

The location and position of a dovecote can vary a great deal. Some may be at quite a distance from the farm, manor, house, or grange while others are located within the religious, agricultural, or manorial complex itself. It has been estimated that a pair of birds will consume four bushels of corn in a year and, as they were given manorial protection and allowed to forage freely in large numbers, they could cause considerable damage to crops. In an attempt to restrict this damage, some dovecotes were deliberately sited on common or waste land on the margins of a manor or estate.

Early dovecotes were usually circular and of massive construction, the walls being a metre thick or more and having a low-domed, vaulted roof. Over time the circular dovecote was replaced by octagon, square and rectangular forms. The materials varied according to the locality. Dovecotes were in a great measure doomed with the introduction of the turnip and the swede to British agriculture in the early 18th century. These, and subsequently oil cake and other feedstuffs, solved the difficulty of over-wintering livestock.

Commentary on the recorded deposits with regard to dovecotes
As with ice houses, a rapid internet search for comparative material resulted in Table 2 (Appendix 3) from which a histogram comparing the maximum internal diameter of dovecote chambers was derived (Fig 16). This shows the greater number of dovecote chambers fall within a diameter range of 3.0m to 3.4m with a steady decrease in numbers as the largest size range, 6.0m to 6.4m, is approached. Again, no sophisticated statistical analysis is needed to show that the dimensions of the Wolverley structure lie far beyond these limits. Also, again, this doesn't preclude the Wolverley structure from being a dovecote: it would just be a highly unusual example.

The Monuments Protection Programme, monument class description for dovecotes (English Heritage 1989), states that dovecotes and the individual components that comprise them may be confused with other classes of monuments that have a similar form. For example, circular dovecotes may be confused with lock-ups and wool-drying houses. Dovecotes may also be confused with other monuments relating to animal husbandry, for example falconries or game larders. Post-medieval examples may be confused with buildings connected with landscape architecture such as summer houses, garden houses, or gazebos. In the particular circumstances (the location of the structure) lock-ups, summer houses, garden houses and gazebos were considered to be highly unlikely. However, it was felt that wool drying houses, falconries, game larders and hothouses were avenues worth pursuing. It was anticipated that these categories would be more difficult to research remotely than ice houses and dovecotes and so the National Heritage List for England (www.historicengland.org.uk) was consulted. There are disadvantages with this approach: only such buildings as appear on the list are available to be considered and the information provided is limited. It was expected, for example, that it would not be possible to compile tables of dimensions and derive graphs for analysis and illustrative purposes as was done with ice houses and dovecotes. However, it was hoped that such information as is typically provided in a listed building description, combined with such photographs as are available from the Images of England project, would enable an assessment of the likelihood that the structure found at the Walled Garden may or may not be a falconry, game larder, wool drying house or hothouse.

Falconry
This category was investigated and dismissed very quickly. Only fourteen records were found for falconries which means that they are either a rare survival or that they were an uncommon feature in the first place. None of the listed examples was circular and they tended to be somewhat smaller than the structure at the Walled Garden. It is therefore thought very unlikely that the Walled Garden structure is a falconry.

Game larders
A game larder, also sometimes known as a deer or venison larder, deer, venison or game house, game pantry or game store, is a small domestic outbuilding where the carcasses of game including deer, game birds, hares and rabbits, are hung to mature in a cool environment. These are a feature of large country houses from the 18th century and they continue to be used by shooting estates. Two-hundred and fifty-eight records were found for game larders. The overwhelming majority of these were octagonal in plan with square or rectangular examples being next in frequency. Only five examples were circular in plan and these were:

Game larder to north of Shadwell Court, Brettenham, Norfolk - List Entry Number: 1342782

Game larder 20m north of Stagshaw House, Sandhoe, Northumberland - List Entry Number: 1370578

Folly or game larder approximately 200m west of Bilton Hall, York Road, Bilton-in-Ainsty with Bickerton, North Yorkshire - List Entry Number: 1150364

Compared with most of the listed examples, this one included a considerable amount of detail. It is of the late 18th century, constructed of brown-red brick on a stone plinth with a thatched roof. It is circular, approximately 6 metres in diameter, and of a single storey. Blocked round-arched doorway of raised headers on north side; a similar opening on the south side enlarged and a wooden lintel inserted. Circular windows of raised headers on west and east sides, the latter with the wooden window or ventilator frame surviving. The wall surface is divided into eight panels by brick pilasters which rise from the plinth and meet a projecting eaves band. The original purpose is uncertain; it has been used as a deer or cattle shelter in recent years and stands close to an ice house

Ford Castle game tower with attached garden walls and carriage arch, Ford, Northumberland - List Entry Number:1154099

Its photograph from Images of England suggests this example could be comparable in size to the Walled Garden structure.

Lodge to Rochetts, Weald Road, Brentwood, Essex - List Entry Number:1293021

The lodge is said to have been a game larder and is the subject of an article in Essex Countryside (1976).

Its photograph from Images of England suggests this example could be comparable in size to the Walled Garden structure.

Commentary on the recorded deposits with regard to game larders
The only example with a dimension (6m) is Bilton Hall. It is not stated but this is probably an external diameter. Making an allowance for wall thickness, this places it in the middle of the range of size with respect to dovecotes which therefore falls a long way short of the Walled Garden structure. Two of the other examples have photographs – Ford Castle and Rochetts - and these appear to be of a similar external diameter to that of the Walled Garden structure. However, the estate associated with Wolverley House seems to be quite a restricted one. Since many listed game larders are quite small ‘shed-like’ buildings it is felt that, on the balance of probability, a game larder, particularly one of the size of the Wolverley structure, is not an appropriate interpretation.

Wool drying house
Another possibility is a wool drying house. Twenty-two records were found of which the majority were rectangular and four were circular. These were:

25, Church Street, Melksham Wiltshire - List Entry Number: 1021698
Wool drying house, now craft shop. Late 18th century. Coursed rubblestone, stone slate conical roof. Circular plan. 2 storeys, 4 windows. Wide door has plain ashlar case, windows to ground and first floor are single casements in beaded cases. Renovated interior has 20th century roof, stairs and first floor. Industrial building associated with Melksham's 18th century and early 19th century wool industry.

Its photograph from Images of England suggests this example could be comparable in size to the Walled Garden structure.

The Round House at Bearfield Buildings, Huntington Street, Bradford-on-Avon, Wiltshire List Entry Number:1255548
Small circa late 18th - early 19th century round cottage built of coursed stone with conical slate roof with a finial. Said to have been used for drying wool or teasels and converted into a cottage. Two storeys with string course at floor level. Pointed arch window and doorway both with plain stone architraves and gothick intersecting glazing bars. Chimney stack at side.

Again, its photograph from Images of England suggests this example could be comparable in size to the Walled Garden structure.

Tower House, Kemps Lane, Painswick, Stroud - List Entry Number: 1090974
Tower House, former wool drying house. Early 19th century or earlier. Squared dressed limestone, stone slate roof. Cylindrical structure with conical roof to stone capping. Towards the house, which is

not of special interest, a pointed arch doorway with plank door under squat paired pointed lights; to left and right of door similar small pointed openings, then at eaves level above these similar openings with wood ventilating louvres. Roof structure is 20th century. A good example of a type of structure once more common in the area.

Round House, Frogmarsh, Woodchester, Stroud - List Entry Number: 1172134
Former teasel drying tower, now small house. Mid-late 18th century; late 20th century addition. Coursed rubble limestone; stone slate roof. Three-storey; circular with 2-storey circular addition. Three small lancets at cardinal positions and upper level pointed arched doorway to rear, now reached by 20th century stairs. Lancets removed at connection with 20th century addition but reused on that addition. Inserted fixed light at low-level on original tower; some timber casements to addition. Conical roofs; addition with finial. Interior not inspected. An important survival, dry teasels being used in the process of raising the nap of cloth.

Commentary on the recorded deposits with regard to wool drying houses
It was noted by Turberville (1852) that Worcestershire clay lands, that formerly were allowed to lie fallow every fourth or fifth year, were now planted with vetches, and sheep-folded. Advances had also been made in the character of the stock reared, especially in the size and quality of the sheep. He attributed this to the land being better drained which prevented much of the disease which used formerly to thin out the flocks year by year, and he remarked that there had been no serious [foot] rot in the county since 1831.

The towns of Worcestershire: Kidderminster, Evesham, Droitwich, Bromsgrove and Worcester itself, had been known for centuries for the manufacture of woollen cloths (Turberville 1852). In the time of Charles II an act was passed ‘for regulating the manufacture of Kidderminster stuffs’. Arras, frieze, cheneys and ratteens, poplin, prunellas, rich brocades and quilted stuffs had all been made. In the middle of the 18th century Kidderminster started to become known for its carpet manufacture and it is this to which it subsequently owed its entire prosperity and fame one hundred years later. At the beginning of the 19th century there were probably about 400 looms at work there, but fifty years later there were at least 3,000.

The connection of all this with Wolverley House and with the interpretation of the circular feature at the Walled Garden was Major Eric Knight. He was a Member of Parliament. Before the twentieth century, members of parliament were unpaid as it was assumed they would have another income. The first regular salary was £400 per year, introduced in 1911. Major Eric Knight, M P, J P, would probably have been a gentleman farmer and may well have kept a flock of sheep. The market for the wool is likely to have been Kidderminster, about three miles away. It is thus entirely possible that the circular feature recorded by this project at the Walled Garden was a wool drying house.

Pineapple house/hothouse
In the Georgian period the pineapple was a potent status symbol and was paraded at the dinner table (Thomas 2017). Producing a crop of tropical fruit in a temperate country before the advent of a hot water heating system was a testament to the gardeners’ expertise as well as the owner’s wealth. Pineapples were cultivated in a special, long, low glasshouse called a pinery. Pineapple cultivation became much more affordable and more common in the 19th century with the invention of hot water heating in 1816, sheet glass in 1833 and the abolition of the glass tax in 1845 (Lausen-Higgins 2019). Victorian gardeners reportedly grew pineapples of enormous sizes and a pinery was mandatory for every estate kitchen garden and continued to be so for almost another century.

Such pineries often existed as adjuncts to the main part of a walled kitchen garden. Forty-four results were obtained but very few had any significant details regarding the hothouse itself, usually because it was described as ’demolished’. Nevertheless, eight examples produced information for comparison with the Walled Garden structure and its surrounding deposits.

Hothouse approximately 60m north-west of Bitham House, Avon Dassett Road, Avon Dassett, Stratford-on-Avon - List Entry Number: 1355549
Described as having brick rear wall.

Stone wall and hothouses in western kitchen garden, Tatton, Cheshire East - List Entry Number:

1278598
Stone wall and hothouses. Mid 19th century. Red, English garden wall bond brick with chimney pots. Timber and glass. 2 lean-to hothouses on south front of stove wall.

Walled garden (including sundial) approximately 100m south-east of Tehidy House, Illogan, Cornwall - List Entry Number: 1310213
Walled garden (including sundial) approx. 100 metres south-east of Tehidy House. Walled kitchen garden to Tehidy House. Built by Francis Basset, Lord de Dunstanville, about 1777-82. Handmade brick. Very large double rectangular enclosure surrounded by walls approximately. 4 metres high, those of the west garden with pilasters at regular intervals; segmental-headed doorways, some blocked; in the centre of the north side of the east garden are the foundations and plastered rear wall of hothouses (probably those built in 1780), and attached to the north wall of the west garden is a long but shallow greenhouse with steeply-pitched roof and a door at the east end. At the centre of the east garden is a sundial of white stone (probably Portland stone), with square base and vase pedestal, but now lacking the plate and gnomon.

Orangery with flanking walls, Botheys, glasshouse and pavilions, Ripley, North Yorkshire - List Entry Number: 1315394
Orangery, botheys, garden wall with glasshouse and pavilions. Possibly *c*1785 by William Belwood for Sir John Ingilby, altered 1817-18 for Sir William Amcotts Ingilby, the glasshouse probably *c*1840. Ashlar, coursed - squared gritstone and glass; orangery roof replaced mid 20th century. The range is composed of a projecting central 5 x 2 bay single-storey orangery flanked by garden walls, both originally with lean-to glass houses but that to left demolished.

Walcot, Clunbury, Shropshire - List Entry Number: 1001321
A long, curving hothouse, also erected in the early 19th century (pre-1822) and described by Charles Hulbert of Shrewsbury as 'the most spacious and costly I ever beheld' . The hothouse was demolished in the mid 20th century, but the brick backing wall survives,

Walled kitchen garden, potting sheds and boiler house, three greenhouses and sundial, Ashton, East Northamptonshire – List Entry Number: 1393626
The scars of the demolished hot-house are apparent on the interior of the north wall, where brackets, presumably for shelving, lighting, wall stubs and evidence of the pipe-work remain. Building scars are also apparent on the interior of the east wall. The interior arrangement of the potting sheds remains. The easternmost shed has a fireplace and stove, and the central shed, from which the interior of the garden is accessed, retains its engineering brick floor and some pipe-work for the hot-house.
A map of the Ashton Wold estate in *c*1901 shows the walled garden, complete with principal south-facing hothouse attached to the north wall and ten other glasshouses in the north-east corner of the garden.

The gravel paths formed a cross with the sundial at the centre, which remain; down both sides of the paths were wide herbaceous borders planted with cottage garden flowers, flanked by cordons of fruit trees of different varieties of apples and pears behind which lay vegetables, strawberries and several raised asparagus beds. Greengages, apricots, plums, pears, cherries and figs were trained around the inside of the stone walls. On the outside were Morello cherries and peaches enclosed in a glass and wooden frame. Hybrid tea roses and a variety of berries were also grown. One greenhouse was reserved for black grapes, another for green grapes and another for a collection of cacti.

Kitchen garden walls immediately north-east of Wood House, South Tawton, West Devon - List Entry Number: 1106026
Kitchen garden walls. 1899-1905 by Thomas Mawson. Granite rubble, carefully chosen to appear as walls of crazy paving with some granite ashlar dressing, some slate coping, some slate and brick dressings and slate roof to the service rooms and glass roofs to the hot and green houses. Plan and description: large kitchen garden built across a gentle slope facing north-east with a series of service buildings at the north-west end including the mens' shed, tool shed, mushroom and forcing shed, seed store, fruit room and a 2-storey boiler room and potting shed. All these are granite with brick dressings and have timber casements with glazing bars and plain carpentry and joinery detail. In front of these are a series of glass-roofed structures including the peat house, vineries, palm house, plant houses and cold frames; all glazed iron-framed structures, mostly on granite footings but some on brick (now disused). A lane separates the kitchen garden and its associated garden from Wood House. The most

noteworthy feature is the watering well or fountain in the north corner. Behind it the outer wall is higher than the rest with ashlar coping and series of small corbels. In front, that is to say, backing onto the house's service courtyard and facing into the kitchen garden, the watering reservoir is contained within a semi-circular retaining wall and was fed through a fountain in a blocked round-headed alcove defined by blocks up-ended slates set at alternative angles. The massive keystone here once included a bronze lion's head tap. The doorway to right of this has a round head and ovolo-moulded surround and contains the original door. To left, running parallel with the house the wall has flat-topped granite coping (some of it collapsed). Once past the house (where there is another doorway from the main formal garden) the walling reverts to slate coping. The kitchen garden is enormous and intended to produce an income rather than simply feed the household. It is part of an extensive landscaping scheme conceived by Mawson to go with the rebuilding of Wood House. Mawson himself considered the whole one of his major achievements.

Downton Castle, Downton, County of Herefordshire - List Entry Number: 1000497
Kitchen garden The lozenge-shaped, eight-sided, brick-walled kitchen garden lies on a southward sloping site 300m north-west of the Castle. Overall the garden measures *c* 140m east/west by 70m north/south. The walls are probably of the late 18th century; incorporated in the north-west corner is a brick gardener's cottage of the mid 19th century. Several ranges of later 19th century glasshouses lie along the north wall, with to their south a free-standing, curvilinear vinery, perhaps that mentioned in the report of 1838. In 1997 the interior was rough grass; a hard tennis court has been laid in the eastern half of the garden. Along the outside of the north wall are ranges of brick and stone sheds, probably of the late 18th and 19th century.

In 1838 the importance of the kitchen garden at Downton to T A Knight's horticultural experiments was noted (Gardener's Magazine). As well as several, but scattered, hothouses (curvilinear-roofed pine-houses; a melon house; a fig house; and a peach house are all mentioned) it also contained seedling fruit trees planted by Knight and vegetable beds.

Brocket Hall, Wheathampstead, St. Albans - List Entry Number: 1000540
Kitchen garden The walled kitchen gardens (probably James Paine or Richard Woods, mid-late 18th century, lie 300m north-west of the Hall. They are divided into several sections, together with an attached gardener's cottage and octagonal, early 19th century glasshouse and other service buildings and glasshouses. An earlier kitchen garden lay to the north of the stables.

Commentary on the recorded deposits with regard to pineapple houses/hot houses
It was noted during the watching brief that an extensive ashy deposit (context 016) was present in between the circular structure (contexts 011 and 013) and the Walled Garden wall (Fig 3.2). In addition, evidence for pipework was found *in situ* (context 015) and in fragments, scattered around the area of the stripping. Furthermore, there is evidence for a lean-to structure against the Walled Garden wall (Fig 10 and context 014). During the trial hole investigation and subsequent watching brief it was noted that the interior of the circular structure was filled with very considerable quantity of flower pot and window glass (context 007). It was felt at the time of the trial hole investigation that these finds were *ex situ* and had come from a demolished greenhouse elsewhere on the site, of which there are a number, both within and without the walls of the Walled Garden. It is now acknowledged that this deposit may have been *in situ* and was related to the activities within and around the circular structure. It is possible that the circular structure and the lean-to structure against the wall of the Walled Garden were elements of a hothouse for the production of exotic fruit.

Conclusion

It is believed that the circular structure found during the excavations for the footings of the development is either a wool drying house or a component for the hothouse production of pineapples or other exotic fruit. A wool drying house would have been part of the commercial side of the estate that was associated with Wolverley House. This would have contributed to providing an independent income for its late 19th and early 20th century occupant, enabling him to pursue activities as a Member of Parliament and a Justice of the Peace. Substantial landowners in general and prominent members of local society in particular would have been expected to periodically entertain their peers. These entertainments were, to a certain extent, competitive. This is the world depicted so well in broadly contemporary novels such as Pride and Prejudice (Austen 1813) and a successful pinery would have contributed significantly to the status of its owner. It was noted above that there are

circular features shown to the north of the Walled Garden on both the tithe map (Fig 2.1) and the early Ordnance Survey mapping (Figs 2.2 and 2.3). They are, however, in slightly different places. It was thought at the beginning of this project that this was simply a discrepancy between two surveys, undertaken several decades apart. However, it now seems possible, even likely, that these were two distinct structures.

The project confirmed that the circular feature shown on the Ordnance Survey mapping was that discovered during the watching brief. However, closer examination of the tithe map suggests that the circular feature shown on this mapping was something of a different nature altogether; possibly a mortar mixer, presumably associated with a construction project in the vicinity of the Walled Garden. There are a number of buildings both within and without the walls of the Walled Garden, including the subject of this project, that appear on the 1st edition Ordnance Survey of 1883 but not on the tithe map of 1838. It is postulated that these buildings were the subject of the putative construction project and that the structure hitherto believed to have been an 'ice house' dates from the second quarter of the 19th century.

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Archive

The physical archive consists of:

16	Context sheets
2	Drawings
1	Hard copy of the report
1	Hard copy of the report illustrations
1	Hard copy of the WSI

It will be deposited at Worcestershire County Museum, Hartlebury upon approval of the report. It is anticipated that the finds will not be of interest to the museum. However, the museum will be consulted in this respect before disposal.

The digital archive consists of

1	Digital copy of the report (.docx format)
21	Illustrations (.bmp format)

It will be deposited with the Archaeology Data Service upon approval of the report.

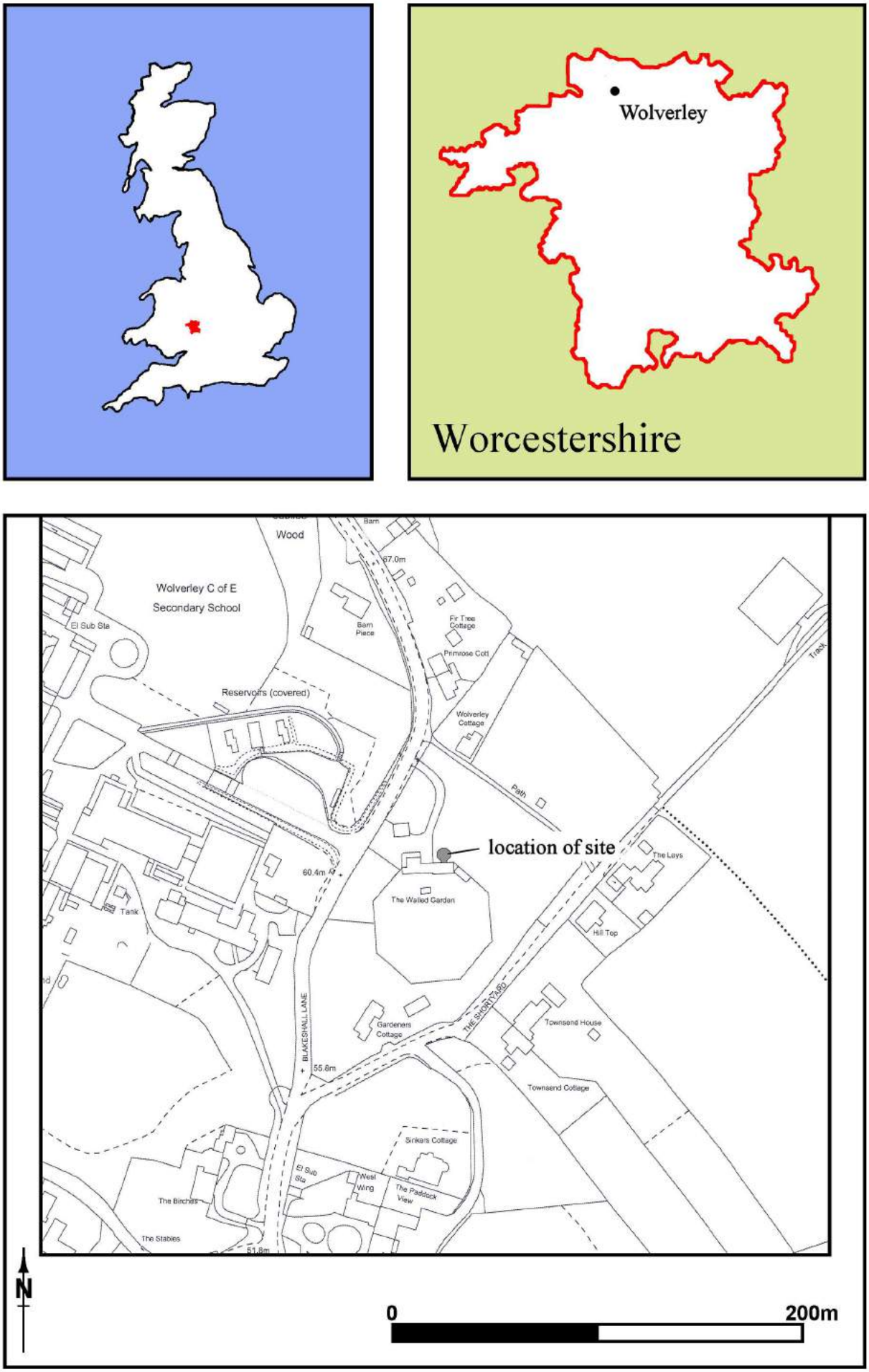


Fig 1: Location of site

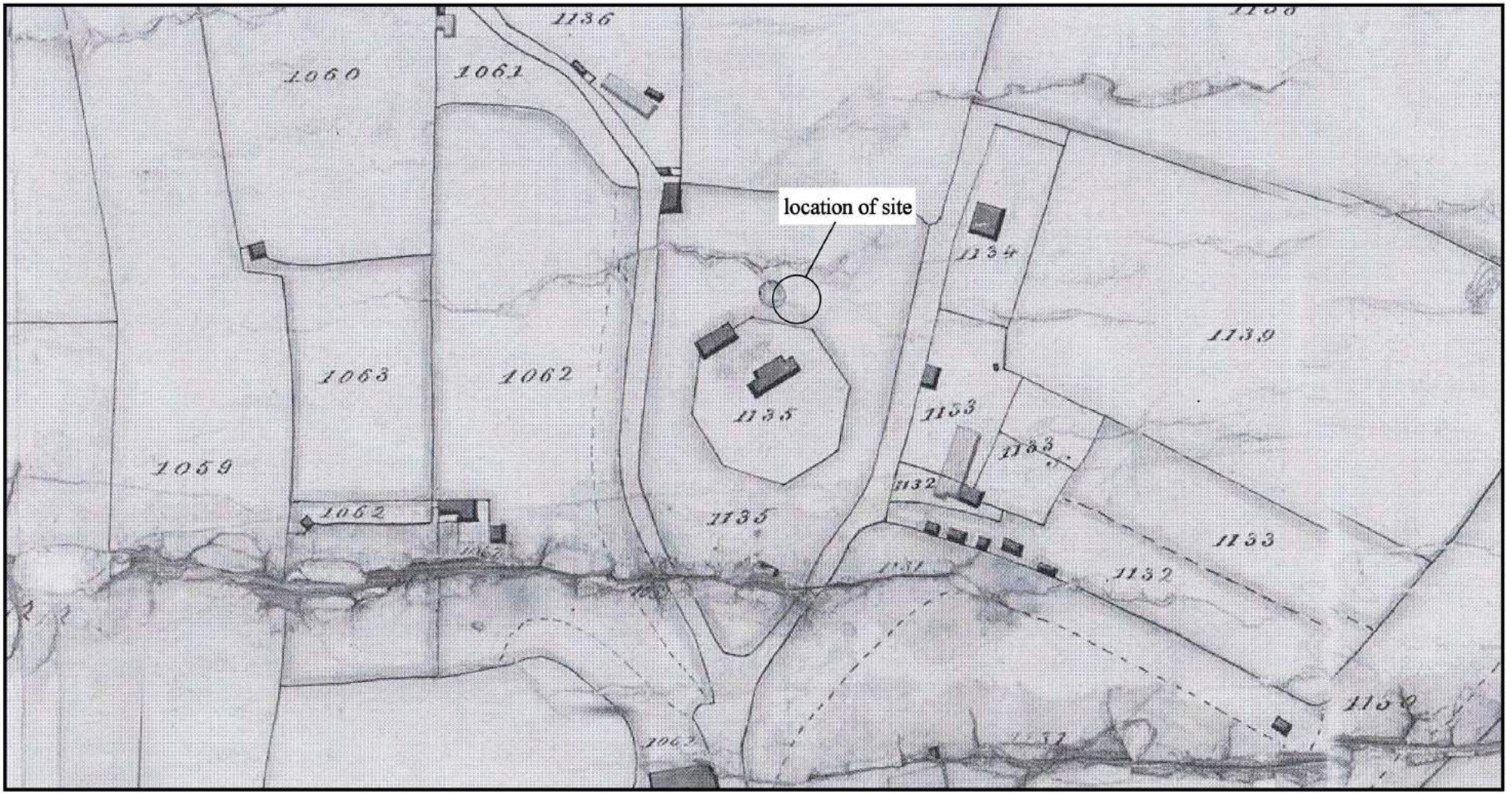
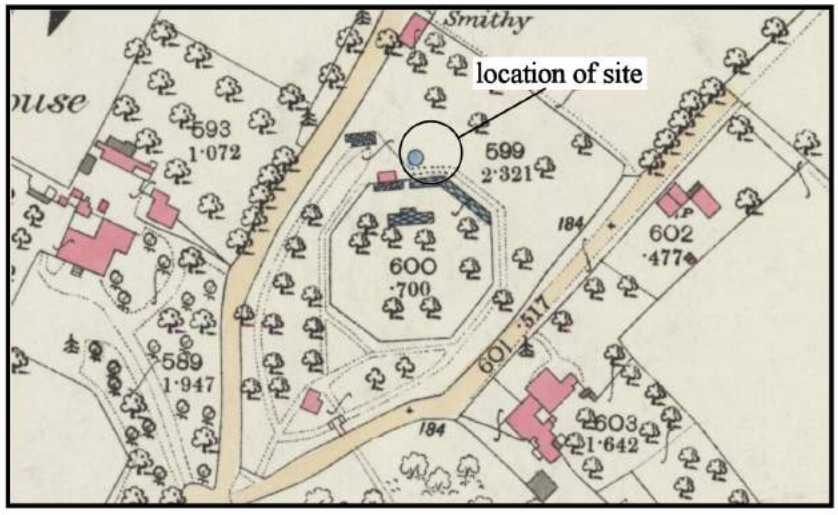
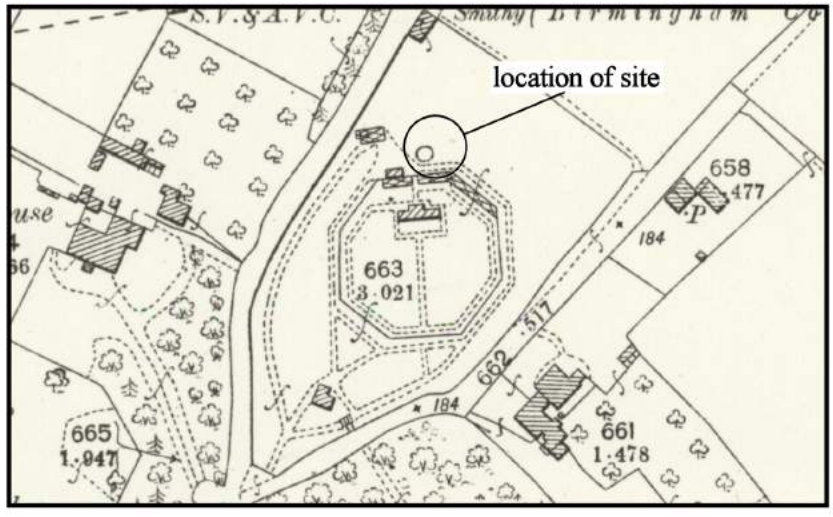


Fig 2.1: Tithe map of Wolverley; 1838

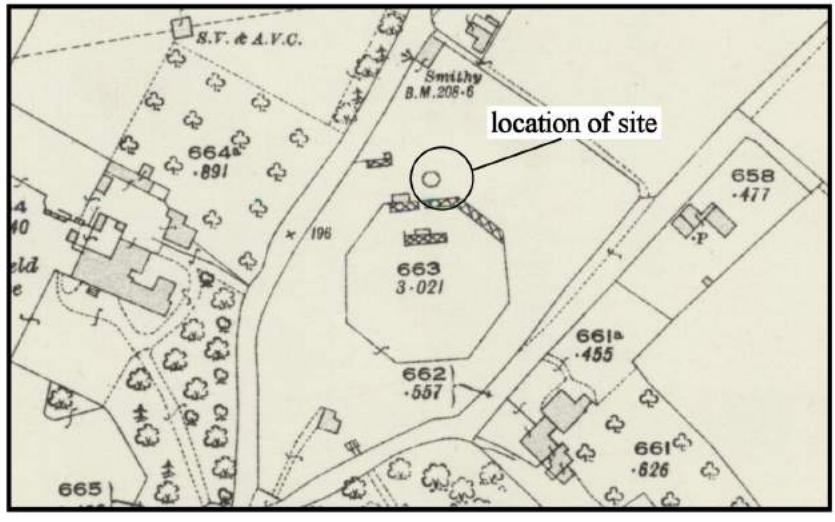
1883



1902



1924



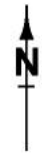


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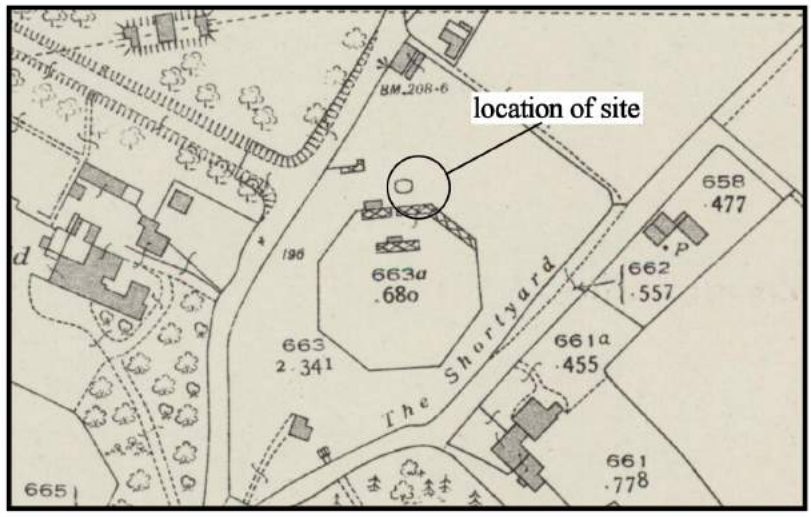
Fig 2.2: Historic mapping

1938



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0 200m

Fig 2.3: Historic mapping

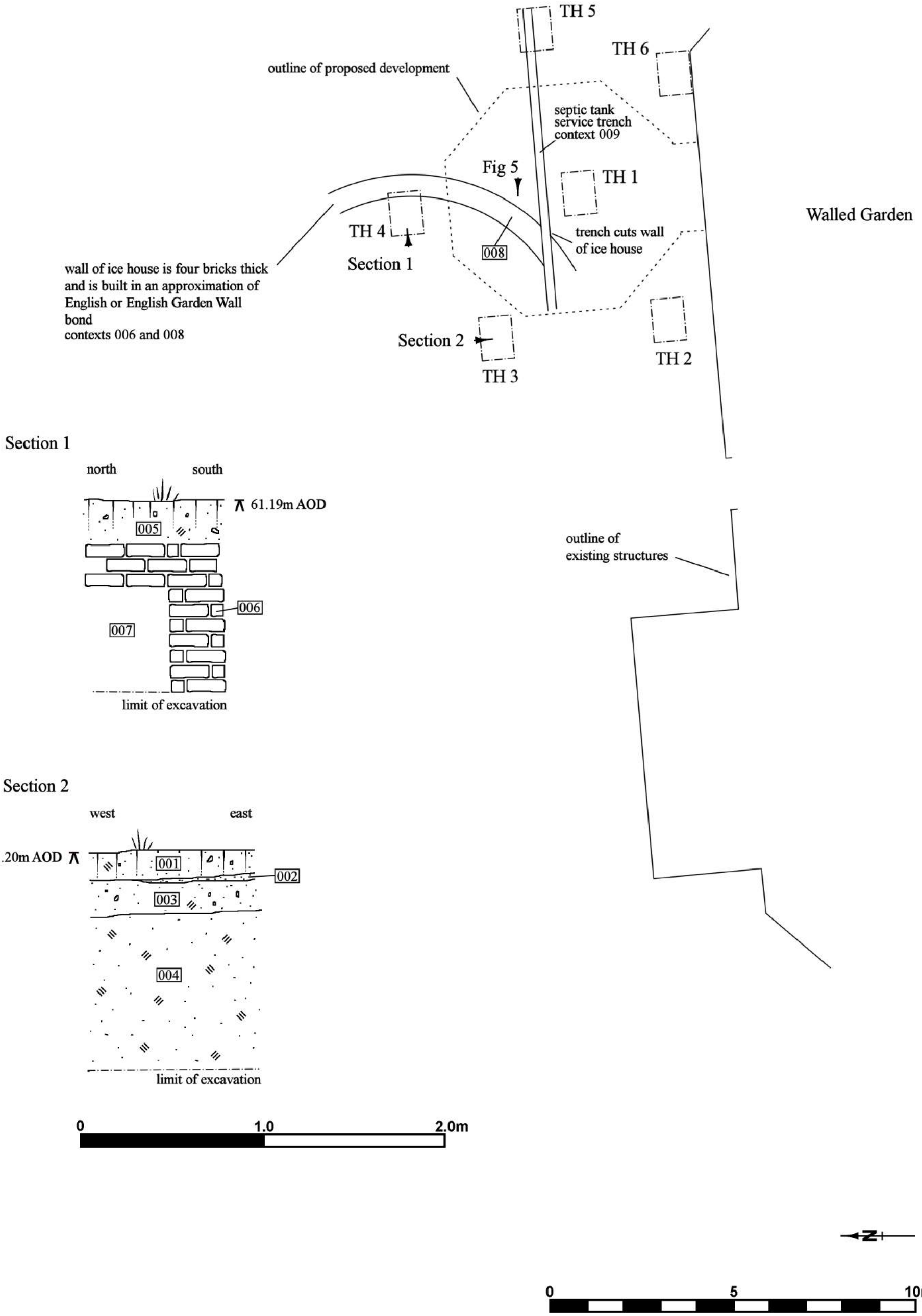


Fig 3.1: Watching brief on trial holes

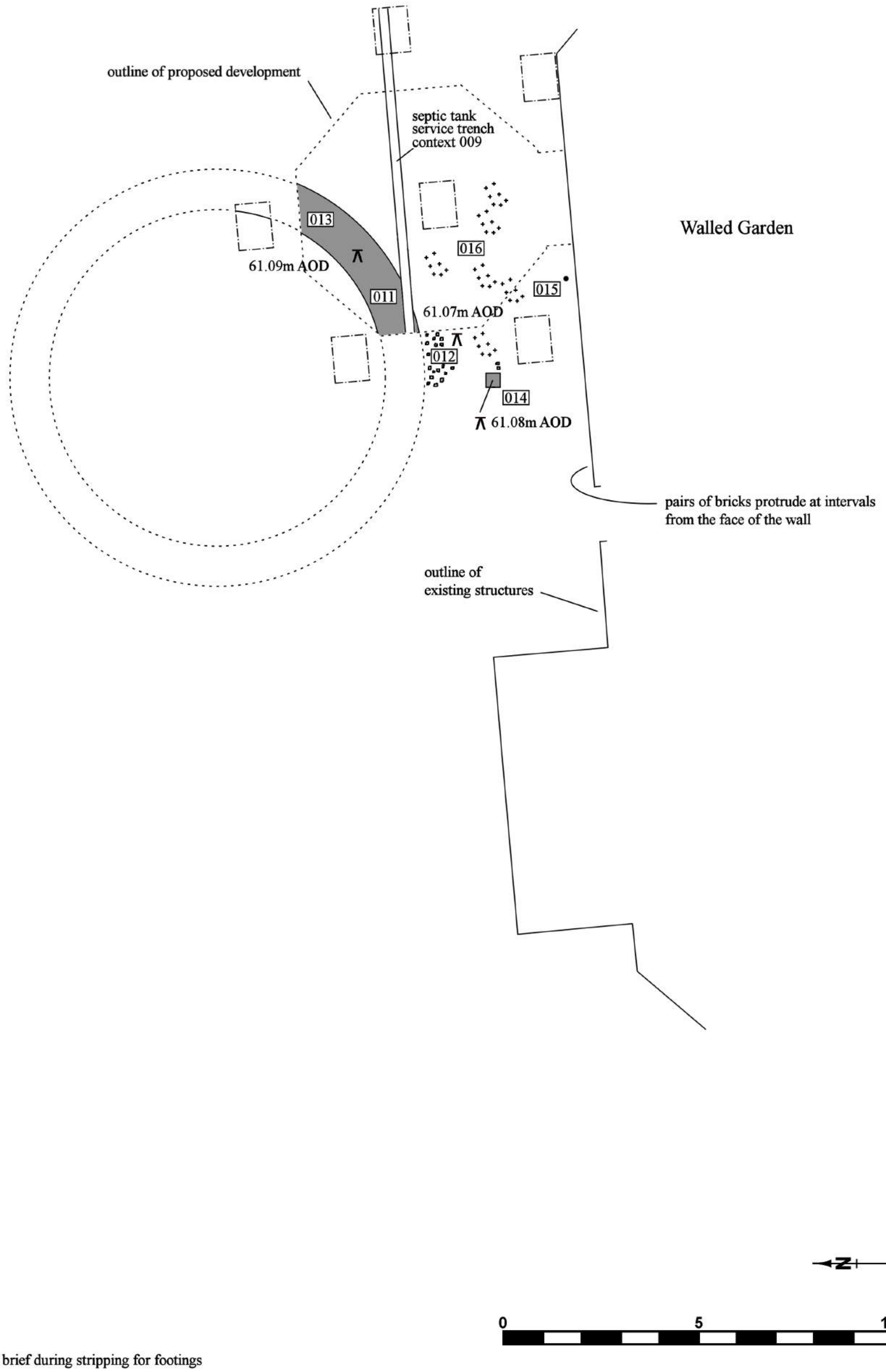


Fig 3.2: Watching brief during stripping for footings

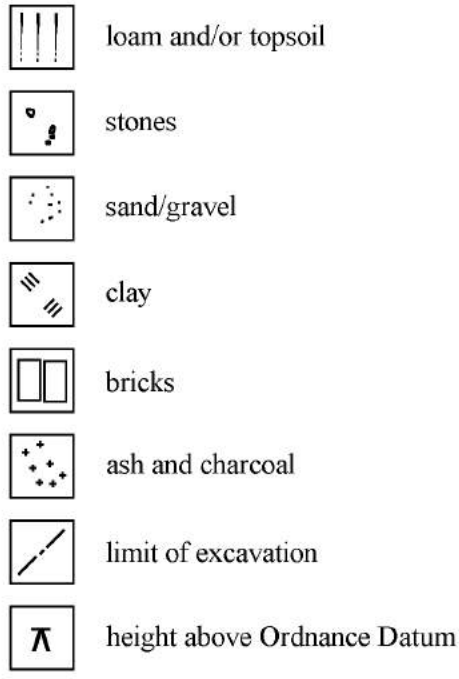


Fig 3.3: Key to sections

Fig 4: Trial hole 4, contexts 006 and 007; see Fig 3.1, section 1

Fig 5: Exposure of outer face of context 008 adjacent to trial hole 1

Fig 6: Excavation of the trial holes

Fig 7: Context 011, curving brick wall, with context 012, cobbled surface in the foreground

Fig 8: Context 013, curving brick wall

Fig 9: Context 014, brick pier

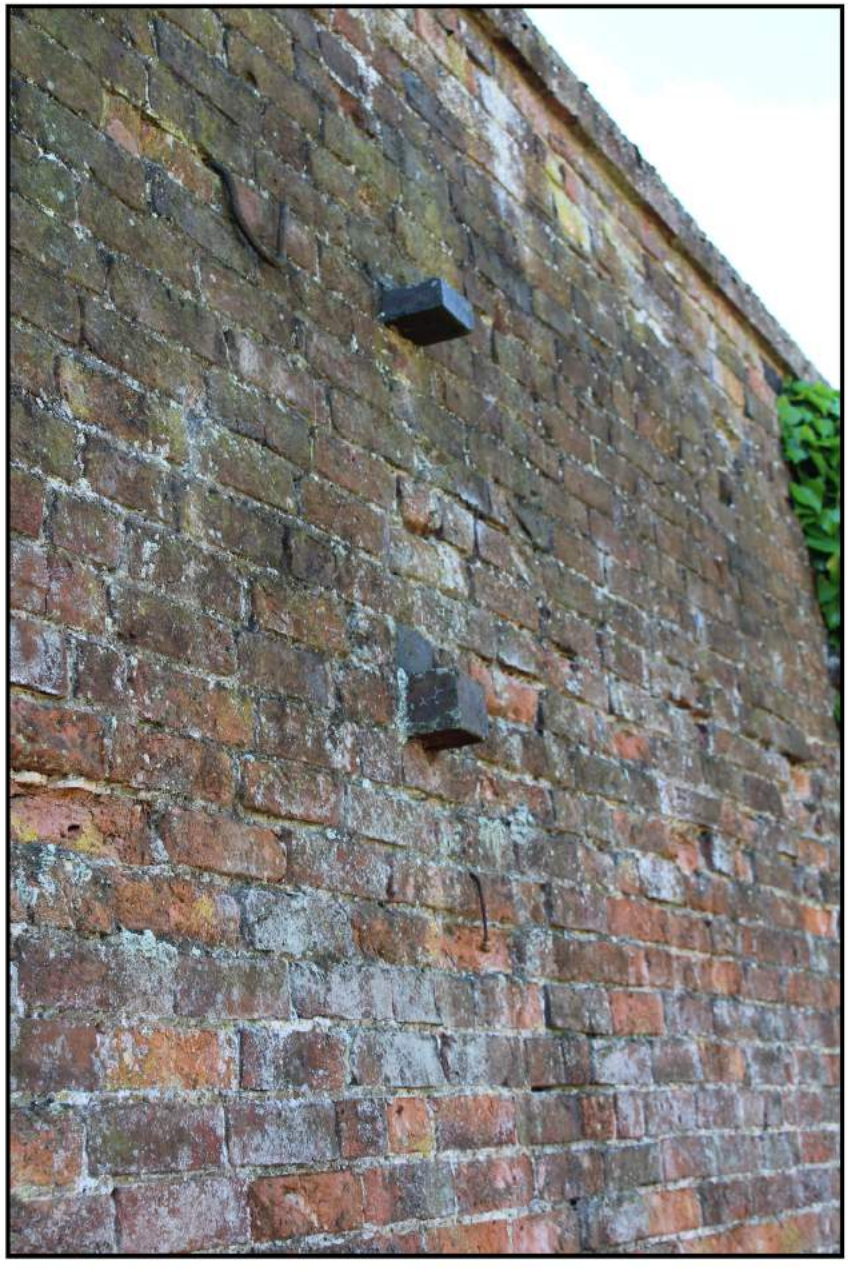


Fig 10: One pair of bricks protruding from the face of the wall of the Walled Garden

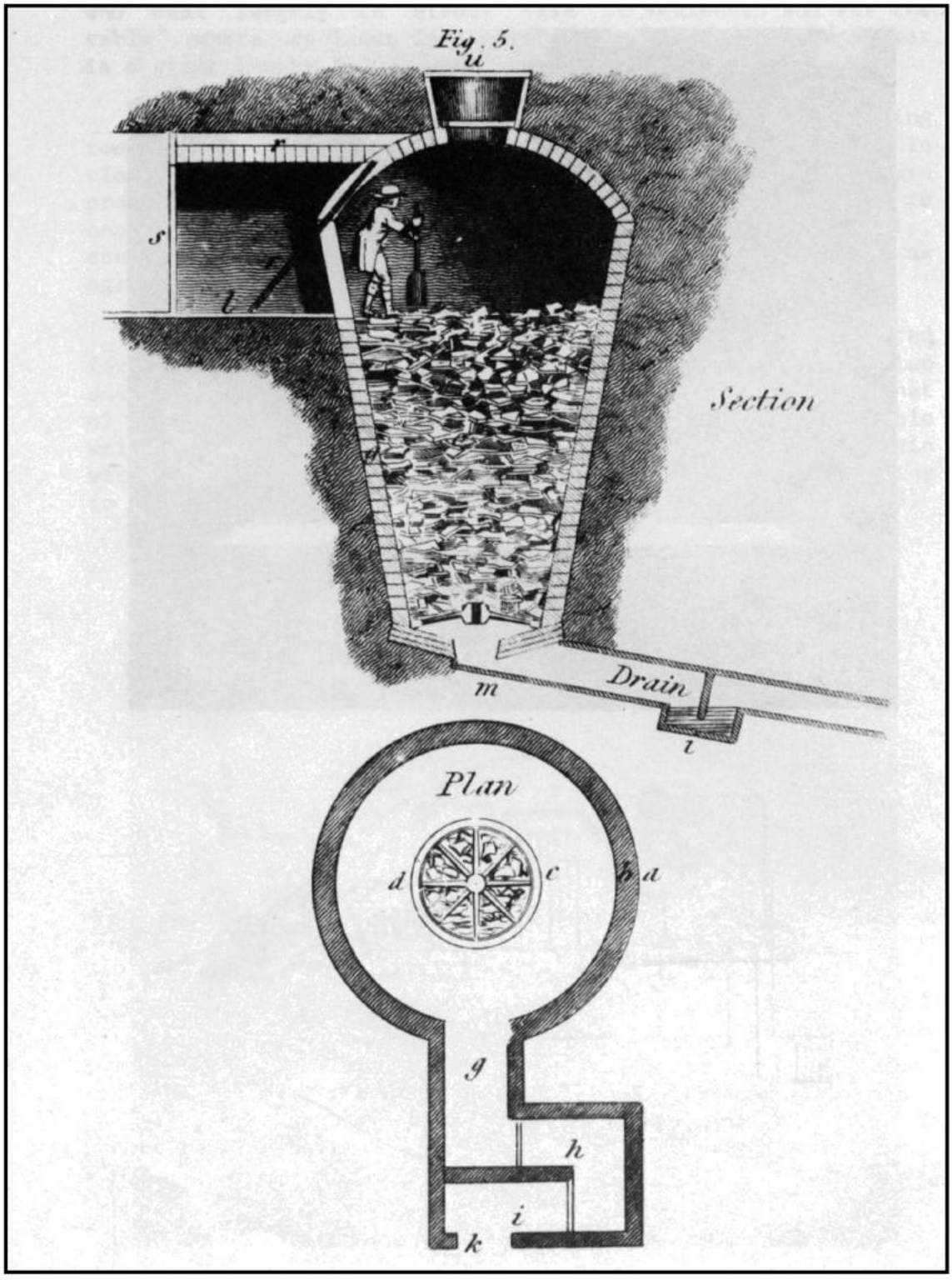


Fig 11: Illustration of an ice house in Rees' Cyclopaedia or Universal Dictionary of Arts, Science and Literature (1819)

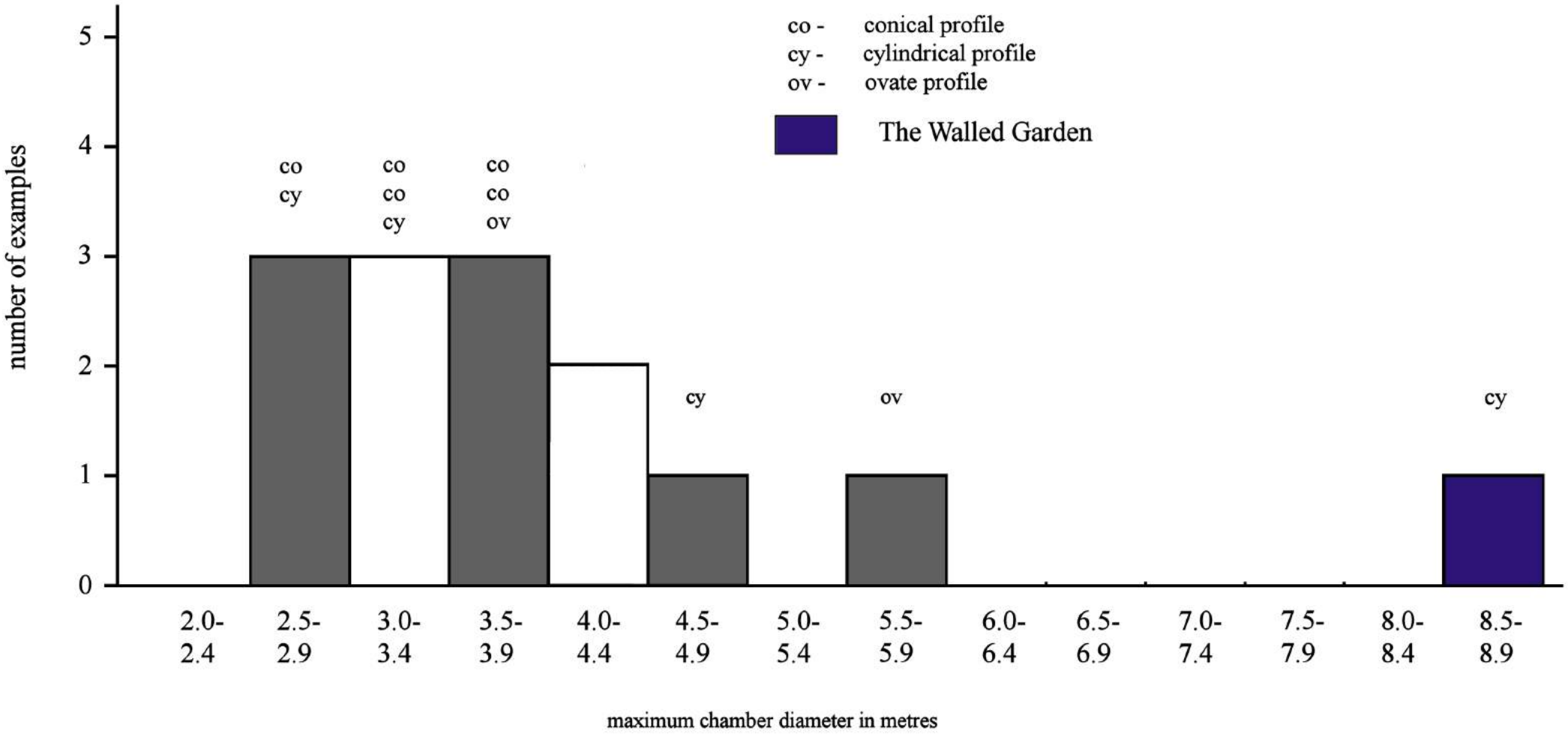
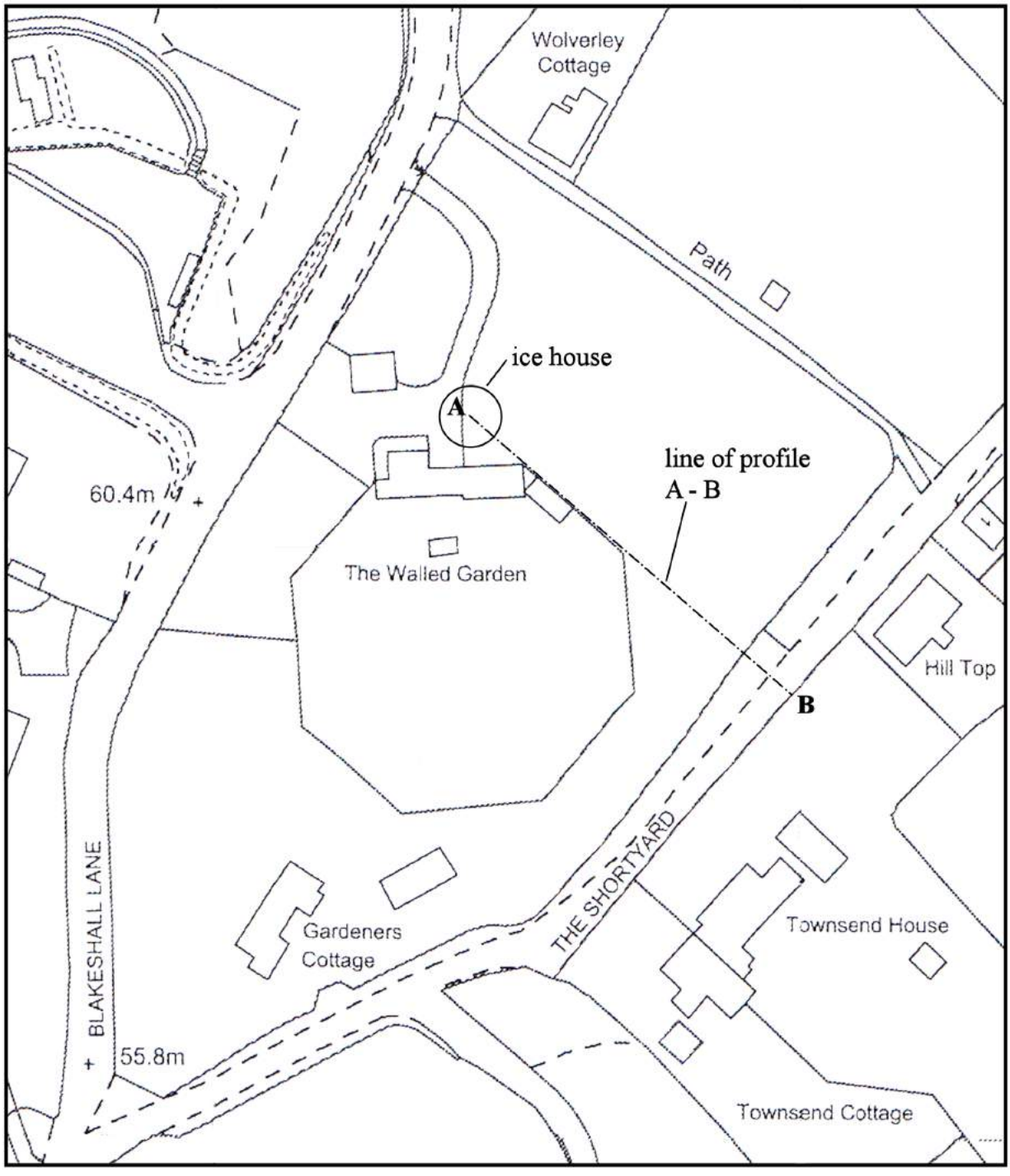


Fig 12: Histogram of maximum chamber diameter against frequency - chamber profile, where available, is indicated



Profile of field between the ice house and The Shortyard

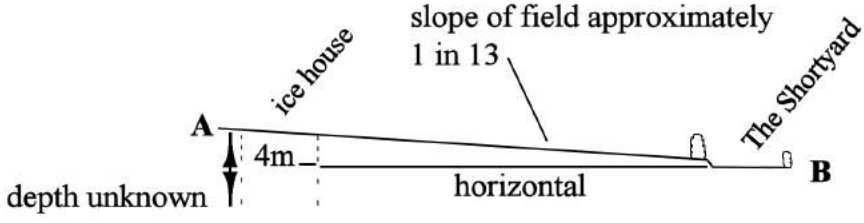


Fig 13: Drainage for the ice house

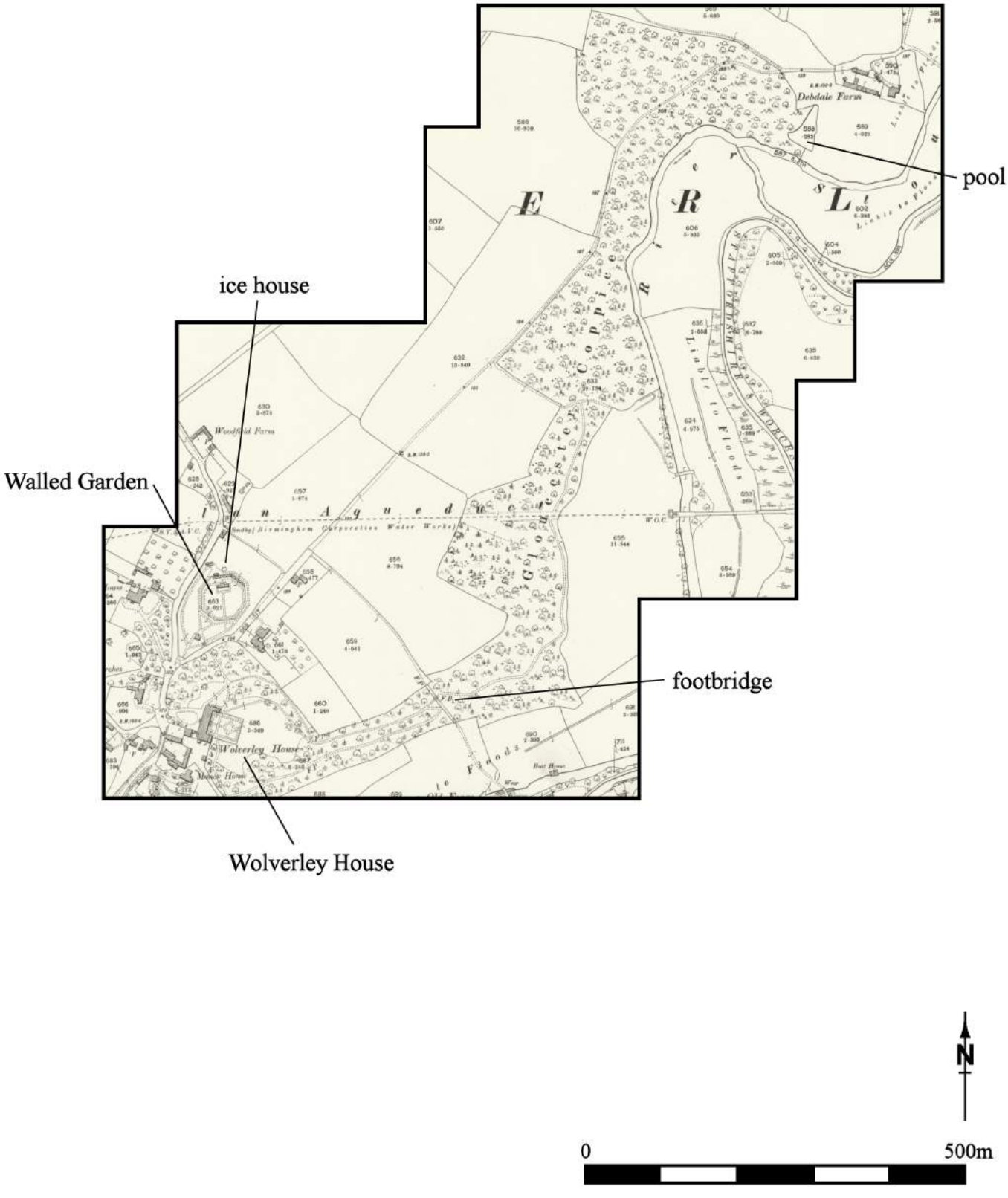
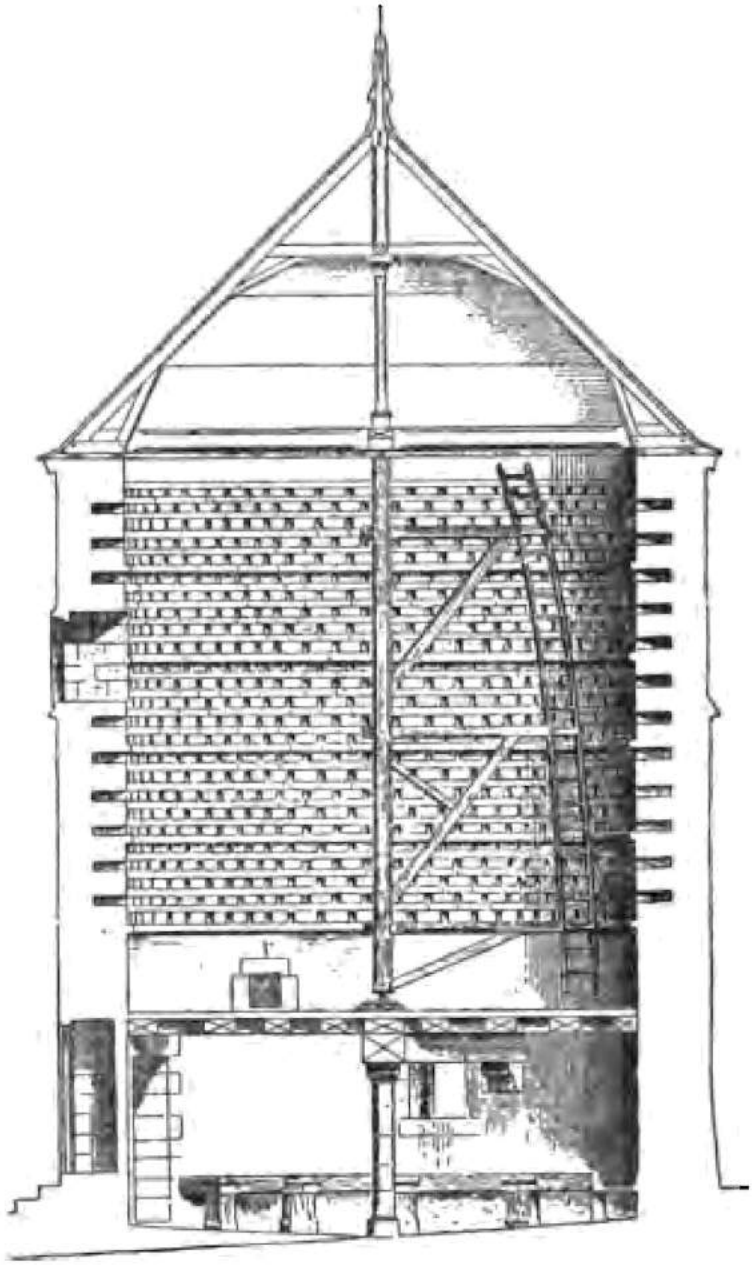


Fig 14: The possible limit of the recreational estate associated with Wolverley House and a possible source of ice for the ice house



not to scale

Fig 15: Sectional elevation of a typical dovecote (Cooke 1920, p114)

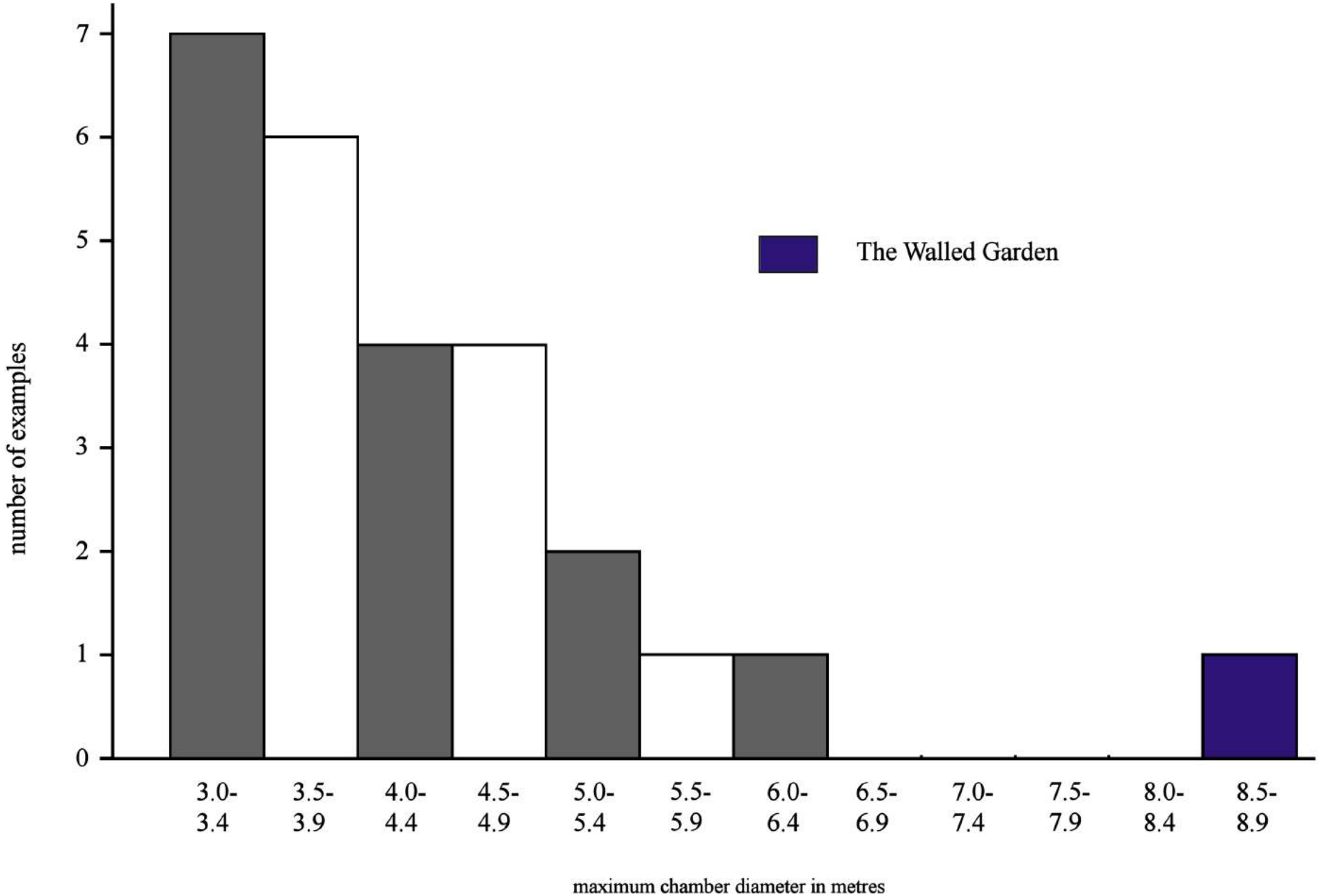


Fig 16: Histogram of maximum chamber diameter against frequency -

Fig 17: Finds from context 001

Finds from context 007

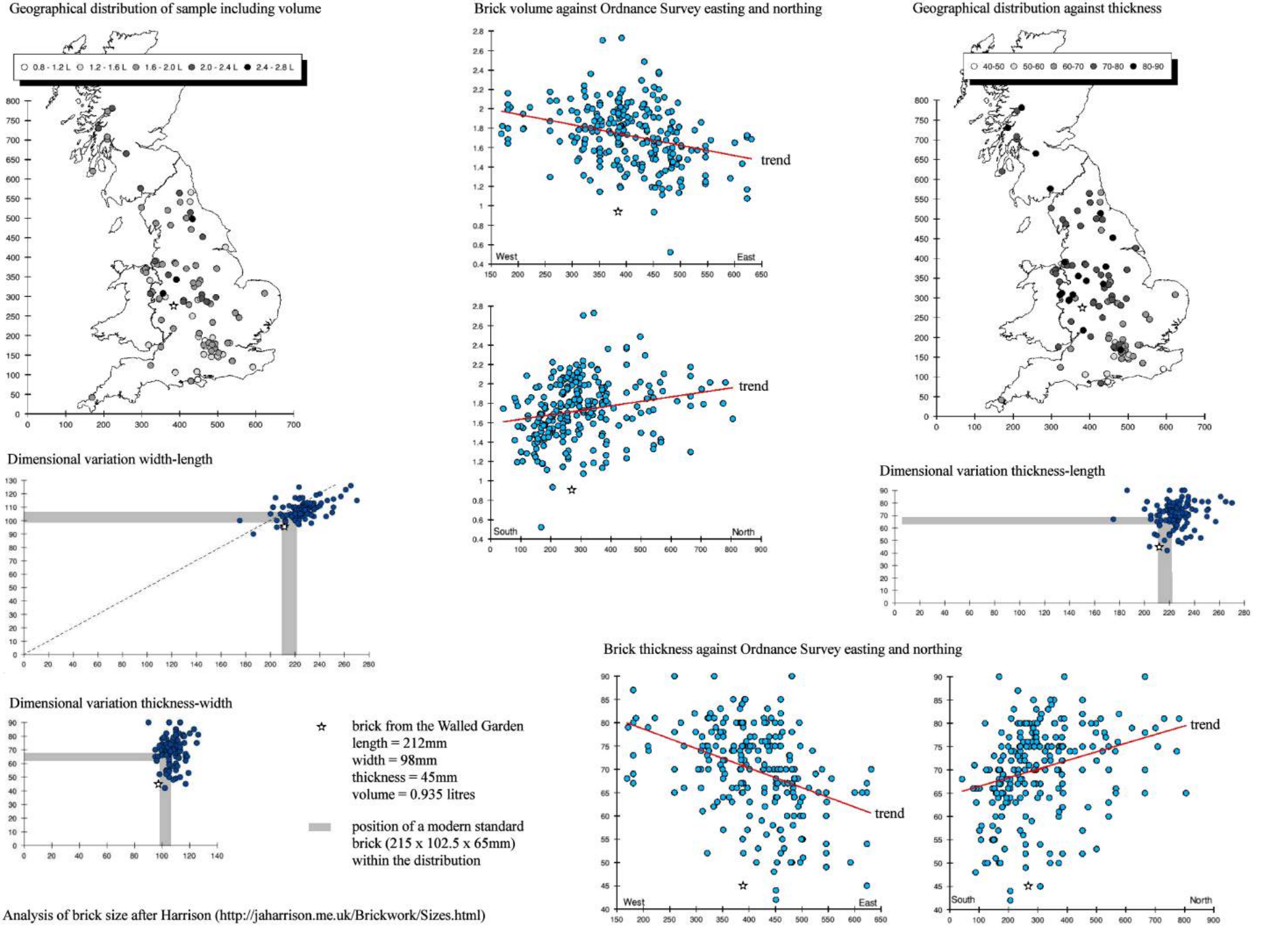


Fig 19: Analysis of brick size after Harrison (http://jaharrison.me.uk/Brickwork/Sizes.html)

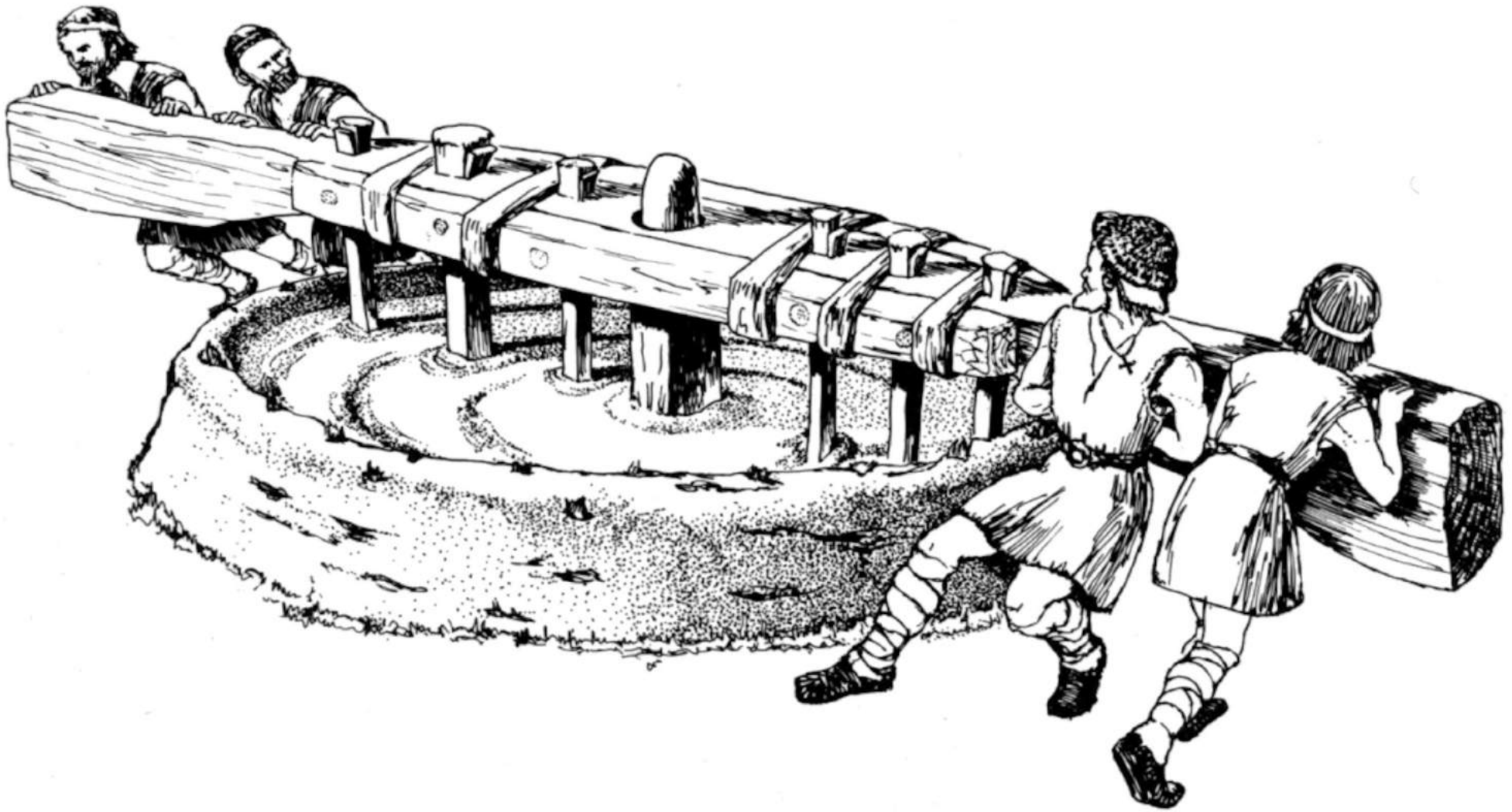


Fig 20: Mortar mixer as reconstructed from archaeological evidence at St Peter's Gardens, Northampton (after Williams 1979)

Appendix 1: List of the contexts

Context number	Description	Interpretation
001	Dark reddy-brown sandy loam with occasional to moderate small rounded pebbles	Topsoil
002	Light grey sandy mortar	Lens
003	Dark grey-brown sandy clay	Subsoil
004	Light reddy-brown slightly sandy clay	Natural subsoil
005	Dark grey-brown sandy loam with common flower pot fragments	Topsoil
006	Slightly curving brick wall with an apparent opening. Brick size 212mm (long) x 98mm (wide) x 45mm (deep)	Interior face of icehouse, see also context 013
007	Abundant small fragments of glass, flower pot and bricks	Fill of ice house
008	Slightly curving brick wall, four bricks thick – appears to be English or English garden wall bond. Brick size 212mm (long) x 98mm (wide) x 45mm (deep)	Exterior face of icehouse
009	Vertically sided cut running north to south	Trench for septic tank pipe – filled with 010
010	Very mixed fill of sandy clay and sandy loam with pea gravel and a plastic pipe at the bottom	Fill of 009
011	Slightly curving brick wall, four bricks thick. Brick size 212mm (long) x 98mm (wide) x 45mm (deep)	Wall of ice house
012	Medium to large rounded stones	Cobbled surface – associated with walled garden
013	Slightly curving brick wall, four bricks thick. Brick size 212mm (long) x 98mm (wide) x 45mm (deep)	Wall of ice house, seen in section 1, context 006
014	Masonry pier, 0.36m square	Possible base for lean-to structure supported on engineering bricks protruding from face of walled garden wall. From east to west, each successive brick drops a course, presumably to level-up the upper part of the roof structure
015	Lead pipe	Water pipe
016	Very dark brown, almost black, sandy clay	Layer of burnt material and ash

Table 1: Comparative ice house data

Site	length of passage	width of passage	chamber height	chamber diameter	source	notes
Hampton Court	unknown	unknown	unknown	4.8m		?cylinder section, foot of door to base of ice well ?9m
Hardwick	2.28m	1.05m	5.09m	4.3m	Strafford and May 2016	cylinder section, concave base, walls 2 bricks thick, foot of door to base of ice well 2.12m
Springfield	1.8m	0.8m	4.28m	3.01m	Trambowicz and Potter 2015	slight conical section, concave base, foot of door to base of ice well 2.68m
Carlton Towers	1.15m	1.0m	unknown	2.8m	Richardson and Dennison 2017	conical section, flat base with sump, brickwork 0.75m thick, foot of door to base of ice well 2.8m – medium sized (Beamon and Roaf 1990)
Moseley Court	unknown	0.95m	unknown	2.5m	Upson-Smith 2006	1½ bricks 0.35m thick
Haddo House	2.18m	1.2m	4.2m minimum	4.38m	Kleman 2017	
Tong (Avoncroft)	3.0m	0.9m	6.0m	3.6m	Avoncroft	conical section, foot of door to base of ice well 3.5m
Netherby Hall	3.6m	1.4m	5.8m	3.2m	David 1981	cylinder section, concave base, foot of door to base of ice well 3.6m
Levens Hall	4.6m	1.0m	7.0m	3.8m	David 1981 and 1982	pronounced conical section, foot of door to base of ice well 4.5m, flat base with sump

Site	length of passage	width of passage	chamber height	chamber diameter	source	notes
Gilmerton Midlothian	2.3m	1.0m	4.8m	3.2m	Calder and Graham 1949	pronounced conical section, flat base with sump, foot of door to base of sump 2.7m
Castle Huntley	2.7m	1.0m	4.0m	3.7m	Urquhart 1959	ovate section, flat base with sump, foot of door to base of ice well 2.3m
Glamis	4.3m	1.8m	7.0m	5.5m	Urquhart 1959	ovate section, irregular base, foot of door to base of ice well 4.0m
Pinner	4.0m	0.7m	3.66m	2.79m	Clarke, Venis and Kirkman 1985	cylinder section, foot of door to base of ice well 1.7m, cylinder walls 365mm thick, dome 228mm thick, slight concave base with sump
Walled Garden	unknown	unknown	unknown	8.6m	Cook 2020	brickwork 0.6m thick, 4 bricks

Table 2: Comparative dovecote data

Site	internal chamber diameter	external chamber diameter	date	source	notes
Apethorpe	6.4m	7.62m	*c* 1740	Hill 2013	
Bonby	3.8m	5.8 -6.0m	16th to 17th	Francis 2012	slightly oval
Buckton	4.94-5.44m	5.2-5.7m	early 17th	Railton and Woller 2008	slightly oval
Burwell	3.3m	5.0m	13th to late 14th	Cooper and Conner 2008	
Haggerston	4.4m	5.8m	early 19th	Mitchell 2011	date of conversion to dovecote – formerly windmill
Wick, nr Pershore Worcestershire	3.0m	5.4m		Cooke 1920	
South Littleton, Worcestershire	4.5m	5.7m		Cooke 1920	
Comberton, Worcestershire	3.1m	5.2m		Cooke 1920	
White House, Aston Munslow	3.0m	4.8m	14th	Cooke 1920	
Compton Wynyates Warwickshire	4.3m	5.5m	?1600	Cooke 1920	
Kinwarton, nr Alcester	5.2m	7.3m		Cooke 1920	
Barforth Old Hall, nr Gainford, Yorks	4.2m			Cooke 1920	

Site	internal chamber diameter	external chamber diameter	date	source	notes
Ladye Place, Hurley, nr Marlow	3.6m	5.8m	1307	Cooke 1920	
Place Manor, Streatley	3.4m	5.6m		Cooke 1920	
Charleston Farm, nr Berwick, Sussex	5.5m			Cooke 1920	
Wilcot, nr Pewsey Wiltshire	3.7m			Cooke 1920	
Angle Hall, nr Pembroke	3.7m		12th or 13th	Cooke 1920	
Buckland-tout-Saints nr Kingsbridge, Devon	4.6m			Cooke 1920	
Pridhamsleigh, nr Ashburton, Devon	3.0m	4.8m		Cooke 1920	
Trevanion, nr Wadebridge Cornwall	3.4m			Cooke 1920	
Stoke Courcy, nr Bridgewater, Somerset	4.6m	6.4m		Cooke 1920	
Norton-sub-Hamdon Somerset	4.0m	4.9m	?late 18th	Cooke 1920	
Stoke-sub-Hamdon Somerset	4.6m	6.4m		Cooke 1920	
Athelhampton Hall Dorset	3.8m	5.6m		Cooke 1920	
Corstorphine, nr Murrayfield Edinburgh	3.8m	5.6m		Cooke 1920	

Appendix 4: Finds report

Artefactual analysis by Laura Griffin

The finds work reported here conforms to the following guidance: for finds work by CIfA (2014), for pottery analysis by PCRG/SGRP/MPRG (2016), for archive creation by AAF (2011), and for museum deposition by SMA (1993).

Aims

- To identify, sort, spot date, and quantify all artefacts;
- To describe the range of artefacts present;
- To preliminarily assess the significance of the artefacts.

Method of analysis

All hand-retrieved finds were examined. They were identified, quantified and dated to period. All information was recorded on pro forma sheets.

The pottery was examined under x20 magnification and referenced as appropriate by fabric type and form according to the fabric reference series maintained by Worcestershire Archaeology (Hurst and Rees 1992 and www.worcestershireceramics.org).

Results

The discussion below is a summary of the finds and of their associated location or contexts by period. Where possible, dates have been allocated and the importance of individual finds commented upon as necessary.

The assemblage recovered from the site totalled seven sherds of pottery weighing 108g (see Table 1). Material came from the topsoil (context 001) and the fill of the main structure (context 007). Level of preservation was good, with finds displaying low levels of surface abrasion, as reflected in relatively higher average sherd weight of 15.4g.

All sherds were of late post-medieval and modern date.

period	fabric code	fabric name	total	weight (g)
post-medieval	78	post-medieval red ware	2	29
modern	83	porcelain	2	14
modern	81.4	miscellaneous late stoneware	1	13
modern	101	miscellaneous modern wares	2	52

Table 1: Quantification of the artefactual assemblage by fabric type

Summary artefactual evidence by period

All pottery has been dated and grouped and quantified according to general fabric class (Table 1). Sherds were datable by fabric type to their general period or production span.

Post-medieval
Two sherds of post-medieval red ware (fabric 78) were retrieved. The first was the small base fragment, likely from a jar, which was high-fired and decorated with a purplish black glaze characteristic of this ware type. The sherd could be dated late 17th-18th century (context 001).

The other sherd (context 007) was from a fairly substantial open vessel (310mm diameter) with a thickened rim and had a dark red iron slip on both surfaces. The walls are near upright, indicating it to have been a straight-sided bowl or large jar form. It is possible, given the context in which it was found, that this vessel was a flowerpot. Evidence from Castle Bromwich Hall, amongst other sites, has indicated that flowerpots of 18th and early 19th century date closely resembled the local domestic vessels, being made of the same orange or buff earthenware and commonly having a dark red/maroon slip reminiscent of those seen on Midlands Blackwares (Currie 1993, 238).

Modern

The only stratified sherd of modern date was identified as the rim of an unglazed earthenware flowerpot (context 007; fabric 101). The rim was of collared form, which had faint traces of white slip painted around the top and measured 330mm in diameter. The collared form and presence of white slip indicate mid19th century date for this sherd (Currie 1993, 239).

Remaining finds came from the topsoil (context 001) and consisted of two sherds from a porcelain bowl or dish with blue, hand-painted decoration (fabric 83), a sherd of late stoneware (fabric 81.4) and a fragment of unglazed flowerpot (fabric 101).

Significance
The assemblage includes a standard range of domestic pottery types for the period. However, the presence of the two probable flowerpot sherds from the fill of the large structure could aid interpretation of this feature.

Recommendations

No further work required.

Bibliography

AAF 2011 *Archaeological archives: a guide to the best practice in the creation, compilation, transfer and curation*. Available at http://www.archaeologyuk.org/archives/

CIfA 2014 *Standard and guidance for the collection, documentation, conservation and research of archaeological materials*. Available at http://www.archaeologists.net/codes/ifa

Currie, C K, 1993 *The Archaeology of the Flowerpot in England and Wales, circa 1650-1950,* Garden History, Vol. 21, No. 2 (Winter, 1993), The Gardens Trust, 227-246. Available at https://www.jstor.org/stable/1587068

Hurst, J D, and Rees, H, 1992 Pottery fabrics; a multi-period series for the County of Hereford and Worcester, in Woodiwiss, S G (ed), *Iron Age and Roman salt production and the medieval town of Droitwich*, CBA Res Rep, **81**, 200-9

PCRG/SGRP/MPRG, 2016 *A standard for pottery studies in archaeology*

SMA 1993 *Selection, retention and dispersal of archaeological collections*. Available at http://www.swfed.org.uk/wp-content/uploads/2015/05/selectionretentiondispersalofcollections1-SMA.pdf

Summary of data for Worcestershire HER

WSM 72046 (event HER number)

WGW 19

Artefacts

period - note 1	material class	object specific type	count	weight	start date	end date	specialist report? (note 2)	key assemblage? (note 3)
modern	ceramic	pot	5	79	L18C	20C	N	N
post-medieval	ceramic	pot	2	29	L17C	18C	N	N

Notes

1) In some cases the date will be "Undated". In most cases, especially if there is not a specialist report, the information entered in the Date field will be a general period such as Neolithic, Roman, medieval etc (see below for a list of periods used in the Worcestershire HER). Very broad date ranges such as late Medieval to Post-medieval are acceptable for artefacts which can be hard to date for example roof tiles. If you have more specific dates, such as 13th to 14th century, please use these instead. Specific date ranges which cross general period boundaries can also be used, for example 15th to 17th century.

period	from	to
Palaeolithic	500000 BC	10001 BC
Mesolithic	10000 BC	4001 BC
Neolithic	4000 BC	2351 BC
Bronze Age	2350 BC	801 BC
Iron Age	800 BC	42 AD
Roman	43	409
Post-Roman	410	1065
Medieval	1066	1539
Post-medieval	1540	1900
Modern	1901	2050

period specific	from	to
Lower Paleolithic	500000 BC	150001
Middle Palaeolithic	150000	40001
Upper Palaeolithic	40000	10001

Early Mesolithic	10000	7001
Late Mesolithic	7000	4001
Early Neolithic	4000	3501
Middle Neolithic	3500	2701
Late Neolithic	2700	2351
Early Bronze Age	2350	1601
Middle Bronze Age	1600	1001
Late Bronze Age	1000	801
Early Iron Age	800	401
Middle Iron Age	400	101
Late Iron Age	100 BC	42 AD
Roman 1st century AD	43	100
2nd century	101	200
3rd century	201	300
4th century	301	400
Roman 5th century	401	410
Post roman	411	849
Pre conquest	850	1065
Late 11th century	1066	1100
12th century	1101	1200
13th century	1201	1300
14th century	1301	1400
15th century	1401	1500
16th century	1501	1600
17th century	1601	1700
18th century	1701	1800
19th century	1801	1900
20th century	1901	2000
21st century	2001	

2. Not all evaluations of small excavation assemblages have specialist reports on all classes of objects. An identification (eg clay pipe) and a quantification is not a specialist report. A short discussion or a more detailed record identifying types and dates is a specialist report. This field is designed to point researchers to reports where they will find out more than merely the presence or absence of material of a particular type and date.

3. This field should be used with care. It is designed to point researchers to reports where they will be able to locate the most important assemblages for any given material for any given date.

Appendix 5: The OASIS form

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: martinco1-394339

Project details

Project name	The Walled Garden Wolverley
Short description of the project	Watching brief at The Walled Garden Wolverley, Worcestershire
Project dates	Start: 01-11-2019 End: 05-05-2020
Previous/future work	No / Not known
Any associated project reference codes	19/0334/FUL - Planning Application No.
Any associated project reference codes	WSM 72046 - HER event no.
Type of project	Recording project
Site status	Local Authority Designated Archaeological Area
Current Land use	Other 5 - Garden
Monument type	WOOL DRYING HOUSE Post Medieval
Monument type	PINERY Post Medieval
Significant Finds	POTTERY Modern
Investigation type	"Watching Brief"
Prompt	National Planning Policy Framework - NPPF

Project location

Country	England
Site location	WORCESTERSHIRE WYRE FOREST WOLVERLEY AND COOKLEY The Walled Garden Wolverley
Postcode	DY11 5XJ
Study area	50 Square metres
Site coordinates	SO 83040 79811 52.415655658497 -2.249388640828 52 24 56 N 002 14 57 W Point
Height OD / Depth	Min: 60.9m Max: 60.9m

Project creators

Name of Organisation	Martin Cook BA MCIfA

Project brief originator	Local Authority Archaeologist and/or Planning Authority/advisory body
Project design originator	Martin Cook BA MCIfA
Project director/manager	Martin Cook BA MCIfA
Project supervisor	Martin Cook BA MCIfA
Type of sponsor/funding body	Developer

Project archives

Physical Archive recipient	Worcestershire County Museum
Physical Contents	"Ceramics"
Digital Archive recipient	ADS
Digital Contents	"Ceramics"
Digital Media available	"Images raster / digital photography","Text"
Paper Archive recipient	Worcestershire County Museum
Paper Contents	"Ceramics"
Paper Media available	"Report"

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Archaeological watching brief at The Walled Garden, Blakeshall Lane, Wolverley, Worcestershire, DY11 5XJ
Author(s)/Editor(s)	Cook, M.
Date	2020
Issuer or publisher	Martin Cook MCIfA
Place of issue or publication	Braunston
Description	A4 blue card cover with transparent front cover

Entered by	Martin Cook (office@martinjcook.com)
Entered on	16 May 2020