



## **Specialist Report 4**

### **Ceramic Building Material**

*by Cynthia Poole*

#### **Introduction and methodology**

Ceramic building material (CBM) dating to the Roman period was recovered from the Pipeline Diversion (COLP15) site, essentially concentrated in Site A (trenches 26 and 33), apart from a single fragment in trench 25, which lay a short distance to the north of site A. A total of 125 fragments of ceramic building material, weighing 26,655g, was recovered from 15 contexts, mostly concentrated in trench 26 of the evaluation. This includes seven indeterminate scraps (9g) collected from bulk sieved samples. The assemblage is fairly well preserved, with a high mean fragment weight of 215g and no or a low level of abrasion. No complete tiles are present in the excavated assemblage and apart from thickness, the only complete dimensions were the length of a tegula and a brick. In addition to the loose tile within feature fills, a tile structure (2630) was exposed on site and is likely to be the source or reason for the presence of tile on the site.

Medieval and post-medieval CBM amounting to 259 fragments and weighing 34139g was recovered from the Pipeline Diversion and Proposed Development at Great Garlands Farm (COLP15), from London Gateway Access Road (COARD12), and from Cooling Marshes, Kent (Salt Fleet Flats; CSCOX 13).

The assemblage has been fully recorded on an Excel spreadsheet in accordance with guidelines set out by the Archaeological Ceramic Building Materials Group (ACBMG 2007). The record includes quantification and details of fabric type, form, surface finish, forms of flanges, cutaways and vents, markings and evidence of use/reuse (mortar, burning etc). The forms and fabrics are quantified in Table 4.1. The terminology for Roman tile follows Brodribb (1987); coding for markings, tegula flanges, etc. follows that established by OA for the recording of CBM, and tegula cutaway types are linked to those classified by Warry (2006). Fabrics were characterised on macroscopic features supplemented with x20 hand lens for finer inclusions.

#### **Roman**

### ***Fabrics***

The tile fabrics were generally fired to red or orange and all were sandy varieties dominated by quartz in variable density and grain size. The clay was commonly noted as being micaceous and sometimes laminated. Coarser inclusions comprised ferruginous grits, clay pellets or grog and occasional large flint grits or pebbles. The fabrics are similar to those found at Stanford Wharf Nature Reserve (Shaffrey 2012), though no direct comparisons have been made. The probable equivalent Stanford Wharf fabrics have been indicated in brackets after each description below.

*Fabric C*: orange, red, occasionally with grey core; hard fired clay, sometimes micaceous, containing a high density of fine-medium quartz sand with scatter of coarser quartz grains and occasionally burnt flint grit and pebbles up to 24mm and red or cream clay pellets up to 22mm. [Stanford Wharf fabric C]

*Fabric Cf*: orange or pinkish orange fine sandy clay, occasionally micaceous. [Stanford Wharf fabric E1]

*Fabric D*: orange red, sometimes with grey core; very fine sandy-silty micaceous clay, rarely containing small iron oxide inclusions less than 2mm. [Stanford Wharf fabric F]

*Fabric E*: fine sandy laminated clay, containing small red iron oxide grits or red and buff clay pellets. [Stanford Wharf fabric E]

*Fabric G*: orange with red core; hard fired, fine sandy clay containing sparse medium quartz sand, scattered angular flint grit (possibly accidentally incorporated from moulding sand), scattered rounded flint pebbles 7-26mm. The moulding sand was distinctive angular white/grey burnt flint grit 0.5-3.5mm. Only one example of this was found. [Stanford Wharf fabric D]

### ***Forms and function***

Brick, tegula and indeterminate flat tile dominate the assemblage, and smaller quantities of flue tile and imbrex are also present.

#### ***Tegula*** (Figs 1-2)

The tegulae generally have a regular finish with knife-trimmed edges, smooth upper surfaces frequently finely striated from smoothing, and fairly regular rough sanded bases, though rough pitted bases occurred on two tiles. Thicknesses ranged from 14mm to 26mm; several exhibited a range of thicknesses from the tile edge to the centre (Fig.

4). One tegula had a complete length of 390mm and a surviving incomplete width of 195mm (Fig. 1, no. 1). Most of the tiles making up tile surface 2630 appear to be deflanged tegulae; dimensions of 410mm long, 330mm wide and 30mm thick was recorded on site. Most of the surviving tegula flanges (Fig. 2, no. 5a-d) are rectangular in form, with either vertical (type A) or angled inner edges (type B), though two had a curved profile (type E and F). Three tegulae had cutaways, one both upper and lower (Table 4.2). The upper cutaway was of standard rectangular form measuring 50mm long. Its lower counterpart was 60-65mm long and was identified as Warry's (2006) type D. Two other lower cutaways were present: a second example of type D and one of type C5. According to Warry, these are both later types. The type C group broadly dates from mid-2nd to mid-3rd century AD and the type D from mid-3rd to 4th century. The relatively short complete length is also consistent with a later date. Tiles with visible flanges and cutaways that remained *in situ* appear to be of type A flanges and type D cutaways. One plain fragment had a large peg or nail hole 16mm in diameter, centred 40mm from the tile edge, and is certainly a tegula fragment. This is rather large, as most nail holes in tegulae measure 7-9mm in diameter. Nail holes are rare features and become more common in the later Roman period.

#### *Imbrex*

Only three fragmentary tiles were found. These had been made in fabrics C, Cf and D and included one corner fragment. They measured 13-19mm thick and had smooth or finely striated upper surfaces and rough undersides. The side edges were rough and the end edge smoothed and concave. All had an angular profile, resulting in relatively flat fragments, which would make recognition of body sherds difficult to distinguish from thinner tegulae.

#### *Brick* (Fig. 3, no. 6)

Brick formed a large proportion of the assemblage, amounting to over 50% by weight and 25% by fragment count). The brick had a rougher finish than the roof tile, often having uneven, lumpy or striated upper surfaces and a rough base and rarely with evidence of knife-trimming. Edges had a variable finish, both rough and smoothed, and a few were knife-trimmed. The brick ranged in thickness from 35mm to 45mm, but unusually for Roman tile, several examples thinned to the edges, rather than the more typical pattern of thickened edges and a slightly concave top surface (Fig. 4). The single

complete dimension of 260mm for a brick is consistent with the size of a *pedalis* or the width of a *lydion*.

Several bricks were identifiable in tile structure 2630. Examples measured 280mm wide, over 350mm long and 40mm thick, and 290mm wide, over 380mm long, and 30mm thick, which suggests that *lydions* were the standard form used in the tile structure.

#### *Flue tile* (Fig. 3, nos 7-11)

A surprisingly large proportion of the assemblage was formed by flue tile (10% by fragment count, 4.5% by weight). By contrast, at Stanford Wharf, only 1% of the tile assemblage was flue tile (Shaffrey 2012, 153). The flue tile was all of standard box flue or *tubuli* type with combed keying on the surface. They measured from 19mm to 25mm thick and the largest surviving piece measured over 200mm long and over 150mm wide. Nearly all were made in the finest fabric D, which contained very little fine or no sand and had a neat, even finish with smooth or knife-trimmed edges. One had a rectangular vent, 63mm long, cut in the plain face. The combed keying was generally made with medium combs 42-47mm wide, with between six and nine teeth or more. A narrower comb of 28mm width had only four teeth creating a very coarse combing. The bands of keying were most often vertical or parallel to the edges, though diagonal and zigzag or criss-cross bands (Fig. 3, nos 7 and 8) were also present, which is the pattern visible on the flue tile fragment incorporated in tile surface 2630 (Fig. 4). The thickness of the flue tile suggests that the tile is likely to be mid-late Roman in date.

#### *Flat tile*

The plain flat tile was most consistent in surface and edge finish with the tegulae, and one with a signature mark is almost certainly a tegula fragment. The thickness of the plain tile covers the same range as tegula imbrex and flue tile and could include any of these forms. One piece, 22mm thick and with pink tile-gritted mortar over the exterior surface, is likely to be a fragment of flue tile, although no keying was visible. Another fragment appeared to have been deliberately chipped to form a small trapezoidal slab measuring 90mm x 105-125mm. Polygonal shapes such as this were used as decorative inlay for walls or floors.

#### *Markings*

Apart from the keying described above, markings included signature marks and accidental imprints, which all occurred during the manufacturing process.

*Signature marks* (Fig. 1, nos 1-4, and Fig. 3, no. 6)

These were deliberately made with the fingers by the tiler soon after moulding the tile. Most occur on tegulae but are also present on brick. Examples were identified on five tiles and comprised the most common designs of simple arcs or hoops. Three formed arcs or hoops of one or two finger marks, starting from the lower edge (type 1.1 and 1.2) on tegulae from context 2615. A horseshoe shape formed with two finger marks (type 2.2) occurred on a brick (context 2650). Another on a tegula (context 2629) made with two finger grooves formed a shallow curved arc, starting *c* 100mm above the base edge of the tile (type 17.2). Some of the tegulae in structure 2630 also have evidence of signatures: one has a very clear single groove forming a hoop and another has a shallower arc of two finger grooves. Examples of arcs and horseshoe designs were found at Stanford Wharf, but the more unusual varieties of circles and concentric circles bisected by a single straight groove (Ø) found there (Shaffrey 2012, 153) were not represented in the present assemblage.

*Imprints*

Generally, imprints occur accidentally during production prior to firing whilst the clay is still soft enough to be deformed. Examples from London Gateway include marks from handling the tile: a smeared finger mark occurs on a flat tile and several fingertip depressions were noted on a tegula (both context 2615). The latter comprised an arc of four fingertips overlying the signature mark, with other imprints on the flange. A long monocot leaf impression occurred on the underside of a brick (context 2629). There may also be an impression, possibly a hoof, on one of the tegulae in structure 2630 although this is difficult to judge.

*Discussion*

The Roman-period tile assemblage from London Gateway represents a group of material that has been brought to the site for reuse. It comprises the standard range of tile that might be expected in a Roman masonry building of some status or wealth, with evidence for a tiled roof and heated rooms. However, the proportion of forms is not typical of such a building and it is clear there has been preferential selection of tegulae

and brick. The fabrics are sufficiently uniform to suggest that the material derived from a limited source, such as a villa complex or urban town house. It has been suggested that the rural settlement at Mucking may have had Roman buildings of some wealth as evidenced by the flue tiles (Jones 2016, 203).

There is no doubt that the tile structures on site were built of recycled tile and many tegulae had been modified for the purpose by careful removal of the flange. The proportion of flue tile is unexpectedly high in a re-used assemblage, suggesting that they either had a useful function in the intended structure or that large box flue tiles were split into flat slabs for re-use.

In rural situations, the overwhelming evidence for the reuse of tile is in ovens, hearths, kilns and similar structures. Such a conclusion here is supported by the quantity (45% by weight, 27% by count) of the tile that had been burnt or heat-discoloured. Much of the tile had been burnt grey on both surfaces and edges with heat discolouration of the core. Some pieces had patchy sooting and a few were burnt on only one surface. A small number was more heavily refired, including one brick vitrified along its edge, a piece with a patch of vitrification on its surface and two fragments heavily burnt grey throughout their thickness. The variations in burning and refiring reflect differences in direct exposure to fire and variations in temperature. Tile embedded and rendered with a clay lining is unlikely to exhibit any secondary burning effect, apart occasionally from heat discolouration (turning the tile from the standard red or orange colour to yellow brown) when adjacent to the hottest areas of any fired structure.

The excavated tile assemblage represents only a part of the tile pertaining to London Gateway, as the *in situ* tile structure (2630) exposed (and reburied) in the excavation on the Pipeline Diversion represents the greater part and the primary evidence for the use of the tile on the site. Much of the loose tile was recovered from the layers sealing this structure or directly associated with it and it is probable that the tile found in other features originated from the robbing and demolition of this tile structure. As it survives, the structure forms a linear alignment of tiles built largely of near-complete or substantial slabs of tegulae and *lydion* bricks. This had originally been interpreted as a path or area of paving relating to pit 2640, but a detailed re-examination of all associated contexts does not support this, and in re-analysing the structure and the associated deposits an alternative interpretation has been reached, namely that the structure was a salt-evaporating hearth.

The feature consists of a ditch (2632) aligned north-west to south-east, which ends in a shallow hollow formed by the partly silted pit 2640. The pit clearly underlies the south-east end of the structure and is an earlier feature into which the tile structure has partly subsided. The linear feature measures *c* 8m long and between 0.88m and 1.25m wide and ranges in depth from 0.2m at the north-west to 0.33m at the south-west. At the north-west end it abuts a large shallow circular pit (2617), which measures 3.5m in diameter and 0.25m deep. There is a shallow lip between 2617 and the terminal of the ditch (2632) and the two features appear to respect each other in plan, although there was some suggestion in section that the pit cut the ditch. It is likely that both are essentially contemporary, but because of heavy robbing, it is now impossible to be certain that the pit formed an integral element of the tiled structure, rather than a contemporary but separate structure.

The ditch had dirty natural gravel (2619/2626/2633) across its base, probably having been disturbed and trampled during the original digging of the feature, and a similar gravel layer (2616) occurred around the edges thinning over the base of pit 2617. Above this in the pit was a compacted layer of pale yellowish-brown sandy clay (2615), 0.2m thick, which contained a large quantity of tile (over 6kg), comprising tegula, flat tile, brick and flue tile and large pieces of carbonised timber up to 300mm long by 100mm wide.

Within the ditch, a layer of sandy silt or clay (2618/2627/2634/2642) overlay the gravel layer or at the south-east end directly lay on the fill of pit 2640. This deposit formed a bedding layer on which a course of tiles was laid (2631/2628). These had disappeared at the north-west end, probably having been robbed out, but survived from the central section to the south-east end. This paved surface consists of two rows of tiles, identified as tegulae and lydion bricks, laid side by side. Some tegulae have been deliberately deflanged, whilst others retained the flange, which had been set alongside the edge of the structure to form a kerb. The tiles had been laid both upright and face down with the sanded base uppermost. At the south-east end, where it subsided over pit 2640, the structure appears to have formed a single course of tiles, four tiles wide, though the full width was not exposed. In the central section, the lower course of tiles was overlain by a thin layer (2638) that can be divided into a lower horizon of grey ashy sandy clay containing charcoal and an upper horizon of compact lightly burnt yellow and red clay that appears to have a worn surface. It is unclear from the record whether this represents a resurfacing of the paving or a collapsed block of superstructure.



A charcoal-rich layer (2639) accumulated over the south-eastern area of paving 2631 and within a sub-oval/sub-rectangular hollow of partly silted pit 2640. This has the typical appearance of an accumulation in a stoking hollow or charcoal and ash debris from the flue of an oven or kiln-type structure. The layer also included fragments of fired clay that appear to be oven wall lining, some of which had pink, lavender and white surfaces typical of salt discolouration. Further subsidence and compaction of fills within the pit caused the tiles to slump at that end of the structure.

Along the south-west edge of the tile structure, imprints of robbed tiles appeared to be visible in the underlying bedding layer (2631) and suggests that the structure has been very deliberately and heavily robbed out. Following demolition of the structure, the structure was covered by a layer of sandy clay (2629/2637/2644) containing tips of gravel, frequent tile fragments, fired clay, charcoal, slag, animal bone and in one area residual Bronze Age pottery. This deposit was thickest across the south-east half over the hollow formed by the earlier pits. The fired clay within this layer comprised structural fragments with wattle impressions, oven wall lining, some with the cerise colouring commonly associated with salt, and a tiny vitrified fragment.

In view of the heavy robbing and the incomplete excavation of the feature, the proposed interpretation is inevitably tentative. Overall it can be suggested the features formed an oven/hearth type structure of enclosed or semi-enclosed construction. Pit 2617 may have formed the main chamber, with the flue and firing chamber represented by structure 2630, which in turn connected to the stoking chamber in the hollow formed over pit 2640. However, this would form a very long oven or kiln and it is possible that pit 2617 was the base of an associated structure, but not an integral part of any oven. A hole in the centre of pit 2617, interpreted as root disturbance on site, possibly held a central supporting structure, which had been pulled out, allowing deposit 2615 to fall back into the void. This could be a pedestal for a suspended floor in a dual-chambered oven structure, but it could be a post providing support for an upper floor in a small storage building or shelter. The presence in the fill of some large carbonised pieces of wood, possibly fuel, and the quantity of tile lend credence to the pit forming the base of a tile-built oven structure. Whilst no evidence for the flue walls survives, it is probable these and any other superstructure were constructed of tile bedded in clay. It is difficult to judge whether the upper layer of tile (2630) and the fired clay slab represent the vault of the flue or a later rebuild or re-flooring. The presence of fired clay with wattle impressions from the layers sealing the tile structure may indicate that the

flue and firing chamber were covered with a surface constructed of clay supported on a framework of interwoven wattles.

The limited intrinsic dating evidence of the tile suggests that the material was obtained from buildings originally constructed in the 3rd, or possibly 4th century AD, and allowing for a lapse of time during its primary use, the tile structure at the site is unlikely to have been constructed before the later 3rd or 4th century. The structure must represent some form of oven or kiln, though the precise function cannot be proven beyond doubt. Certain categories may be eliminated. The absence of carbonised grain suggests that this was not a crop-processing structure, while the dearth of pottery on the site and the form of structure exclude a pottery kiln. Smithing hearth bottom slag was found on site and it could be argued some form of metalworking was undertaken, but it is unlikely that such an elaborate structure was used for such a purpose. The use of tile to construct the oven suggests that it needed to be sufficiently robust, which combined with its location close to the salt marshes alongside the Thames Estuary and its late Roman date, points to its use for salt evaporation in lead pans. The use of lead pans would account for the absence of briquetage, contrasting with earlier periods when ceramic containers were used for evaporation.

At Stanford Wharf Nature Reserve, one of the late Roman saltern hearths was constructed of tile (Biddulph *et al.* 2012, 128-9) and was probably intended for use with a lead evaporating pan. This was circular in form with a short flue and three pilasters projecting internally within the main chamber, which would have supported the lead pan. Such a design would support the suggestion that pit 2617 was the robbed out main chamber, but this leaves the problem of an unusually long flue adjoined to the circular chamber. Alternative interpretations could be that the upper tile surface forms part of a later structure joining to the circular pit, and replaced an earlier rectangular structure, perhaps going out of use when the floor started to subside into the underlying pit. However, rectangular ovens or hearths are more common on salt working sites and one could argue for a single phase of linear hearth/oven, with a covered firing chamber/flue at the south-east end and open area at the north-west end, where the evaporating pan or pans would be supported on the side walls. A linear, rectangular salt evaporation hearth dated to the 3rd century AD is known from Cooling in north Kent (Miles 1974, 29), though by contrast it measured only 1.5m long by c 0.5m wide and was cut into the underlying deposits without any form of built structure or superstructure. A late Roman saltern at Middleton, Norfolk, had a rectangular sub-surface oven/hearth c 2.2m long,

consisting of a narrow, steep-sided flue opening at either end into opposing firepits or stokeholes (Crowson 2001, 170-1). Rectangular hearths are commonly found at sites in northern France and Brittany during the late La Tène and 1st-century AD, with examples measuring between 4m and 7m long (Daire 2003, 65-87). In all these structures, there was clear evidence that they were used in conjunction with ceramic briquetage. Evidence of late Roman salt production using lead pans is poorly represented in the archaeological record, possibly because this is more difficult to identify and substantiate, as a change to the use of lead pans resulted in an absence of briquetage debris and the pans themselves are rarely found, the metal being readily recycled.

### **Catalogue of illustrated ceramic building material**

Fig. 1, no. 1. Tegula: half tile with flange type F2, cutaway type D and signature type 1.1. Ctxt: 2615, Id.1

Fig. 1, no. 2. Tegula: corner fragment with signature type 1.2 and imprint of fingertips. Ctxt: 2615, Id.2

Fig. 1, no. 3. Tegula/flat tile: fragment with flange type A/B, cutaway type D, and signature type 1.2. Ctxt: 2615, Id.5

Fig. 1, no. 4. Tegula: corner fragment with flange type A, cutaway type C5 and signature type 17.2. Ctxt: 2629, Id.27

Fig. 2, no. 5. Tegula flange profiles: 5a. Type A (2629, Id.32), 5b. Type A3 (2629, Id.28), 5c. Type A5 (3301, Id.55), 5d. Type B (2629, Id.29)

Fig. 3, no. 6. Brick: fragment with signature type 2.2. Ctxt: 2650, Id.59

Fig. 3, no. 7. Tubulus: fragment with zigzag combed keying. Ctxt: 2615, Id.6

Fig. 3, no. 8. Tubulus: fragment with zigzag and wavy combed keying. Ctxt: 2629, Id.22

Fig. 3, no. 9. Tubulus: fragment with straight perpendicular and diagonal bands of combed keying. Ctxt: 2629, Id.23

Fig. 3, no. 10. Tubulus: fragment with straight perpendicular and diagonal bands of combed keying. Ctxt: 2629, Id.24

Fig. 3, no. 11. Tubulus: fragment with straight linear band of combed keying and rectangular vent. Ctxt: 2629, Id.46

### **Late medieval and early post-medieval (late 14th-16th century)**

The majority of the ceramic building material was recovered from Areas A and H of the Access Road (COARD12). Elsewhere, the recovery of CBM was sparse and only a scatter of isolated fragments was produced. A small quantity was found in the topsoil in Area E of the Access Road, while two fragments of roof tile and a 'Tudor' brick came from the Pipeline Diversion and the Proposed Development at Great Garlands Farm (COLP15) respectively (Table 4.3).

### ***Fabrics***

The most common fabric was Fabric F, an orange-red fine sandy clay containing rare grog or mudstone grits up to 17mm, which was used for both brick and roof tile, as were the other common fabrics found. Fabric D was an orange or red fine clay fabric, sometimes laminated or with a grey core and with no visible inclusions. Fabric C was similar but contained scattered sparse coarse quartz sand. Fabric E was a laminated red or brown clay with cream streaks containing small clay pellets. Fabrics B and G were reddish brown sandy fabrics containing abundant medium-coarse sand, whilst B was differentiated by scattered dark red or purple ferruginous grits.

### ***Roof tile***

The majority of the roof tile was flat tile, most of which probably derived from peg tile, although only a few retained evidence of the peg hole and some of the thinner pieces could be from ridge tiles. No complete tiles survived. Most measured 13-15mm thick, but ranged from 10 to 17mm, with some tending to thicken to the edges. Two complete widths of 140 and 165mm survived. Most were fairly well finished with even surfaces and angular arrises, although minor irregularities were sometimes present and a number of fingerprints were visible from handling, especially around the edges. Peg holes were cylindrical or conical and ranged in size from 10-16mm diameter, apart from one partial peg hole, which may have been square. Another peg hole was unusually small, measuring only 3mm diameter and must have been intended for a nail, though there is nothing in the character of the tile to suggest it was any later in date than the others. A corner fragment has sub-circular peg hole, *c* 15mm in diameter, made with a polygonal piercing tool. One fragment of roof tile had been roughly chipped to form a circular disc *c* 70mm in diameter. The function is uncertain, though discs of this sort are usually thought to have been used as pot lids.

Four fragments of glazed ridge tile were found. These were slightly thinner than the peg tiles, measuring 11-13mm thick. Examples of both angular and curved profiles survived and all had evidence of a thin amber or brown glaze partly covering the surface. On one, the glaze formed a broad margin adjacent to the tile end. On no fragment did the apex of the tile survive to establish whether they were crested ridge tiles. Splatters of glaze also occurred on a three peg tiles. Glazed roof tiles normally date to the 13th-14th centuries. The character and finish of the peg tile is consistent with a high or late medieval to early post-medieval date (14th-16th centuries). Much of the peg tile found in contexts 10014 and 10016 had burning and sooting on the tile edges, which were damaged and shattered from the heat. This effect is typical of their re-use in a pitched tile hearth or oven floor, commonly found features in domestic medieval buildings.

### ***Floor tile***

A single medieval floor tile, found with peg and ridge tiles, was recovered from pit 1159. The floor tile measured 26mm thick by over 75mm wide and had a plain surface patchily coated with an amber glaze and straight smooth, vertical sides partly coated with glaze. There is a void in the surface, possibly where an organic inclusion burnt out, which may have made this a 'second'. There was no keying on the underside, but the tile has taken up the stamped pattern of an encaustic decorated tile, which included part of a dotted circle. It is uncertain whether the floor tile had been accidentally stamped or had rested on a stamped tile. It was made in a sandy fabric of different character to the that of the roof tiles, suggesting that the floor tile had come from a non-local source, possibly Penn in Buckinghamshire. It is also dated to the 13th-14th centuries, contemporary with the associated roof tile.

Of later date was a very worn Flemish-style quarry (floor) tile dating from the late 14th to 16th century. This was recovered from Salt Fleet Flats in the Cooling Marshes. The date of the tile fits neatly with that of the associated pottery, which is dated to c 1380-1450. The wear pattern on the tile suggests that the tile was set on edge, perhaps having been reused.

### ***Brick***

All the brick is similar in character and is of late medieval or early post-medieval (Tudor) date, essentially late 15th to 16th century. It is handmade using a wooden

mould, which sometimes left striations on the sides when removed and evidence of a ridge along the base arris where clay had squeezed under the mould. The upper surface was usually well smoothed, the sides flat and slightly rough or creased and the base rough, pitted or, in rare instances, with organic impressions of grass or turf. Two bricks from pond 8008 had indented borders 11-13mm wide on the top surface, as did the brick fragments from trench 4 of the Proposed Development at Great Garlands Farm. The bricks ranged in size from 40 to 62mm thick and 100-118mm wide. A number of individual bricks varied considerably in thickness (42-46mm, 44-51mm, 47-62mm, 54-66mm) or width (106-118mm). It is unlikely that they were deliberately tapered and this variation is more likely a reflection of the standard of manufacture of the crude handmade bricks.

Over 50% of the brick by weight had evidence of burning, sooting, overfiring or in one case thick vitrification, suggesting that the brick may have been used in a fireplace, chimney or oven. All came from Area A of the Access Road, except for three from the pond in Area H. One in the latter had a heavily worn base surface suggesting that it had been reused as flooring.

### *Discussion*

The brick and tile from the Great Garlands area form a uniform assemblage dating from the 13th to 16th centuries. The main concentrations occurred in Area A of the Access Road, where a series of small enclosures were identified along the High Road, and at the southern end of Area H close to the interface between the gravel terrace and the tidal flat. In general, the CBM is not heavily abraded, and though no complete items survive, the general condition suggests that it derives from buildings in the area. The presence of roof tiles with burnt edges indicative of their use in a hearth or oven floor suggests that any structures included domestic buildings. The quantity and character of the CBM suggests that the material was brought in to be reused where fireproofing was necessary in hearths or chimneys and does not represent the main structural elements of any buildings on the plots. The medieval glazed ridge tile and floor tile are unlikely to represent a display of status or wealth but reflect the reuse of earlier building materials. The lack of evidence for buildings on the site may indicate any buildings that had been present were very low status and took advantage of an unused strip alongside the High Road or a marginal area beside the tidal flats in Area H. Such structures could have been built of locally available materials, such as clay, wattles and reed thatch, leaving

little trace in the archaeological record. Although there is no vernacular evidence for earthen buildings in Essex before the late 18th century (Brunskill 2009, 219) clay cottages were usually built for, and by, the poor and such buildings would leave little trace once abandoned and left to decay. The sparse scatter of CBM of a similar date found in the other areas across Access Road, the Proposed Development at Great Garlands Farm, and the Pipeline Diversion suggests that the late 15th-16th century represents a period of greater exploitation of the resources of the area.

### **Later post-medieval (16th-19th century)**

Building material found during this period is sparse and there is no evidence to suggest the presence of buildings or occupation within the areas exposed. In the Proposed Development at Great Garlands Farm (COLP15), a small quantity of post-medieval brick and roof tile, none of it closely dated, was found in trenches fringing the tidal flats. Some of this could be contemporary with the preceding phase of activity.

On the south side of the Thames Estuary on the Cooling Marshes (Salt Fleet Flats; CSCOX 13), a total of 14 pieces of CBM, weighing 7.776kg, was recovered from eight contexts. Apart from the Flemish floor tile mentioned above, the remainder of the CBM dates to the 16th-19th century. The greatest concentration occurred in six contexts from Trench 16, which produced only 18th- and 19th-century pottery. These produced four bricks, two of which are complete. The earliest piece is a sandy red 'Tudor' brick-end of late 15th- to 16th-century date (context 1622), possibly used for paving. Two other bricks (including one complete) are of late 16th- to 17th-century date (contexts 1617 and 1618). The brick from 1617 bears a couple of small possible cat paw-prints on its upper surface. The other complete brick is a frogged yellow 'stock' brick from the 19th century (1602). Contexts 1612 and 1613 produced a few pieces of red sandy, 18th-19th century, pan tiles. Otherwise, the site produced no examples of medieval or post-medieval peg tiles, which are normally very common in Kent. Trench 24 produced two items of 19th- or 20th-century stoneware, including a piece of drainpipe and the rim of a white stoneware object, which may be from a chimney pot or part of a stove or a water filter.

## References

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## Ceramic Building Material Tables

**TABLE 4.1: QUANTIFICATION OF ROMAN TILE FROM PIPELINE DIVERSION (COLP15) BY FORM AND FABRIC**

<b>Form/Fabric</b>	<b>C</b>	<b>CF</b>	<b>D</b>	<b>E</b>	<b>G</b>	<b>U</b>	<b>Total count</b>
Brick RB	7	6	16		1	1	31
Flat tile	8	9	4	5		1	27
Tegula	4	10	14	7			35
Imbrex	2	1	1				4
Flue		1	12				13
Indeterminate	3		8				11
<b>Total</b>	<b>24</b>	<b>27</b>	<b>55</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>121</b>
<b>Form/Fabric</b>	<b>C</b>	<b>CF</b>	<b>D</b>	<b>E</b>	<b>G</b>	<b>U</b>	<b>Total Wt (g)</b>
Brick RB	2781	3815	6153		978	222	13949
Flat tile	978	1100	787	571		46	3482
Tegula	585	800	2662	3133			7180
Imbrex	305	31	87				423
Flue		115	1075				1190
Indeterminate	218		11				229
<b>Total</b>	<b>4867</b>	<b>5861</b>	<b>10775</b>	<b>3704</b>	<b>978</b>	<b>268</b>	<b>26453</b>

**TABLE 4.2: TEGULAE FLANGE AND CUTAWAY SIZES**

<b>Id</b>	<b>Context</b>	<b>Fl type</b>	<b>Fl width</b>	<b>Fl height</b>	<b>Warry type</b>	<b>C/a type</b>	<b>C/a length</b>	<b>C/a width</b>	<b>C/a height</b>
1	2615	F2	19-36	46-52	D	A3b	60/65	8/20-40	48/31;
					Upper	A2	50	17	28
2	2615	B	25t, 33b	53	D	A3b	60-73	6/12-22mm	45/25mm
3	2615	E	30	53	~	~	~	~	~
27	2629	A	25-30mm	46	C5	A3/C1	60-75mm	20	full/?
28	2629	A3	27	46	~	~	~	~	~
29	2629	B	22t, 31b	30	~	~	~	~	~
30	2629	A4/D	23	46	~	~	~	~	~
32	2629	A	26	44	~	~	~	~	~
42	2637	U	35	>35	~	~	~	~	~
43	2637	A?	24	>43	~	~	~	~	~
55	3301	A5	39	41	~	~	~	~	~

Key: Fl – flange, C/a – cutaway. All dimensions in millimetres

**TABLE 4.3: QUANTIFICATION OF MEDIEVAL AND POST-MEDIEVAL CERAMIC BUILDING MATERIAL BY SITE**

<b>Site code</b>	<b>Site name</b>	<b>Count</b>	<b>Wt (g)</b>	<b>Date</b>	<b>Material present</b>
COARD12	LG Access Road	233	24893	Mainly 13th-16th C	Roof, brick and floor tile
COLP15	Pipeline Diversion and Proposed Development at Great Garlands Farm	12	1470	14th-19th C	Roof tile & brick
CSCOX13	Cooling Marshes, Salt Fleet Flats, Kent	14	7776	14th-19th C	Brick, floor, pan tiles, drain pipe
Total		259	34139		

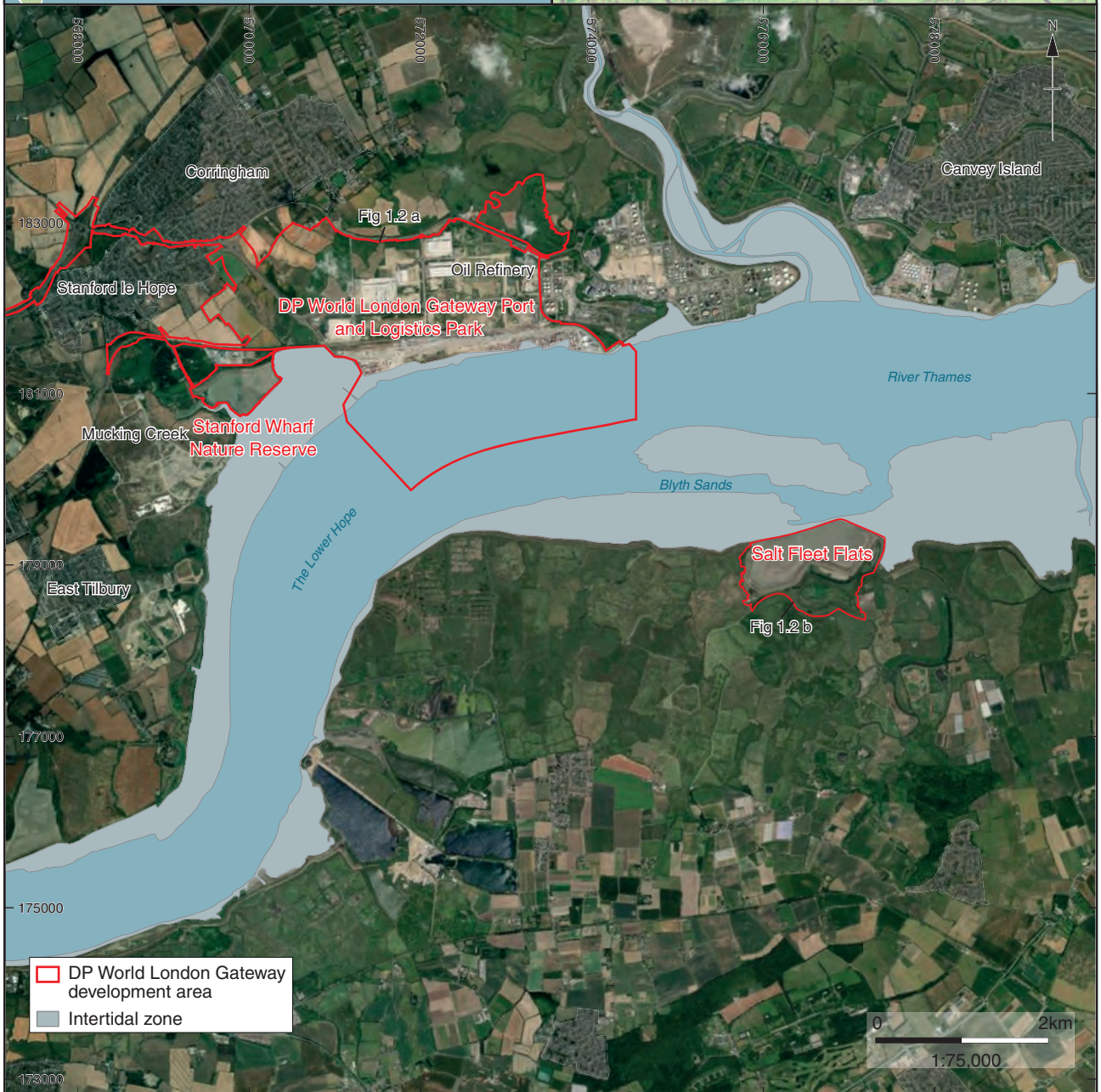
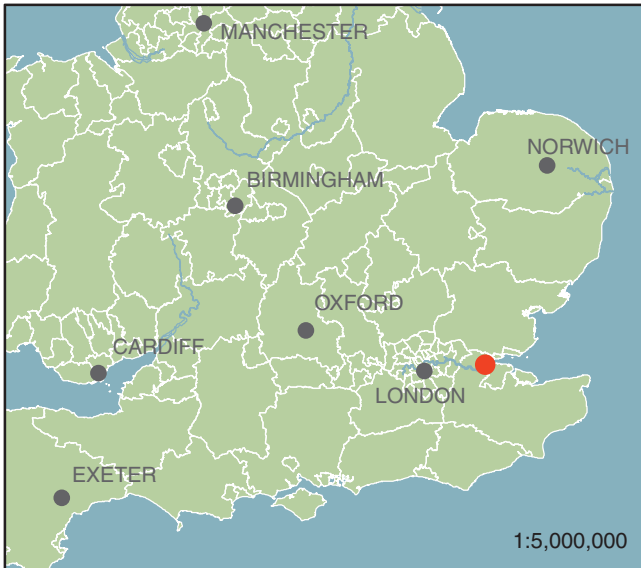




Figure 1: Tegulae, nos 1-4

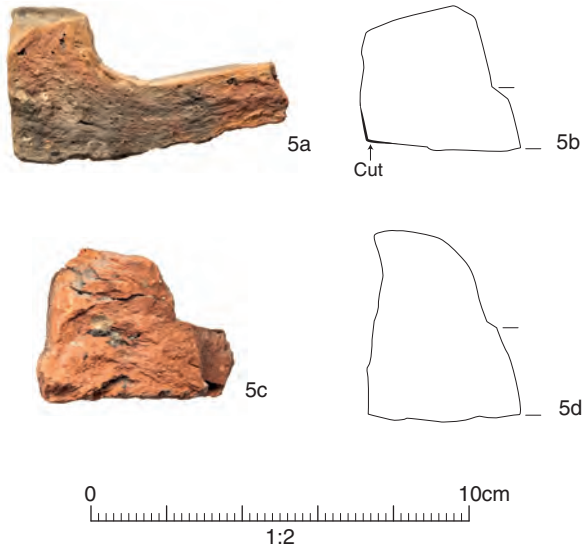
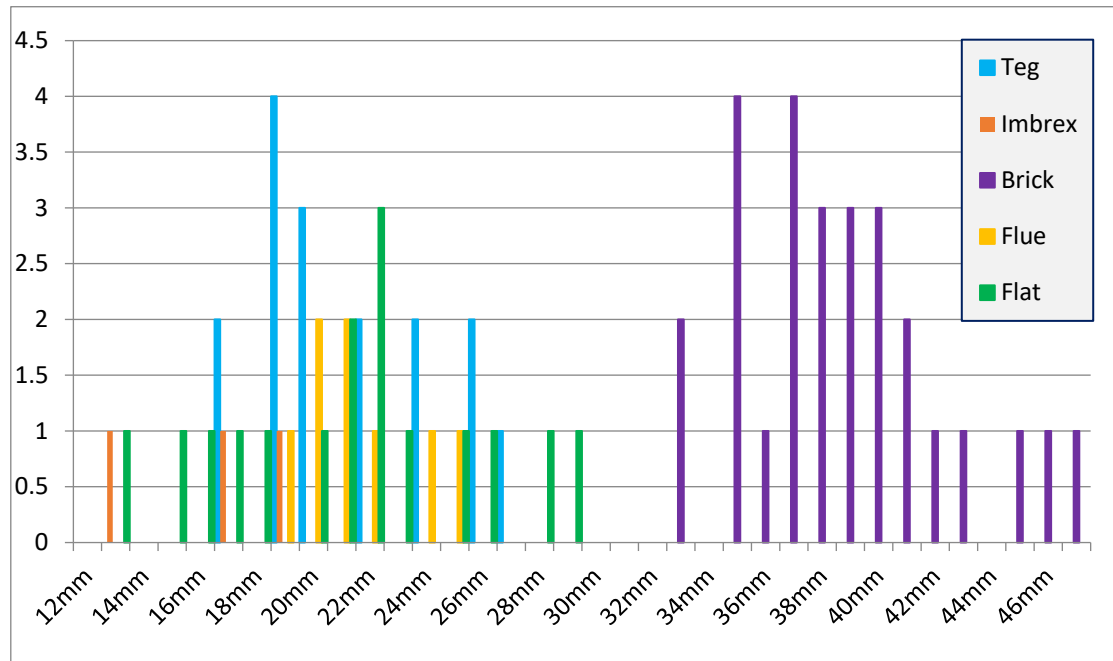


Figure 2: Tegulae, no. 5



Figure 3: Brick and tubuli (box flue) with combed keying patterns

**FIG. 4: ROMAN TILE THICKNESS IN RELATION TO DIFFERENT TILE FORMS (WHERE TILES HAD A THICKNESS RANGE THE THICKEST MEASUREMENT WAS USED)**





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