Chapter 5

The medieval and post-medieval periods

SETTING THE SCENE

Little evidence was found for activity during the Anglo-Saxon period, despite the proximity of extensive areas of settlement at Mucking and Orsett. Excavations at Stanford Wharf Nature Reserve uncovered two timber piles, one of which was radiocarbon dated to cal AD 660–780 (94.5% confidence). Though not *in situ*, the timbers may have been part of a jetty or fishing platform and hint at coastal exploitation here during this time (Biddulph *et al.* 2012c, 177 and 184). Pottery of early or middle Anglo-Saxon pottery is known a little distance to the north at Stanford-le-Hope (Evison 1955, 170, fig. 7.3; Myres 1977, no. 3760).

Excavations at Mucking between 1965 and 1978 recorded 468 cremation burials, more than 380 inhumation graves, 203 sunken featured buildings (SFBs), or *Grubenhäuser*, and 53 post-built structures, as well as a large number of other features and finds. The pottery, metalwork and coin evidence indicated that occupation commenced in the early 5th century AD and continued, with shifts in settlement focus, until the end of the 7th century (Hamerow 1993). A further two SFBs were recorded to the north of the excavation area at Mucking at the site of the North Ring (Jones 1988, 46). Pottery broadly dated to the 6th to mid-8th century was also collected from Butts Lane *c* 400m east of the North Ring (Tyler 2005, 137).

Excavation in 1976 of the Orsett 'Cock' enclosure revealed five SFBs of 6th-century date, apparently positioned with reference to earlier field boundaries, and two more SFBs were found further east during road construction in 1983. The occupation is less dense than at Mucking, which may reflect a scattered pattern of settlement (Carter 1998, 177). Excavation in 1975 of a Neolithic causewayed enclosure to the south revealed two inhumation burials, each within ring ditches. The burials were dated to the late 7th or early 8th century and a possible further three ring ditches have been identified from cropmark evidence. Together, the discoveries represent an Anglo-Saxon barrow group (HER 5162).

Around Salt Fleet Flats, on the Kent side of the DP World London Gateway development, discoveries of Anglo-Saxon date are again limited, although it is possible that undated features within the low-lying marshes and recorded on the Kent Historic Environment Record date to this period may relate to salt production. A *sceatta* of 7th-century date found during excavations in the mid-1970s by LMARG some 375m south-east of the site and a silver penny collected further south at Halstow offer more tangible, though slight, evidence for Anglo-Saxon activity.

The London Gateway development area lies within the medieval parishes of Stanford-le-Hope and Corringham, and in Kent the parishes of Cooling, Cliffe and High Halstow. It encompasses or adjoins the estates of several manors recorded in Domesday Book, among them the manors of Mucking, Hassenbrook Hall, Corringham and Fobbing (Table 5.1). Stanford-le-Hope is not listed, but it may have been included as part of Hassenbook Hall, which has two entries in Domesday. Stanford-le-Hope itself seems to have been established as a settlement by at least the late 12th or early 13th century (the parish church dates from this period). It was apparently not a manorial site but may have developed as a meeting place and market, at the point where the London Road crosses the Hassenbrook stream, *c* 300m south of the A13/A1014 junction. The stream forms the parish boundary between Stanford-le-Hope and Mucking for much of its length. In the Norman period, manors were held by the lord of the manor, usually the king or his tenant-in-chief or else a lesser noble. The tenant-in-chief of Hassenbrook Hall was Odo of Bayeux (half-brother of William I), who also held Cliffe and Cooling in Kent. Fobbing was held by Eustace II, Count of Boulogne (a companion of William I), while Corringham was held by William de Warenne, first Earl of Surrey. Access to the coast and marshland were vital to the economy of these manorial estates. Each manor owned part of the coastal marshland, a detached part if necessary, which gave it access to good pasture for livestock, typically sheep, and areas for fowling and fishing. Traps and nets could be set along the coast (Darby and Campbell 1971). Salt extraction was another important activity. The role of the intertidal zone is reflected in Domesday – the entry for Fobbing, for example, includes a fishery and pasture for up to 1100 sheep. Domesday attaches no fisheries to the manors of Cliffe and Cooling and none of the 24 salt-pans (*salinae*) recorded in Domesday lie nearby, although it is unclear whether the survey provides a complete picture of these activities in Kent in 1086 (ibid., 538).

Something of the importance of the marshland to the medieval economy period was revealed during excavations at Stanford Wharf Nature Reserve. In the north-eastern part of the site, ditched enclosures and internal gullies appeared to mark the site of a 'wick' or sheep dairy; pottery suggested that the site was in use between the 12th and 15th centuries (Biddulph *et al.* 2012c, 177–80). Timber alignments further south,

Table 5.1: Saxon manors in the vicinity of DP World London Gateway as noted in Domesday Book (Powell-Smith, nd)

Manor	*Households*	*Lord in 1066*	*Overlord in 1066*
ESSEX			
Chadwell 1	-	Godman	-
Chadwell 2	7 smallholders. 1 slave. 1 freeman	Edwold	King Edward
Chadwell 3	7 smallholders. 4 slaves. 1 priest	Aelfric	King Edward
Corringham	2 villagers. 25 smallholders. 3 slaves	Sigar (of Corringham)	-
East and West Tilbury 1	16 households	Sweting of Tilbury	-
East and West Tilbury 2	1 smallholder	freeman, one	-
East and West Tilbury 3	1 villager. 11 smallholders. 2 slaves	Aelfric the priest	-
Fobbing	3 villagers. 42 smallholders. 9 slaves. 22 free men	Brictmer (son of Queneva); freemen, twenty-two	King Edward
Hassenbrook Hall 1	3 smallholders	Leofstan	-
Hassenbrook Hall 2	14 smallholders. 20 freemen	freemen, sixteen	-
Horndon-on-the-Hill 1	-	freeman, one	-
Horndon-on-the-Hill 2	4 smallholders	Winge	-
Horndon-on-the-Hill 3	4 smallholders. 1 slave	Godwin (of Benfield)	-
Horndon-on-the-Hill 4	11 smallholders. 3 slaves	Aelfric the priest	-
Horndon-on-the-Hill 5	12 smallholders. 3 slaves	Wulfric	-
Horndon-on-the-Hill 6	1 villager. 16 smallholders	freemen, two	-
Mucking 1	3 smallholders	Barking (St Mary), abbey of	-
Mucking 2	12 villagers. 25 smallholders	Barking (St Mary), abbey of	-
Orsett 1	1 priest	Engelric (the priest)	London (St Paul), bishop of
Orsett 2	22 villagers. 36 smallholders. 2 slaves	-	London (St Paul), bishop of
KENT			
Cliffe 1	20 villagers. 18 smallholders. 2 slaves	Archbishop of Canterbury (Christ Church)	-
Cliffe 2	2 villagers	Aelfric and Ordric, brothers	King Edward
Cooling 1	5 villagers. 4 slaves	Wulfwin	Earl Leofwin
Cooling 2	1 smallholder	God	King Edward

radiocarbon dated to cal AD 1305–1420 (95.4% confidence), may have been the remains of a causeway across part of the marsh, giving estate workers access to its resources, such as wild fowl, fish and shellfish (ibid., 178, 185). By the late medieval period, some of the manorial estates could boast considerable wealth. A highly decorated dish fragment recovered from Stanford Wharf Nature Reserve had been imported from Beauvais (Fig. 5.1; Cotter 2012). The land here belonged to Cabborns Manor, shown on the Ordnance Survey map of 1863 to the north-west of Stanford Wharf on the edge of Mucking Creek and owned in the late 15th century by one William Hengsey, a London grocer (Fig. 5.2; Biddulph *et al.* 2012c, 185).

Excavation by the Essex County Council Field Archaeology Unit (ECCFAU) in 1999 along a section of the Coryton Gas Pipeline in an area that would form part of the London Gateway development offered a more detailed view of medieval life on the marsh-edge. The site was located on the gravel terrace adjacent to the head of Carter's Creek, which issued into the

Lord in 1086	*Tenant in chief in 1086*	*Resources*
Grim the reeve	Grim the reeve	-
(Ralph) son of Turold	Bishop Odo of Bayeux	1.5 lord's plough teams. 0.5 men's plough teams. Pasture 100 sheep. Woodland 80 pigs
Hugolin	London (St Paul), bishop of	2 lord's plough teams. 1.5 men's plough teams. Pasture 100 sheep. 2 cobs. 10 cattle. 81 sheep
Bishop Odo of Bayeux; William	London (St Paul), bishop of	2.5 lord's plough teams. 4 men's plough teams. Pasture 400 sheep. Woodland 300 pigs. 1 mill. In 1066: 2 cobs, 3 cattle, 4 cows, 8 pigs, 400 sheep. In 1086: 6 cattle, 10 pigs, 500 sheep, 21 goats
Ranulf	William of Warenne	Meadow 1 acre. Pasture 40 sheep
Hunald	Theodric Pointel	Meadow 4 acres. Pasture 50 sheep
Osbern the Frenchman; Ralph the Frenchman	Swein of Essex	2 lord's plough teams. 4 men's plough teams. Pasture 300 sheep. Woodland 4 hides. 1 fishery. In 1066 1 cob, 60 sheep. In 1086: 1 cob, 31 cattle, 9 pigs, 260 sheep. 12 other
Count Eustace (of Boulogne)	Count Eustace (of Boulogne)	4 lord's plough teams. 17 men's plough teams. Meadow 10 acres. Pasture 1100 sheep. Woodland 750 pigs. 0.8 fisheries. In 1086: 31 pigs, 717 sheep
Turold (son of Odo)	Swein of Essex.	1 lord's plough teams. 6 acres of meadow. In 1066: 10 cattle. In 1086: 13 cattle, 5 pigs
(Ralph) son of Turold	Bishop Odo of Bayeux	7 men's plough teams. Meadow 16 acres. Pasture 400 sheep. Woodland 200 pigs
Godwin Woodhen	Godwin Woodhen	-
Hugh of St Quentin	Hugh of St Quentin	1 lord's plough teams. 1 cob. 1 cattle. 1 pig. 30 sheep in 1066 and 1086
Bishop Odo of Bayeux; William	London (St Paul), bishop of	1 lord's plough teams. Woodland 10 pigs. 0.1 fisheries
Payne	Swein of Essex	1 lord's plough teams. 0.5 men's plough teams.1 church. In 1066: 1 cob. In 1086: 1 cob and 2 cattle
Warner	Count Eustace (of Boulogne)	2 lord's plough teams. Meadow 12 acres. Pasture 60 sheep. 1 church. 0.12 church lands. In 1086: 2 cows, 10 pigs, 110 sheep
Edmund son of Algot; deacon, one	Edmund son of Algot	2 lord's plough teams. 1 men's plough teams. Meadow 12 acres. Pasture 50 sheep. 0.3 churches. 0.25 church lands. In 1066: 1 cob, 5 cattle, 20 pigs, 150 sheep. In 1086: 35 sheep
William	Barking (St Mary), abbey of	-
Barking (St Mary), abbey of	Barking (St Mary), abbey of	2 lord's plough teams. 9 men's plough teams. Meadow 40 acres. Pasture 300 sheep. Woodland 300 pigs. 1 mill. 1 fishery. In 1086: 2 cobs, 10 cattle, 18 pigs, 250 sheep
Count Eustace (of Boulogne)	Count Eustace (of Boulogne)	1 lord's plough teams. 1 men's plough teams. 1 church lands
Ansketil (of Graye); Gilbert; London (St Paul), bishop of; Tidbald; William	London (St Paul), bishop of	8 lord's plough teams. 22 men's plough teams. Woodland 1000 pigs. 6 cattle. 40 pigs. 115 sheep
Archbishop of Canterbury (Christ Church)	Archbishop of Canterbury (Christ Church)	6 ploughlands. 1.5 lord's plough teams. 5.5 men's plough teams. Meadow 36 acres. 1 church
Arnulf of Hesdin	Bishop Odo of Bayeux	0.5 lord's plough teams. Meadow 10 acres. Pasture 100 sheep
Adam (son of Hubert); Richard son of (Count) Gilbert	Bishop Odo of Bayeux	1.5 ploughlands. 2 lord's plough teams. 0.5 men's plough teams. Meadow 7 acres. Woodland 10 swine render
Odo	Bishop Odo of Bayeux	Meadow 4 acres

Thames. The fieldwork uncovered a gravel surface, interpreted as a farmyard, and the remains of a timber structure, probably a barn for the processing and storage of cereals. Evidence for a kiln or oven was also found and this may have been used for smoking of meat, cheese or fish (Fig. 5.3; Peachey and Dale 2005, 144). Pottery recovered from the site spanned the 13th to 16th centuries (Walker 2005, 141–2). The site's location suggests that produce was brought here from both the upland and marshland parts of an estate for processing and storage before being transported down the creek (Peachey and Dale 2005, 145), and indeed the site lies close to the historical settlement of Feake's Hithe, whose name implies the existence of a wharf. The pottery and other finds suggested that the estate the farm belonged to was prosperous and well-connected; Peachey and Dale (2005, 144) make the case for this being Oak Farm to the north of the site, which has a medieval origin and has been known by a variety of names, among them Pitseys and, before that, Pease (Fig. 5.4), but an alternative and more plausible possibility is that the site formed part of the Old Garlands estate,

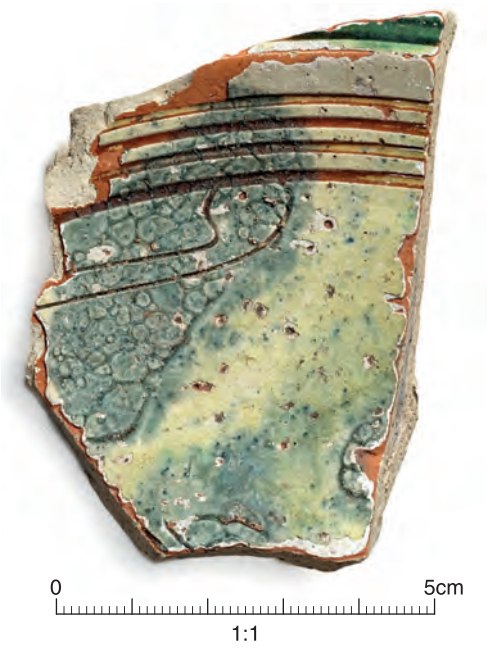

Figure 5.1 Fragment from a Beauvais sgraffito ware dish, Stanford Wharf Nature Reserve

within whose boundary the site was located according to a 1617 estate map (Fig. 5.5; ERO D/DU 112/1). By the mid-18th century, Feake's Hithe was incorporated into a farm called Great Garlands.

The 17th century was a period of extensive land reclamation. There may have been attempts to drain the marshes in the medieval period (Rippon and Wainwright 2011), but firm evidence is lacking. Marginal or 'waste' land was reclaimed in order to provide good-quality grazing for livestock and fertile land for crops. Reclamation was achieved by first building a sea wall, then digging channels around parcels of land in order to drain them; the material excavated from the channels may have been used to raise banks around the edges of the fields for further protection. Some evidence of the use of this reclaimed landscape was recorded at Stanford Wharf Nature Reserve, where a timber structure near the south-eastern edge of the excavation area, radiocarbon dated to the mid-17th century or later, was identified as a sheepfold on the first edition Ordnance Survey map of 1863. Not all the marshland was reclaimed, however, and those areas that were not enclosed by the sea walls continued to be exploited for coastal and intertidal resources. Archaeological investigations at Canvey Island, *c* 5km east of the London Gateway development, offered a variety of evidence that might be expected in such environments, among them oyster storage pits, fish-traps and duck decoys (Wilkinson and Murphy 1995, 207–10).

The evolution of the pattern of post-medieval settlement and field systems within London Gateway can be traced on historic mapping dating from the early 17th century onwards. While the varying fortunes of farms and small settlements are shown by changes in name or size, disappearance or replacement, overall the maps demonstrate remarkable continuity in the landscape until modern times; field boundaries recorded on the 1617 map of Feake's Hithe and the Old Garlands estate (Fig. 5.5) appear on 19th- and 20th-century Ordnance Survey mapping, having remained in use for over 300 years, while sea walls raised in the early 17th century and marked on the map survive to the present day as upstanding earthworks. The evolving settlement pattern is also evident from cropmarks and soilmarks recorded in the Access

Figure 5.2 Cabborns Manor, as sketched by Donald Maxwell in 1925

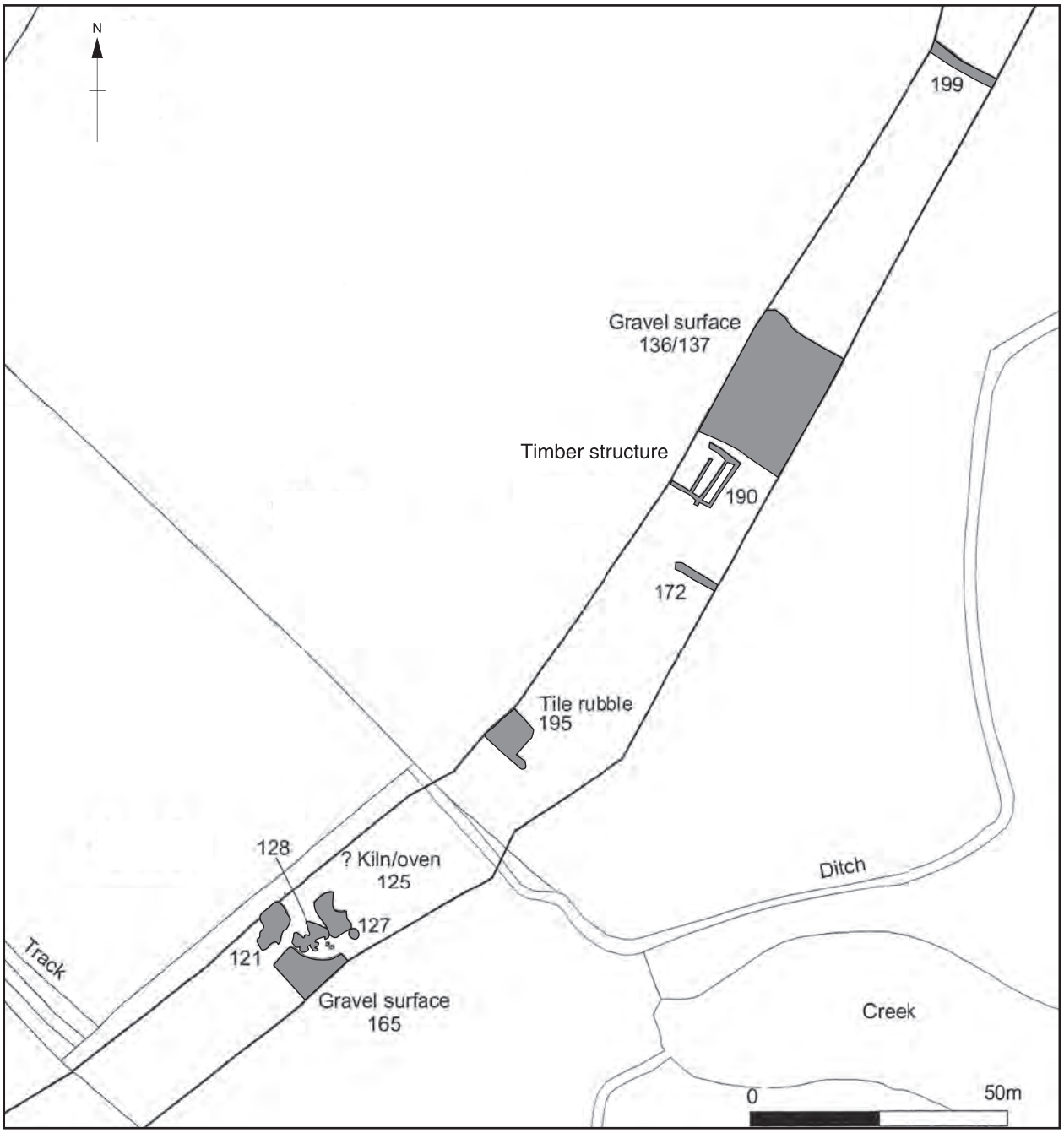

Figure 5.3 Archaeological features at Great Garlands Farm (after Peachey and Dale 2005, fig. 4)

Road area. These show enclosures, field boundaries and house plots that may belong to former medieval farms and settlements, although very few of these are dated and may be earlier in date.

The modern industrialisation of the London Gateway area began in the 19th century with the construction of the Thames Haven Branch Line of the London, Tilbury and Southend Railway through the southern part of the site, as well as a dock, railway station, warehouses and associated infrastructure at Shellhaven Creek on the south-eastern tip of the development area. This was initially used for passenger traffic – mainly tourists boarding paddle-steamers to Margate – but subsequently became a transhipment point for imported coal, cattle and other goods destined for the London markets. Goods also went through Stanford Wharf, which was located at the mouth of Mucking Creek. In the late 19th and early 20th centuries, the goods warehouses at Shell Haven were replaced by large explosives factories and oil storage and refinery sites, which were attracted by the railway, the strategic location of the site in relation to London, the deep-sea anchorage at Shell Haven and the remoteness of the location from centres of habitation. These dramatically altered the visual character of the former marshland landscape. The refinery was subject to very extensive development and expansion during the 20th century and was identified as a key defence site during the Second World War.

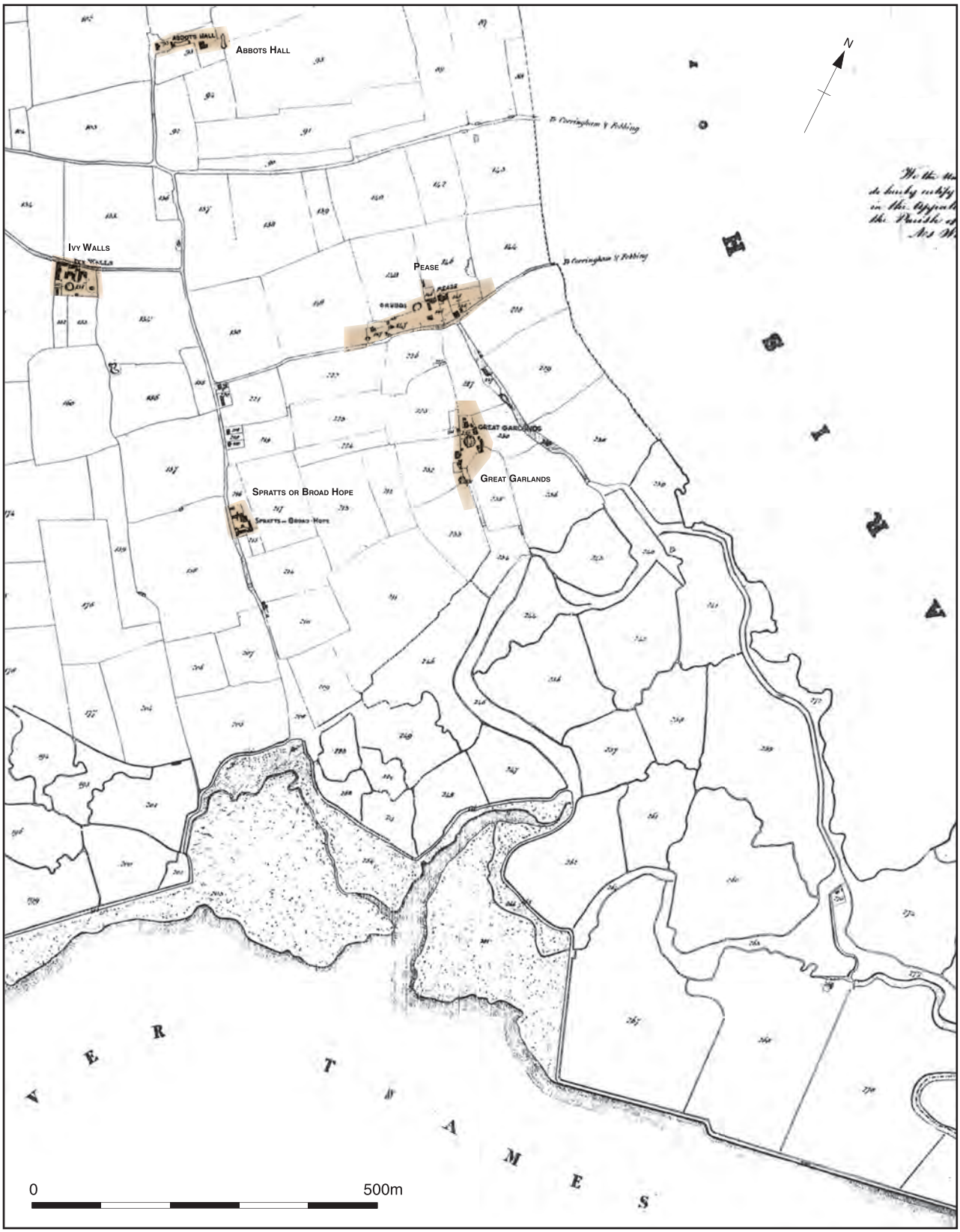

Figure 5.4 Tithe map of 1839 showing Great Garlands Farm and Pease (reproduced courtesy of Essex Record Office)

Figure 5.5 Map of the Old Garlands estate and Feake's Hithe, 1617 (reproduced courtesy of Essex Record Office)

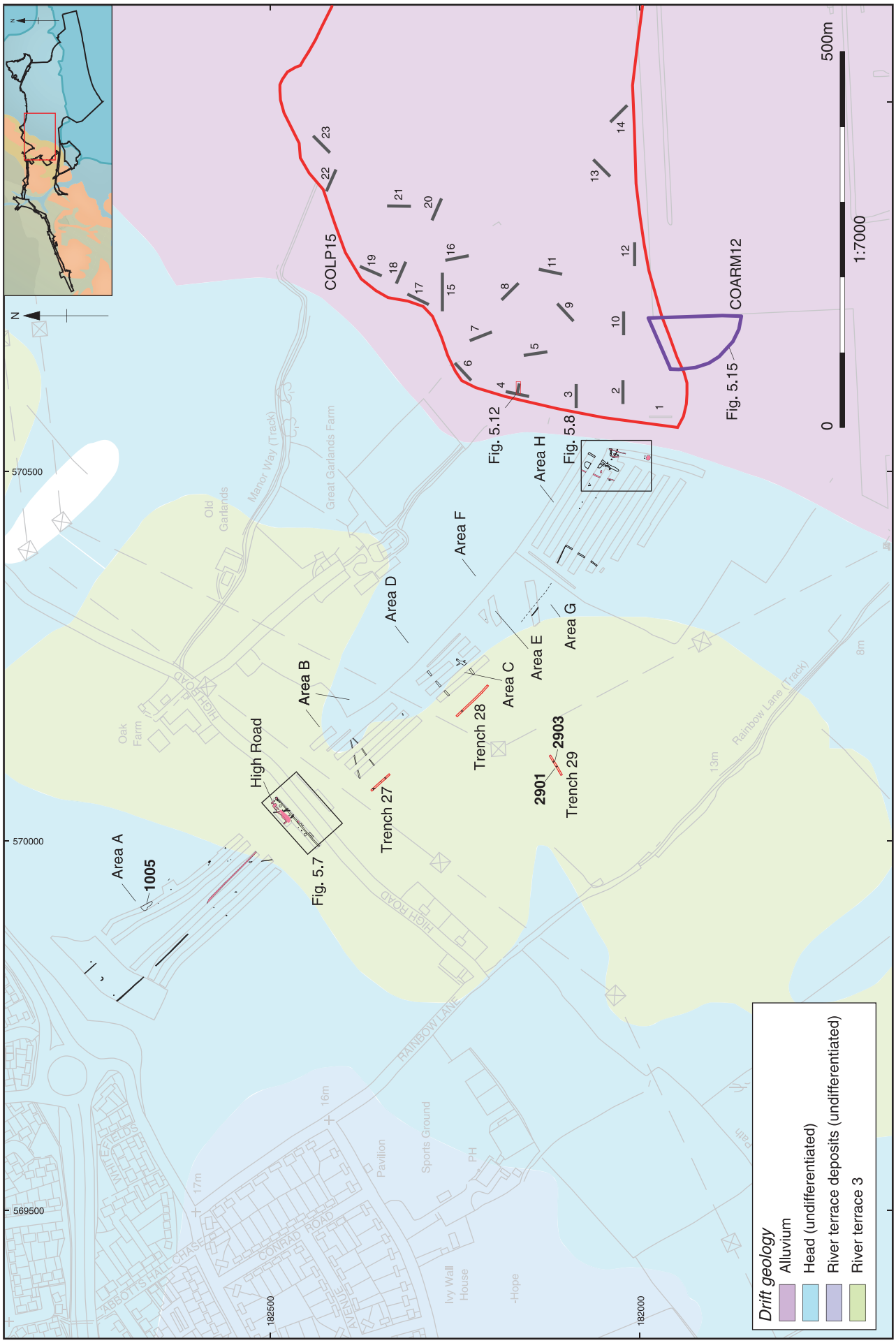

Figure 5.6 Access Road showing locations of medieval and post–medieval archaeological features and contemporaneous features in Trench 29, Pipeline Diversion

THE DP WORLD LONDON GATEWAY SITES

Anglo-Saxon period

A single fragment of pottery (15g) in a sand- and organic-tempered fabric was recovered from the intertidal survey.

Medieval period

Access Road

Two areas of medieval activity were investigated along the Access Road. One was north-west of the High Road (Area A, Fig. 5.6), the other south of Great Garlands Farm (Area H).

Area A

The south-eastern end of Area A exposed a sequence of ditched enclosures and boundaries adjoining the north side of High Road that appeared to represent rapid episodes of reorganisation over a short period of time during the late 13th and 14th/15th centuries (Fig. 5.7). There was not sufficient dating evidence to provide a detailed chronology, but five phases of development were identified. A *terminus post quem* for the sequence was provided by pit 10073, which was stratigraphically the earliest feature and contained pottery dating to the late 13th to mid-14th century. The first phase of boundaries comprised a series of rectangular plots alongside the road, which were defined to the rear by NE–SW-orientated ditch 1094, which measured 1.7m wide and 0.4m deep. The plots were subdivided by ditches 10076, 10080, 10087 and 10091, which were on average 1m wide and 0.2m deep. No finds were recovered from this phase of ditches. Ditch 1197, which extended on a parallel alignment to ditch 1094, may also have been part of this phase, and contained pottery of 13th- to 15th-century date. This arrangement was cut by ditch 1179, which was orientated N–S obliquely across the plots, measured 0.8m wide and 0.3m deep, and corresponded to a field boundary seen as a cropmark. Again, no finds were recovered, but the ditch was cut by pit 1129, which similarly contained pottery of late 13th- to mid-14th-century date. The orientation of the original plots was restored in phase 3, when three ditches (10085, 10089 and 10093) were laid out to form one or more enclosures, cutting across the earlier boundaries. The ditches of this phase were on average 1.3m wide and 0.25m deep. Ditch 10093 may have continued further north as ditch 1163, which contained pottery

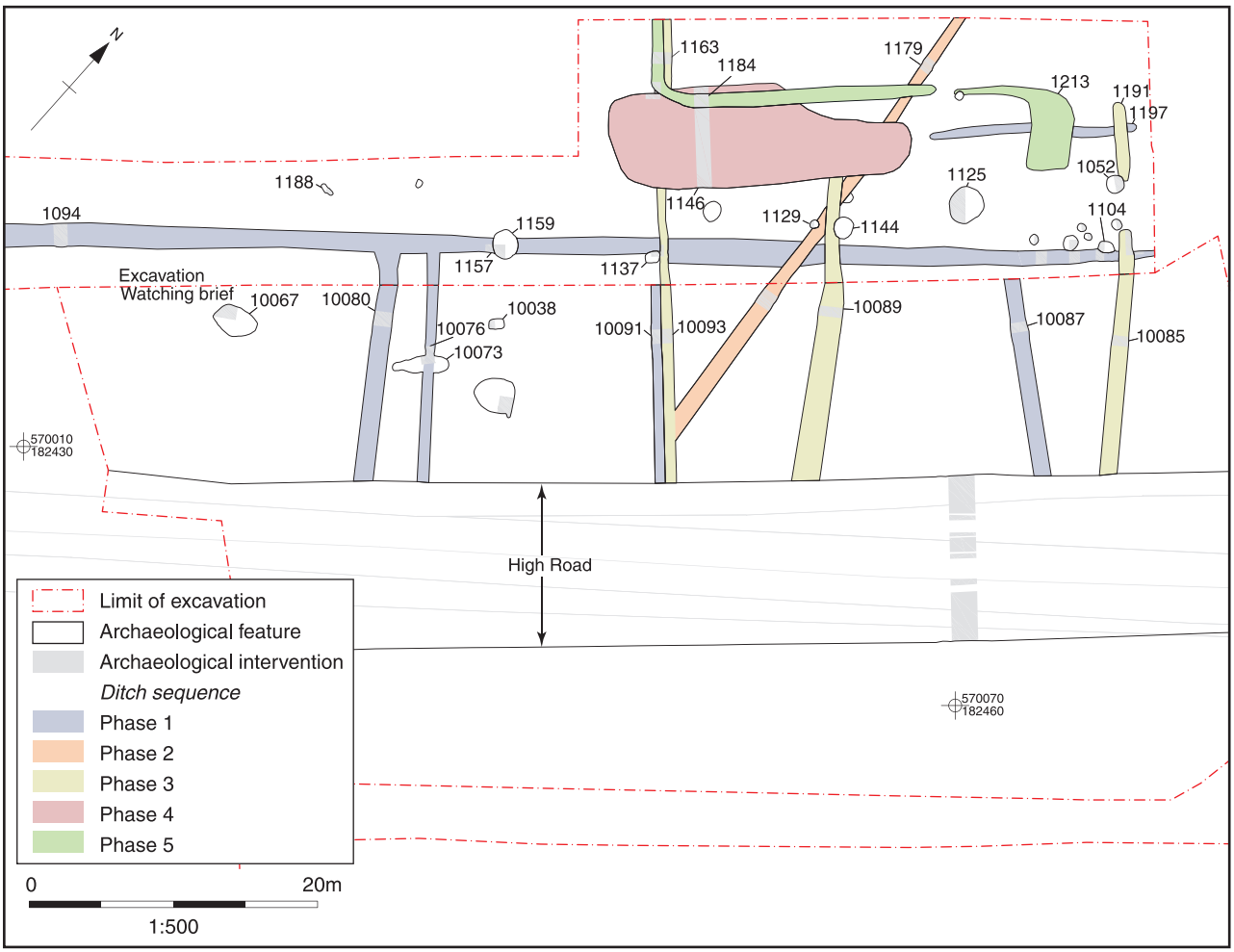

Figure 5.7 Plan of medieval and post–medieval features, Access Road Area A

dated to the late 13th to mid-16th century, although the relationship between the two ditches, separated by later hollow 1146, is unproven. Ditch 10085 may similarly have continued as ditch 1191, with the gap between them perhaps serving as an entrance into the enclosure. A large hollow (1146, phase 4), probably a sump, was dug across part of the enclosure defined by 10093 and 10085. The hollow measured some 20 x 7m but was only 0.4m deep. No pottery was recovered, but ceramic building material of medieval or post-medieval date was collected from the feature. Ditch 1184 (phase 5) measured 0.9m wide and 0.15m deep and contained pottery of late 13th- to mid-14th-century date. It partly recut ditch 1163 and may represent a division between the phase 3 plot and an adjoining enclosure to the north-west beyond the limit of the excavation area. Ditches seen further north-west in Area A that were aligned NW–SE and correspond with the position of field boundaries shown on the first edition six-inch Ordnance Survey map (1863) may also be part of this arrangement. Ditch 1213 may be another feature that relates to 1184 – there is a small gap between them, perhaps another entrance – but in plan had a somewhat amorphous shape. Several pits were recorded within the

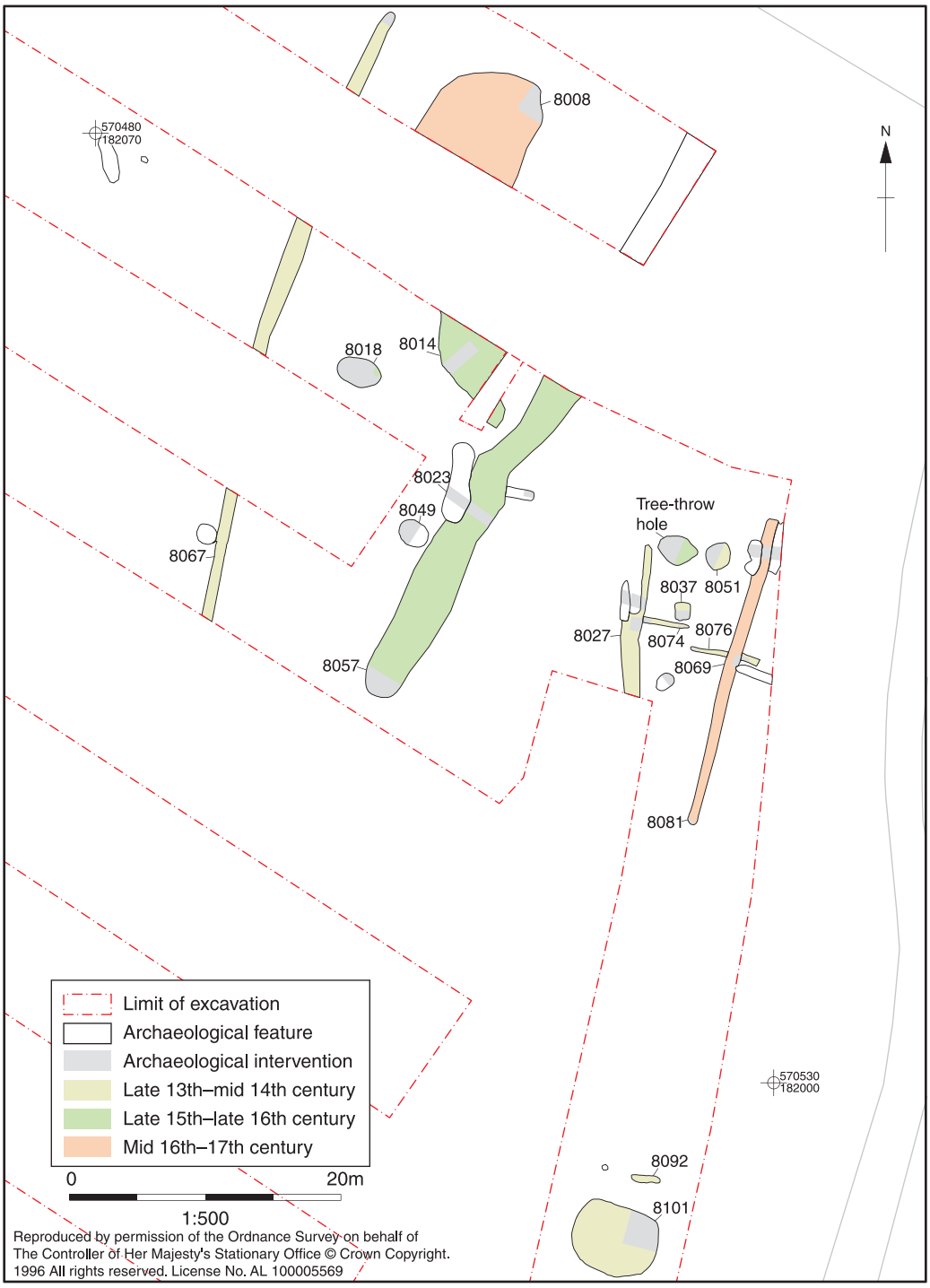

Figure 5.8 Plan of medieval and post–medieval features, Access Road Area H

Figure 5.9 Salt Fleet Flats Site 1, overlaid on 1961 aerial photograph (reproduced courtesy of Kent County Council)

excavation area. Pottery from pits 1125, 1129, 1188, 1159, 10067 and 10073 was uniformly of late 13th to mid-14th century date, and pit 10038 contained pottery dating to the mid-13th to mid-15th century.

Area H

In Area H, evidence was found for medieval activity adjacent to the river terrace edge and what would have been a tidal foreshore beside Carter's Creek prior to reclamation in the 17th century (Fig. 5.8). The earliest features may have been a pair of E–W aligned gullies near the eastern edge of the excavation area (8074 and 8076). Gully 8074 contained pottery of late 13th to mid-14th century date and gully 8076, which contained no pottery, was cut by a post-medieval feature (8081). The western end of gully 8074 was cut by ditch 8027, which, with ditch 8067, formed a pair of N–S boundaries parallel to the edge of the terrace. Ditch 8067 was exposed for a length of 50m and was 0.7m wide and 0.1m deep, while ditch 8027, which terminated to the north within the excavation area, was much shorter at a little over 10m long. It had a width of 0.45m and depth of 0.3m. A pond or waterhole (8101) was situated towards the southern edge of the site. It measured 5m wide and 0.24m deep and contained a substantial quantity of pottery (*c* 200 sherds) dating to the late 13th to mid-14th century. Gully or pit 8092, immediately north of the pond, contained pottery of similar date.

Salt Fleet Flats, Cooling Marshes, Kent

Investigations on Salt Fleet Flats uncovered a series of mounds and dump deposits of medieval date. Trenches at Site 1 targeted an earthwork mound on the northern bank of Hope Fleet (Figs 2.16 and 5.9). The earthwork was far from unknown, having been recorded on historic maps, aerial photographs, Lidar and magnetometer plots. The aerial photograph shows broad, linear features, which seem to be channels or ponds, on the western side of the earthwork. Trench 30 was excavated across the northern edge of the mound, as well as a large pit, probably a pond. A series of reddish-coloured silty clay dump deposits forming part of the mound were recorded (Fig. 5.10). No pottery was recovered from these layers, but the pond/pit contained pottery spanning the late 13th to mid-15th century. An infilled channel or pond was recorded running through the central part of the trench, the fills of which produced modern finds including wine-bottle fragments.

A sequence of artefact- and organic-rich dumped deposits was recorded in Trench 32. Organic grey silty clay layers, rich in artefacts and environmental remains, were interleaved with silty clay layers with a lower density of cultural material, the latter possibly representing hiatuses or flood events between episodes of rubbish dumping. Although the deposits formed a relatively complex stratigraphic sequence at least 1m thick, all the pottery fell within the period *c* 1175–1350. Metal finds recovered from the trench included iron nail fragments and some tiny undiagnostic iron fragments, including possible hammerscale, the latter indicating small-scale metalworking in the vicinity. Two whetstones and a hone were also retrieved, as well as shellfish and fish bones, identified as small flatfish, herring and eel. Some small pieces of fired clay recovered from a sieved sample had impressions of plant stems running through them and may relate to the use of turves for fuel, the clay having adhered to the turf and been burnt accidentally. Alternatively, turf may have been used in the construction of the superstructure of an oven or hearth, with the clay representing the lining. A small palaeochannel was investigated at the north end of the trench.

The northern end of Trench 33 exposed the eastern edge of the circular mound, which consisted of a slightly reddened silty clay deposit. No artefacts were recovered

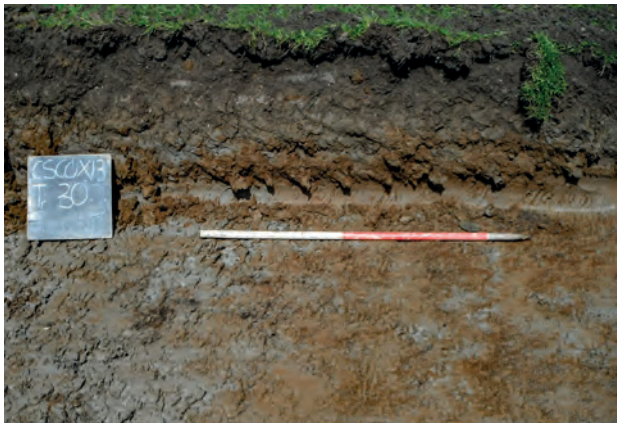

Figure 5.10 Reddish silty clay deposits in Trench 30, Salt Fleet Flats, Site 1

Figure 5.11 Calf burial, pit 8018, Access Road, Area H

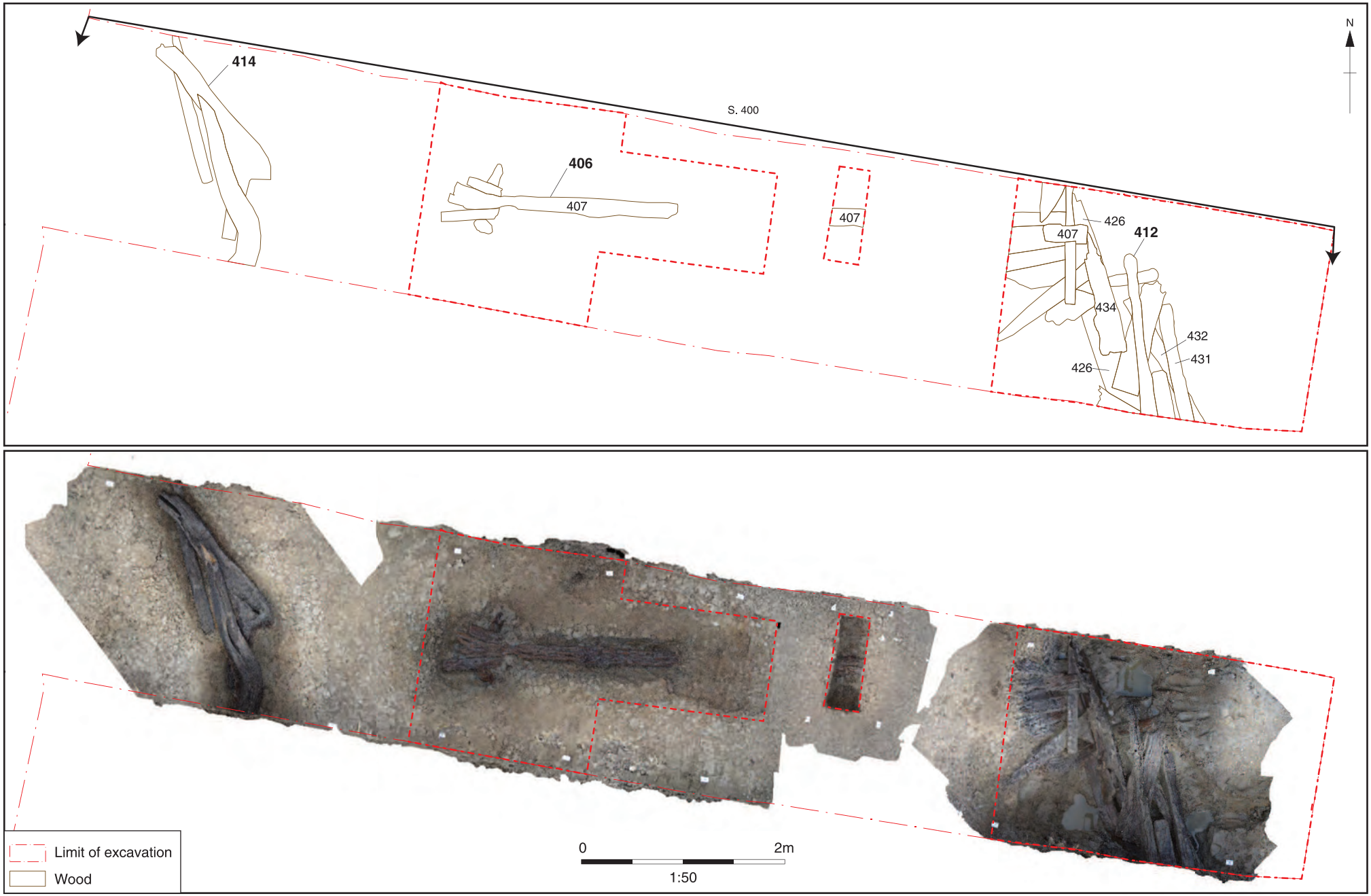

Figure 5.12 Timber wharf and association woodwork, Trench 4, Proposed Development at Great Garlands Farm

from this deposit, though a single pottery sherd of medieval date was found in association with a similar deposit at the west end of Trench 34. The deposit in Trench 33 became gradually thicker, slightly redder and more distinct towards the north. It lay immediately below 0.3m thick topsoil and was up to 0.6m thick.

Trench 34 exposed a sediment sequence of topsoil overlying alluvial deposits. A palaeochannel was noted towards the eastern end of trench. A faint band of apparently heat-reddened silty clay was observed within the alluvial deposits at the base of the western end of the trench at a depth of 1.0m below ground level, and appeared to represent a dumped deposit rather than *in situ* structural remains. The layer contained a sherd of pottery dated to the mid-12th to mid-14th century.

Late medieval/early post-medieval period

Access Road

A group of features in Area H within the Access Road were dated by pottery to the late 15th to mid/late 16th century (Fig. 5.8). The broadly contemporaneous features comprised a pond, a ditch, a pit and a tree-throw hole. Pit 8018 measured 3.3m long, 2.1m wide and 0.8m deep. It contained a near-complete skeleton of a calf (Fig. 5.11) aged 2 to 2½ years at death. No butchery marks or pathologies were identified on the bones and, while the reason why the calf was buried is uncertain, the animal does not seem to have had its meat or hide removed. Ditch 8057 was orientated NE–SW and measured at least 25m long and up to 2.9m wide and 0.6m deep. It was cut by an elongated pit (8023) that contained residual late 13th to 15th century pottery. Pond 8014, adjacent to the ditch, was at least 5m wide and 1.2m deep. A tree-throw hole to the east, irregular in plan, measured 2.1m wide and 0.33m deep.

Another pond (8008), excavated near the northern edge of the exposed area, had steep sides and a flattish base. Pottery of mid-16th to 17th century date recovered from feature suggests that the pond was silting up during this time. Ditch 8081, which was some 15m long, 0.75m wide and 0.3m deep, may also belong to this period, as pottery of similar date was recovered from its northern terminus. The ditch had a similar orientation to ditches 8057 and 8067 and may have been a replacement of those earlier drainage features. Several undated features were present in the vicinity of the medieval and post-medieval features, among them a circular pit (8049) with near-vertical sides. The feature was excavated to depth of *c* 1m without the bottom being reached and could be a well or waterhole.

Figure 5.13 Timber structures 406, 412 and 414, Trench 4, Proposed Development at Great Garlands Farm, looking west

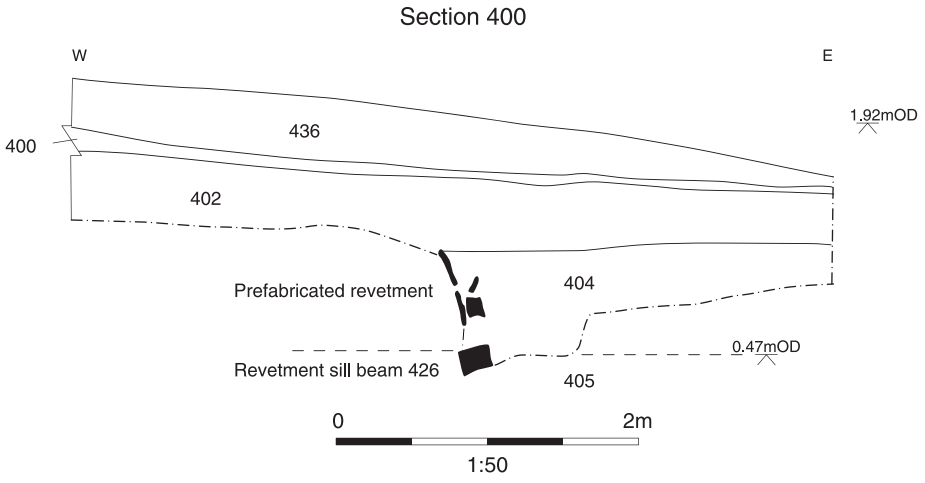

Figure 5.14 Section through timber wharf 412, Trench 4, Proposed Development at Great Garlands Farm

A pond was uncovered some 200m north-west of this area (1005; Fig. 5.6). The partially exposed feature measured *c* 20m across and 1.4m deep. It contained multiple fills, which produced both medieval and later artefacts. The feature appears to be relatively modern, since pottery dating to the mid-19th to early 20th century was recovered from one of the lower fills.

Pipeline Diversion

Ditches belonging to the medieval or early post-medieval field system were exposed in several trenches

Table 5.2: Radiocarbon determinations

Lab. ID	*Context*	*Feature*	*Element*	*δ13C (0/00)*	*Radiocarbon age (BP)*	*Calibrated date (95% confidence)*	*Calibrated date (68% confidence)*
SUERC-62750 (GU38665)	432	Wharf timber	Wood (oak sapwood)	-27.8	426 ± 34	cal 1420-1520 AD (87.4%) cal 1595-1620 AD (8%)	cal 1435-1460 AD
SUERC-62754 (GU38666)	431	Wharf timber	Wood (oak sapwood)	-27.2	404 ± 34	cal 1430-1520 AD (74.7%) cal 1570-1630 AD (20.7%)	cal 1440-1495 AD (58.6%) cal 1600-1615 AD (9.6%)

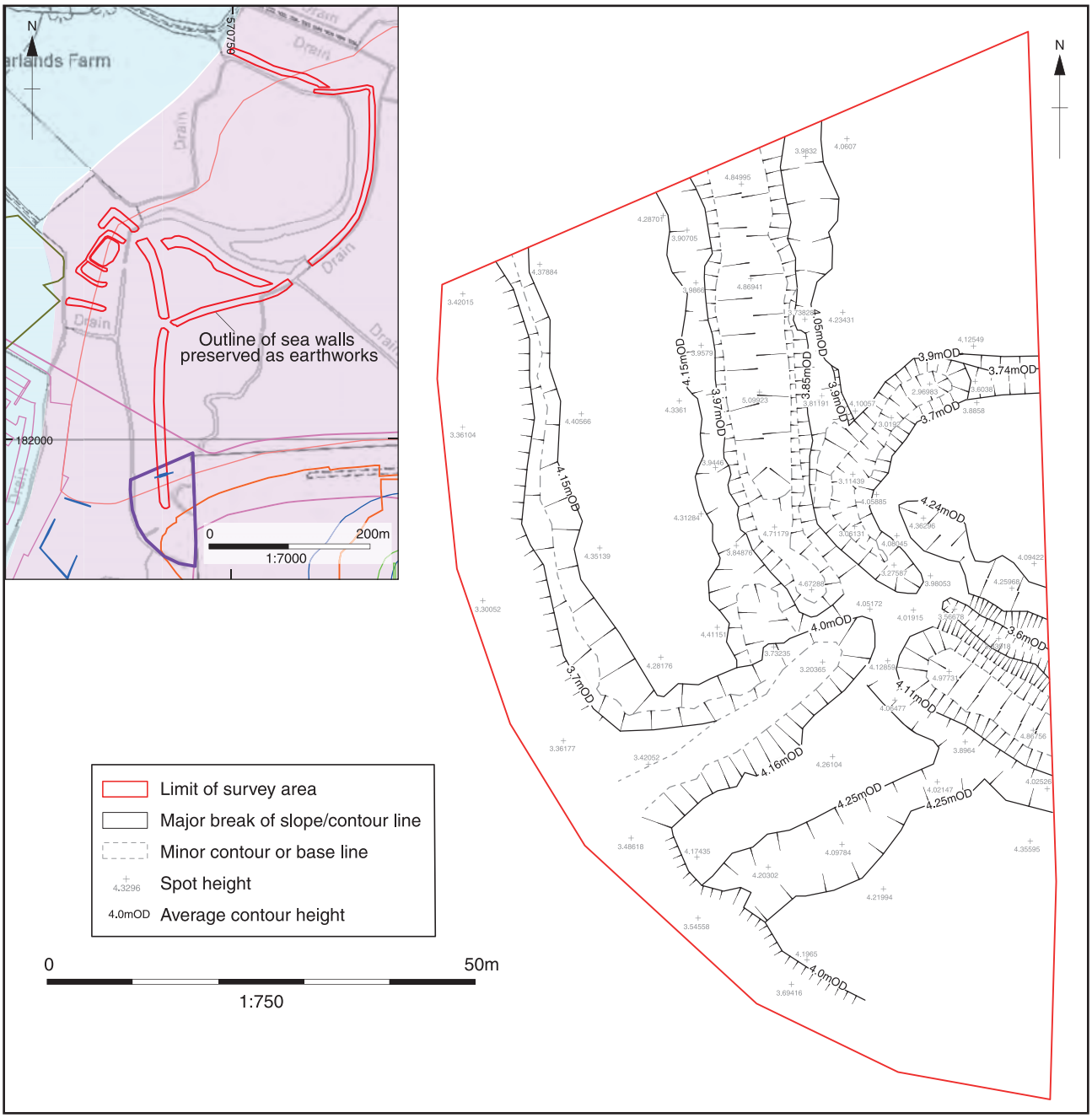

Figure 5.15 Topographic survey of sea walls within the Access Road

within the Pipeline Diversion (Fig. 5.6). Trenches 27 and 28 uncovered parallel ditches orientated NE–SW which were also traced at the adjacent Access Road site. The ditches produced little dating evidence but correspond with field boundaries shown on the 1617 estate map of Old Garlands (Fig. 5.5). Two ditches aligned NW–SE were also recorded in Trench 29. One was a shallow ditch (or plough furrow) and the other was a deep, V-shaped ditch that contained medieval/post-medieval tile and iron fragments. The ditches do not match field boundaries on Ordnance Survey mapping but may relate to early boundaries that were no longer extant by the 19th century. Unfortunately, the location of Trench 29 is not shown on the 1617 map.

Logistics Park: Proposed Development at Great Garlands Farm

Trench 4, on the west bank of Carter's Creek, exposed part of a timber wharf associated with Feake's Hithe, comprising three groups of timbers (406, 412 and 414) embedded within alluvial silty clay (Figs 5.6 and 5.12–14). The wharf frontage was represented by group 412, which comprised a prefabricated timber-framed wall of oak posts, each *c* 200mm x 100mm in profile and set *c* 250mm apart, which supported oak planks on the landward side, set on end between them and overlapping their edges (Fig. 5.26; Goodburn, Specialist Report 11). Tenons, some locked with pegs, secured the posts to a substantial elm sill beam (timber 426) of *c* 250mm x 200mm profile. The prefabricated structure was fixed to the land by a long elm land-tie beam (407) anchored with stakes to the west (structure 406). Group 414 lay to the west and comprised three roughed-out nautical timbers for use in plank-built ships.

Dating evidence places the wharf within the 15th to late 16th/early 17th century. Tree-ring dating of the timbers was unfortunately not possible, but two radiocarbon determinations were obtained from structure 412: timber 431 produced a date of cal AD 1430–1630 and timber 432 was dated to cal AD 1420–1620, both at 95% confidence (Table 5.2).

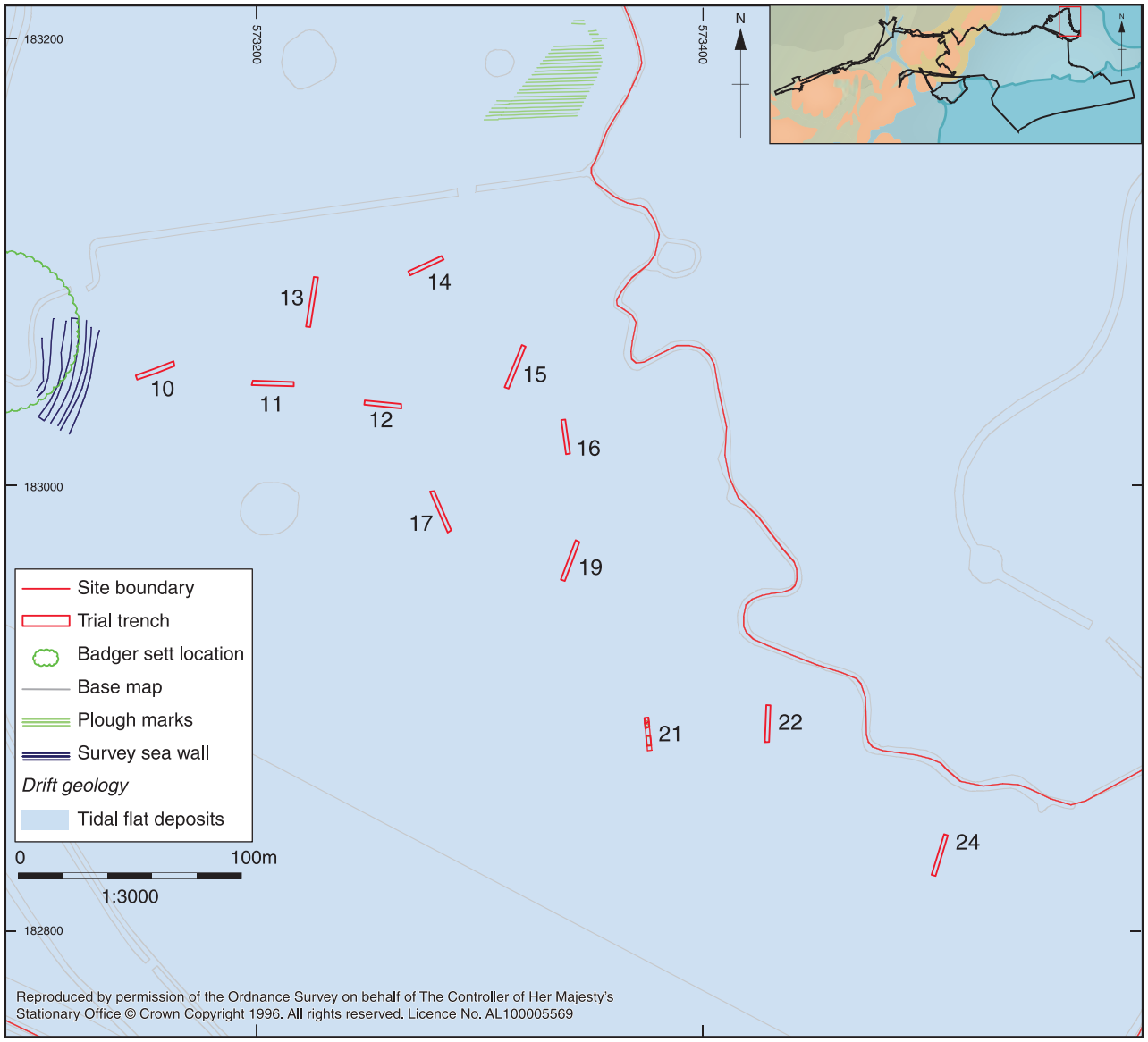

Figure 5.16 The Northern Triangle East site, showing 'stetch' cultivation

Figure 5.17 View of 'stetch' cultivation, Northern Triangle East, looking east

Pottery from the alluvium (405) in which structure 412 was embedded dated to *c* 1475–1575/1600 and pottery from layer 404, which built up against the wharf frontage (and contained the partially articulated remains of a horse), was of similar date.

Topographic survey of the sea wall within the Access Road

Prior to development, various historic sea walls and associated drainage ditches survived within the boundary of the DP World London Gateway area as extant earthworks. One relatively large area of well-preserved historic sea wall lies to the east of Feake's Hithe and close to the southern end of the Access Road. As shown in a plot of Lidar data, the sea wall follows the east side of Carter's Creek and extends northwards to Manor Way corresponding with the line of the sea wall as depicted on historic maps of the early and mid-17th century. Part of the sea wall was recorded by means of a topographical survey and limited excavation before being buried and preserved *in situ* under the road embankment (Figs 5.6, 5.15 and 5.28). The fieldwork found that the bank here was 1.2m thick at the highest surviving point and was constructed simply with clay, which is likely to have been alluvium cast up from the digging of the flanking drainage ditches. One of the ditches measured 3m wide and the other was 3.9m wide. No finds or other dating evidence were recovered from the features, but they were probably part of the primary phase of post-medieval reclamation in the Stanford-le-Hope marshes during the early 17th century.

Later post-medieval period

Northern Triangle East

A rapid survey was conducted across the site prior to trenching to record an area of low ridges formed by stetch cultivation, as well surviving sea-wall earthworks evident along the eastern side of the site (Fig. 5.16). The regular pattern could be observed in plan at most pond locations once the topsoil had been removed (Fig. 5.16). Stetch ploughing was a type of cultivation practised in East Anglia during the 18th and 19th centuries, particularly on coastal marshes (Gascoyne and Medlycott 2014, 24). 'Stetch' is a dialect term that in the context of this site refers to straight, parallel plough ridges derived from steam-powered cultivation (Fig. 5.17). In other parts of Essex and elsewhere, for example in Suffolk, the word had other meanings, referring to any portion of land to be ploughed – there are descriptions in farming manuals of six-, eight- or twelve-furrow stetches – or the narrow, unploughed gaps between furrows. Equipment, such as harrows and rollers, was specially designed to deal with the wide variation in the dimension and layout of stetches (Baker 1844, 16, 140; Caird 1852, 153).

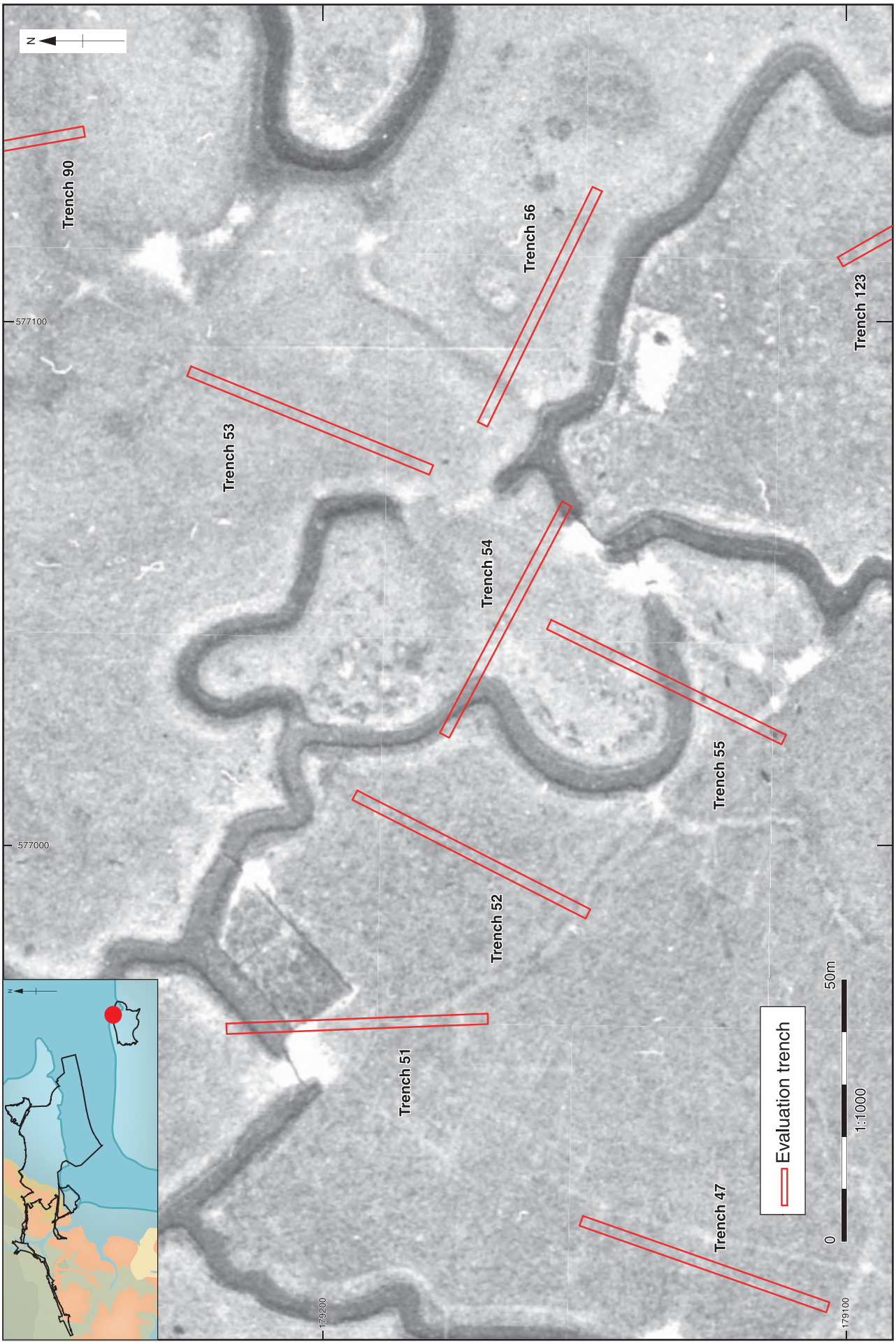

Figure 5.18 Salt Fleet Flats Site 2, overlaid on 1961 aerial photograph (reproduced courtesy of Kent County Council)

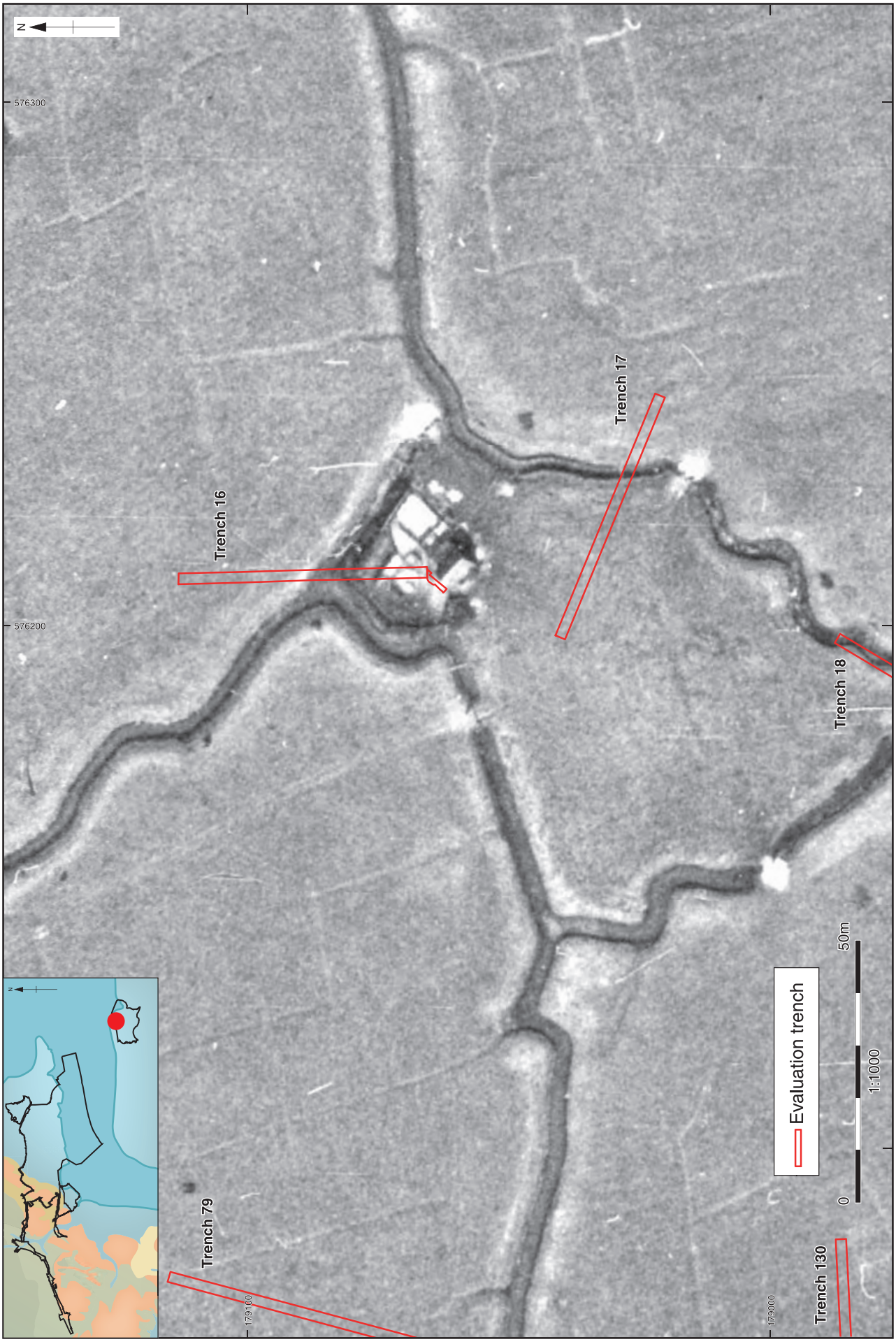

Figure 5.19 Salt Fleet Flats Site 3, overlaid on 1961 aerial photograph (reproduced courtesy of Kent County Council)

The sea-wall earthworks survive as triple-ridged features, the lines on the plan representing the crests and bases of the banks. Some of the sea walls was used to create livestock enclosures. One is shown as a sub-circular feature close to trenches 16 and 19; another is a square enclosure in the vicinity of trenches 13 and 14. These features are depicted on historical maps and generally have a 17th-20th century date range, post-dating land reclamation.

Salt Fleet Flats, Cooling Marshes, Kent

Site 2 uncovered evidence of post-medieval and modern activity (Figs 2.16 and 5.18). Infilled palaeo-channels were noted in Trenches 53, 54, 55 and 56. A palaeochannel recorded in Trench 56 contained partly articulated sheep skeletons along with pottery dating to *c* 1475–1550. There was no trace of the post-medieval sheepfold depicted within this site on the 1898 Ordnance Survey map of Halstow Marsh and apparent as a slight depression on aerial photographs taken in 1947. The remains of a metal scaffold pole and a timber structure, probably part of a former footbridge of 20th-century date, were uncovered at the north end of Trench 51.

Trench 16 at Site 3 targeted the site of a post-medieval sheep-dip and modern sheepfold (Figs 2.16 and 5.19). Excavation revealed that the earliest structure (1611) comprised a semi-circular brick wall, probably originally a complete circle, adjoining a straight section of wall (Fig. 5.20). It was made from handmade unfrogged bricks of late 16th–17th century type, though it had evidently been built later than this, since finds from a contemporary occupation layer included pottery, clay tobacco pipe fragments and miscellaneous small finds with a date range of *c* 1740–1800. It seems likely that the sheep-dip was built in the latter part of the 18th century using bricks recycled from some earlier structure.

During the 19th century, the sheep-dip was cut in half by the construction of a rectangular brick structure (1602) with a concrete floor, identified on Ordnance Survey mapping as a sheepfold. A deposit associated with this later phase included fragments of transfer-printed pottery, clay tobacco pipes, pantiles and glass vessels with a date range of *c* 1830–1900. The structure, built on a foundation of yellow stock bricks, was rectangular in plan and measured *c* 8m NW–SE and *c* 18m NE–SW. The concrete floor survived in patches but had mostly been broken up. A group of four sheep burials were found adjacent to the sheepfold, but they were not excavated on account of their clearly modern date. Trench 18 contained a carefully laid brick rubble surface made from unfrogged Tudor bricks (1809; Fig. 5.21). Its precise function is unclear, but is likely to have

Figure 5.20 Brick rubble surface 1809, Salt Fleet Flats

Figure 5.21 Eighteenth–century sheep–dip 1611 cut by 19th–century brick and concrete sheepfold 1602, Salt Fleet Flats

been associated with sheep-farming. As with the sheep-dip, the Tudor bricks may have been recycled from an earlier structure.

Trench 22, a short distance north of Site 3, investigated a post-medieval pond that was visible as an oval earthwork on aerial photographs taken in 1947 (Figs 2.16 and 5.22). When inspected at ground level in 2012, it was found to be a slightly oval, almost circular depression *c* 13 m in diameter and *c* 0.3m deep. The pond was not detected with any clarity by the magnetometer or Lidar survey and aerial photographs indicates that it had been infilled and levelled sometime between 1961 and 1999. Excavation suggested a diameter of at least 9.4m. Three fills were identified. The lower fill appeared to have accumulated gradually as a result of alluvial deposition rather than through deliberate infilling. The upper fill comprised a similar alluvial clay, although this had probably been redeposited, having been used to infill the pond in the late 20th century. In between, a deposit containing a cluster of disarticulated sheep or goat bones was recorded.

A sheepwash marked on Ordnance Survey mapping was investigated at Site 4 (Figs 2.16 and 5.23). A pile of rubble was noted at this site when it was visited in 2012, but no structure could be discerned. The edge of a palaeochannel was noted at the south-west end of Trench 25. Two modern concrete and wooden posts were exposed immediately below the topsoil at the north-west end of Trench 26. The topsoil contained a considerable amount of loose brick and concrete rubble, presumably derived from the demolition of the structure. The structure was located on the edge of an infilled channel.

Modern

A poorly preserved small wooden post was recorded during work associated with the A13/A1014 Junction improvements. The post, left *in situ*, was discovered at a high level in the alluvial sequence and is probably of relatively recent date.

Evidence for the preparation of the farmland for industrial use and the construction of the Shell Haven oil refinery was recorded at various sites across the London Gateway development. An evaluation trench at Carter's Lagoon exposed a sequence, from top to bottom, of sand, made ground and alluvium. The total depth of deposits investigated was 3.5m, of which 1.15m was modern made ground that contained frequent brick, concrete and tarmac fragments. A similar sequence was seen at the Gate Complex. The top of the sequence comprised silty sand, formed from material dredged from the Thames as part of the London Gateway ground raising. This was typically *c* 2.5m thick. Underlying made ground deposits, associated with the refinery and *c* 1m thick, were recorded below the sandy horizon, and overlay blue-grey clay silt alluvium. Trenches opened across the Tongue Land HGV Lorry Park uncovered a fairly uniform sequence of deposits. The uppermost layer was a sandy levelling deposit that typically overlay a rubble layer of concrete, brick and tarmac, which in turn sealed blue-grey clay alluvium. Trenches across the Logistics Park Infrastructure site generally encountered alluvium only, although in Trenches 2, 3A and 5 concrete piles relating to the oil refinery were observed. Monitoring of a cable connection across Shellhaven Creek revealed, below the topsoil, alluvial deposits that had filled the former watercourse. A watching brief along the Rail Corridor at Mucking Creek similarly revealed alluvium that had filled the channel. Installation of a separator tank at the site of the Welfare and Workshop Building in the south-eastern part of the development area penetrated the modern made ground that covered the site and exposed the underlying Holocene alluvium.

Foreshore structures of uncertain date

Several wooden structures were recorded on the foreshore during the intertidal survey. These could not be dated, but most are likely to be reasonably recent. Discoveries on Stanford-le-Hope Marsh included a possible fish-trap, a possible jetty, and the ribs of a hulked boat. All three were identified by Wessex Archaeology during an earlier survey (WA 2002). At Shellhaven Creek, OA's survey recorded incoherent structures of post-lines and wooden plank fragments within the eroding foreshore behind the modern sea defences. Most

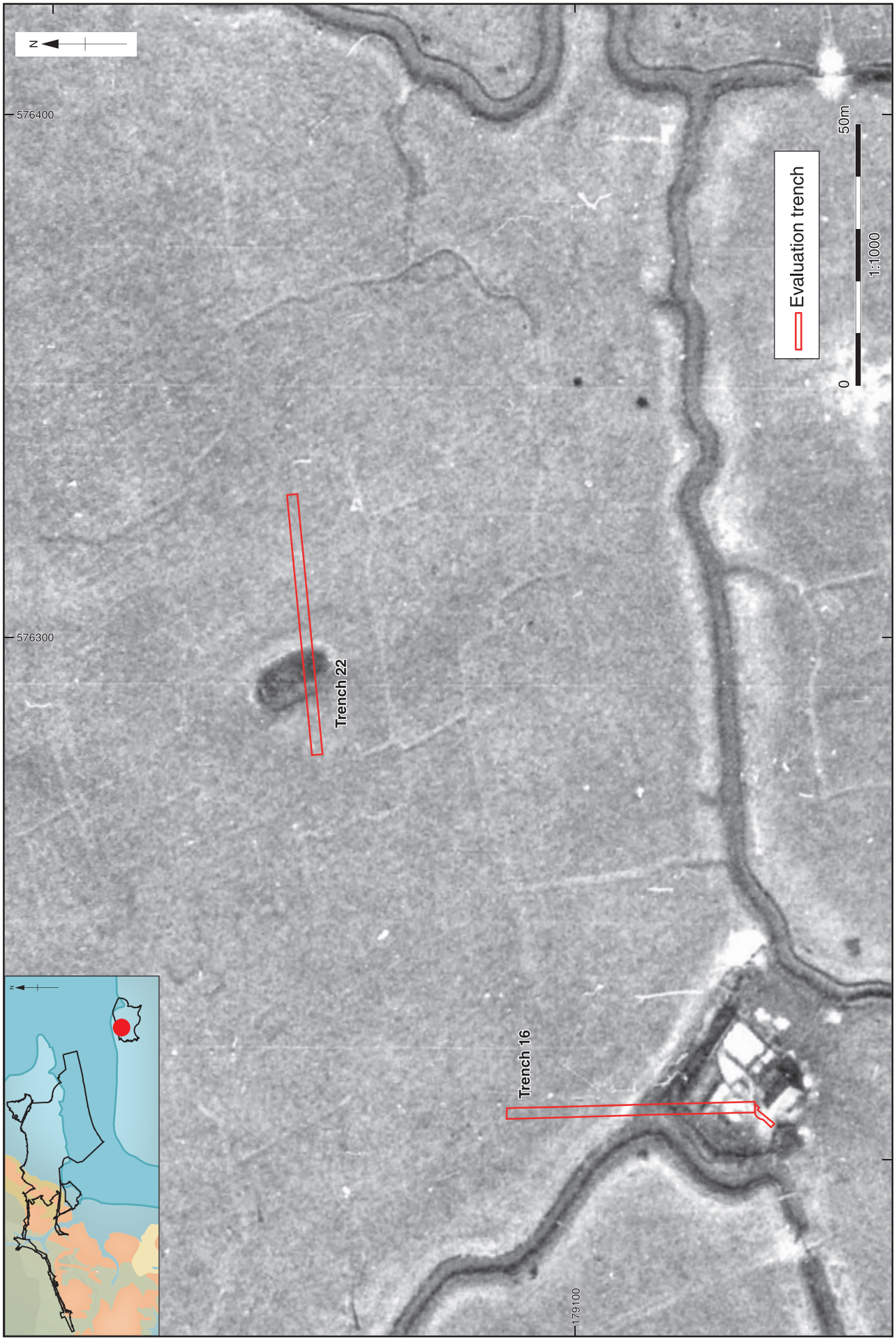

Figure 5.22 Salt Fleet Flats Trench 22 across pond and overlaid on 1961 aerial photograph (reproduced courtesy of Kent County Council)

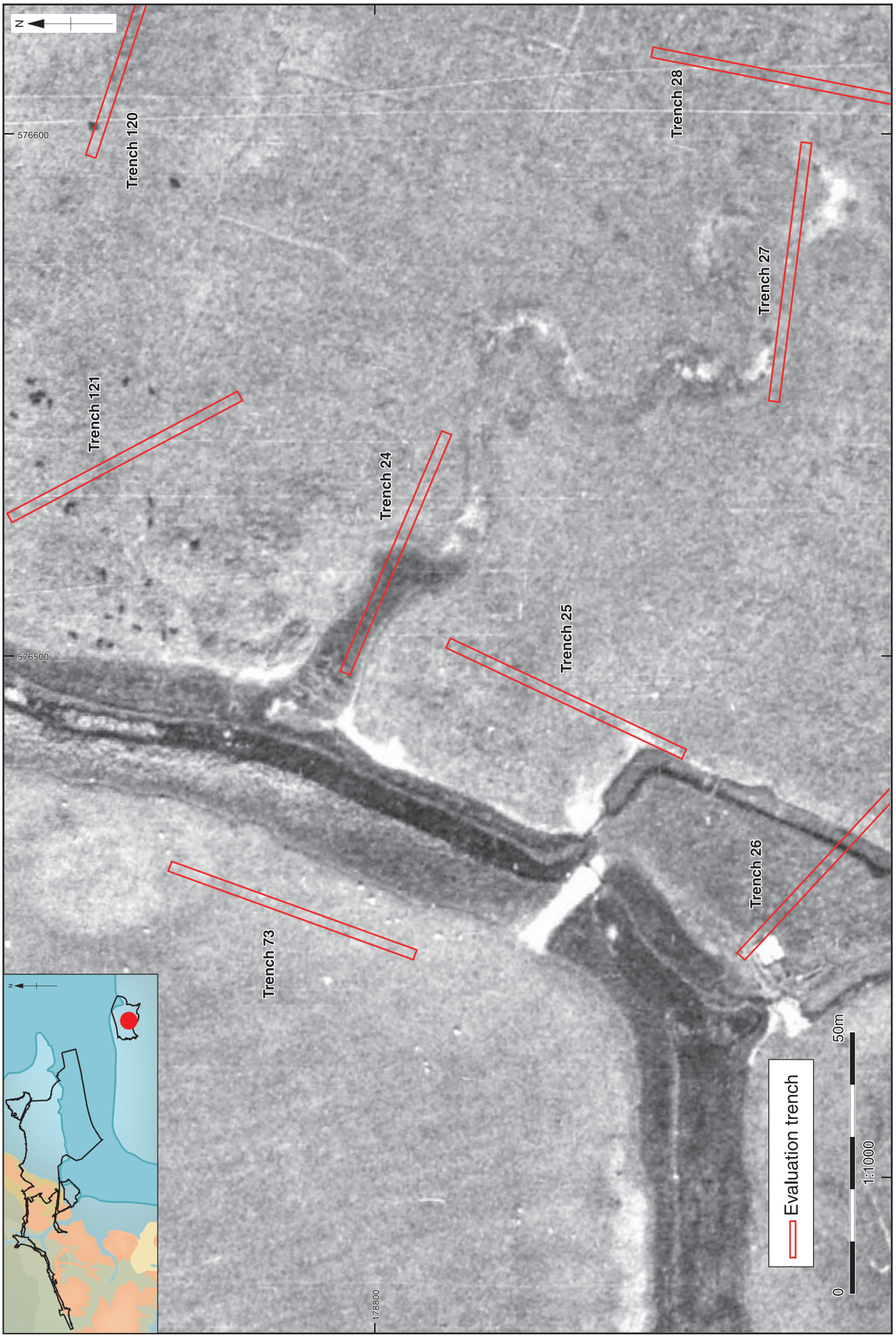

Figure 5.23 Salt Fleet Flats Site 4, overlaid on 1961 aerial photograph (reproduced courtesy of Kent County Council)

Figure 5.24 Recording the remains of a timber structure preserved in the foreshore, looking south

are likely to be former jetties and another group of timber may possibly be a hulked boat (Fig. 5.24).

FINDS AND ENVIRONMENTAL EVIDENCE

Pottery by John Cotter

Some 600 sherds of medieval and later pottery were recovered from DP World London Gateway (Fig. 5.25; Cotter, Specialist Report 3). All but six sherds (166g) came from the Access Road. The bulk of this is medieval (mainly 13th–14th century), but early post-medieval pottery (*c* 1480–1650) is also well represented. A few 19th-century sherds were also recovered.

In general, the range of medieval wares present is what one would expect from a coastal site in south Essex, with local wares predominant, particularly Mill Green wares from the centre of the county. Other coarse wares could be from more local sources, while at least a few vessels are from Surrey and perhaps the London area. The presence of three vessels from Saintonge in south-west France (Fig. 5.25, no. 3) shows that the users of the pottery had access to imported fine wares, possibly redistributed from London, as well as regional English fine wares from as far afield as Scarborough in Yorkshire (Fig. 5.25, no. 2). As many as eight or nine individual vessels in Scarborough ware have been identified from this relatively small assemblage, including part of a highly decorative 'knight jug' (*c* 1225/50–1350; Fig. 5.25, no. 1) and possibly part of a second example. While it may not be so surprising to find one or two sherds of this ware from sites along the Essex coast or the Thames Estuary, it is quite surprising to find so many from such a relatively small area. There are, for instance, only ten Scarborough ware vessels known from Colchester (Cotter 2000, 74–5). This suggests that the site was well positioned to take advantage of fine pottery and other goods brought to the area by the flow of maritime trade along the North Sea coast. The smaller early post-medieval assemblage is also mainly from local sources but includes a sprinkle of more exotic imports, including Dutch redwares and perhaps Dutch tin-glazed wares (maiolica) and German stonewares. Probably the most unusual item is a rim sherd probably from a large Iberian or Mediterranean storage jar (Fig. 5.25, no. 4). Only three vessels date to the 19th or 20th century. These include a small 'Holloway's Ointment' jar in transfer-printed whiteware, which can be dated to 1840-1867 (Fig. 5.25, no. 5).

Almost 700 sherds of pottery were recovered from Salt Fleet Flats on the Cooling Marshes. The assemblage spans the 12th to early 20th centuries, but most of the pottery is medieval and mainly dates from the 12th to 14th centuries. In general, the range of medieval wares present is what one would expect from a coastal site in north-west Kent. These are mainly of fairly local origin with a small quantity of regional English glazed wares commonly found in the Thames Estuary area –

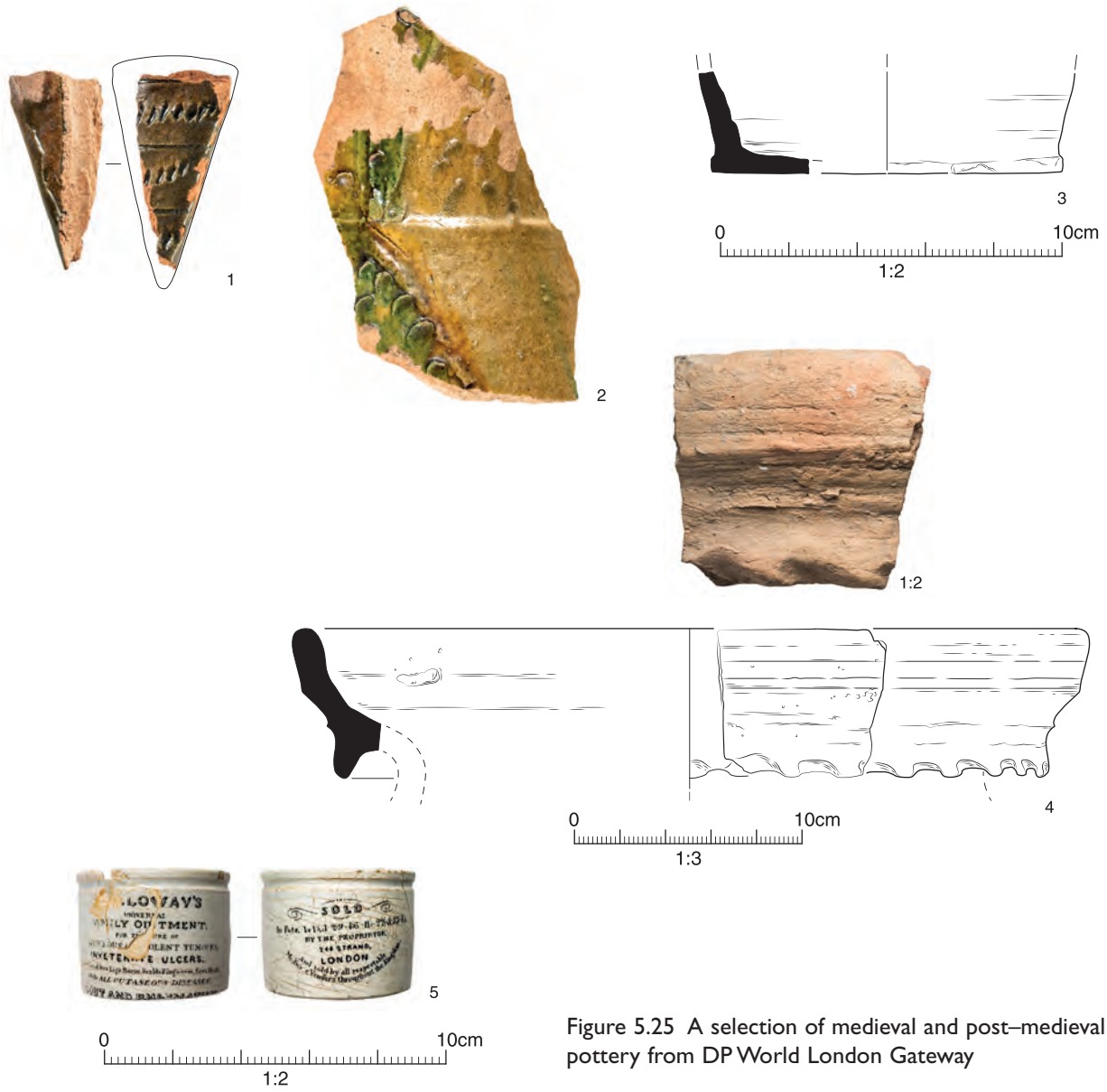

Figure 5.25 A selection of medieval and post–medieval pottery from DP World London Gateway

Mill Green ware, London-type ware and Surrey whitewares. The presence of a Saintonge polychrome jug also shows that the occupants in this area had access to some imported fine wares, possibly re-distributed from London or Sandwich where imports were more common (Cotter, Specialist Report 3).

Ceramic building material and fired clay
by Cynthia Poole

Some 260 fragments of ceramic building material (CBM), weighing *c* 35kg, were recovered from the investigations (Poole, Specialist Report 4). Most of the material came from the Access Road.

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 alongside 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, with its general condition suggesting that it derived from buildings nearby. 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 associated with the plots. A medieval glazed ridge tile and floor tile were present but are unlikely to represent a display of status or wealth, instead likewise reflecting the reuse of earlier building materials.

Ceramic building material of 16th to 19th-century date was sparse on the Essex side of Thames, but a little more was found at Salt Fleet Flats. The earliest piece is a sandy red 'Tudor' brick-end of late 15th- to 16th-century date, possibly used for paving. Two other bricks are of late 16th- to 17th-century date. One bears a couple of small possible cat paw-prints on its upper

surface. The other is a frogged yellow 'stock' brick from the 19th century. A few pieces of red sandy 18th-19th century pan tiles were recorded, and two items of 19th- or 20th-century stoneware were also collected.

A small quantity of fired clay (8 fragments, 31g) was recovered from the Access Road Area A by hand excavation, together with a further 63 fragments (202g) from sieved samples from contexts dated to the medieval period (Poole, Specialist Report 5). None of the fired clay is intrinsically datable and some could be residual. Although fired clay continued in use during the medieval period, its use declined and there are no diagnostic forms that can be attributed to this period. The fired clay can be classified as structural, though little shape or form survived. All the material was made in sandy or sandy chaff-tempered fabrics. Fragments from one pit included a piece with an irregular surface covered with impressions of roughly parallel narrow monocot stems, where clay had possibly been daubed over a bed of straw or grass. This may be thatch where smoke escaped through the roof of a cottage. Fragments from a hearth or oven base had a single rough flat moulded surface and some blackening and burning. These probably represent remnants of oven wall lining from the structure.

Worked stone by Ruth Shaffrey

Eleven fragments of worked stone representing eight objects were recovered (Shaffrey, Specialist Report 7). These include seven fragments from five Norwegian Ragstone whetstones from the Access Road and Salt Fleet Flats and two adjoining fragments of a lava rotary quern from the Access Road. Salt Fleet Flats also produced a possible quern or processing slab of quartzite. These objects are indicative of general activity and are made of materials typical for the region in this period. Norwegian Ragstone was the most commonly used whetstone material in medieval England; occurring widely in urban contexts, it must have been imported in great quantities. Indications are that it was imported as rough slabs and broken up into useable pieces but not always fashioned into neatly finished tools. Lava was imported from Germany for use as querns and millstones during the medieval and post-medieval periods and occurs across the country, although not in great number. A limestone slab was found in pond 1005 at the Access Road site. The slab is of a strikingly white crystalline limestone, which was almost certainly imported from the Continent and was presumably used as flooring.

Woodwork by Damian Goodburn

The remains of a timber-framed waterfront structure, part of a wharf associated with Feake's Hithe, was recorded at the Proposed Development at Great Garlands Farm. The structure was aligned roughly N–S, parallel with what would have been the western bank of Carter's Creek. Several features could be recorded. The nature of the oak and elm raw materials used and how they had been arranged and jointed suggests a date range between the late 15th and early 17th century and this is supported by radiocarbon dating.

The wharf had been built by professional carpenters who produced a 'stave and muntin'-like front wall to the wharf similar to that of many partition walls in timber-framed houses of the period (Fig. 5.26). However, the posts alternating with planking set on its ends were not grooved to hold the plank edges but simply overlapped, a cheaper alternative. This might have been an effort to give the structure a more sophisticated appearance. The prefabricated structure was anchored to the land by a long elm land-tie beam anchored with stakes to the west. The posts were tenoned into a large elm sill beam, the top of which was set at *c* +0.45m OD. The vertical frontage survived *c* 0.5m above that level, rather more if upright, although the original top of the wharf must have reached *c* +1.9–2.0m OD to have been above virtually all high spring tides. It is likely that a second tier of land ties was originally used, as has been found in other related types of structures of 15th- to 17th-century date on the Thames. This means that the wharf was probably around 1.5m high as built. Built to these proportions and levels, it would have been suitable for the use of boats, barges and possibly small coastal traders, but not larger vessels. Some suggestions of repair and/or provision of fender piles were also recorded in the form of timbers slumped to the east of the frontage. The protruding land tie end(s) would potentially have been awkward for craft to come alongside in tidal conditions, and so extensive fendering or an off-lying jetty would have been necessary.

A group of three weathered, roughly trimmed oak timbers were found to the west of the wharf frontage. These timbers had been given very roughly square cross-sections and were cut from strongly curved parts of open grown oaks. These are typical of 'roughed out' large boat- or ship-frame timbers, with the most angular example probably being a 'knee', a type of bracket used to hold a small ship or large boat's side- and cross-beams in place. The three timbers appeared to have had historic rot voids, suggesting a reason why they may have been used as landfill. Initially, this material was interpreted as evidence for ship-, boat- or barge-building on or near the site, but the lack of the debris typical of such sites suggests that the site was instead quite possibly one where nautical timbers were traded out to dockyards (Goodburn, Specialist Report 11).

Metalwork and glass by Ian R Scott

A small piece of undiagnostic vessel glass was collected from the Access Road; Scott, Specialist Report 8). An L-shaped hinge pintle, copper alloy sheet fragments, possibly the covering or binding for a box or chest, three pieces probably from two different horseshoes, a side bar from a snaffle bit and an incomplete drawn wire dress or sewing pin were also recovered from the Access Road

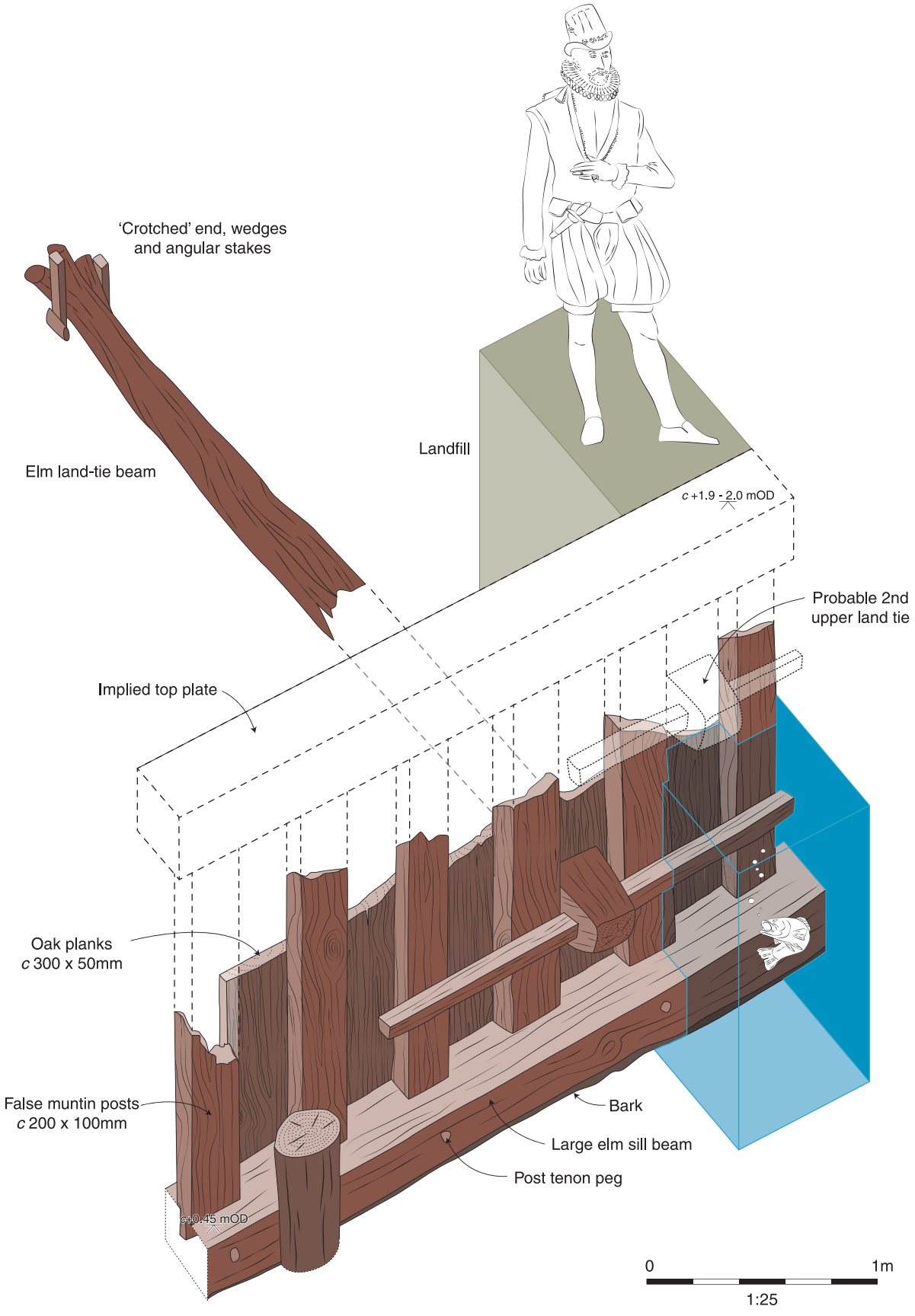

Figure 5.26 Reconstruction of Feake's Hithe wharf, Proposed Development at Great Garlands Farm

(Scott, Specialist Report 9). The Pipeline Diversion produced two nails and a length of wire.

Animal bone by Lena Strid

Twenty hand-collected animal bone fragments were recovered from the Proposed Development at Great Garlands Farm. The majority was from a partial articulated horse skull and neck within alluvial deposit 404, which had built up against the front of the early post-medieval timber wharf. The assemblage from the Access Road was dominated by bones from cattle and to a lesser extent horse and sheep/goat. Pit 8018 in Area H contained the almost complete skeleton of a sub-adult male cattle. Red deer, owl, wood mouse and frog were among the other identifiable animals. Judging by bone surface structure and epiphyseal fusion, most animals were adults or sub-adults. Some 475 bones were recovered from Salt Fleet Flats. The assemblage was dominated by bones from sheep or goat (but most probably sheep). The size of several of the sheep bones suggests that the animals are post-medieval (Strid, Specialist Report 14).

Marine shell and fish remains by Rebecca Nicholson

A collection of shells, mainly from the native European flat oyster (*Ostrea edulis*), were collected from the Proposed Development at Great Garlands Farm. Marine shell, including mussel (*Mytilus edulis* L.), was also recovered from Salt Fleet Flats. All the shells are likely to derive from shellfish deliberately gathered for human consumption and subsequently dumped during the late medieval or post-medieval period. A clear v-shaped notch on one of the largest valves provides good evidence that the oysters were deliberately opened and presumably eaten. The Thames Estuary was home to some of the most important oyster beds in the British Isles. Mussel beds can be found along the estuary close to London Gateway (Nicholson, Specialist Report 15).

Sixteen bones from small flatfish, herring (*Clupea harengus*) and eel (*Anguilla anguilla*) were recovered from Salt Fleet Flats. In addition, six tiny fragments were extracted from a sample taken from the Proposed Development at Great Garlands Farm. A fragment of a tiny vertebra and fin ray and rib fragments were recorded. All these fish could have been caught in the outer Thames Estuary using traps and nets and are likely to represent dumped domestic waste (Nicholson, Specialist Report 15).

Charred plant remains by Julia Meen, Sharon Cook and Kath Hunter Dowse

Asteracaeae seeds, a seed of ribwort plantain (*Plantago lanceolata*) and occasional cereal grains, including wheat and barley, were identified in a sample from medieval gully/pit 8092 in Area H at the Access Road. Two seed capsules of thrift (*Armeria maritima*) were noted within a flot taken from a medieval dump deposit at Salt Fleet Flats (Meen *et al.*, Specialist Report 16).

DISCUSSION

The near-complete absence of evidence for Anglo-Saxon activity within the development area suggests that, despite the proximity of extensive Anglo-Saxon settlement at Mucking (Hamerow 1993) and possible habitation at Stanford-le-Hope suggested by stamped pottery of 7th-century date (Evison 1955, 170, fig. 7.3), any contemporaneous activity within the intertidal zone was ephemeral or transitory, and possibly of a seasonal nature. While settlers on the gravel terraces may have exploited the adjoining marshland and coast for pasture, waterfowl and fish, there is no trace of such activity at DP World London Gateway beyond a sherd of early Anglo-Saxon pottery and the two timber piles at Stanford Wharf Nature Reserve that may have belonged to a 7th- or 8th-century jetty or fishing platform. This is meagre compared with what has been found in other areas of the Essex coast. An early Anglo-Saxon brushwood platform, for example, was discovered within the upper peat of the Crouch Estuary during the Hullbridge Survey (Wilkinson and Murphy 1995, 198–200). The structure may have formed part of a trackway to the open water or supported a mound for use during hunting. The survey also uncovered the remains of a late Saxon post-built structure on the Blackwater Estuary. It was suggested that the structure, found with Anglo-Saxon pottery, may have been a hut associated with domestic activity or salt production (Wilkinson and Murphy 2012, 145). The sites of seven Anglo-Saxon timber-built fish-traps or weirs, V- or L-shaped structures formed of timber posts and wattle-work, have also been recorded in the Blackwater Estuary (Heppell 2011; ECCFAU 2013). While no such structures have been found at London Gateway, a possible fish-trap recorded on Stanford-le-Hope Marsh during OA's intertidal survey conceivably may be of Saxon date, and further structures may yet survive within the silted-up creeks and intertidal mud at London Gateway. Early Saxon pottery recovered from the intertidal zone, possibly having derived from an earlier red hill that had been eroding in the face of coastal action, also hints at use of the foreshore during this period. Former Iron Age and Roman salterns may have provided dry, elevated areas for shepherds to watch their flocks and refuges for the sheep themselves.

The importance of the coastal marshes to the early medieval economy is shown by entries in Domesday Book. In Essex, manors for which pasture for sheep was listed lay in a belt parallel with the coast, abutting the marshland, while inland parishes commonly owned a detached portion of the coastal marshes (Darby and Campbell 1971, fig. 64). The parishes of Corringham, Stanford-le-Hope, Fobbing and Mucking follow this

general pattern; in owning a part of the marshland, each manor would have access to good pasture and an intertidal area where a number of economic activities such as fowling and fishing could be undertaken. This is reflected in Domesday; the entry for Fobbing lists, among other assets, a fishery and pasture for up to 1100 sheep (a considerable number), while that for Corringham shows 400 sheep, rising to 500 in 1086. Hassenbrook 2 (?Stanford-le-Wharf) owned pasture for 400 sheep, while Mucking is credited with a fishery and pasture for 300 sheep, reduced to 250 sheep in 1086. The references to fisheries are telling, hinting as they do at the presence of fish-traps. Such structures were sufficiently numerous in the rivers of early medieval England for Magna Carta in the early 13th century to order their removal from the Thames, the Medway and throughout England except on the coast (Cohen and Wragg 2017, 37). As the presence of fish bones from the Proposed Development at Great Garlands Farm and Salt Fleet Flats demonstrates, however, fish probably caught in traps and nets in the outer Thames Estuary continued to find a place on the dining tables of medieval or later households at London Gateway (Nicholson, Specialist Report 15). The high value attached to marshlands in the area is also illustrated by a mid-13th century document recording that one John Ayleward gave the pasture of Curry Marsh to the abbot (lord of the manor of Abbott's Hall in Stanford-le-Hope) and Convent of Waltham Abbey, but the gift was blocked by the Lord of the Fee, Roger de Beauchamp, until he received forty marks of silver in compensation from the abbey (Saunders 1989). (The place-name 'Curry Marsh' in this context probably derives from Old French *corier* or *curreiour*, one who dresses and colours leather after it is tanned, which suggests that the marsh was used during the medieval period for raising livestock for use in the leather trade.)

As for ownership in the late Saxon and early medieval period, Domesday records that the lord and tenant-in-chief of Fobbing in 1086 was Count Eustace of Boulogne, while Corringham belonged to Bishop Odo of Bayeux (who was also tenant-in-chief of Hassenbook 2) and William the Conqueror, the tenant-in-chief being the bishop of London. The lord and tenant-in-chief of Mucking was the Abbey of St Mary, the nunnery at Barking (Table 1; ibid.). Clearly, the coastal manors formed part of extensive royal and ecclesiastical estates, which presumably benefited from the strategic value of the Thameside location, as well as the exceptional resources the landscape offered. Intriguingly, the nunnery of Barking had also been granted land at Swanscombe on the opposite side of Thames. The parish boundary of Swanscombe extended to the River Ebbsfleet, which issued into the Thames, and, at least in the late 7th century, when the grant was originally awarded, the abbey's assets would have included a tidal mill at Northfleet, built on the Ebbsfleet (Hardy *et al.* 2011; Foreman 2011, 27). This historical coincidence not only demonstrates something of the extent of land holdings, but also a connection between the coastal parishes of Essex and Kent.

The archaeological evidence in Area A at the north-western end of the Access Road represents successive phases of plots or enclosures that lined the north side of the High Road between the late 13th and mid-14th/15th centuries. The enclosures, which indicate that the road dates back at least as far as the medieval period, lie adjacent to a former dwelling named 'Eve's Cottages', which is shown on early Ordnance Survey mapping (Fig. 5.33). This house plot, occupied in the 19th century, may have originated in the medieval period as part of a row of cottages or similar low-status rural dwellings, of which the enclosures seen in Area A formed part. The putative buildings here would have been built of locally available materials, such as clay, wattle and reed thatch, leaving little trace in the archaeological record. Two main phases of the enclosures, separated by a field ditch, are evident from the stratigraphic sequence recorded. Ditch 10093/1163/1184, which belonged to the second phase enclosure, continued north-west to form a field boundary whose alignment matches that of the field system recorded in the first edition Ordnance Survey map, demonstrating continuity of the field system into modern times. The field system and the High Road had themselves been influenced by the alignment of Rainbow Lane, a routeway which has been argued to have Roman origins (see Chapter 4).

Medieval salt-making?

Site 1 at Salt Fleet Flats on the Cooling Marshes investigated an earthwork recorded as a circular feature on the 1898 Ordnance Survey map which was believed to be a medieval saltern or a mound formed from the discarded waste material of salt manufacture. Like the red hills of Essex, such mounds are a characteristic feature of the marshland of the Hoo Peninsula and offer tangible evidence of a once extensive industry (Newsome *et al.* 2015, 20). In the medieval period, salt was extracted through a process known as sleeching. As described by William Brownrigg in 1748 (see p. 118), salt-rich sands or mud were collected from the shore, placed into pits, and washed through with seawater. The resulting brine drained through a filter of peat or turf into reservoirs (McAvoy 1994). To obtain salt crystals, the brine was boiled in open pans using an evaporation method similar to that used in the Roman period at Stanford Wharf Nature Reserve and elsewhere (Biddulph *et al.* 2012a). The waste – the sand and peat retained in the filtration units, as well as the waste fuel – was dumped onto mounds. Unlike salt-making in prehistory and the Roman period, coarse clay briquetage props and evaporation vessels were not used in medieval salt-working. Instead, the brine was boiled in lead pans and discarded fragments of such vessels are sometimes found on salt-working sites, for example at Wainfleet St Mary in Lincolnshire (Thompson 1994, 160) or, closer to home, Seasalter Level near Whitstable in Kent (Thompson 1956, 59).

The art of making common salt

Collecting the sand

The sand from which they prepare the brine is collected... on flat sandy shores, on those parts which are only covered with sea water in the high tides which flow two or three before, and three or four days after the full and new moon. The sand is only collected in dry weather, when the sea water hath been exhaled from it by the sun, and the rains have not washed the salt out of it. At such times, and in such places, they rake up the sand into heaps, to the depth of two or three inches, and convey it to their works in carts; laying it up in a large heap, where it is exposed to the weather, and subject to be much injured by rains. They therefore work it up with all diligence, and rarely boil any salt in the winter season.

Preparing the brine

In order to extract the salt from the sand, adjoining to the saltern, they dig a pit eighteen feet long, three feet broad, and one foot deep. The bottom of this pit they cover with rushes, or straw, and then fill it up with the salt sand from their heap; upon the sand they pour sea water, which they take into a pond or sump at spring tides; the water imbibing the salt from the sand, filtrates through the rushes or straw, and runs through a pipe from the bottom of the pit, into a cistern placed in the boiling house. They continue pouring sea water upon the sand, so long as the brine in the cistern will bear a hen's egg to a certain height. And thus having extracted most of the salt from the sand, they remove it, and fill up the pit with fresh sand from their heap.

Extracting and drying the salt

The brine being thus prepared, they boil it with turf fires in small leaden pans; in which they only make about two gallons of salt at each process, which is usually performed in four hours. They use no clarifying mixtures, but take off a scum, which arises in great plenty when the brine begins to boil. They drain their salt in wicker baskets, which they hang up in the hottest part of the saltern. After each process, they throw out the bittern that remains in the pan; and about once a day, while the pan is hot, remove it from the fire, and beat it with a wooden mallet, and thus free it from the calcarious crust which adheres to its bottom and sides.

William Brownrigg (1748)

Without excavation, it is difficult to establish whether such mounds relate to salt-working or were created to form refuges – traditionally known in Kent as coterells (Thompson 1956, 44) – for livestock to escape tidal flooding. Of course, the mounds may have served both purposes, the accumulation of salt-working waste providing convenient elevated refuges. Turning to the evidence from Site 1, it seems unlikely that the sequence of dumped deposits in Trench 32 relates to salt-making. The fish bones, shellfish, metalworking debris, possible fuel debris, stone objects, and relatively abundant pottery and animal bone retrieved from the sequence are much more characteristic of domestic detritus than waste associated with medieval salters and suggest that domestic waste had been brought to the marsh, presumably from settlements to the south. This not only removed rubbish that had been accumulating within areas of habitation but created a raised area or refuge. The discoloured soils in Trenches 30, 33 and 34 are, however, more promising as evidence for salt-working. Dumped deposits of reddish-coloured silty clay were seen in Trench 30, while thin layers of reddened silty clay were recorded in Trenches 33 and 34. In contrast to the deposits in Trench 32, all were largely devoid of cultural material; a single fragment of pottery from a reddened deposit in Trench 34 dated to the late 12th to mid-14th century.

Though slight, the evidence from Trenches 30, 33 and 34 is not inconsistent with that uncovered at medieval salt-making sites in Kent. At Seasalter Level, for example, two mounds that received quite detailed investigation are described as comprising marsh clay with patches of reddened clay and quantities of charcoal, likely to be the burnt fuel and soil from the fire used to evaporate the brine. Pottery was recovered, though not in any great amount (Thompson 1956, 50). The reddened soil from Salt Fleet Flats could be similarly viewed as waste from an evaporation hearth, although the paucity of charcoal casts a little doubt on the interpretation (a dump of charcoal was recorded within a channel in Trench 33, but this is likely to be later than the reddened mound deposits). One notable aspect of the Seasalter Level evidence was the association with each mound of a wicker-lined pit, one pit at the base of one mound, the second at the top of the other, which Thompson (1956, 54) suggested were used for filtering the salt-impregnated sand. It is tempting to identify possible pit 3002 in a similar light, but as the feature was not fully exposed we cannot be certain of its function. It can be added that pottery from this feature spanned the late 12th to 15th centuries, and so it is possible that the feature received dumped household waste after any putative salt-making activity ceased.

The lost settlement of Feake's Hithe

Feake's Hithe was a small settlement at the head of Carter's Creek, hithe or hythe being a historical term for a waterfront or harbour (cf. Ayto and Croften 2005). In the late 16th century, the settlement was significant enough to send its own representative to the annual inquisitions of the Barstable Hundred Court; two of its residents, William Roger and John Rattell of 'Fakesheve', are listed among representatives from the parish of Stanford-le-Hope at the court in 1577 and 1579 (ERO Q/SR 70/51). The settlement is recorded on the estate map of 1617 (ERO D/DU 112/1), which depicts buildings either side of a trackway or road that connected the High Road with Carter's Creek (Fig. 5.5). The building on the south-west side of the road is surrounded by trees and there is an orchard close by. Another building is shown further to the south on the east side of the road. The wharf uncovered during the excavation at the Proposed Development at Great Garlands Farm is not depicted, but some other form of structure – a jetty or area of hardstanding, perhaps – is suggested by brown shading immediately north of the location of the wharf (Figs 5.5 and 5.28). The settlement is named Fox Hive on the Chapman and André map of Essex, published in 1771 (Fig. 5.27), but its buildings had by this date already been demolished and replaced by those of Great Garlands Farm; an inscribed stone slab dates the new farmhouse, which incorporated part of the brickwork of earlier buildings, to 1753 (Bingley 1977, 77).

Some of the archaeological discoveries from London Gateway can be related to Feake's Hithe. The earliest evidence from the medieval sequence in Area H at the south-eastern end of the Access Road comprised a pond, drainage ditches orientated NE–SW and several short ditches dug perpendicular to the drainage ditches. Pottery from the features dated between the late 13th and mid-14th century. Several other ditches and ponds were recorded in the area. Pottery recovered from them suggests that the features filled between the late 15th and 17th century and are therefore later than those that contained earlier pottery, although it is possible that the earlier pottery is residual and the period of activity here is less than the 300-odd years suggested by the ceramic evidence. This chronological question notwithstanding, Area H during the medieval and early post-medieval periods is likely to have been open pasture for livestock, cattle mainly rather than sheep judging by the animal bone evidence, not least the near-complete skeleton of a calf which had been buried possibly, given its location and the absence of butchery marks, having succumbed to disease. The ponds could have served as waterholes for livestock but may have been used as fish ponds for the estate. Drainage was clearly a concern for the medieval farmers; the evidence pre-dates the formal raising of embankments and the reclamation of the marshes to the south in the early 17th century.

The 1617 map, which depicts the head of Carter's Creek and adjoining fields, labels the land on which the archaeological features in Area H are likely to have lain as 'part of Feake's Hithe'. The excavated ditches generally share the alignment of the mapped field boundaries (Fig. 5.28), suggesting either that the fields here were laid out before the early 17th century, with the drainage ditches being aligned with contemporaneous field

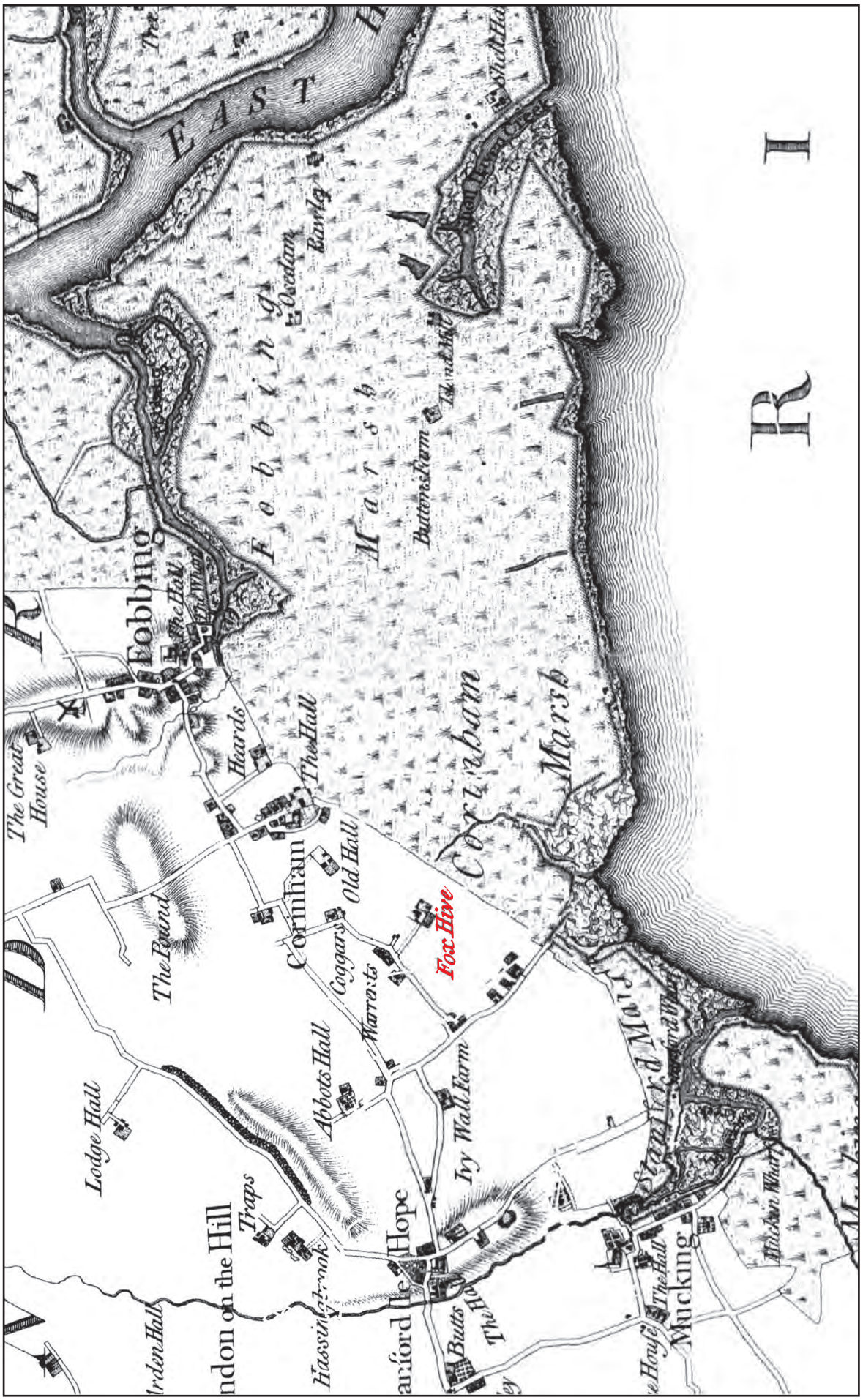

Figure 5.27 Chapman and André's map of Essex, dated 1771 showing Corringham and the surrounding area (Fox Hive, formerly Feake's Hithe, highlighted)

Figure 5.28 Detail of the 1617 map of Feake's Hithe with archaeological features superimposed (reproduced courtesy of Essex Record Office)

boundaries, or that the field system was laid out with reference to the arrangement of drainage ditches. Some of the shorter ditches may have formed a pen for livestock or a gate giving access to the edge of the creek.

Dating evidence from the remains of the timber wharf exposed on the west bank of Carter's Creek – radiocarbon dating and pottery give a range from the 15th to late 16th/early 17th century – suggests that the wharf was contemporary with some or all of the later features in Area H, among them ponds 8008 and 8014, ditch 8057 and pit 8018. The wharf represents a very rare survival of what must have been a common rural waterfront feature in later medieval and post-medieval times (Goodburn, Specialist Report 11). The carpentry of the waterfront is most typical of the 16th century and broadly comparable to medium- to high-status timber waterfronts built at the head of the Thames Estuary in London at the time. There is some evidence that it was designed to impress in terms of the false stave and muntin construction used, even though money-saving shortcuts were employed. The later 16th century in particular was a time when sea-, estuary- and river-born trade was substantially expanding, with the newly founded Thames and Medway dockyards beginning to act as the first factories, drawing in huge volumes of specialised materials. The defective ship's 'knees' – curved oak timbers that held the planks of the vessel's frame – that were found abandoned at the site are probably diagnostic waste of this developing specialised trade network. That the field immediately behind the wharf (that is, to the north-west), is named 'Sawpit Field' in the tithe map of 1839 is highly suggestive of this maritime industry. The knees may well have been built or otherwise worked here before being dumped.

Though not depicted on the 1617 map, there can be little doubt that the wharf was part of Feake's Hithe. Goods were brought here and stored before being transported downstream towards the Thames, or conversely were received from incoming craft. What sort of boats would have been seen in the creek can be surmised from the estimated tidal range. The top of the large elm sill beam base in which the water-facing vertical timbers of the wharf were inserted was set at a height of *c* +0.45m OD and the top plate or uppermost beam of the frontage is estimated to have rested at a height of *c* +1.9–2m OD. Clearly, the maximum water level must fall within this range, but to obtain a more precise view it is instructive to turn to the late 7th-century tidal mill on the River Ebbsfleet, a minor tributary of the Thames in Kent. There, a tidal range of +0.4 to +1.5m OD is suggested by the height of the base of the waterwheel and height of the upper edge of the higher of two pentrough inlets, through which water flowed in order to turn the wheel (Watts and Hardy 2011, 330–1). If the tidal range on Carter's Creek was similar, then at low tide the base of the wharf frontage is likely to have been exposed and any boats moored against the wharf would have been beached until the water level rose. We can surmise from this that vessels of shallow draft were employed along the creek. Little is known of the smaller boats that would have operated in the narrower waterways during the late medieval period, but vessels such as the 15th-century Blackfriars III ship, a clinker-built sailing vessel some 14m long and corresponding to a type of craft called a 'shout' (Dunkley 2016, 9), would have been a familiar sight on the Thames at London Gateway. In the 17th and 18th centuries, the tilt-boat, a masted vessel fitted with a canvas cover or tilt at one end to protect the cargo or passengers from the elements, was used by merchants and ferrymen plying their trade along the Thames. We know that such boats were used in the waters off Thurrock, since the parish register records that in 1697/8 a tilt-boat foundered there with the loss of 56 passengers (Tompkins 1947, 241). The rights to provide boats for passage and collect wharfage fees in the medieval period typically fell to the lord of the manor and could be a source of dispute. Documentary evidence records a complaint in 1228 by the Prior of the Hospital of Jerusalem in England against unreasonable access and tolls at Grays Wharf charged by Richard de Gray, Lord of the Manor of Thurrock (Thurrock Council, nd). It is not certain to whom such rights belonged at Feake's Wharf, but it is a reasonable assumption that the Garland family held them until the late 16th century, when Sir John Hawkins acquired Old Garlands, the Garlands' ancestral estate. The rights are likely to have been transferred to Robert Salmon, trustee of the Hawkins Hospital lands, when he in turn acquired the estate from Hawkins in the mid-17th century.

Whether the wharf was still operating at this time is uncertain. No buildings are shown on a map of the mid-17th century (Fig. 5.29; ERO D/DU 112/2) – a shepherd's hut is shown elsewhere, demonstrating that buildings, where present, were depicted – and the latest pottery collected from the alluvium that built up within the creek against the wharf front dates to *c* AD 1650 (Cotter, Specialist Report 3). However, Carter's Creek on the map is annotated, 'the creek going to Feake's Hithe', implying that the watercourse remained navigable at least up to this time. Nevertheless, the wharf may have undergone a gradual decline from the early 17th century, possibly as a result of silting and reclamation of the marshes. The manner in which it appears to have collapsed suggests that the wharf came to an abrupt end, possibly having been destroyed by a high-energy flood such as a tidal storm surge.

In a watching brief a short distance to the north-east the Essex County Council Field Archaeology Unit (ECCFAU) uncovered the remains of a gravelled area, interpreted as a farmyard, a barn-like structure, and a kiln or oven, which had possibly been used for smoking and preserving meat, fish or cheese (Peachey and Dale 2005, 144). These features were dated to the late 15th or 16th century, broadly contemporary with the later features in Area H and the timber wharf, and may similarly have formed part of Feake's Hithe. Charred grain, predominantly barley, rye and wheat, was recovered from the gravel surface and may have been brought semi-processed to the site for further processing and storage, presumably in the barn, before being loaded

Figure 5.29 Map of the Old Garlands estate, mid–17th century (reproduced courtesy of Essex Record Office)

onto vessels at the wharf and, after the payment of due fees, shipped via the Thames. Barley would have been gown inland rather than on the coastal edge (Fryer 2005) and clearly did not represent locally grown and consumed produce. It is worth noting that wheat and barley were also recovered from Area H (Meen *et al.*, Specialist Report 16), although in that case deposition was earlier in the medieval period.

The finds from both sites suggest that some of the inhabitants who lived nearby enjoyed a high standard of living and access to exotic items from other parts of England and abroad. Objects from the farmyard and associated farm structures included a unicorn-headed toothpick, imported pottery from the Low Countries and the Rhineland, and vessel forms – a dripping pan and culinary mould – indicative of a varied diet. The assemblage is matched to some extent by the pottery, albeit of earlier medieval date, from Area H, which included a dripping pan, imported French vessels and regional English fine wares from as far afield as Scarborough in Yorkshire. We know from the map of 1617 that the ECCFAU site lay on land belonging to Old Garlands, and rather than coming from Oak Farm as suggested by the excavators (Peachey and Dale 2005, 144), it is more likely that these objects once belonged to members of the Garland family.

Old Garlands Farm

Old Garlands was a farming estate with origins in the medieval period. The main farmhouse was located north of Feake's Hithe on a track that joined the High Road at Oak Farm and would be extended in *c* 1636/7 by Manor Way, a raised driveway, possibly built on top of an earth sea wall (Rippon 2011, 10), that took traffic to the marsh. There is some confusion about the relationship between Old Garlands Farm and Little Garlands Farm. Documentary evidence indicates that the two were separate estates in *c* 1637 – the unnamed owner of Little Garlands was liable with the Hawkins Hospital for the cost of building Manor Way (Medway Archives, GB.1204/CH.108, item 150). On historical mapping, however, the same location is indicated for both estates. The first edition six-inch Ordnance Survey map of 1863 and the second edition map of 1898 give the name 'Little Garlands', but 'Old Garlands' is shown on the 1924 map and on a plan that accompanied the sale catalogue of the estate in 1920 (ERO SALE/A430). It is possible that there were originally two properties on the Old Garlands estate, Old and Little Garlands, and in time, the two names may have come to refer to a single property and be used interchangeably. Why Little Garlands predominated on 19th century mapping is uncertain. It is tempting, though, to attribute this to the construction of Great Garlands Farm in 1753, Little Garlands being preferred for the neighbouring property to distinguish the two.

Whatever the case, when the Garland family came into possession of Old Garlands is not clear. A 13th-century land grant relating to the Petre Family of Ingatestone and Horndon was witnessed by a group of south Essex notables, including Peter de Stanford and Robert de Garlande (ERO D/DP T1/139). The earliest reference to the estate is in a legal case in 1425, which includes details of the estate and describes a dispute between rival claimants – Robert Garlond on one side and a John Draypole on the other – to the farm, each side producing evidence from earlier charters to back up their claims (see p. 125).

The date of the earlier events described in the document and involving the painter Richard Garland, is not explicitly stated, but Thomas atte Wode was an attorney-at-law involved in various Court of Common Pleas cases at Westminster in the 1370s and 1380s, which places Richard Garland in the same period. This makes Richard Garland a probable contemporary of the events of the Peasants' Revolt and a neighbour of one of its chief instigators, Thomas Baker of Fobbing, who was freeholder of the small estate known as Pokattescroft alias Bakerescroft (later Whitehall Six Acres), near the High Road in Fobbing (*c* 3.5km north-east of Old Garlands). The revolt began on 30th May 1381 as a violent protest against a new poll tax by the villagers of Fobbing, Corringham and Stanford-le-Hope. We have no information regarding where Richard Garland's political sympathies lay, but it seems likely that he would have been a witness to the dramatic events in Essex or London. As a minor landowner in Stanford-le-Hope, and as a member of the guild of painters of London, his sympathies might well have been with the rebels. The medieval guilds of London were highly organised and were a focus for economic and political tensions in the period preceding the revolt. Many of the instigators convicted after the event were not in fact peasants but minor landowners, artisans and tradesmen with at least some property ('Peasants' Revolt' was a derogatory term first coined in the 15th century). Of just over 100 rebels indicted at Chelmsford in July 1381 for the initial attack on poll tax collectors in Brentwood that triggered the revolt, about half were from Fobbing and at least 20 more from Stanford-le-Hope, Corringham, Mucking and Horndon (Barker 2014).

In 1591 the Old Garlands estate was acquired from local landowner Eugeny Gatton of Mucking Hall by Sir John Hawkins (then Comptroller of the Royal Navy) to endow a hospital in Chatham for sick and elderly sailors in the aftermath of the defeat of the Spanish Armada (see p. 126). The Hospital of Sir John Hawkins, Knight still exists today, although it sold the Old Garlands estate in 1920. The hospital was in possession of the estate continuously from 1592 to 1920 and extensive records survive from that period, held in the Rochester-upon-Medway City Archives. A conveyance dated 1599 (formally transferring the farm to ownership of the hospital, following Hawkins' death in 1595) refers to the 'manor and capital messuage called Olde Garlandes, 30 acres pasture adjacent to 95 acres greenmarsh and salt marsh [abuttals], pasture for 26 sheep in Church Marsh, all in Stanford-le-Hope, rent of 5 acres from a fresh marsh in Corringham, and right of passage to and

A legal dispute between Robert Garlond and John Draypole

Robert Garlond [RG] states that on 1 November 1424 John Draypole [JD] forcibly broke his close and house at Stanford-le-Hope and took goods and chattels to the value of £40, namely a psalter, one portas (portable breviary), 40 quarters of malt, 40 quarters of grain, 40 quarters of barley and 40 quarters of peas, and threatened his men and servants, namely Stephen atte Lee and John Eliot, so greatly that they did not dare perform their duties, such as tilling 20 acres of his land, for a long time, from that date until Christmas, depriving him of their service. This was against the peace, and to his damage of 100 marks. JD comes and says that he did not come with force and arms, and denies the trespass. Concerning this JD puts himself on the country, and RG puts himself likewise. Concerning the accusation of close and house breaking, JD says that RG should not continue the action against him. JD says that a certain Richard Garland, painter, of London, was lately seised in his demesne and as of fee (freeholder), of one messuage, 38 acres of land, five acres of pasture, 60 acres of marsh and 18s. rents with appurtenances in Corringham and Stanford-le-Hope, Essex, of which the close and house aforesaid are a parcel. There follows several membranes, including details of charters, in which JD and RG make claims and counterclaims to the rightful possession of the land in question. In summary, JD claims that a certain Richard Garland, by way of his charter, granted the aforesaid tenement to William Bonauntir, William Duke, Thomas atte Wode and John Parker to be had by themselves and their heirs in perpetuity, by way of which grant JD ultimately argues he has a valid claim to the said tenement. Robert Garlond claims that Richard Garland did not grant the said tenement to the parties named in the manner claimed by JD. At assize, a jury came and found in favour of Robert Garlond on all claims, excepting some of the goods taken. Robert Garlond is awarded damages, above and beyond costs, of 20s. And for costs, Robert Garlond is to receive an additional 100s. JD is committed to the Fleet Prison.

Court of Common Pleas, CP 40/659, rot. 530

Sir John Hawkins and Old Garlands

Sir John Hawkins was one of the leading English seamen of the Elizabethan age, a second cousin and mentor of Sir Francis Drake. Hawkins was regarded as a national hero in the aftermath of the Armada, having served as rear admiral in the battle and been knighted for his actions. As Treasurer (1577) and Comptroller (1589) of the Royal Navy, he is credited by many historians as the main architect of the fleet that defeated the Spanish and set England on a path to eventual naval supremacy. He was associated with key administrative reforms, the professionalisation of the navy, and the innovative design of 'race-built' warships intended primarily for gunnery rather than boarding actions. Hawkins' reputation, however, has since declined in comparison with his contemporaries, the seaman having become a notorious and highly controversial figure owing to the leading part that he played in establishing the English transatlantic 'triangular trade' system. In this grossly exploitative system, European goods exported to the west African coast were used to purchase and enslave men and women, who were taken to Caribbean plantations to produce cash crops such as sugar, which were in turn imported into Britain and sold to great profit. Hawkins published a treatise describing his slave-raiding tactics and went so far as to include the figure of a bound slave in his coat-of-arms.

The acquisition of the Old Garlands estate had been carefully considered by Sir John Hawkins. He owned houses near the royal dockyards at Chatham and Deptford and was a frequent visitor to the court of Elizabeth I. Old Garlands was roughly halfway between Deptford and Chatham by boat and conveniently close to the fort and ferry at Tilbury, and so had perhaps been familiar to the Hawkins before he eventually acquired the estate in 1591. The farmhouse would have offered commanding views over the busy deep-sea anchorage in Lower Hope Reach, which was much frequented by ships of the Royal Navy, as well as merchant vessels, and was commonly used as a fleet rendezvous. Feake's Hithe would have provided a convenient landing place. It may also be significant that Old Garlands lay a few miles from the fort and ferry at Tilbury, where in 1588 thousands of troops had gathered in anticipation of a landing by the land forces of the Spanish Armada. Appropriately, Hawkins' last flagship, which was laid down at Deptford in 1590 and in which he died in 1595, was called *Garland* (or *Guardland*).

Sir John Hawkins (1532–1595) (BHC2755 © National Maritime Museum, Greenwich, UK)

from Mousehole Well to carry water' (ERO T/B 202/1). The terminology to distinguish different types of marsh is interesting here: 'greenmarsh' indicates unreclaimed marsh, while 'fresh marsh' referred to reclaimed marsh; then there was 'salt marsh' or, simply, *marisci* (marsh). Such terminology was applied with increasing frequency in the 17th century (Rippon 2004). A lease dated 1614/15 describes the main tenement as the 'messuage called Old Garlandes, 4 closes of upland ground (30 acres), a wick house and 5 marshes (70 acres) all in Stanford-le-Hope and in tenure of Francis Shawe [citizen and cloth-worker of London].' The term 'wick' in the Essex marshes is specifically associated with dairies, cheese-making sheds and shepherds' huts, occupied seasonally in most cases (Rippon 2000, 204).

By the mid-17th century, a Mr Robert Salmon was trustee of the Hawkins Hospital lands, and accordingly he is named as landowner of some of the fields shown on the map of the Old Garlands estate (Fig. 5.29; ERO D/DU 112/2). Curiously, other plots are labelled as 'belonging to Rochester Bridge'. Institutional arrangements for managing the repair and maintenance of Rochester Bridge pre-date the 12th century. In time, funds were raised using the income from a portfolio of landed estates, which included Old Garlands. These estates were managed by elected wardens, the wardens who managed the Old Garlands estate also serving on the board of governors of the Hawkins Hospital. The Manor Way track, which runs along the northern part of the Old Garlands estate, was established in *c* 1636/7 as a result of legal action brought by a Robert Cheslin, the owner of Curry Marsh, against the Hawkins Hospital and the owner of Little Garlands, obliging them to build a 'driveway' to provide access to the marsh for grazing sheep (Medway Archives, GB.1204/CH.108, item 150).

The 1920 sale catalogue of the Old Garlands estate lists as part of its 137 acres a house and garden, a moat field and building, marsh and saltings (ERO SALE/A430). Outbuildings included a barn converted into a cowshed, a stable and a well. The catalogue advertises the estate as a market garden and marsh, which, along with the outbuildings, highlight that the estate derived much of its value from pasture and livestock and the small-scale cultivation of plants and vegetables, rather than crops. Bingley (1977, 76) records that the farmhouse of Little (?Old) Garlands was demolished in 1977, though some elements of the estate remained standing after that date, among them a late 17th-century timber-framed, black weather-boarded barn with a thatched roof (HER 35289).

Reclamation and the development of the farming landscape

There is little conclusive documentary or archaeological evidence for reclamation in the Stanford-le-Hope and Corringham marshes during the medieval period. There is a reference to 'five acres of pasture' in late 14th-century charters quoted in the 1425 legal case of Robert Garlond and John Draypole (CP 40/659, rot. 530), which may be the same 'five acres from a fresh marsh in Corringham' referred to in the 1599 title deed mentioned above (ERO T/B 202/1). If the five acres do indeed represent reclaimed marsh, this would suggest that medieval reclamations here were small-scale and localised and remained broadly unchanged in extent between the late 14th century and the late 16th century.

The early 17th century saw the raising of embankments or sea walls within the intertidal zone, which heralded the large-scale reclamation of the marshes across the London Gateway development area (Figs 5.15 and 5.30). The earth-built sea walls are depicted on the 1617 map as thin green lines. The sea walls follow the eastern side of Carter's Creek and extend along the boundary of the intertidal zone and gravel terrace. Some of the fields are also enclosed by sea walls. Narrow strips between the sea wall and the creek were retained as salt marsh, and some of the enclosed parcels of land are labelled 'fresh marsh', that is, reclaimed. Part of the embankment, visible as an earthwork, was surveyed at the southern end of the Access Road, and in plan can be matched with the sea walls depicted on the 1617 map. Whether the sea wall across the London Gateway area was built in a single phase or over several years is uncertain. The map of the mid-17th century of the Old Garlands estate (Fig. 5.29) shows that, by this time, the marshland east of Carter's Creek had been enclosed, or 'inned', up to the edge of the Thames, taking in Curry Marsh. The construction of the sea walls are attributed on the map to 'the Dutch men', and it is possible that these are the same Dutch engineers who were responsible in 1623 for the sea walls of neighbouring Canvey Island under the direction of Cornelius Vermuyden. The men received one third of the land reclaimed in payment for their labours, and examples of their distinctive octagonal workers' cottages still survive on the island. The date coincides with references in documents relating to royal commissions of 1633/4 and 1637/8 to the inning of the Fobbing Level Marshes ten years previously. While it is possible that pottery imported from the Netherlands and recovered from the Access Road (Cotter, Specialist Report 3) records the presence of the Dutch engineers at London Gateway, the date of the pottery falls more comfortably within the 16th rather than 17th century, and more likely belongs to the wealthier households in the area.

The impact of large-scale reclamation is evident from the results of pollen and diatom analysis of post-Roman alluvial deposits at Stanford Wharf Nature Reserve. It was found that the proportion of salt marsh species was lower compared with Roman-period samples, suggesting that the marsh had retreated. Conversely, the proportions of tree and shrub and grassland taxa had increased, hinting at tree re-growth and expanding pasture (Peglar 2012; Cameron 2012). A sense of the scale of reclamation is also provided by the documentary records. A notice relating to the lease of Old Garlands Farm, dated *c* 1750, lists 'messuage, barn, stable, 30 acres upland, 87 acres fresh marsh land and 15 acres salt/waste land'.

Figure 5.30 The remains of a 17th–century sea wall, looking north

Compared with the document of 1599, the estate still boasted 30 acres of upland pasture, but the 95 acres of greenmarsh had been replaced largely by 87 acres of fresh (or reclaimed) marsh. Despite the sea walls, however, flooding remained a perennial risk, and the tenants of Old Garlands Farm in 1735 complained of the disastrous effect on their livestock and corn of severe Thames floods (Medway Archives, GB.1204/CH.108, item 374).

Chapman and André's 1771 map of the coastline along the edge of the London Gateway development area depicts the sea wall along the coast as a linear feature with a row of short lines or strokes, rather than a solid line, and it is possible that these represent wooden posts (Fig. 5.27). Timber posts seen during the breaching of the modern sea wall at Stanford Wharf Nature Reserve may have been part of this structure (Fig. 5.31; Biddulph *et al.* 2012c, 183). The sea walls became something of a visitor attraction; picnickers came to the sea wall at Stanford Wharf during the summertime to eat and look out at the vessels in the estuary as recently as the Second World War (Jenkins 1995, 16). Artist and writer Donald Maxwell (1925, 22–3) thought the sea-view from the Thames shores at Stanford-le-Hope, with its 'passing pageantry of ships', compared very favourably with that of Margate. 'Here', he writes, 'you can sit all day and watch the endless traffic on the river-road to London.'

Figure 5.31 Timbers from a sea barrier of post–medieval date from Stanford Wharf Nature Reserve

The chronology of land reclamation in and around Salt Fleet Flats is not known in detail. Prior to the construction of Cooling Castle, much of the marsh was described in an assessment of the Cooling estate in 1300 as 'saltings', indicating that they were not enclosed by sea walls in the early 14th century (Nichols nd, 8). Draining of the marsh by means of walls and ditches, however, may have taken place on a small, localised scale before then; Newsome *et al.* (2015, 58) draw attention to the increase in land values between 1066 and 1086 in the manors of Cliffe, Cooling and Chalk, hinting at programmes of land improvement. This activity is unlikely to have reached Salt Fleet Flats, however. The putative salt-working mounds and flood horizons at Site 1 show that the area continued to be subject to the tides in the medieval period. Seed capsules of thrift (*Armeria maritima*) recorded in a sample taken from the medieval dumped deposits in Trench 32 indicate that salt marsh plants were growing in the area (Meen *et al*, Specialist Report 16). Systematic large-scale reclamation is shown by a map of the Cliffe and Higham Levels dated 1695, which depicts the marshes immediately to the west of the site. A note indicates that 'all of the Levels eastward of this [that is, the Cooling Marshes] is sewed entirely by the Fleets and Delph Ditches'. It would therefore appear that reclamation of the marshland within the evaluation site had largely been completed by 1695, a little later than the 'inning' recorded on the opposite side of the Thames. Mudge's map of 1801 show individual parcels of reclaimed marshland, behind a sea wall. The parcels are fairly uniform in size (if somewhat irregularly

Figure 5.32 Salt Fleet Flats: Mudge's map of the Cooling Marshes, 1801 (reproduced courtesy of Kent History and Library Centre)

shaped, being defined in large part by natural creeks), suggesting planned reclamation, with the land being divided up into several properties (Fig. 5.32). The second edition six-inch Ordnance Survey map, dated 1898, marks the appearance of two sea walls along the edges of the Cooling and Halstow Marshes (OA 84 and 85). Maps from 1910 to the present day show relatively little change other than the creation of a new section of sea wall at Egypt Bay after 1961, along with the disappearance of several sheepfolds and the infilling of one major creek in the western part of the site, and some of the smaller drains. Comparison of aerial photographs from 1947, 1961 and 1999 suggests that the site may have been extensively levelled, and creeks and other features infilled, between 1947 and 1961.

The reclaiming of the marshes across the London Gateway development area, both in Essex and Kent, was motivated by the desire of the landowners whose farms lay on the higher ground of the gravel terrace to open up the land to farming and increase the value of their estates for economic gain. Archaeological evidence for this is provided, as we have seen, by the remains of sea walls, channels and drains, but it is also clear in the traces of farming structures that dot the landscape. The character of these structures demonstrates that the reclaimed marsh was 'sheep-country'. The remains of a possible medieval wick or sheep dairy were recorded on the intertidal zone close to the edge of the gravel terrace at Stanford Wharf Nature Reserve (Biddulph *et al.* 2012c, 177–80). A wick of later date is shown on the Ordnance Survey map of 1898 close to Site 1. A sheep skeleton associated with late 15th to mid-16th-century pottery was recorded in Trench 56 at Salt Fleet Flats. The skeleton was partially articulated and therefore not representative of domestic waste. The remains of a timber sheepfold dating to the 17th-century or later and shown on the Ordnance Survey map of 1863 were recorded at Stanford Wharf Nature Reserve (Biddulph *et al.* 2012c, 183). A 19th-century or modern brick-built sheepfold with a concrete floor was uncovered in Trench 16 at Salt Fleet Flats and had been built on the site of an earlier brick-built sheep-dip. The dip resembles one of Victorian date recorded by the Essex Wildlife Trust south of Manor Farm (formerly Cabborns) on the edge of the Hassenbrook close to Stanford Wharf. This was complete and in plan was keyhole-shaped, with a brick-built ramp, ridged to give the animals purchase, that led to a circular basin or dip (Bingley 2013). The semi-circular brickwork and long, straight section of wall of the Salt Fleet Flats structure clearly corresponds to this arrangement. Ordnance Survey mapping records another sheepfold and a sheep-wash or sheepfold at Salt Fleet Flats, the latter seen during excavation at Site 4 as an area of rubble.

While sheep farming dominated, the economy of the farms that bordered the marsh on the gravel terrace – in addition to Great Garlands and Old Garlands, farms within or immediately beyond the London Gateway development area include Broadhope Farm and Crooked Billet on Rainbow Lane, Oak Farm on the High Road and Old Hall in Corringham – was nevertheless diverse. The cowsheds and market garden of Old Garlands have already been mentioned. Similarly, Great Garlands Farm, built in the mid-18th century, was equipped with cowsheds and milking parlours, and at least in recent times kept a herd of Friesian cattle (Bingley 1977, 77; Flint 2010). Cattle joined sheep on the marshland pasture but would also have been seen grazing in the upland fields. Much of this upland witnessed little change; investigations in the Pipeline Diversion and Access Road sites uncovered ditches that match field boundaries seen on the 1617 map, tithe maps of the 19th century and Ordnance Survey maps of the 19th and 20th centuries, demonstrating continuity of the basic farming landscape until very modern times (Figs 5.6 and 5.33).

At the east end of the development area, at the Northern Triangle East, earthworks from 'stetch' cultivation offer evidence for arable farming on Fobbing Marsh during the 18th and 19th centuries. Quite what was grown is uncertain, but wheat and barley are strong candidates, having been attested elsewhere in the development area, albeit from earlier deposits and on the gravel terrace. Stetch cultivation was commonly practised on reclaimed farmland along the Essex coast, with evidence identified as far west as Rainham Marsh and as far north as Horsey Island near Frinton-on-Sea (Gascoyne and Medlycott 2014).

War and industry

This seemingly unchanging agricultural rhythms of the London Gateway landscape did not always remain undisturbed. Famously, diarist Samuel Pepys recorded on 10th June 1667 that the Dutch fleet had passed Shellhaven Creek at the south-eastern tip of London Gateway and had reached Sheerness (Latham 2003). This was on the eve of their devastating raid on the River Medway, an action that formed part of the second Anglo-Dutch war, fought for supremacy in trade and naval power. To what extent the presence of the Dutch ships was felt on the banks of the river is uncertain, but two cannonballs preserved in Thurrock museum, one said to have been found under the floorboards of Great Garlands Farm, are believed to date to this period and hint at some skirmishing as the fleet sailed down river (Sparkes 1962, 7).

More common was riverine activity of a calmer sort – passage between the banks of the Thames and transportation of goods via coastal wharves. As we have seen, the wharf at Feake's Hithe fell into disuse by the early 17th century, and while Carter's Creek may have remained navigable for a time afterwards the creek seems to have declined in importance as an access point to and from the Thames. Over time, other wharves were established, such as the example depicted on Chapman and André's map of 1771 (Fig. 5.27). Stanford Wharf is located on the first bend of Mucking Creek, while Mucking Wharf is shown further round. A square enclo-

Figure 5.33 The area of Great Garlands/Feake's Hithe, as shown on the 1617 estate map and 1863 Ordnance Survey map and modern aerial photograph, showing continuity of field patterns (1617 map reproduced courtesy of Essex Record Office)

sure containing several buildings is depicted at Shell Haven and it is possible that wharf or harbour facilities existed here in the 18th century, if not before. Another wharf was located on the bank of Fobbing Creek at the settlement itself. The creek does not issue into the Thames itself, but enters Holehaven Creek, which separates the London Gateway area and Canvey Island and in turn reaches the Thames.

Stanford Wharf continued to function well into the 20th century, being recorded (as Stanford-le-Hope Wharf) on the six-inch Ordnance Survey map of 1945. During the 19th and early 20th centuries, the wharf was used for the maintenance of barges as well as the import and export of goods. Grain was off-loaded here from boats that had sailed from London Docks and in return the capital received straw and hay for horses (Jenkins 1995). Stanford Wharf also has a literary connection; the writer Joseph Conrad lived for a time at Ivy Wall Farm (demolished *c* 1924), located on Billet Lane some 1.5km north of the wharf and just outside the London Gateway development area. Conrad, a sailor himself, is likely to have been a frequent visitor to the wharf. He enjoyed cruises along the Thames on the 'Nellie' (Canton 2013), a yawl or two-masted sailing boat immortalised in his 1899 novel, *Heart of Darkness*. The opening section of the novel sees the Nellie anchored in the Thames off Gravesend and includes descriptions of the Essex foreshore that are likely to have been inspired by the stretch by Stanford Wharf. Conrad's writing ('…the very mist on the Essex marshes was like a gauzy and radiant fabric…') came almost 40 years after Charles Dickens had written about the marshes on the Hoo Peninsula on the opposite side of the river in *Great Expectations*. Dickens' description, similarly in the opening chapter ('…the dark flat wilderness beyond the churchyard, intersected with dykes and mounds and gates, with scattered cattle feeding on it…'), might be describing the very landscape of Salt Fleet Flats. Later in the novel, in chapter 54, Dickens briefly describes the Essex coast between Thames Haven and Tilbury, noting 'the solitary flat marsh and far away the rising grounds, between which and the river there seemed to be no life save here and there in the foreground a melancholy gull.'

The remote, featureless, and sparsely populated landscape of the reclaimed marshland in Essex made it attractive for industrial development. Plans were prepared as early as 1835 for a large deep-water tide dock for steam boats and a pier at Shell Haven to supply London with coal and fish, and in the following year an Act of Parliament was obtained for the Thames Haven Dock and Railway Company. The route of the railway would pass through the current development site immediately north of the Thames, while the dock and railway station were to be located immediately to the west of Shellhaven Creek. Plans included a large rectangular dock, coal stores, warehouses, a hotel, and custom house (Kay 1999). By now, 'Thames Haven' had replaced 'Shell Haven' as a place name; presumably the company regarded the new name as more fitting for its enterprise, and the name would continue to be used for the rest of the 19th century. There was, however, some reversion to Shell Haven in the 20th century when the Shell Oil Company established its refinery there.

Construction work on the dock and railway was intermittent. It commenced in 1838, was halted in 1839, recommenced in 1847, ceased again in 1848, and restarted in 1854. The railway opened in 1855, but the dock remained unfinished (Kay 1999). Two rows of workers' cottages that were built at the site in 1838 are shown on the first edition (1863) and second edition (1895) Ordnance Survey maps and were demolished in the early 20th century. Other structures associated with the dock or the station included cattle pens, a pier and a public house ('The Dock House'). From the mid-1860s, the dock and railway were used for the transportation of livestock imported from the Continent. The surrounding fields were of course well known for their excellent pasture, and cattle were put to graze there for fattening before being sent to London (Anon. 1951). The railway was not, however, solely for the transportation of livestock and goods. An express train carried passengers daily from Fenchurch Street Station to Thames Haven, where they could board paddle boats to Margate (Kay 1999).

The cattle trade was particularly good from between 1867 and 1876, when about a third of the total livestock imports in Britain came through Thames Haven. Facilities were substantially enlarged in 1876/7 but soon after trade dramatically collapsed when there were several outbreaks of disease. These prompted a change in regulations, demanding animals be slaughtered on arrival in Britain, but given the isolated location of the dock, no abattoirs were ever built. The trade in the importation and transportation of cattle limped on for some years, but finally ceased in in 1895. Over the following years, the buildings associated with the dock and station were demolished. The pier, after neglect and damage, appears to have been officially closed in 1913, while the Thames Haven station, wharf and cattle-importation facilities were demolished in the mid-1950s.

Further industrialisation of the area occurred in the later 19th century following the Explosives Act of 1875, which made it obligatory to build new explosive works on remote sites such as the area around Shell Haven. The first development was the formation of the Miner's Safety Explosives Company Limited in 1888 and the establishment in 1890 of works on Curry Marsh to produce a mining explosive known as ammonite. Factory buildings are shown on Ordnance Survey maps of 1898 and 1924. A single rail track linked the works with the railway, but for a period the explosives had to be transported by sea, as the railway company refused to carry it (Sparkes 1965). The factory closed in 1927 and the site remained vacant until it was incorporated into the Shell Haven refinery in the 1960s (Kay 1999).

Another, and much larger explosives factory, which produced gun cotton, black and smokeless powder, cordite, nitroglycerine and cartridges, was established by Kynoch & Co. to the east of the London Gateway development at Holehaven Creek at the end of the 19th

century in anticipation of war in South Africa. As at Curry Marsh, many of the detached buildings associated with the plant (shown on the 1924 map) are surrounded by earthwork mounds to deflect the blast of explosives. A village was constructed to accommodate workers who were not commuting from the villages of Corringham and Fobbing via the newly built Corringham Light Railway. Known as Kynochtown, it would comprise some 40 houses, a school and a shop (Scott 1982). The village was renamed Coryton when the factory site was bought by Cory Brothers Ltd in 1923 and was closed in 1969/70 to allow expansion of the oil refinery that had replaced the explosives factory.

The origins of the oil industry in the London Gateway area, which would come to dominate the landscape, date to the 1870s when an Act of Parliament prohibited the passage of large petroleum vessels above Mucking Lighthouse at Thames Haven (Kay 1999). As a consequence of this, Thames Haven naturally became the location for an oil wharf. At this time, oil imports were largely of kerosene transported by sailing ship, each carrying about 5000 wooden casks (Anon. 1951). The ships moored at buoys in the river and the barrels were off-loaded into small lighters to be transported to the wharf.

A more permanent installation was soon established. A warehouse and large pier projecting into the river were constructed in 1876, allowing the barrels to be off-loaded direct to land rather than via lighters. The barrels were stored in the warehouse and subsequently transported to London on the Thames Haven railway (Kay 1999). Some barrels were transported locally by means of a self-propelled platform-type trolley along the sea wall. The first oil tankers arrived in 1892 and took a week to unload (Anon. 1951). The installation is shown on the Ordnance Survey map of 1898, which depicts the pier with a crane at the end and a simple set of rail tracks along its length. A large rectangular building shown adjacent to the pier was presumably the main warehouse. To the north are shown several further substantial buildings and 14 circular oil tanks of various sizes. Three sections of track forming the rail sidings link each part of the installation to the main rail lines. The installation was operated by a succession of oil companies, the most prominent being LATHOL, London and Thames Haven Oil Wharves Ltd (Sparkes 1965; Kay 1999). LATHOL expanded its operations into adjacent areas in the late 19th century and early 20th, and in 1914 established a small refinery on land immediately north of the railway line beneath a loop in the Rugward Fleet. These developments are shown on the Ordnance Survey map of 1922.

Another major oil installation was developed to the north-east of the Thames Haven railway station on the site of Oil Mill Farm – the name relates to the production of linseed oil on this site in the early 19th century – by the Anglo-Saxon Petroleum Company, an operating company set up in 1907 by the Shell/Royal Dutch group. The new facility included a tank farm, piers and a refinery which was designed to yield 3,000,000 gallons per year (Anon. 1951). The Shell refinery is shown on the 1915 Ordnance Survey map, although the plant was not operational until the following year. The refinery developed substantially in the inter-war period and was responsible for a variety of products – fuel oil, lubricating oils, bitumen, asphalts, Mexphalte, horticultural sprays and insecticides, and printing ink (Anon. 1951; Kay 1999). This expansion is recorded on the 1938 Ordnance Survey map, although oil storage tanks are not shown. Cory Brothers Ltd purchased the Kynoch site in 1923 and constructed a rival oil refinery and storage plant, although supply problems forced the refinery to close in 1938 and throughout the Second World War the site was used as a large storage depot.

With perceptions prominent in our minds of the Western Front and its mud-filled trenches and devastated battlefields, it is sometimes forgotten that there was a home front in Britain during the First World War (1914–18). Coastal defences were an important element of the home front, with various measures, among them the construction of pillboxes and the siting of gun batteries, being devised to protect ports and dockyards, defend against air raids and invasion, and secure the supply of food and other commodities. While the London Gateway development area appears to have remained unaffected by these works, the site lay within the area of the London Defence Line, a linear arrangement of trenches and mobilisation centres stretching south and east of London from Guildford to the Darent Valley in Kent and from Epping to Basildon in Essex (Pattison and Thomas 2018, fig. 4.24). On the Hoo Peninsula, an explosives factory operated by Curtis's & Harvey was built at Cliffe in 1916 (although cordite production had been established there some years before). Like the explosives factories in the London Gateway development area, the site at Cliffe was chosen because of its remoteness and flat landscape unimpeded by topography (Cocroft 2018, 125). On the opposite side of the peninsula, excavation by Archaeology South-East at Damhead Creek Power Station at Kingsnorth uncovered the remains of airship hangar, one of two built in 1912 that served as a base for aerial operations and the design, development and manufacture of airships (Dawkes 2017, 151–5).

The London Gateway development area contains a considerable number of sites constructed during the Second World War (1939–45), as attempts were made to protect the north bank of the river, a key strategic target for air-raids. The sites take the form of pillboxes (some located on top of the sea wall), road blocks, mortar emplacements, gun emplacements and observation posts. Most lie beneath the Shell Haven oil refinery and have been destroyed, and in the areas outside the refinery they appear to have been subsequently infilled. Aerial photographs dating to the 1940s show an extensive spread of anti-glider ditches, typically cross-shaped ditches bordered by concrete stumps, across the whole of the marshland area. Some of these devices are known within the Northern Triangle East and at Corringham Marsh (Strachan 1998, 87). The ditches were designed

to break up the flat ground surface, preventing enemy airborne aircraft from landing. Other measures included the construction of decoys. Stanford Wharf was the site of Stanford-le-Hope Oil QF (diversionary fire) bomb decoy. Concrete and brick structures found in the eastern end of Stanford Wharf Nature Reserve may be the remains of some of the oil fire installations (Biddulph *et al.* 2012c, 187–8). Bomb decoys were designed to simulate bomb damaged oil tanks to trick German bomber aircraft into dropping their payload onto the empty marshland. It is unknown whether they succeeded; bomb craters are known from aerial photographs at Corringham Marsh, immediately east of Stanford Wharf, but these are currently undated. All these measures were among many that were built around the coast and incorporated into the 'outer crust' of defences designed in conjunction with natural sandbanks and mudflats to halt or delay a German invasion force (Gilman and Nash 1995, 16). The bomb decoys at Stanford Wharf are modest compared with other oil-related devices. In 1944, a fake oil terminal, complete with pipelines, storage tanks and jetties, was built at Folkestone as part of an elaborate scheme of deception to divert German intelligence from discovering the true launching point for D-Day (Rankin 2008, 571). The Thames Estuary played a role, too, in 'Operation Diver', Britain's defence against Nazi Germany's V1 flying bomb. Batteries of heavy and light anti-aircraft artillery were positioned along the Essex coast between Canvey Island and Clacton-on-Sea and on the north Kent coast on the Hoo Peninsula and the Isle of Sheppey inside an area known as the 'Diver Box'. The eastern part of the Essex side of the London Gateway development and Salt Fleet Flats on the Kent side fell within this defensive area (Dobinson 2019, 298–9, fig. 18.2).

Some early snapshots of life at the Shell plant are provided by *The Pipe Line*, Shell's in-house journal. While the journal tended to concentrate on the social life of the employees, rather than documenting the refinery's expansion and operations, it occasionally hinted at the risks faced by employees – there is a reference, for example, to a tank fire in 1921, which destroyed a 50ft-diameter tank with 800 tons of heavy spirit – and the sense of isolation felt by the workers, owing to the location of the Shell Haven site (Anon. 1921). Apart from site workers, the plant served as a training ground for recruits to the Shell Company who were being prepared for foreign service, among them the future children's writer Roald Dahl, who had joined the company in 1934 (Dahl 2016, 210).

In the years following the Second World War, the oil plants in the Shell Haven area expanded greatly following the trend for primary refining to be undertaken in the country of consumption. The main post-

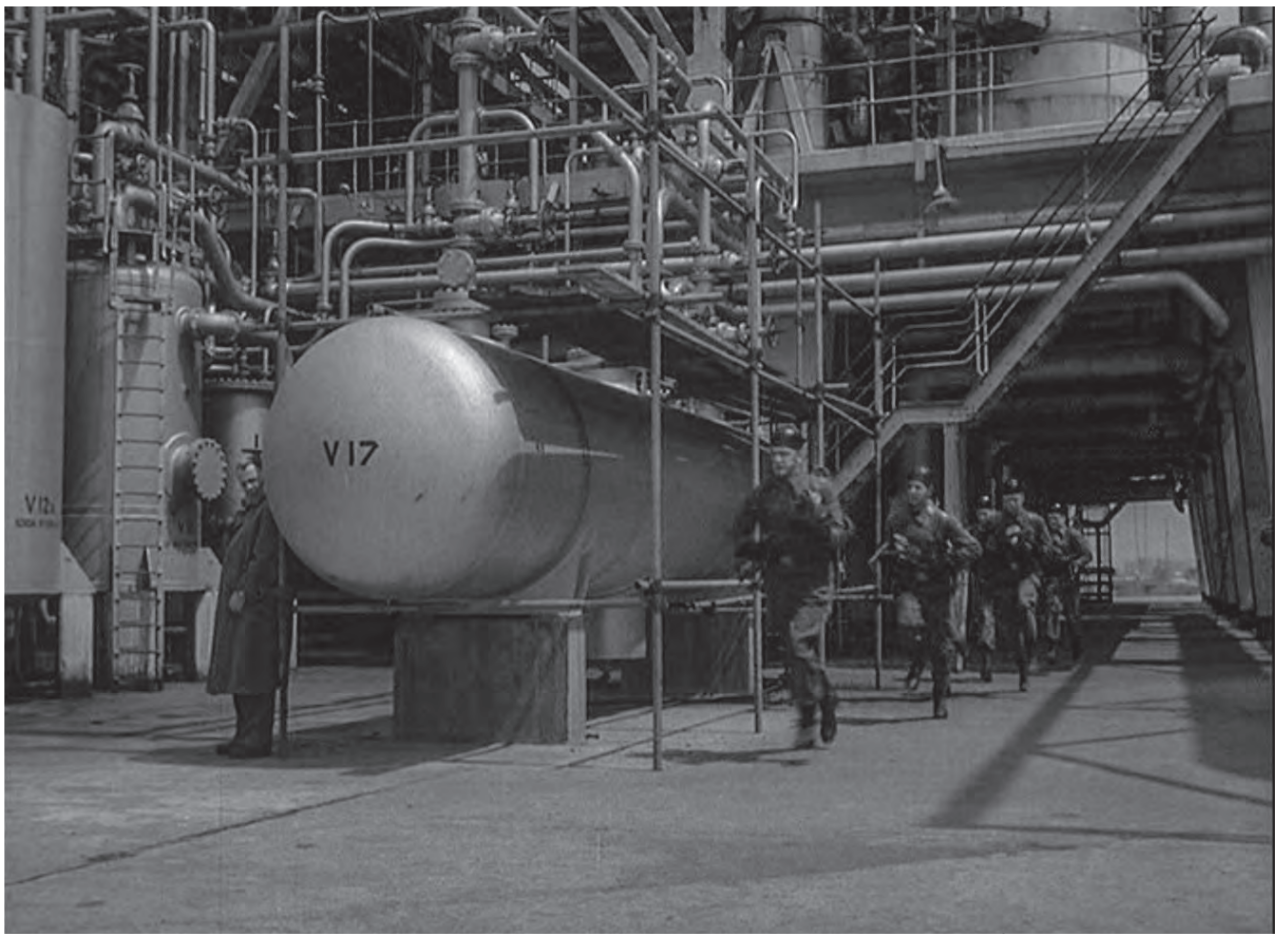

Figure 5.34 A scene from *Quatermass 2* (dir. Val Guest, 1957), showing Professor Quatermass (Brian Donlevy) hiding among the tanks and pipes of Shell Haven oil refinery © Hammer Films

war expansion of the Shell plant was on a large, formerly marshy area to the north-west of the LATHOL plant and within the current development area. The land was purchased in 1947 from LATHOL with an agreement that Shell would not use the land for an oil storage installation. An agreement was reached for Shell to use LATHOL's storage facilities and, after a period of closer integration, Shell took over the LATHOL plant and piers in 1969. The development and enlargement of the post-war Shell refinery can be clearly followed on the Ordnance Survey maps of 1960, 1968 and 1976. Other units constructed in the area included the MEC (Middle East Crude) refinery, which came on stream in 1950 and produced various petroleum products (Anon. 1950).

The vast, science-fiction environment suggested by the futuristic steel towers, tanks and pipes of the Shell Haven refinery rising from the low, almost primeval landscape inevitably attracted filmmakers. The BBC used the refinery as a backdrop for its television serial *Quatermass II*, broadcast in 1955, and in 1957 the site received the big-screen treatment with *Quatermass 2*, Hammer Films' adaptation of the serial (Hearn and Rigby 2003). The refinery received substantial screen time and was the scene for the film's thrilling conclusion involving a gun-battle between Quatermass and an angry mob on the one side and a blob-like alien lifeform and its human slaves on the other (Fig. 5.34). The refinery doubled as a factory that produces an ammonia-based atmosphere able to sustain the alien lifeform. In something of a case of fact following fiction, an ammonium nitrate plant opened on the London Gateway site two years later. The factory, operated by the horticultural chemicals company Fisons, was located on the south side of the Thames Haven branch line close to the junction between the railway and Wharf Road, south of Stanford-le-Hope. The plant closed in *c* 1970 (Kay 1999).

Little of the industrial landscape was investigated archaeologically. The still-extant oil refineries and associated buildings removed much of the earlier industrial features, and along the southern edge of London Gateway, in interventions at Carter's Lagoon, the Tongue Land HGV Lorry Park, the Gate Complex, Logistics Park Infrastructure site and Shellhaven Creek, evidence of industrial development was confined to layers of made ground, deposits of concrete and rubble used to build up the land over the alluvium.