Archaeological Trench Investigation

London Gateway Logistics Park, Stanford le Hope, Essex, Proposed Great Garlands HGV Lorry Park

Archaeological Trench Investigation

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Proposed Great Garlands HGV Lorry Park

Archaeological Trench Investigation

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Summary

Oxford Archaeology South was commissioned by London Gateway Logistics Park Ltd to undertake an archaeological evaluation of the site of a proposed Heavy Goods Vehicle Lorry Park at the London Gateway Logistics Park (LGLP), adjacent to the London Gateway Port alongside the River Thames near Stanford-le-Hope, Essex, centred on NGR TQ 70887 82261*. The proposed location for the Lorry Park (the 'application site') is an area of farmland at Great Garlands Farm, located outside the LGLP to the west.*

Significant archaeological remains were encountered in two evaluation trenches out of 21, both of which were situated along the western edge of the site. However, the trenches only investigated the top 1m of the soil sequence, which would be most directly affected by the development. Because of the thick sequence of alluvium covering the site, archaeological features could be present at any depth down to 9.4m below ground level. Based on the results of the evaluation, a number of potential archaeological impacts are anticipated if the development proceeds as proposed.

The most vulnerable features are a series of well-preserved surface earthwork features of medieval/ post-medieval date that cross the site, comprising sea walls and enclosures associated with a 16th-17th century wharf known as 'Feake's Hithe' and sea walls of medieval or post-medieval date. Construction of the proposed Lorry Park would inevitably have an adverse effect on the upstanding earthwork features. These were not targeted for investigation in this phase of trench investigation as their chronology and significance is sufficiently understood from documentary research and Lidar analysis to inform the EIA process. Consultation with Essex County Council indicates that construction impacts to the upstanding earthworks would only be acceptable as a final resort, once all other options for preserving them in situ have been explored.

The western margins of the historic Carter's Creek have considerable potential for maritime archaeological finds associated with Feake's Hithe, which has produced evidence for ship or boat building. Trench 4 contained the remains of a timber wharf, buried at a depth of 1m below ground level. This area is likely to be excluded from the development but any proposed groundworks within the western side of the application site, including ecological mitigation earthworks, would require careful assessment.

It is very likely that significant remains are present at greater depth within the Holocene alluvial sequence. One evaluation trench produced a group of late Bronze Age flint and pottery from a location close to the river terrace edge, along the western edge of the application site. These were found at such shallow depth that they are most likely to have been dug out from the thick alluvial sequence underlying the site and redeposited in the post-medieval period. However, being so close to the terrace edge these prehistoric finds could conceivably be from an in situ Bronze Age horizon. However, more deeply buried remains will be below the level of the construction impacts, and would be preserved in situ beneath a protective layer of made ground.

Detailed design information for the Lorry Park is not available at this stage and will be reviewed during the design process to ensure that the assumptions used in this archaeological evaluation remain valid.

1 INTRODUCTION

1.1 Location and scope of work (Fig.1)

1.1.1 DP World London Gateway Logistics Park Limited (LGLPL) proposes to construct a new temporary Heavy Goods Vehicle (HGV) Lorry Park in an area of the London Gateway site on farmland at Great Garlands Farm, adjacent to the London Gateway Port, alongside the River Thames near Stanford-le-Hope, Essex (NGR TQ 70887 82261; Fig. 1).

1.1.2 The proposed new Lorry Park would provide haulage yards, parking and welfare facilities for hauliers using the Port and Logistics Park. LGLPL is proposing to submit an application for planning permission for the proposed project to Thurrock Council under the Town and Country Planning Act 1990.

1.1.3 The site encompasses an area of *c* 24.25 hectares, bounded by the London Gateway Logistics Park (LGLP) development plots to the east, and the London Gateway Port (LGP) Access Road and Admin Building to the south. All of these have been developed or redeveloped in recent years as part of the London Gateway development. The River Thames is 500m south of the site. The nearest historic settlement is Great Garlands Farm, visible on the rising ground to the north of the site. The nearest urban area is Stanford-le-Hope, situated *c* 1km to the north-west of the site. The site forms part of the Corringham/Fobbing Marshes Local Wildlife Site, one of the largest areas of relict grazing marshes in South Essex.

1.1.4 The archaeological potential of the application site was considered to be uncertain, but probably very high. Oxford Archaeology South (OAS) was commissioned by LGLPL to conduct a trench investigation to establish the potential for significant archaeology within the site to be affected by construction of the proposed Lorry Park. This was intended to inform a screening process to establish whether an Environmental Impact Assessment (EIA) was required for the development. Although the proposed development is not covered by existing planning permissions for the London Gateway Port and Park, the trench investigation was completed in accordance with the London Gateway Archaeological Mitigation Framework (AMF, OA 2003), to ensure consistency with previous investigations at the London Gateway site.

1.1.5 An 'Archaeological Project Design' (APD) was prepared in accordance with the format laid out in the London Gateway AMF. The assessment of archaeological impacts and mitigation proposals, however, were presented in outline only, since detailed design information for the Lorry Park is not yet available. Section 4.2 of this report is an updated impact assessment that takes into account the results of the trench investigation.

1.1.6 The APD was prepared by DP World's Archaeological Contractor (Oxford Archaeology) and approved by the LG Archaeological Liaison Officer (Gill Andrews) and the archaeological statutory consultee for the LG Park, Richard Havis (Historic Environment Advisor, ECC Place Services).

1.1.7 Prior to the evaluation, the archaeological impacts arising from the proposed Lorry Park development were expected to be substantial: The application site lies in an area of reclaimed marshland covered with a thick sequence of Holocene alluvium. There is considerable potential for well-preserved marine and coastal archaeology, buried at depth within the alluvium. Within the site the traces of 17th century (and potentially medieval) sea walls and other landscape features survive as upstanding earthworks. Marine archaeology, such as boats or wharf structures, were predicted in the deposits

infilling historic creeks, but any such remains were expected to be deeply buried. Prior to the creation of the Lorry Park, the ground would be built up to a similar level as the LGLP, preserving any deeply buried archaeology *in situ*. Previous trenching in the adjacent plots to the south (Carter's Lagoon and Port Admin Building) had not encountered any significant archaeology within the upper part of the alluvium, but these areas had been previously developed as part of the Shell Haven Oil Refinery and subject to much ground disturbance. In contrast, the application site is undeveloped farmland.

1.2 Geology and topography

1.2.1 The application site lies entirely within geological deposits mapped by the British Geological Survey as 'tidal flat' deposits (inter-tidal alluvium). The development of these deposits is complex and has a direct bearing on the archaeological potential of the site. An extensive geoarchaeological 'deposit model' has been completed covering the floodplain areas of the LG Port and LG Park, incorporating the results from borehole surveys, an electrical resistivity survey, radiocarbon dating and palaeoenvironmental analysis (OA 2012). The model does not detect archaeological sites directly; rather, it provides a framework for predicting the most likely locations for significant sites and for assessing past and future construction impacts within the floodplain. It allows the depth and potential location of archaeological sites to be predicted and compared against specific construction impacts.

1.2.2 At the end of the Devensian and during the early Holocene, the Thames floodplain is likely to have been an extensive gravel braidplain. The deposit model indicates that the development area began to accumulate inter-tidal sediments from the late Mesolithic, from both marine and riverine influences, the channel network probably becoming more constrained and less braided as a result. The process of sedimentation continued throughout the Holocene, producing the current depth of alluvium.

1.2.3 In 2009 a resistivity survey successfully modelled the interface zone between the Holocene and Pleistocene deposits in the area of the application site, defining the transition between the terrace and tidal flat deposits (OA2012). The electrical resitivitity profile clearly shows a rapid deepening of deposits across the interface zone. This suggests that the interface between the terrace and tidal flat deposits coincides with an avulsed palaeochannel at the floodplain edge that has laterally incised into the terrace deposits (which has possibly influenced the alignment of Carter's Creek). This subsequently infilled with fine-grained sediments, producing a rapid deepening of allluvium at the terrace edge. In general the upper alluvium in the tidal flats is considered to have high potential for preserving organic remains, due to the waterlogged environment, but low potential for archaeology, as the deposits have formed in an inter-tidal environment. The interface between the tidal flats and terrace edge, on the other hand, is considered to have exceptionally high potential for marine and coastal finds such as boats, wharves, sea walls, sluice gates etc, due to the likelihood of complex archaeology being preserved within comparatively shallow, waterlogged, sediment sequences. Non-intrusive surveys and the trenching have therefore been concentrated in that transitional zone. This potential is greatly enhanced by documentary sources, which indicate the presence of a medieval/post-medieval wharf at this location, and the absence of modern development (in contrast to the former Shell Haven Oil Refinery to the east).

1.2.4 The alluvial sequence within the application site has been assessed for palaeoenvironmental evidence in Boreholes ARCBH2 and ARCBH3 (Figs 3 and 8), which were drilled in 2001 and subject to radiocarbon dating and palaeoenvironmental

analysis as part of the initial stages of the geoarchaeological deposit model. Full details can be found in the deposit model report and associated archive (OA 2012). The radiocarbon dates from cores ARCBH2 and ARCBH3 are from two peat/organic silt units which are mid-Holocene in age (early Neolithic). The peat layer in ARCBH2 (6.6m below ground level, -4.3m above Ordnance Datum (AOD), dated to 3990-3770 cal BC) is at a lower level than peat of similar age in ARCBH3 (5.2m below ground level, -3.1m AOD, dated to 3670-3370 cal BC). The deeper sequence in ARCBH2 is probably due to the presence of the palaeochannel along the terrace edge that had been identified by the electrical resistivity survey. The higher level in ARCBH3 may indicate the presence of an island in the marsh in the early Neolithic, located on the eastern side of the application site. Further to the south-east the Holocene deposit sequence deepens. For example, in ARCBH7, near the north-eastern edge of the London Gateway Commercial Park, the Holocene floodplain deposits were recorded as being 12.4m deep in total and a peat horizon at the base of the sequence (at -10.2m AOD) was dated to the early Mesolithic (7200-6450 cal BC).

1.2.5 During the historic period (according to documentary evidence from *c* 1620 onwards) systematic marshland reclamation and the construction of sea walls largely halted marine influence within the alluvial floodplain and the vertical accretion of the sediment body slowed or stopped. The top of the alluvial sequence has subsequently undergone soil maturation and stabilisation, coupled with drainage and agricultural improvement.

1.2.6 The interface between geologically defined landscape zones often acts as a focus for human settlement. The high archaeological potential of this zone is borne out by the presence of known historic settlement activity in the vicinity. Nearby historic terrace-edge settlements, such as the medieval farm complex at Old Garlands/ Great Garland are typically located on areas of river terrace gravel (apparently avoiding the clayey head deposits) at around the 13m contour, presumably to avoid the effects of floods. However, prior to the systematic construction of sea walls in the early 17th century they were located close enough to the terrace edge to permit ready access to the river Thames via navigable creeks.

1.2.7 The application site is within a rural buffer zone between the London Gateway development and the urban extents of Stanford-le-Hope, Corringham and Fobbing. The land retains a flat, open aspect, within which a well-preserved complex of historic earthworks extend around the head of Carter's Creek (so-named on the 1898 OS map, Fig.2). Construction of the Thameshaven Branch of the London, Tilbury and Southend Railway in 1854 seems to have largely blocked the flow of water through Carter's Creek to the Thames and reversed the direction of flow. The land retains a flat, open aspect and has escaped the westward expansion of the Shell Haven Oil Refinery in the latter half of the 20th century.

1.3 Archaeological and historical background

1.3.1 While the Thames river terrace in the Stanford-le-Hope area contains extensive evidence for later prehistoric and Roman settlement and agriculture, there is little evidence for prehistoric or Roman activity within the application site. As described in Section 1.2, any such remains are likely to be buried beneath several metres of alluvium.

1.3.2 The application site contains a well-preserved complex of historic earthworks which extend around the head of Carter's Creek (so-named on the 1898 OS map). These are associated with the marshlands of Old Garlands Farm, an estate with well-documented medieval origins and a deserted medieval and post-medieval wharf known in the 16th

and 17th century as *'Feake's Hithe'*. Within this area the pattern and extent of creeks and field boundaries appears to have changed relatively little since the medieval period, although the natural saltmarsh environment has been modified by land reclamation and subsequent drainage and agricultural improvement, each phase of which has left its mark on the landscape.

1.3.3 Old Garlands Farm was formerly one of a group of small medieval estates in the south-east of the Stanford-le-Hope. In a Title Deed dated AD 1594 the alternative name of the estate is given as 'Old Garlands Den', which suggests that it may have originated as a detached portion of an upland parish, a common arrangement in south Essex in the late Saxon and Norman periods by which parishes with no river frontage were provided with access to the Thames marshes for summer grazing. Each estate historically consisted of core settlements located on the river terrace (e.g. Broadhope Farm; Old Garlands Farm) located among their respective 'upland' fields, which at the time of the 1840 Tithe Map (ERO D/C/T362B) lay broadly between High Road and the edge of the river terrace. In addition, each estate included extensive marshland pasture, comprising, 'fresh marsh' (enclosed by a sea wall) and unenclosed 'saltings' or 'waste'.

1.3.4 Artefacts recovered from archaeological investigations within the lands of Old Garlands and Broadhope Farm suggest that these terrace edge settlements had developed into permanent settlements by at least *c* AD 1200, although most of the finds to date have been from a wharf site on the former Thames foreshore rather than the farms themselves (see Section 1.4 below). The high value attached to marshlands in the area is illustrated by a mid-13th century document recording that one John Ayleward gave the pasture of Curry Marsh to the Abbott and Convent of Waltham Abbey (Lords of the Manor of Abbott's Hall in Stanford-le-Hope), 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 placename 'Curry Marsh' in this context probably derives from Anglo-French *curreier* (to curry-comb a horse), which perhaps suggests that this marsh was particularly valued as a horse pasture in the medieval period. At the time of the Dissolution of the Monasteries, Curry Marsh was associated with Stanford-le-Hope Chantry Chapel, a possession of Waltham Abbey (National Archive Reference E 354/11).

1.3.5 Medieval attempts at land reclamation are recorded in the Thames estuary on both sides of the river, particularly in the 12th-13th centuries. However there is currently no conclusive documentary or archaeological evidence for medieval reclamation in Stanford-le-Hope and Corringham marshes. Some early reclamations seem to have failed in the 14th and 15th centuries as a result of rising sea levels and reduced pressure on land in the aftermath of the Black Death, removing the economic incentive to maintain them (Rippon and Wainwright 2011). Rippon and Wainwright have devised a typological dating scheme for marshland reclamations in south Essex, including the Stanford-le-Hope marshes, using detailed analysis of historic maps. They concluded that evidence for medieval reclamation is rare in this region. The bulk of the south Essex marshes remained unreclaimed saltmarsh until the early 17th century. Stanford-le-Hope marshes, including Old Garlands Farm, they conclude are among the few possible examples of medieval reclamation in the County, although the dating evidence is very poor. The most that can be said with certainty is that some of the sea walls in the area pre-date the well-documented early 17th century reclamation (Rippon and Wainwright 2011). It is therefore possible that traces of medieval sea walls could be encountered within the application site.

1.3.6 The Old Garlands estate is remarkably well documented from at least the late 14th century. A very small neighbouring estate known in the early 17th and 18th centuries as 'Little Garlands' was probably originally part of the same estate but seems to have been separated off in the late medieval period. The core of 'upland ground' belonging to Old Garlands was 38 acres in 1425 but was reduced to 30 acres by 1594. Old Garlands was held as a freehold manor by successive members of the Garland family from at least the late 14th century until the 16th century, the earliest certainly named being 'Richard Garland, painter, of London' (Court of Common Pleas, CP 40/659, rot. 530). The Garland family were still in residence in Stanford-le-Hope in 1525 (National Archives Reference C241/279/16).

1.3.7 The earliest definite reference to the estate is in a legal case in 1425, which includes details of the estate and describes a dispute between rival claimants to the farm, each producing evidence from earlier charters to back up their claims (Court of Common Pleas, CP 40/659, rot. 530):

1.3.8 "Robert Garlond states that on 1 November 1424 John Draypole 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 Garlond 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".*

1.3.9 The date of the earlier events involving Richard Garland, painter, 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 'Peasant's 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 High Road in Fobbing (*c* 3.5km north-east of Old Garlands). The revolt is regarded by many historians as one of the most significant events in English History, an early example of a grass roots working class revolt against oppression. It started on 30 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 where Richard Garland's political sympathies lay, but it seems likely that he would have been a witness to the dramatic events in Essex and/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). Out 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).

1.3.10 In 1591 the Old Garlands estate was acquired 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. The estate was acquired by Hawkins from local landowner Eugeny Gatton of Mucking Hall in a form of mortgage foreclosure. '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 1592-1920 and extensive records survive from that period, held in the Rochester-upon-Medway City Archives (Medway CityArk CH108). 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 saltmarsh [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 from Mousehole Well to carry water"*. The use of three different terms for different categories of marshland here was a practise that became common 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).

1.3.11 The 1591 title deed for Old Garlands has some intriguing historical associations. 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 an English 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. His reputation has suffered in comparison with his contemporaries because of the leading part that he played in establishing the highly profitable English transatlantic 'triangular trade' (he published a treatise describing his slave-raiding tactics and his chosen coat-of-arms included the figure of a bound slave).

1.3.12 Hawkin's last flagship, which was laid down at Deptford in 1590, and in which he died in 1595, was called 'Garland', possibly named after the Old Garlands estate, which suggests that this may not have been a chance acquisition (Archivist note in Records of the Hospital of Sir John Hawkins, Knight, in Chatham 1594-1987, Rochester-upon-

Medway City Archives, CH.108, Medway Archives and Local Studies Centre, Ref: GB 1204 CH108). Hawkins owned houses near the royal dockyards at Chatham and Deptford and was a frequent commuter 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, so had perhaps been familiar to the Captain-General 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. The small manorial wharf known as *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. The other witnesses to the Old Garlands title deed included Hawkin's three brothers-in-law (who also witnessed his will in 1594), namely Edward Fenton (a sea captain who had also served against the Spanish Armada), Robert Peterson (prominent lawyer and poet) and Benjamin Gonson (son of Hawkin's predecessor as Treasurer of the Navy). Fenton and Peterson were close acquaintances of Sir Robert Dudley, Earl of Leicester, "Lieutenant and Captain General of the Queen's armies and companies", who commanded the troops at Tilbury (Medway CityArk CH108).

1.3.13 The historic Manorway track, which forms the northern boundary of the application site, seems to have built soon after *c* 1640, as a result of legal action brought by the owner of Curry Marsh against the Hawkins Hospital as owners of Old Garlands, obliging them to build a ‘driveway’ to provide access to Curry Marsh for grazing sheep (Medway CityArk CH108).

1.3.14 The records indicate periodic increases in, and improvements to, the associated marshland pasture as a result of land reclamation and drainage, particularly in the early 17th century. Documentary sources held in the Essex Records Office indicate that a large area (1500 acres) named ‘Fobbing Level Marshes’, which probably included Curry Marsh and possibly some or all of the marshlands of Old Garlands, were ‘inned’ (i.e., enclosed by sea walls) in *c* 1623. A map of the marshlands dated 1617 may have been drafted in planning for this (ERO Ref: D/DU 112/1). A mid-17th century map held in the Essex Record Office, labels the sea wall as 'the Dutch wall against the Thames' and annotates Curry Marsh as 'lately inned by the Dutchmen', a reference to the immigrant Dutch engineers who undertook many major English reclamation schemes in the early 17th century (Fig.7, ERO Ref: D/DU 112/2). The map is undated but was very likely produced in connection with a legal dispute in 1636-40 over rights-of-way to Curry Marsh, which resulted in construction of the Manor Way track (Medway CityArk CH108). The contemporary reclamation of nearby Canvey Island by Dutch engineers in 1623, possibly under the direction of Cornelius Vermuyden, is well documented. Reclamation marked a major investment, resulting in substantial changes in land use within the marshes and reflects their increasingly intensive exploitation, still mainly for grazing livestock, in response to population pressure. This was a nationwide phenomenon but pressure on land was particularly intense in the Thames estuary due to the growth of London. The 300 Dutch engineers who 'inned' Canvey received one third of the land reclaimed in payment for their labours. Examples of their distinctive octagonal worker's cottages still survive on the island.

1.3.15 The mid-17th century map (Fig.7) names Mr.Robert Salmon as trustee of the Hawkins Hospital lands, who must be one of three merchant venturers of that name to hold the office of Master of Trinity House in the late 16th and early 17th century (father, son and grandson). This eminent nautical dynasty was based at Leigh-on-Sea, a few miles to

the east of Old Garlands. Trinity House was (and still is) a charity primarily concerned with the safety, education and welfare of mariners. The Masters of Trinity House were among the *ex officio* members of the Board of Governors of the Hawkins Hospital, from its foundation in 1594, with responsibility for auditing the accounts, among other duties. Other *ex officio* governors included senior officials of the Royal Navy and the Royal Dockyard at Chatham, the Archbishop of Canterbury and the Dean of Rochester. The rest of the board was mainly recruited from Kent-based aristocrats. The hospital governors took a close interest in their Essex estate, which involved a group visit on at least one occasion (Medway CityArk CH108). Day-to-day management was undertaken by the Deputy Governor.

1.3.16 Some of the plots within the Old Garlands marshlands are referred to as 'belonging to Rochester Bridge' on the mid-17th century map (Old Garlands was at times divided between two tenements). Institutional arrangements for managing the repair and maintenance of Rochester Bridge pre-date the 12th century. By the 17th century, funds were raised using the income from a portfolio of landed estates, which were managed by elected wardens. The Wardens of Rochester Bridge also served on the board of governors of the Hawkins Hospital (Medway CityArk CH108).

1.3.17 There is archaeological evidence from a watching brief by ECC on the Coryton Gas Pipeline and from the London Gateway Access Road excavations, that during the 16th century *'Feake's Hithe'* was a busy wharf with at least one substantial building and a variety of craft and agricultural activities clustered in a band around the head of Carter's Creek. One of the fields on the 1848 Tithe Map at this location is called 'Saw Pit Field', supporting archaeological evidence that ship or boat building activity took place here. Documentary evidence suggests that the wharf was inhabited in that period: William Roger and John Rattell of *'Fakesheve'* are listed among representatives from the Parish of Stanford-le-Hope in the Inquisitions of Barstable Hundred Court in 1577 and 1579 (ERO Ref: Q/SR 70/51).

1.3.18 The 1617 map is very indistinct and it is not possible to tell whether buildings were present at the wharf by that date. The c 1640 map is very clearly drawn and certainly does not show any buildings at the wharf site, even though it does depict an individual shepherds hut in Old Garlands Marsh. It thus seems likely that the wharf site was no longer inhabited by this time, although the place name lived on until the 18th or 19th century and it may have continued in use as a landing place as late as the *'Fox Hive'* on the 1777 Map of Essex by Chapman and Andre. The wharf at *Feake's Hithe* seems to have undergone a gradual decline from around the early 17th century, possibly as a result of silting in the Creek, and possibly connected with reclamation of the marshes in *c* 1623.

1.3.19 The 18th century estate records include a draft "to be let" notice for Old Garlands Farm, dated *c* 1750, which by this date is described as 'messuage, barn, stable, 30 acres upland, 87 acres fresh marsh land and 15 acres salt/waste land'. This appears very similar in terms of area to the 1599 and 1614/15 descriptions, but the bulk of the marshland is described as ‘fresh marsh’ in the *c* 1750 document whereas it was described as ‘greenmarsh’ in 1599, presumably reflecting the reclamation of the area in *c* 1623. Flooding was clearly a perennial risk. The tenants of Old Garlands Farm in 1735 complained of the disastrous effect on their livestock and corn of severe Thames floods.

1.3.20 In the late 19th and early 20th centuries large explosives factories and oil storage and refinery sites were developed some distance to the south-east of the application site, 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 WW2. Wartime aerial photographs show several anti-glider landing ditches forming cross patterns within the application site. These were mostly infilled in the immediate post-war period and little or no trace remains on the ground.

1.4 Previous archaeological surveys

1.4.1 The application site has been subject to various non-intrusive archaeological surveys, including geophysical and surface artefact collection surveys carried out in 2002 for the original Environmental Statement. These did not cover the whole site and did not produce useful results. The plots show a complex pattern of magnetic responses, typical of Holocene alluvium, which obscure any archaeological features that may be present. As described above, more recent non-intrusive baseline studies include a geoarchaeological deposit model, which characterised the floodplain areas of the London Gateway development, including the Lorry Park, using a combination of borehole data, extensive electrical resistivity survey and palaeoenvironmental analysis.

1.4.2 The baseline studies have shown that the entire Thames floodplain in this area was occupied by intertidal mudflats and salt marsh from *c* 6500BC (during the Mesolithic period, when the site was inundated by rising sea levels) until the early 17th Century, when the marshlands in the area were subject to large-scale systematic reclamation, through the construction of sea walls. The Holocene alluvial deposits that infilled the floodplain area between *c* 6500BC and the early 17th Century are up to *c* 12-15m thick in the main London Gateway development site, but thin out to the west in proximity to the river terrace. The application site lies at the western edge of the floodplain at the interface with the river terrace, in an area with relatively shallow alluvial deposits.

1.4.3 The only previous intrusive surveys (trenching or excavation) that have been undertaken within the application site boundary to date comprise trial trenches in the Access Road and Admin Building plots, which overlap slightly with the south-western corner of the site. No significant archaeology was found in the upper part of the sediment sequence in these investigations, although a section was recorded through a 17th century sea bank associated with Carter's Creek.

1.4.4 An archaeological site of particular interest, in the western part of the application site and further to the west, dates from *c* AD 1200-1600 and must represent *'Feake's Hithe'*, the small deserted manorial wharf within Old Garlands Farm, focused at the head of the historic 'Carter's Creek'. It was first discovered to the south of Great Garlands Farm during a watching brief by ECC FAU on the Coryton Energy Centre gas pipeline in 1999 (Peachey and Dale 2005). A further group of medieval and post-medieval features was identified during trial trenching and excavation along the LG Access Road (OA 2010). The earliest features on both sites are a series of medieval drainage ditches, some of which were in-filled with dumps of domestic rubbish dating from the 12th-14th centuries. The LG Access Road excavation discovered a medieval pit containing a complete calf skeleton. The medieval features were sealed by alluvium in some places (probably flood deposits). The most significant features date from the 15th-16th century and were concentrated in the 1999 Coryton Energy Centre gas pipeline excavation (Fig. 2, ECCAS watching brief, Great Garlands Farm). If the 1999 gas pipeline and LG Access Road site is part of a continuous linear site extending along the edge of the gravel terrace, its total extent would be *c* 600 m, stretching from the Manor Way track in the north, to the LG Access Road centre line in the south, as shown on Figure 2. The

13th-16th century features appear to be confined to a narrow strip, no more than *c* 50m wide, closely following the edge of the river terrace, which would have been tidal foreshore prior to land reclamation in the 17th century.

1.4.5 The ECC FAU excavation revealed a considerably wider range of features and artefacts than were apparent in the LG Access Road excavation, including more direct evidence for structures, and stratified occupation deposits. They included two cobbled surfaces (the largest 25m wide and 0.2m thick). Given the landscape context, close to the head of a large tidal creek, these surfaces are perhaps best interpreted as 'hards' for pulling boats up onto the shore. The largest cobbled surface lay alongside a broadly contemporary large, rectangular timber building (10m by at least 9m). The cobbled surface was partly overlain by an "occupation layer" which produced a variety of finds including "*the handle of a late medieval copper alloy chafing dish, an almost complete late medieval Surrey White ware dripping dish, and a 16th century carved bone toothpick with a head in the shape of a unicorn*". A second, smaller cobbled surface, possibly a kiln or oven, a pit, postholes and other features, were also recorded in the same area.

1.4.6 The area of 13th to 16th century activity south of Great Garlands Farm is located at the very edge of the gravel terrace. The earliest map consulted, Chapman and André's map of 1771, clearly shows a creek extending through the marshes to the foot of the terrace at this point, which is named as 'Carter's Creek' on the 1st Edition OS map. The surviving earthworks at that location support the interpretation of the site as a wharf, including a flat area surrounded by a substantial (c 2m high) sea wall at the foot of the terrace immediately south-east of the present Great Garlands Farm, with two level platforms beside the sea wall.

1.4.7 The latest artefacts from this site seems to coincide broadly with the documented onset of large scale, systematic land reclamation in the early 17th century. The construction of sea walls might well have rendered the wharf unusable, as well as altering the pattern of land-use in the marshes. The latest artefacts from previous excavations at *Feake's Hithe* are also broadly contemporary with the acquisition of Old Garlands Farm by the Hawkin's Hospital in 1592, although the dating of the archaeological finds is not sufficiently precise to establish a definite connection.

1.5 Acknowledgements

1.5.1 Oxford Archaeology were appointed to undertake the evaluation by LGPL, who funded the project. Richard Havis, the Archaeological Officer for Essex County Council, monitored the work. The fieldwork was conducted by Andrew Ginns assisted by Pete Vellett. The report was written by Vix Hughes and Stuart Foreman. The project was managed for Oxford Archaeology by Stuart Foreman. Gill Andrews (Consultant Archaeologist) monitored the work on behalf of LGPL.

2 Evaluation Aims and Methodology

2.1 Introduction

2.1.1 The various drainage swales and ponds that will be required have the potential to intrude into archaeological deposits and alluvium. Medieval and post-medieval deposits associated with the deserted settlement of *'Feake's Hythe'* include extant earthworks and may include archaeological features buried at shallow depth, which would be affected by the excavation of swales and ponds.

2.1.2 It is likely that the deepest ponds would extend to a maximum depth of *c* 0.3m below present ground level. Due to the presence of infilled palaeochannels and the terrace edge environment, archaeology could be encountered at any level within this impact zone. In contrast to the neighbouring LG Park, the Lorry Park site has not been subject to previous modern development. Any archaeology present may be exceptionally well-preserved in waterlogged alluvial deposits.

2.2 Aims

2.2.1 The aim of the investigation was to understand the likely impact of the development on any significant archaeology contained within the upper alluvial sequence in the western side of the Lorry Park development, in order to inform the EIA process.

2.2.2 Construction of the proposed Lorry Park would inevitably have an adverse effect on the extensive upstanding earthwork features described above. These were not targeted for investigation in this phase of trench investigation as their chronology and significance is sufficiently understood from documentary research and Lidar analysis to inform the EIA process. Excavation of trenches through the embankments would cause damage to the earthworks and disturbance to the Local Wildlife Site and were not undertaken at this stage. Consultation with ECC indicates that construction impacts to the upstanding earthworks will only be acceptable as a final resort, once all other options for preserving them *in situ* have been explored.

2.2.3 The investigation aimed to determine the presence/absence, extent, date range, condition and complexity of any archaeological remains which may survive, and assess the associations and implications of any remains encountered with reference to the historic landscape.

2.2.4 It also aimed to determine the potential of the site to provide palaeoenvironmental evidence, and the implications of any remains with reference to economy, status, utility and social activity, including consideration of the likely range, quality and quantity of the artefactual evidence present.

2.3 Methodology

2.3.1 The likely impact of proposed drainage features in the western part of the development site was investigated through archaeological trenching, sufficient to inform the EIA. The depth of investigation was generally limited to 1m, concurrent with the typical depth of the proposed drainage features.

2.3.2 An array of 21 trenches was excavated to characterise deposits of all dates within the uppermost 1m of the sediment sequence, the typical depth of the proposed drainage swales and ponds (Fig. 4). The trenches were focused on the western side of the Lorry Park plot where the proposed drainage features are to be located.

2.3.3 The trenches were infilled as part of a rolling programme before they could become inundated with ground water. Richard Havis (ECC) was invited to inspect them on

behalf of the local planning authority. Photographs of all of the trenches are included in this fieldwork report.

2.3.4 All of the trenches were positioned to try to establish the eastern extent of the deserted settlement and wharf of *Feake's Hythe*, and any earlier archaeology that may be present within the top 1m of the sediment sequence.

2.3.5 The excavation of 21 archaeological trenches was carried out in an ecologically sensitive green belt area. Due to ecological constraints Trench 1 could not be excavated.

2.3.6 The DP World surveyor marked out the trench locations on the ground with pegs, using a GPS surveying unit corrected by long range RTK stations.

2.3.7 All trenches were excavated using a 360º mechanical excavator supplied by the on-site sub-contractor (PJ Contracting), fitted with a toothless ditching bucket and under the supervision of an experienced archaeologist. Machining continued in spits, no more than *c* 0.2m thick, down to the top of the undisturbed natural geology or the first archaeological horizon depending upon which was encountered first. Once archaeological deposits were exposed, further excavation proceeded by hand and the appropriate use of machine.

2.3.8 The proposed trenches varied in size (most commonly 30 x 2m at base), and were excavated to a maximum depth of *c* 1.0m.

2.3.9 Digital photos and colour and black-and-white negative photographs were taken of any archaeological features, deposits, trenches and evaluation work in general.

2.3.10 Plans were drawn at an appropriate scale (1:50) with larger scale plans (1:20) of features as necessary. Section drawings of features were drawn at a scale of 1:10. All section drawings were located on the appropriate plans. The absolute height (mAOD) of all principal strata and features, and the section datum lines was calculated and indicated on the drawings.

2.3.11 All fieldwork was undertaken in accordance with standard OAS practices (Wilkinson 1992).

2.3.12 On completion of recording work at each location, the trench was back-filled and compacted using the mechanical excavator.

2.3.13 Deeply buried deposits (greater than 1m depth) were not investigated as any archaeology within them was expected to be preserved *in situ* through sensitive design and construction methods. The eastern areas of the site to be covered by the proposed ground-raising were also not included in the current trenching scope. If the development is approved these areas may require investigation at a later date, to allow the impact of soil compaction on any deeply buried archaeology to be assessed.

2.3.14 It is accepted that significant archaeological remains are likely be present at greater depth within the *c* 6.0-9.5m thick Holocene alluvial sequence underlying the site. The trenches were concentrated in the western part of the plot, which has the highest potential for archaeological remains in the upper layers of alluvium, in particular the deposits along the western margins of 'Carter's Creek'.

3 RESULTS

3.1 Introduction and presentation of results

3.1.1 The results of the evaluation are presented below, and include a stratigraphic description of the trenches which contained archaeological remains. The full details of all trenches with the dimensions and depths of all deposits form the content of Appendix A. A photographic record of each trench is also provided in the plates section.

3.1.2 Only three of the 21 trenches contained features and deposits of probable archaeological origin, Trenches 4, 6 and 7.

3.1.3 The archaeological remains in all cases were immediately beneath topsoil and subsoil and above or within silty clay alluvial deposits.

3.2 General soils and ground conditions

3.2.1 The alluvium consisted of a variable blueish grey silty clay, with some orange to brown mottling, typical of marine alluvium. There was no indication of organic peaty horizons in any of the trenches. The deposit sequence was checked by the excavation of deeper sondages positioned at the ends of several trenches, none of which encountered archaeological remains or organic horizons.

3.2.2 The ground conditions were generally good and the weather conditions were sunny with showers with good visibility.

3.3 Trench 4 (Figs 3-5, Plates 3-6)

3.3.1 **Stratigraphic description:** Trench 4 formed a T-shape and was positioned in the western part of the site to investigate a series of small enclosures shown on the *c* 1640 map that were thought to be associated with *Feake's Hithe*. The trench lay at the interface between the dry ground of the terrace edge and the floodplain, on the edge of what had been a large tidal creek (Carter's Creek), prior to the 'inning' of the tidal marsh. The trench exposed the remains of a north-south aligned wooden revetment (structure 412) consisting of numerous upright and collapsed timbers, an east-west aligned horizontal tie-beam arrangement (structure 406), and a group of three timbers (structure 414) which were interpreted by the timber specialist as discarded roughed-out ships timbers, perhaps used as infill behind the wharf revetment.

3.3.2 The upright posts of the revetment were mounted on a sill beam (Plate 4) which was embedded within the alluvial silty clays (405). The sill beam seems to have been laid horizontally originally but had shifted out of position to an oblique angle when the revetment collapsed inwards towards the bank.

3.3.3 Silty clay alluvial deposits 403 and 404 were stratigraphically later than the revetment, having formed around the collapsed timbers, during or soon after the collapse of the structure. Deposit 404 contained part of an articulated horse skeleton, of which the skull (including mandibles) and neck vertebrae protruded into the trench (Plate 4). Disarticulated leg bones, probably a forelimb from the same animal, were found among the uppermost timbers of the collapsed revetment and the remainder of the skeleton may well have been present outside the area excavated. One leg bone was sandwiched between two planks, suggesting that the horse may have fallen into the water as the wharf revetment collapsed, although it is also possible that the body of the horse floated into the collapsed structure from elsewhere. The horse was a male aged 8-18 years old. These deposits were sealed by subsoil layer 402, which was in turn overlain by topsoil 400.

3.3.4 A small number of pottery sherds were recovered from deposits 404 and 405, post-dating the collapse of the structure, and these date from the period *c* AD1475-1650. In addition, fragments of ceramic building material were found in deposits 403 (infill behind the revetment) and 405 (infill post-dating collapse of the revetment). These can only be dated very broadly to the late 15th-19th centuries.

3.3.5 The levels of the timbers above Ordnance Datum are detailed on Figure 4 in plan and Figure 5 in section. The ground surface in this trench dipped down slightly towards the edge of the creek, from 2.3m AOD in the west to 1.92m AOD in the east. The sill beam at the base of the revetment was at 0.47m AOD and the truncated uppermost timbers were encountered at *c* 1.22m AOD.

3.3.6 **Revetment timbers, Structure 412 (Plates 3-5):** This north-south aligned structure, of which individual timbers 418-435 were identified within the trench, was over 2m in length and continued beyond the limits of excavation to north and south. It was built mainly of alternating thick, squared oak posts (419, 421, 422, 424, 427) and planking (418, 420, 425, 428, 429, 430, 432, 434 and 435) set on end. The original form of the structure was clearly built to resemble 'stave and muntin' work. However, money was saved by not grooving the edges of the posts to engage with the planks but simply setting them slightly overlapping. This is thus 'false stave and muntin work'. The sill beam was a large squared timber (0.25 x 0.20m in profile), possibly re-used since it had at least one unused circular socket in the east face. It was embedded in the silty clay alluvium (405). The base of the structure and sill beam (426) were not fully exposed. It was nevertheless clear, where the structure had pulled apart, that the upright posts had been fixed to the sill beam with mortice and tenon joints. Other timbers (423, 431 and 433), including thinner planks, possibly from the decking of the wharf, were found at various angles overlying the revetment timbers. The top of the revetment was truncated by rot.

3.3.7 Intriguingly, the originally vertically set staves and muntins were found lying tilted towards the land rather than, as is normally the case, towards the water.

3.3.8 No clear tool marks were visible on the timbers and only a little sapwood on the oak was preserved. As it was agreed that the structure would be reburied and left *in situ*, any underlying were not exposed.

3.3.9 **Tree-ring dating:** The potential for tight tree-ring dating of the timbers is somewhat limited as the material exposed in the trench was generally fast grown and lacking sapwood (with one exception). Subsequent specialist assessment of timbers selected by the worked wood specialist, Damian Goodburn, determined that the two samples recovered lacked sufficient growth rings to provide a date. If more extensive excavation takes place in future there is a reasonable likelihood that suitable samples would be recovered.

3.3.10 **Radiocarbon Dating:** As tree-ring dating was not possible from the two recovered timbers, two samples of oak wood were taken from Timbers 431 and 432, part of the wharf / revetment (Structure 412) and subject to radiocarbon dating. The samples were processed by Scottish Universities Environmental Research Centre (SUERC) in September 2015. The calibrated age ranges were determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal14).

3.3.11 The sample from Timber 431 (SUERC-62754, GU38666) produced a calibrated date range of between AD 1433 – 1630 (95% probability).

3.3.12 The sample from Timber 432 (SUERC-62750, GU38665) produced a calibrated date range of between AD 1420 – 1619 (95% probability).

3.3.13 The results are consistent with documentary and artefactual dating evidence for the wharf, but do not narrow the date range.

3.3.14 **Land-tie beam, Structure 406 (Fig. 4, Plate 3):** The revetment was linked to an east-west land-tie beam of elm. This structure (406) comprised individual timbers 407-411. The creek end of the assembly was given a square through-socket with a squared oak lock bar set through it to retain the upright planks and posts. What appears to have been the landward end of the land-tie beam (407) was also uncovered, and showed an unusual method of securing the 'crotched' top in the parent tree. A pair of anchor stakes (408 and 409) were driven either side of the bulge created by the crotch and further secured with two oak timber wedges (409 and 410). An isolated small stake also lay to the north.

3.3.15 **Group 414 (Fig. 4, Plate 6):** On the landward side of the revetment, three roughly squared, weathered oak timbers (415-417), were found lying within the land-winning dumps, as make up. All three timbers had strongly curved shapes, clearly indicating that they were intended for use in ship- or boat-building. The two uppermost timbers (415 and 416) appeared to have original rot hollows, suggesting that they may have been rejected for actual use. Such roughed out, defective nautical timbers have been found casually reused or dumped on several Thames sites with boat- and ship-building connections. The lowest and largest timber (417) was an angled 'knee timber' shaped for use as a bracket joining beams to the ship (or large boat) side.

3.4 Trench 6 (Figs 3 and 5, Plates 8 and 9)

3.4.1 This NE-SW trench was located near the western edge of the site, to investigate a dam shown on the mid-17th century map (Fig. 7), apparently placed to control water flow from the upper reaches of Carter's Creek. This was considered a likely location for a sluice-gate to control the drainage of water from the marshes towards the Thames. The SLRM plot shows that the trench is at the northern terminal of a north-south aligned sea wall, where it butts against the terrace edge. The earthwork was barely visible on the ground.

3.4.2 A deeper sondage that was dug at the southern end of the trench exposed deposits 603, 604 and 605 (Fig. 5 section 600). No obvious structural remains were encountered in the trench. The stratigraphy consisted of topsoil (600) and a probable made ground deposit (601) above a buried soil (602) and lower subsoil (603). These overlay a sequence of what appeared at first to be natural alluvial silty clays (604-608) but contained artefacts and are thus likely to be redeposited alluvium forming the dam wall. Deposit 603 contained one fragment of post-medieval Ceramic building material (CBM). The underlying deposit (604) had a very small amount of late Bronze Age to early Iron Age pottery, eleven worked flints, oyster shell and fish bones. Below this, deposit 605 had similar late Bronze Age to early Iron Age pottery and seven worked flints.

3.5 Trench 7 (Figs 3 and 6, Plates 10 and 11)

3.5.1 The north-south aligned trench located in the western part of the site was positioned to investigate an earth bank or relict sea wall visible on the SLRM plot (Fig. 3). This feature was considered a possible candidate for a medieval sea wall pre-dating the early 17th century reclamation, as the mid-17th century map shows no structure at this point. The stratigraphy consisted of topsoil (700) and subsoil (701) which overlay the natural alluvial clays (702 and 703). No trace of the putative bank could be discerned.

3.5.2 A single linear stone deposit/feature (704) was identified in the southern part of the trench, outside the relict bank suggested by the SLRM plot. It's slight and fragmentary

nature made a certain interpretation difficult. It consisted of 13 small sub-rounded chalk blocks forming an intermittent NE-SW line, seen for 1.27m and found to be 0.13m thick. No artefacts were found in the deposits in this trench.

3.6 Finds summary

3.6.1 A very small quantity of artefactual material was recovered from the features recorded in the evaluation. The range of material included pottery, ceramic building material, animal bone, stone and wood. The timber assemblage recorded in Trench 4 was quite large but was left *in situ*, apart from selected dendrochronology samples. A more detailed description of the finds can be found in Appendix B.

3.6.2 The pottery assemblage consisted of nine sherds. A total of three sherds of prehistoric pottery, weighing 13,g were recovered from contexts 604 and 605. The size of the sherds precludes any secure dating but the handmade, flint-tempered wares are consistent with other prehistoric material from the region and the sherds are likely to be of late Bronze Age to early Iron Age date.

3.6.3 A total of six sherds of pottery, weighing 166g, were recovered from contexts 404 and 405. The sherds date from *c* 1475-1650 and include fragments of jugs, jars and bowls, suggestive of domestic or utilitarian objects.

3.6.4 Ten pieces of ceramic building material, weighing 1286g, were recovered from four contexts (403, 405, 603 and 1801). The fragments cannot be more closely dated than the late 16th-19th century.

3.6.5 A total of 20 hand-collected animal bone fragments, weighing 4094g, were recovered from contexts 403, 404 and 405. The majority were from a partial articulated horse skull and neck within deposit 404. Disarticulated leg bones from the same context are probably from the same animal. In addition there were six fragments of fish bones from a soil sample from context 604.

3.6.6 The oyster valves from 403 and 604 are likely to represent accumulations of shells dumped after eating. While there are similar numbers of left and right valves, the sizes are not indicative of former pairs and the clear v-shaped notch on one of the largest valves provides good evidence that these oysters were deliberately opened and presumably eaten.

3.6.7 A small assemblage of 15 struck flints was recovered from contexts 604 and 605. These contexts also produced 23 pieces of burnt unworked flint weighing 351g. The assemblage is mostly later prehistoric in character, with many squat hard-hammer struck flakes displaying limited or no platform preparation and usually with either cortical or plain platforms. The two tools present in the assemblage are both piercers and are of a fairly simple type often associated with later prehistoric knapping.

3.6.8 A total of six pieces of stone were retained. These comprise pieces of a light black material, probably coal or lignite from contexts 405, 403, and 404. None of these show signs of having been worked.

3.7 Environmental summary

3.7.1 The single bulk sample from context 605 produced a large quantity of oyster shell, occasional fish bone and rare charred plant remains of *Anthemis cotula* (stinking chamomile), *Juncus* sp. (rush), emmer/spelt wheat (*Triticum dicoccum/spelta*) and *Bromus/Avena* sp. (brome or oat).

3.7.2 Two overlapping monoliths were taken from the Trench 4 channel fill, through topsoil (400) and mottled grey alluvium (402) and (404), from a location adjacent to the

collapsed late or post-medieval timber wharf. These monoliths have been retained for reference and possible further investigation to determine the nature of deposition.

3.7.3 The palaeoenvironmental potential of the deeply buried Holocene deposits within the application site was assessed as part of the London Gateway Geoarchaeological Deposit Model (OA 2012). The borehole locations and logs are included for reference as Figure 8.

4 Discussion

4.1 Reliability of field investigation

4.1.1 The 21 trenches represent a limited sample of the site area, but are sufficient to characterise the near-surface ground conditions in the areas of highest archaeological potential, within the uppermost sediments that would be affected most directly by the proposed development. It is clear from previous borehole investigations and desk-based studies that further significant prehistoric, Roman or medieval archaeology could be present below the levels investigated in the trenches, which were only excavated to a typical depth of *c* 1m below ground level).

4.1.2 The absence of significant archaeological features within most of the trenches suggests that the only significant archaeological features present in the top 1m of the sediment sequence are likely to be medieval and early post-medieval landscape features associated with *Feake's Hithe* and associated sea walls and enclosures.

4.2 Significance of the archaeology

4.2.1 As predicted in the APD, significant, complex and well-preserved early post-medieval structures associated with *Feake's Hithe* were found at shallow depth along the western margin of the historic Carter's Creek. The revetment discovered in Trench 4 is consistent with the remains of a minor manorial wharf of 15th-16th century date. The location of the wharf is as indicated on the mid-17th century map of Old Garlands marshlands (Fig. 7). The evidence for ship- or boat-building and rich historical associations add to the potential significance of this site.

4.2.2 The well-preserved upstanding medieval/post-medieval earthworks within the application site were specifically not targeted for investigation at this stage. It is therefore not surprising that the majority of the trenches in the central and eastern side of the site contained no archaeology in the top 1m of the sediment sequence. The embankments are particularly important because some are potentially medieval in origin and thus unusually early for Essex. The surviving remains of such early embankments have been identified in a recent report as being 'of very great importance' as rare surviving evidence for possible medieval reclamations in the Essex marshes (Rippon and Wainwright, 2011).

4.3 Archaeological potential and impact assessment

4.3.1 **Baseline levels:** The site has not previously been developed and represents a well-preserved historic grazing marsh landscape, which has not been subject to significant ploughing. The existing ground level of the application site lies at *c* 2.2m AOD. Significant archaeological remains survive at and above the general ground level in the form of upstanding earthworks (historic sea walls and features associated with *Feake's Hithe)*. In contrast to previously developed plots within the adjacent LG Commercial Park, there is no layer of pre-existing modern made ground to protect the archaeology. Thus, any level of construction activity will have an adverse impact on the upstanding earthworks and associated near-surface archaeology.

4.3.2 The depth of archaeological remains within the application site will vary considerably, depending on the landscape context and the type of archaeology. The remains in Trench 4 are likely to be the tip of the iceberg. The alluvial sequence in this trench is comparatively shallow near the river terrace edge and similar remains may be expected all along the western edge of Carter's Creek. The early post-medieval timber wharf in Trench 4 was found at a depth of just 1.0m below ground level at the western edge of

the application site and the timbers of the wharf lie between 1.22m AOD (the uppermost surviving timbers) and 0.47m AOD (the base of the sill beam). The manner in which the wharf collapsed suggests that it may have been destroyed by a high energy flood, such as a tidal storm surge, and not rebuilt on the same site, which increases the likelihood of encountering wrecked boats or other contemporary wreckage in silted channels at similar or greater depth than the wharf structure. It is likely that this area will be left undeveloped, but the archaeological impact of any ecological or drainage ponds, or other landscaping in the western side of the application site, would need to be assessed in detail.

4.3.3 Marine and marshland archaeology of Mesolithic to post-medieval date are likely to be present at greater depths within the application site but for the most part would not be substantively impacted by the development because the ground level will be raised to the same level as the adjacent Commercial Park (3.6-3.9m AOD), creating a protective layer of sand above the archaeological remains. However, any deeper drainage and structural features and ecology ponds have the potential to impact archaeological deposits as discussed below.

4.3.4 The level at which contemporary archaeological features occur within the alluvial sequence is also likely to vary substantially within the application site due to the presence of an infilled major creek underlying the western half of the site. The base of the Holocene alluvium in Borehole ARCBH2 is recorded at -7.10m AOD (9.4m below ground level), which represents the approximate lowest level at which archaeological finds could occur. There is potential at the base of the sequence for well-preserved Mesolithic land surfaces that were inundated by rising sea levels in the early Holocene.

4.3.5 Peat layers, which represent periods of sea level regression and landscape stability, have been dated to the early Neolithic at two locations within the application site (Fig. 3). The peat layer in ARCBH2, near the western edge of the application site, lies 6.6m below ground level (-4.3m AOD). A peat of similar age in ARCBH3, in the eastern side of the application site, lies 5.2m below ground level (at -3.1m AOD). The greater depth of the sequence in ARCBH2 is probably due to the presence of a palaeochannel along the terrace edge, identified by the electrical resistivity survey, which may have influenced the alignment of Carter's Creek. The higher level in ARCBH3 may indicate the presence of an island in the marsh in the early Neolithic, on the eastern side of the application site (OA 2012).

4.3.6 The prehistoric artefacts (worked flint and pottery) found during the present evaluation in Trench 6 are very likely to be redeposited, as they were found in the top 1m of the sediment sequence, in fill material on the site of a post-medieval dam wall, which was probably originally built as part of the documented reclamation in *c.*1623. However, the Bronze Age material is unlikely to have moved very far from its point of origin and may well have been dug up from the underlying alluvium during the excavation of drainage ditches alongside the 17th century sea wall and dam. The presence of this material suggests that *in situ* late Bronze Age archaeology could be buried within the top 3 - 4m of the alluvial sediment sequence, along the western edge of the application site. It is conceivable that that layers 603 and 604 are in fact *in situ* Bronze Age horizons, as Trench 6 lies very close to the river terrace edge. The level of the Bronze Age alluvial deposits would be expected to rise up sharply along the terrace edge.

4.3.7 **Assessment of construction impacts:** The detailed design of the Lorry Park has not yet been completed, but preliminary conclusions regarding the impact of the development on archaeological deposits can be drawn from comparison with adjacent

plots that have been developed previously within the London Gateway Commercial Park, including the Admin Building and Carter's Lagoon.

4.3.8 The construction phase of the proposed project comprises the following main components, which have the potential to affect archaeological remains:

- Construction of a 'Common Services Area' (CSA), consisting of parking bays (275) for use by passing HGV traffic.
- Construction of a haulage yard to accommodate 540 HGVs and associated facilities.
- Construction of welfare and support buildings for the CSA (i.e. Administration Area).

4.3.9 Further details of each construction component are provided in the EIA Scoping Report. The scheme is designed to be constructed as a single phase, with preparatory works taking place prior to the construction of all three elements.

4.3.10 Preparatory works, listed below, will be required prior to the construction of the CSA, Haulage Yard and Administration Area:

- Drainage management
- Earthworks
- Ecological mitigation

4.3.11 The location of the proposed project is above a number of surface-water field drains which will need to be rerouted prior to construction. The rerouting will include the construction of wet swales along the northern and western edges of the proposed development.

4.3.12 Land-raising is required to raise the level of the CSA / Haulage Yard to the level of the Logistics Park (3.6-3.9m AOD) to the south. Any excavated spoil generated during land-raising will be re-used within London Gateway-owned land.

4.3.13 The earthworks will include construction of *c* 24 acres of landscaping and security bunds along the western and northern edges of the proposed development:

1) Pre-construction ecological works will be required to compensate for the loss of Corringham/Fobbing Marsh Local Wildlife Site. This will result in the creation of a wader scrape of 5ha area to provide a foraging resource for wader species such as lapwing. If possible, the scrape will be located in a natural depression; otherwise, earth moving, undertaken during a dry period, may be required to achieve the correct depth. The location of this scrape has not yet been finalised and will be agreed through the EIA process. In accordance with the LG AMF such methods would require prior archaeological investigation if significant earth moving is involved. Depending on the location selected and the method adopted, impacts to the historic environment could be substantial.

2) Surcharging and ground raising – The Lorry Park will be surcharged to a height of 3m above finished levels. This surcharge is predicted to cause a settlement of 500mm of the underlying material. Any archaeological remains that may be present already lie under pressure from several metres of existing overlying deposits and consequently compression from surcharging is not expected to have a substantive additional adverse effect. When complete, the raised ground will form a protective layer, greatly limiting the potential for disturbance to the underlying alluvium during construction and service installation work within the lorry park itself. Land-raising is

required to raise the level of the Haulage Yard to the level of the Logistics Park (3.6-3.9m AOD) to the east. Any excavated spoil generated during land-raising is likely to be re-used within London Gateway-owned land. This will result in raised ground thickness from *c* 1.6m to 1.9m. It should be noted that in contrast to plots within the former Shell Haven Oil Refinery, there is no pre-existing modern made ground within the application site. The total thickness of made ground protecting archaeological levels is thus substantially thinner (by *c* 1-2m) than in the Commercial Park.

3) Localised deeply piled structures and band drainage have the potential to disturb intact and potentially well-preserved buried archaeological deposits of various dates. Deep excavation features, such as main drains, manholes and separator pits, and any buried fuel tanks, would also have the potential to impact buried archaeological remains in localised areas if they penetrate through the raised ground.

4) Drainage - Various drainage swales and ponds will be excavated, the design of which has not been detailed at this stage. Their excavation will have a potential archaeological impact as some intrusion into the alluvium will inevitably take place. Medieval and post-medieval deposits associated with the deserted settlement of 'Feake's Hythe' include extant earthworks and may include archaeological features buried at shallow depth, which would be affected by the excavation of swales and ponds. It is likely that the deepest ponds would extend to a maximum depth of *c* 3m below present ground level. Due to the presence of infilled palaeochannels and the terrace edge environment, archaeological remains could be encountered at any level within this impact zone. In contrast to the neighbouring LG Park, the Lorry Park site has not been subject to previous modern development. Any archaeological remains present may be exceptionally well-preserved in waterlogged alluvial deposits.

4.4 Conclusions

4.4.1 Significant archaeological remains were encountered in two evaluation trenches, both of which were situated along the western edge of the site. Based on the results of the evaluation, a number of potential archaeological impacts are anticipated if the development proceeds as proposed. The most vulnerable features are the well-preserved surface earthwork features of medieval/ post-medieval date.

4.4.2 The western margins of the historic Carter's Creek have considerable potential for maritime archaeological finds associated with the early post-medieval wharf known in the 16th and 17th centures as *Feake's Hithe*, which has produced evidence for ship- or boat-building. Trench 4 contained the remains of a timber wharf, buried at a depth of 1m below ground level. This area is likely to be excluded from the development but any proposed groundworks within the western side of the application site, including ecological mitigation earthworks, would require careful assessment.

4.4.3 It is very likely that significant remains are present at greater depth within the Holocene alluvial sequence. The evaluation produced redeposited late Bronze Age finds from a sequence of soil layers (604 and 605) in Trench 6, at a depth of 0.8m below ground level, which are most likely to have been dug out from the thick alluvial sequence underlying the site and redeposited in the post-medieval period, but were found so close to the river terrace edge that they could conceivably be from an *in situ* Bronze Age horizon. Across most of the application site any prehistoric remains will be below the proposed level of most construction impacts arising from the proposed Lorry Park development and would be preserved *in situ* beneath a protective layer of made ground.

4.4.4 Since detailed design information for the Lorry Park is not available at this stage, provisional assumptions have been made about the depth and extents of development impact, based on preliminary design information. Should the impacts be deeper or more extensive than expected, then further assessment and/or mitigation would be required.

Appendix A. Trench Descriptions and Context Inventory

Trench 1						
General description					**Orientation**	
Trench was unexcavated due to ecological constraints.					**Avg. depth (m)**	
					Width (m)	
					Length (m)	
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**

Trench 2						
General description					**Orientation**	E-W
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and two alluvial subsoils overlying the natural clay.					**Avg. depth (m)**	0.97
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
200	Layer	-	0.23	Topsoil: dark brown, firm tacky clay, with low density organic content	-	-
201	Layer	-	0.39	Subsoil: dark brownish grey clay	-	-
202	Layer	-	0.35	Subsoil: mid grey clay, mid orange mottling	-	-
203	Layer	-	-	Natural / allvium: mid blueish grey clay with brown mottling and infrequent chalk fragments and oyster shells	-	-

Trench 3						
General description					**Orientation**	E-W
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and two alluvial subsoils overlying the natural clay.					**Avg. depth (m)**	0.99
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**

Trench 3						
300	Layer	-	0.22	Topsoil: dark brown, firm tacky clay, with low density organic content	-	-
301	Layer	-	0.33	Subsoil: dark brownish grey clay	-	-
302	Layer	-	0.46	Subsoil: mid grey clay with brownish orange mottling	-	-
303	Layer	-	-	Natural / alluvium: mid blueish grey clay with brown mottling and infrequent chalk fragments	-	-

Trench 4			
General description		**Orientation**	N-S and E-W (T-shaped)
The trench contained significant archaeology. The remains consisted of a N-S aligned wooden revetment / wharf 412 with numerous upright and collapsed timbers. There was also a horizontal tie-beam arrangement 406, aligned E-W, to the west. There were three grouped timbers 414, west of 406. The stratigraphy consisted of topsoil and subsoils overlying the wooden structures which appear to be driven in to the natural clay. NB: timber dimensions are the largest visible rather than the full extent of the timbers.		**Avg. depth (m)**	1
		Width (m)	2
		Length (m)	30

Contexts

Context no	Type	Width / Length (m)	Depth (m)	Comment	Finds	Date
400	Layer	-	0.25	Topsoil: dark greyish brown silty clay	-	-
401	Layer	-	0.48	Subsoil: pal-mid grey silty clay with orangey brown mottling	-	-
402	Layer	-	0.47	Buried Topsoil: dark greyish brown silty clay	-	-
403	Layer	-	>0.1	Subsoil: mid greyish brown silty clay, (west of revetment)	CBM Bone Shell	Late C16th-19th
404	Layer	-	>0.62	Subsoil: mid grey clayey silt, with orangey brown mottling (east of revetment)	Pottery Bone	1475-1650
405	Layer	-	-	Subsoil: mid blueish grey silty clay, with orangey brown mottling, decayed organic matter within it	Pottery CBM Bone Shell	1475-1600 late C15th – mid 16th
406	Structure	>6.35	>0.75	Timber Land-tie: consists of individual timber objects 407-411, E-W aligned	-	
407	Structure	0.25	0.13	Timber: main horizontal beam, part of 406	-	
408	Structure	0.11		Timber: vertical upright, north, part of 406	-	
409	Structure	0.11		Timber: vertical upright, south, part of 406	-	
410	Structure	0.11	0.07	Timber: horizontal wedge / packing, north, part of 406	-	

Trench 4						
411	Structure	0.11	0.07	Timber: horizontal wedge / packing, south, part of 406	-	
412	Structure	-	-	Timber Wharf / Revetment: aligned N-S timbers objects 418-435,	-	
413	Layer	-	-	Alluvium: dark blackish grey clayey silt, high organic content, humic silt	Shell	
414	Structure	2.15	0.23	Timber: 3 unfixed timbers clustered together, generally horizontal, timber objects 415-417, aligned N-S	-	
415	Structure	1.75	0.23	Timber: possible beam, part of 414	-	
416	Structure	1.6	0.14	Timber: possible beam, part of 414	-	
417	Structure	1.45	0.11	Timber: possible beam, part of 414	-	
418	Structure	0.8	0.05	Timber: upright plank, part of 412	-	
419	Structure	0.8	0.1	Timber: upright post, part of 412	-	
420	Structure	0.52	0.05	Timber: upright plank, part of 412	-	
421	Structure	0.8	0.1	Timber: upright post, part of 412	-	
422	Structure	0.8	0.1	Timber: upright post, part of 412	-	
423	Structure	1.13	0.09	Timber: horizontal bracing timber, part of 412	-	
424	Structure	1.2	0.1	Timber: upright post, part of 412	-	
425	Structure	0.67	0.05	Timber: upright plank, part of 412	-	
426	Structure	2.5	0.21	Timber: large socketed horizontal base beam	-	
427	Structure	0.53	0.13	Timber: collapsed post, part of 412	-	
428	Structure	0.5	0.05	Timber: upright plank, part of 412	-	
429	Structure	1.15	0.05	Timber: plank, part of 412	-	
430	Structure	1.5	0.05	Timber: plank, part of 412	-	
431	Structure	1.5	0.07	Timber: beam, part of 412	wood	AD 1433-1630

Trench 4						
432	Structure	1.32	0.1	Timber: plank, part of 412	wood	AD 1420-1619
433	Structure	0.2	0.24	Timber: pile / post collapsed, part of 412	-	
434	Structure	1.6	0.05	Timber: plank, part of 412	-	
435	Structure	1.57	0.2	Timber: upright plank, part of 412	-	
436	Layer	-	-	Deposit: made ground, east end of trench	-	

Trench 5						
General description					**Orientation**	
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural clay.					**Avg. depth (m)**	0.44
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
500	Layer	-	0.24	Topsoil: dark brown, firm tacky clay,	-	-
501	Layer	-	0.27	Subsoil: mid brownish grey clay	-	-
502	Layer	-	0.5	Alluvium: mid grey clay with brown mottling	-	-
503	Layer	-	-	Alluvium: mid blueish grey clay	-	-

Trench 6						
General description					**Orientation**	NE-SW
The trench was placed to investigate a dam and sea wall shown on a mid-17th century map at the head of Carter's Creek. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay. A deeper sondage was dug at the southern end of the trench and the deposits were found to contain prehistoric artefacts, probably redeposited from the underlying alluvium during ditch digging / sea wall construction.					**Avg. depth (m)**	1
					Width (m)	2
					Length (m)	28
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
600	Layer	-	0.06	Topsoil: dark greyish brown silty clay	-	-
601	Layer	-	0.26	Subsoil: pal-mid grey silty clay with orangey brown	-	-

				mottling		
602	Layer	-	0.18	Buried Topsoil: dark greyish brown silty clay	-	-
603	Layer	-	0.54	Subsoil: mid greyish brown silty clay, (west of revetment)	CBM	C15th-18th
604	Layer	-	0.2	Alluvium: pale grey clayey silt, mid orangey brown mottling	Pottery Flint Bone	Late Bronze Age or early Iron Age middle-late Bronze Age
605	Layer	-	0.2	Alluvium: pale brown clayey silt, pale grey and orange mottling	Pottery Flint	Late Bronze Age or early Iron Age middle-late Bronze Age
606	Layer	-	>0.18	Alluvium: pale grey clayey silt, mid orangey brown mottling		
607	Layer	-	-	Alluvium: mid blueish grey silty clay		
608	Layer	-	-	Alluvium: mid-dark blueish grey clayey silt		

Trench 7

General description	**Orientation**	N-S
The trench contained potential archaeology. A single deposit / feature 704 was identified though the fragmentary nature made a certain interpretation difficult. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.	**Avg. depth (m)**	0.95
	Width (m)	2
	Length (m)	30

Contexts

Context no	Type	Width (m)	Depth (m)	Comment	Finds	Date
700	Layer	-	0.2	Topsoil: dark brown, firm tacky clay,	-	-
701	Layer	-	0.36	Subsoil: mid brownish grey clay	-	-
702	Layer	-	0.4	Alluvium: mid grey clay with brown mottling	-	-
703	Layer	-	-	Alluvium: mid blueish grey clay with brown mottling	-	-
704	Deposit	1.27	0.13	Stone Alignment: possible structure, 13 small sub-rounded chalk blocks in an intermittent NE-SW	-	-

				line		

Trench 8						
General description					**Orientation**	NW-SE
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.					**Avg. depth (m)**	1.01
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
800	Layer	-	0.22	Topsoil: dark brown, firm tacky clay,	-	-
801	Layer	-	0.29	Subsoil: mid brownish grey clay	-	-
802	Layer	-	0.48	Alluvium: mid grey clay with orangey brown mottling	-	-
803	Layer	-	-	Alluvium: mid blueish grey clay with brown mottling	-	-

Trench 9						
General description					**Orientation**	NE-SW
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.					**Avg. depth (m)**	0.98
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
900	Layer	-	0.25	Topsoil: dark brown, firm tacky clay,	-	-
901	Layer	-	0.26	Subsoil: mid brownish grey clay	-	-
902	Layer	-	0.47	Alluvium: mid grey clay with orangey brown mottling	-	-
903	Layer	-	-	Alluvium: mid blueish grey clay with brown mottling	-	-

Trench 10						
General description					**Orientation**	E-W
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.					**Avg. depth (m)**	0.95
					Width (m)	2

	Length (m)	30

Contexts

Context no	Type	Width (m)	Depth (m)	Comment	Finds	Date
1000	Layer	-	0.18	Topsoil: dark brown, firm tacky clay,	-	-
1001	Layer	-	0.3	Subsoil: mid brownish grey clay	-	-
1002	Layer	-	0.42	Alluvium: mid grey clay with brown mottling	-	-
1003	Layer	-	-	Alluvium: mid blueish grey clay with brown mottling	-	-

Trench 11

General description	Orientation	N-S
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.	**Avg. depth (m)**	1.0
	Width (m)	2
	Length (m)	30

Contexts

Context no	Type	Width (m)	Depth (m)	Comment	Finds	Date
1100	Layer	-	0.23	Topsoil: dark brown, firm tacky clay,	-	-
1101	Layer	-	0.29	Subsoil: mid brownish grey clay	-	-
1102	Layer	-	0.48	Alluvium: mid grey clay with brown mottling	-	-
1103	Layer	-	-	Alluvium: mid blueish grey clay with brown mottling	-	-

Trench 12

General description	Orientation	E-W
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.	**Avg. depth (m)**	1
	Width (m)	2
	Length (m)	30

Contexts

Context no	Type	Width (m)	Depth (m)	Comment	Finds	Date
1200	Layer	-	0.29	Topsoil: dark brown, firm tacky clay,	-	-
1201	Layer	-	0.72	Subsoil: mid grey clay with orange mottling	-	-

1202	Layer	-	-	Alluvium: mid blueish grey clay with brown mottling	-	-

Trench 13						
General description					**Orientation**	NE-SW
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.					**Avg. depth (m)**	0.95
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
1300	Layer	-	0.24	Topsoil: dark brown, firm tacky clay,	-	-
1301	Layer	-	0.72	Subsoil: dark grey clay with brown mottling	-	-
1302	Layer	-	-	Alluvium: mid blueish grey clay with orangey brown mottling	-	-

Trench 14						
General description					**Orientation**	NW-SE
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.					**Avg. depth (m)**	0.95
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
1400	Layer	-	0.23	Topsoil: dark brown, firm tacky clay,	-	-
1401	Layer	-	0.31	Subsoil: mid greyish brown clay	-	-
1402	Layer	-	0.43	Alluvium: mid grey clay with orangey brown mottling	-	-
1403	Layer	-		Alluvium: mid blueish grey clay with orangey brown mottling	-	-

Trench 15						
General description					**Orientation**	E-W

The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay. A deeper sondage was excavated within the trench.	**Avg. depth (m)**	2.1
	Width (m)	2
	Length (m)	40

Contexts

Context no	Type	Width (m)	Depth (m)	Comment	Finds	Date
1500	Layer	-	0.22	Topsoil: dark brown, firm tacky clay, with low density organic content	-	-
1501	Layer	-	0.3	Subsoil: mid brownish grey clay	-	-
1502	Layer	-	1.15	Subsoil: mid grey clay with brown mottling, infrequent chalk fragments	-	-
1503	Layer	-	>0.4	Natural / alluvium: dark blueish grey clay with brown mottling	-	-

Trench 16

General description	**Orientation**	N-S
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.	**Avg. depth (m)**	1.05
	Width (m)	2
	Length (m)	30

Contexts

Context no	Type	Width (m)	Depth (m)	Comment	Finds	Date
1600	Layer	-	0.2	Topsoil: dark brown, firm tacky clay	-	-
1601	Layer	-	0.2	Subsoil: mid brown clay	-	-
1602	Layer	-	0.55	Subsoil: mid brownish grey clay	-	-
1603	Layer	-	>0.05	Subsoil: mid grey clay with brown mottling	-	-

Trench 17

General description	**Orientation**	N-S
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.	**Avg. depth (m)**	1.06
	Width (m)	2
	Length (m)	30

Contexts

Context	Type	Width	Depth	Comment	Finds	Date

no		(m)	(m)			
1700	Layer	-	0.23	Topsoil: dark brown, firm tacky clay	-	-
1701	Layer	-	0.2	Subsoil: mid greyish brown clay	-	-
1702	Layer	-	0.63	Subsoil: mid brown clay, orange and grey mottling	-	-
1703	Layer	-	-	Subsoil / alluvium: mid grey clay with brown mottling, infrequent charcoal, chalk fragments, oyster shell	-	-

Trench 18						
General description					**Orientation**	E-W
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.					**Avg. depth (m)**	1.05
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
1800	Layer	-	0.24	Topsoil: dark brown, firm tacky clay	-	-
1801	Layer	-	0.19	Subsoil: dark greyish brown clay	CBM	C15th-18th
1802	Layer	-	0.63	Subsoil: mid brown clay, orange and grey mottling	-	-
1803	Layer	-	-	Subsoil / alluvium: mid blueish grey clay with brown mottling, infrequent charcoal	-	-

Trench 19						
General description					**Orientation**	N-S
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.					**Avg. depth (m)**	1.1
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
1900	Layer	-	0.23	Topsoil: dark brown, firm tacky clay	-	-

1901	Layer	-	0.31	Subsoil: dark brownish grey clay	-	-
1902	Layer	-	0.52	Subsoil: mid grey clay, orange mottling	-	-
1903	Layer	-	-	Natural / alluvium: mid blueish grey clay with orange mottling	-	-

Trench 20						
General description					**Orientation**	E-W
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural clay.					**Avg. depth (m)**	1.15
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
2000	Layer	-	0.23	Topsoil: dark brown, firm tacky clay	-	-
2001	Layer	-	0.18	Subsoil: mid brown clay	-	-
2002	Layer	-	0.7	Subsoil: mid brownish grey clay	-	-
2003	Layer	-	-	Subsoil / alluvium: mid grey clay with brown mottling	-	-

Trench 21						
General description					**Orientation**	N-S
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay. A deeper sondage was dug within the trench.					**Avg. depth (m)**	1.02 – 1.5
					Width (m)	2
					Length (m)	30
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
2100	Layer	-	0.25	Topsoil: dark brown, firm tacky clay	-	-
2101	Layer	-	0.2	Subsoil: mid brown clay	-	-
2102	Layer	-	0.6	Subsoil: mid brownish grey clay	-	-
2103	Layer	-	0.45	Subsoil / alluvium: mid grey clay with brown mottling	-	-
2104	Layer	-	-	Natural: pale grey clay	-	-

Trench 22		
General description	**Orientation**	E-W
The trench was devoid of significant archaeology. The stratigraphy consisted of topsoil and subsoil overlying the natural alluvial clay.	**Avg. depth (m)**	0.95
	Width (m)	2
	Length (m)	30

Contexts

Context no	Type	Width (m)	Depth (m)	Comment	Finds	Date
2200	Layer	-	0.22	Topsoil: dark brown, firm tacky clay	-	-
2201	Layer	-	0.31	Subsoil: dark greyish brown clay	-	-
2202	Layer	-	0.35	Subsoil: mid brown clay, orange and grey mottling	-	-
2203	Layer	-	-	Natural / alluvium: mid blueish grey clay with brown mottling	-	-

APPENDIX B. FINDS REPORTS

B.1 Prehistoric pottery

By Lisa Brown

B.1.1 Three sherds of pottery from the site are clearly prehistoric in date:

B.1.2 A single sherd weighing 6g from context 604 is a fragment of a handmade vessel with a simple jar rim, slightly rolled over the external side, but not a proper beaded rim. The sherd is too fragmentary to determine the vessel form but it has a rim diameter of *c*. 160-180mm. The fabric contains fine sand and sparse white and grey calcined flint up to 1mm in size, along with sparse small, rounded black, powdery ferrous pieces. The sherd is fired to dark grey and is roughly wiped but not smoothed. The sherd could date to the late Bronze Age or early Iron Age, but this is very tentative.

B.1.3 Two sherds weighing 7g from context 605 almost certainly belong to a single handmade vessel, which is relatively hard fired, but quite abraded. The lightly sanded, slightly soapy fabric incorporates ill-assorted white and grey calcined flint (0.5 – 2mm in size) in moderate quantity, along with orange grog. The sherd is fired to dark grey and the surfaces are 'pimply', but no special finish has been applied. The calcined flint and grog inclusions indicate a prehistoric date, almost certainly pre-Iron Age because of the presence of grog, but little more can be said in the absence of any diagnostic features.

B.1.4 The pottery is probably redeposited in sea wall/ dam deposits in Trench 6 and so of limited value in helping to characterise or date any prehistoric activity on the site. The handmade, flint-tempered wares are consistent with other prehistoric material from the region, including a small group of pottery from London Gateway Access Road (COARD12), which produced small quantities of Deverel-Rimbury and early Iron Age pottery.

B.2 Medieval and post-medieval pottery

By John Cotter

B.2.1 A total of 6 sherds of pottery weighing 166g were recovered from two contexts. This is of medieval and post-medieval date. Given the small size of the assemblage a separate catalogue has not been constructed and instead the pottery is simply described and spot-dated below. Fabric codes assigned in the comments are those of the Essex County Council medieval pottery reference collection (Cunningham 1985; Cotter 2000). The few fabrics identified are typical of this part of Essex (Cotter 2012). No further work on the assemblage is recommended.

B.2.2 **Context 404 spot-date: c 1475-1650** Description: 4 sherds (72g). One bag contains a large fresh body sherd (44g) in post-medieval redware (Fabric 40). This appears to be from the lower wall of a large jar or jug. It is unglazed and in a good quality fine sandy fabric typical of early post-medieval products (perhaps 16th or early 17th century?). Context 404 is a probable flood deposit that infilled the space in front of the wharf revetment following collapse of the structure. The other three sherds (28g) are all body sherds in medieval orange sandy ware (Fabric 21, *c.*1250-1500); they comprise two small worn unglazed sherds possibly from the same vessel (jug?), and a larger thicker sherd from the centre of a wheel-thrown vessel with a sagging base (possibly a large jar/cooking pot or bowl?) with traces of decayed glaze internally; it appears to be heat-altered (greyish), suggesting a cooking function.

B.2.3 **Context 405 spot-date: c 1475-1575/1600?** Description: 2 sherds (94g). Comprising two vessels in early Fabric 40, both large fresh sherds. They probably date from the 16th century. One is from the rim of a wide bowl/pancheon (diam c 330mm) with a simple flanged rim and flaring/conical wall; no glaze present but the inside appears to be sooted, suggesting that it may have been used as a firecover (curfew)? The other sherd is from the lower wall of a fairly large jar or steep-sided bowl with splashes of clear brown glaze on the lower internal surface (probably covering the whole inside of the base).

B.3 Ceramic building material (CBM)

By John Cotter

B.3.1 Ten pieces of CBM weighing 1286g were recovered from 4 contexts, mainly of post-medieval date. This has not been separately catalogued but is described below.

B.3.2 **Context 403: Spot-date: Late 16th to 19th century.** Description: 4 pieces (161g): 2x very fresh edge fragments of flat roof tile (peg tile?) in a smooth red post-medieval fabric (similar to pottery Fabric 40 above), possibly from the same tile? 1x worn flake of similar tile. 1x worn scrap of early post-medieval soft red brick.

B.3.3 **Context 405: Spot-date: Late 15th to mid 16th century?** Description: 4 pieces (869g): 1x large fresh end fragment of fairly crude hand made 'Tudor' place-brick in a plum-coloured purplish-red fabric with rare coarse flint inclusions (brick width 105mm, thickness 51mm). The upper surface has recessed mould marks along the sides and the underside has coarse vegetation impressions. Smaller fresh brick fragment in similar fabric with similar mould mark (thickness 51mm). 2x small worn scraps of soft red early brick.

B.3.4 **Context 603: Spot-date: 15th to 18th century?** Description: 1 piece (42g): Very worn scrap of fairly soft red late medieval/early post-medieval flat roof tile.

B.3.5 **Context 1801: Spot-date: 15th to 18th century?** Description: 1 piece (214g): Worn fragment (17mm thick) of fairly hard late medieval/early post-medieval flat roof tile in a fine orange-red fabric with some fine vesicles from dissolved calcareous inclusions (similar to pottery Fabric 40 above). Sanded underside.

B.4 Animal Bones

By Lena Strid with Rebecca Nicholson

B.4.1 A total of 20 hand-collected animal bone fragments were recovered from this site, the majority of which came from an articulated horse skeleton associated with the collapse of the wharf. The bones are preliminarily dated to the late medieval/early post-medieval period.

B.4.2 The bone condition was generally fair. Traces of burning or of animal gnawing were absent. The horse remains included the skull, both mandibles and hyoids (tongue bones), as well as the first six neck vertebrae, which protruded from the north-facing section of Trench 4 (Plate 4). The bulk of the skeleton probably lay beyond the limit of excavation. The horse tooth from context (403) articulates with the rest of the teeth. A fragment from a large mammal upper humerus in context (404) probably also derives from this animal (it was found between two of the uppermost planks in the collapsed revetment). The presence of canines suggests that it was a male horse. Judging by toothwear on the incisors, the horse would have been c. 8-18 years old when it died (Habermehl 1975).

B.4.3 No further information can be gained from such small sample of bones. However, if further excavations take place on the site, the bones should be included in the full excavation report.

	Context 403	**Context 404**	**Context 405**	**TOTAL**
Cattle			1	1
Horse	1	14		15
Dog			1	1
Large mammal		2	1	3
TOTAL	**1**	**16**	**3**	**20**
Weight (g)	28	4018	48	4094

B.4.4 Six tiny undiagnostic fragments of fish bone were extracted from the heavy residue of sample 1 (604); they comprised a fragment of a tiny vertebra and fin ray and rib fragments.

B.5 Shell

By Rebecca Nicholson

B.5.1 A collection of shells, mainly from the native european flat oyster (*Ostrea edulis*) were collected by hand during the evaluation. They come from deposits provisionally dated to the late medieval or early post-medieval periods and comprise:

B.5.2 **Context 405**: 472g of shell including two valves (left and right) of cockle (*Cerastoderma edule*) and 14 right, 14 left valves and one indeterminate valve of oyster, of variable size and shape. The oyster valves are in fair condition, with a few left valves potentially measurable. One left valve appears to be an old valve with several other smaller oysters attached to its internal and external surface, and a few valves are irregular in shape suggesting that they grew in unmanaged, potentially crowded conditions. A few valves have evidence of internal tunnelling from the polychete worm *Polydora hoplura* and/or chalky areas and chambers internally. There are rare occurrences of external tunnels caused by *Polydora ciliata*.

B.5.3 **Context 403**: 578g of shell including one small whelk (*Buccinium undatum*) as well as 15 right and 16 left valves, again of variable size and shape but including some large left valves (over 10cm from the hinge to the ventral margin). Most valves were in fair or good condition but most have some damage to the ventral margin. Around 50% of valves have some evidence of post-depositional staining with iron compounds. Again a small number of valves have evidence of internal and/or external tunnelling by polychete worms, and a small number of valves have chalky areas internally. One very large left valve has a clear notch in the ventral margin suggestive of deliberate opening.

B.5.4 **Context 413**: A single large whelk (*Buccinium undatum*) weighing 31g.

B.5.5 **Context 604**: In addition to hand collected shells, the dry residue of soil sample <1> from redeposited alluvium (context 604) included a large quantity of shells (29 right, 29 left), all from small/immature flat oysters (*O. edulis*). Most are complete and in good condition, and all have an orange hue due to post-deposition iron precipitation. With the exception of a small number of elongated valves and valves with a 'heel', the valves are of the traditional flat hinged round form and it is likely that a significant proportion of left and right valves are pairs. While most valves are in good condition two are 'rotten

backs', exhibiting extensive pock-marks, probably made by the sponge *Cliona celata*, as well as burrows made by polychete worms including *P. hoplura*. One oyster valve has another attached to its internal surface. Context 604 also contained an assemblage of later prehistoric (probably mid-late Bronze Age pottery and worked flint) but was almost certainly redeposited in the fill of a post-medieval sea wall dam. The material may have been dug out from a Bronze Age level in the underlying alluvium during drainage ditch digging. In contrast to the shells from (403) and (405), the oysters from (604) are likely to have come from a natural estuarine shellfish bed rather than from a dump of shell.

B.5.6 The Thames estuary was home to some of the most important oyster beds in the UK, and oysters from it were extensively exploited in the past. The oyster valves from (403) and (604) are likely to represent accumulations of shells dumped after eating. While there are similar numbers of left and right valves, the sizes are not indicative of former pairs and the clear v-shaped notch on one of the largest valves provides good evidence that these oysters were deliberately opened and presumably eaten.

B.6 Flint

By Michael Donnelly

B.6.1 A small assemblage of 15 struck flints was recovered from this evaluation. All the flints originated from two contexts (604 and 605). These contexts also produced 23 pieces of burnt unworked flint weighing 351g.

B.6.2 The assemblage is mostly later prehistoric in character with many squat hard-hammer struck flakes displaying limited or no platform preparation and usually with either cortical or plain platforms. The two tools present in the assemblage are both piercers and are of a fairly simple type often associated with later prehistoric knapping.

B.6.3 A small number of blades were found in context 605 alongside later prehistoric flakes. While these may simply be regular outliers in a later, cruder assemblage, the two blades and one thin very regular flakes most likely date to the Mesolithic or earlier Neolithic periods.

B.6.4 The assemblage is generally quite fresh and it would seem likely that they are either in their primary context or have not moved far. Context 604 also contained an assemblage of later prehistoric (probably mid-late Bronze Age) pottery, but was almost certainly redeposited in the fill of a post-medieval sea wall dam. The material may have been dug out from a Bronze Age level in the underlying alluvium during post-medieval drainage ditch digging.

B.6.5 The assemblage is likely to date to the middle-late Bronze Age. An iron age date could also be argued for much of this material. However, Iron Age knapping is still a controversial subject in Britain (McLaren 2012; Young & Humphreys 1999). The blade forms and one or two flakes in the assemblage suggests a limited local early Neolithic or Mesolithic presence.

Context	Type	Sub-type	Description	Date
604	piercer	side trimming	small piercer on a double side trimming flake, proximal example with tip missing concave retouch upper left and right	LPH
604	flake	misc trimming		
604	flake	preparation		

Context	Type	Sub-type	Description	Date
604	flake	misc trimming		
604	flake	inner	squat, hard-hammer flake	LPH
604	flake	inner	quite squat and low levels of skill and prep	LPH?
604	flake	inner	squat, hard-hammer flake	LPH
604	flake	preparation	squat, hard-hammer flake	LPH
604	burnt	unworked	3 pieces weighing 31g	LPH
605	flake	side trimming	damage mid left and some on right could be use, long and blade-like but still very hard hammer	LPH?
605	flake	preparation		LPH
605	flake	inner	squat, hard-hammer flake	LPH?
605	blade	side trimming	very genuine looking EPH blade, outlier in LPH assemblage or real?	Meso-Neo?
605	piercer	inner flake	squat retouched form, piercer tip not that well developed but clear retouch either side of distal mid projection	LPH
605	bladelet	misc trimming	genuine early form	Meso-E-Neo
605	flake	side trimming	thin and regular	Meso-Neo
605	burnt	unworked	20 pieces weighing 320g	LPH

B.7 Stone

By Ruth Shaffrey

B.7.1 A total of six pieces of stone were retained. These comprise five pieces of a light black material, probably coal or lignite (405. 403, 404) from deposits associated with the early post-medieval wharf revetment. None of these show signs of having been worked. The sixth piece of stone (403), is a slab of a speckled grey slate. It is also not worked. The slate can be discarded. The coal should be retained in case future worked material is found and needs to be compared with this.

B.8 Wood

By Damian Goodburn

B.8.1 Damian Goodburn visited the site and inspected the timber structures discovered in Trench 4, an E-W trial trench 2m wide, cut to run from the ‘dryland, into grazing land lying over the edges of what had been a large tidal creek, prior to the ‘inning’ of the tidal marsh. The bulk of the land winning and drainage was carried out in the post-medieval period. The specialist provided advice on the interpretation, broad dating, recording and sampling of the woodwork. Discussion was had on-site and notes and sketches were made with key advice noted. The structures were then photographed to aid recording and sampling.

B.8.2 The small exposure of historic waterlogged timbers were due to be preserved *in situ* within two days. If the local water table is not dropped then the timbers should survive if buried in soft alluvium, though it must be noted that they have suffered some drying and

weathering before burial and some drying after recent exposure. No clear tool marks were visible on the timbers at the time of the visit and only a little sapwood on the oak.

B.8.3 The comments offered here are based on first hand experience of the recording of large numbers of historic waterfront structures in South-East England since 1986. The author's experience and Phd research includes dealing with large numbers of nautical timbers including assemblages of partly prepared ship and boat timbers. The vast majority of this evidence is closely dated using tree ring dating.

B.8.4 With regard to evidence for relative sea level change, it was noted that it was important to obtain levels AOD for the upper and lower timbers.

The timbers found: a brief summary

B.8.5 Three main groups of historic timbers were exposed in Trench 4 at the time of the visit:

- A group of three roughed out oak ship/boat timbers towards the landward, western end;
- The remains of a disturbed revetment with an E-W land-tie assembly running to the west was found; The sill beam at the base of the revetment was not exposed until after the specialist visit.
- A little further to the east, towards the historic water channel, a spread of very disturbed oak planks and beams was visible together with one elm log pile.

The disturbed revetment timbers

B.8.6 This structure was built mainly of alternating thicker, squared oak posts and planking set on end. The original form of the structure was clearly built to resemble ‘stave and muntin’ work. However, money was saved by not grooving the edges of the posts to engage with the planks but simply setting them slightly over lapping. This is thus ‘false stave and muntin work’. The base of the structure and sill beam was not exposed at the time of the visit. Subsequent investigation by the site exposed the sill beam, a large squared timber (0.25 x 0.20m in profile) possibly re-used as it had at least one unused circular socket in the east face. The sill beam extended beyond the trench edge to north and south. The upright posts were fastened to the sill beam using mortice and tenon joints.

B.8.7 The revetment ran N-S and included an east west land-tie beam of elm. The creek end of the assembly was given a square through socket with a squared oak lock bar set through it to retain the upright planks, and posts. What appears to have been the landward end of the elm land-tie beam was also uncovered showing an unusual method of securing the ‘crotched’ top in the parent tree. A pair of anchor stakes were driven either side of the bulge created by the crotch and further secured with two oak timber wedges. An isolated small stake also lay to the north. Strangely the originally vertically set staves and muntins were found lying tilted towards the land rather than as is normally the case towards the water. The top of the revetment was truncated by rot and the base lay well out of sight.

B.8.8 The function of this revetment is uncertain, as is its original height which could well be c. 3m. As the structure is roughly in line with, a clearly old, major farm track this might suggest that it was built as a farm wharf. As some form of ship building apparently took place close by it may also have functioned as a wharf for unloading materials such as timber and tar etc.

B.8.9 The worked wood to the east, lying in foreshore alluvium, was massively disturbed material possibly derived from structures built on the land above wharf frontage or

possibly the wharf itself. The disturbance of the wharf front and these timbers seems to imply destruction by a massive flood, possibly with elements of human disturbance? Clearly the structure was then abandoned and not replaced close by.

B.8.10 To landward, three roughly squared, weathered oak timbers were found apparently lying within the land winning dumps, as make up. All the three timbers had strongly curved shapes clearly indicating that they were destined for ship/ boat building use. The two uppermost appeared to have original rot hollows suggesting that they may have been rejected for actual use. Such roughed out, defective nautical timbers have been found casually reused or dumped on several Thames sites with boat and ship building connections. The lowest and largest timber was an angled 'knee timber' shaped for use as a bracket joining beams to the ship, or large boats, side.

Initial broad dating in relation to the materials and working visible

B.8.11 It must be noted that the vast majority of the woodwork was not totally exposed but many diagnostic features could still be seen. The revetment structure had a basic form known from the late 14th to 16th centuries in the region. Key features include the use of tangentially faced (must have been sawn) planking and beam sections cut square from thick slabs of oak timber (again must have been sawn out due to knottyness). These features and the use of some elm timber suggest a broad dating to the late 15th to early 17th centuries centring on the 16th century.

B.8.12 The potential for tight tree-ring dating of the timbers is somewhat limited as the material exposed in the trench was generally fast grown and lacking sapwood (with one exception). The best timbers to slice sample were marked on a sketch plan and subsequently recovered by the site team. Subsequent specialist assessment determined that the two samples selected lacked sufficient growth rings to provide a date. If more extensive excavation takes place in future there is a reasonable likelihood that suitable samples would be recovered.

APPENDIX C. ENVIRONMENTAL REPORTS

C.1 Environmental samples

By Julia Meen

Introduction

C.1.1 A single bulk sample was taken from an undated alluvial deposit rich in marine shell during archaeological evaluation works at the Lorry Park site, London Gateway. Sampling was undertaken primarily to establish whether the deposit represented an anthropogenically gathered shellfish midden, or represented a natural accumulation. The sampled layer was recorded in the field as potentially containing waterlogged remains, so sampling also aimed to establish whether preservation conditions were suitable for this type of material. The deposit, context (604), was a pale brown (10YR 6/3) clay, and the sample was 9L in volume.

C.1.2 A series of two overlapping monoliths was taken from the Trench 4 channel fill, through topsoil (400) and mottled grey alluvium (402) and (404), from a location, adjacent to the collapsed late or post-medieval timber wharf. These monoliths will be retained for reference and possible further investigation to determine the nature of deposition.

Methodology

C.1.3 The sample was processed for the recovery of CPR by water flotation using a modified Siraf style flotation machine. The flot was collected on a 250µm mesh and the heavy residues sieved to 500µm and dried in a heated room, after which the residues were sorted by eye for artefacts and ecofactual remains. The CPR flot was scanned for plant remains using a binocular microscope at approximately x15 magnification. Identifications were made with guidance from K. Hunter. Nomenclature for the plant remains follows Stace (2010).

Results

C.1.4 *Residue:* The sample produced a large quantity of oyster shell, and occasional fish bone. All finds were passed to the relevant specialists for further study. It was noted that many of the shells had both the left and right valves present and joined, suggesting that they were naturally occurring rather than food waste.

C.1.5 *Flot:* The sample produced a very small flot (less than 10ml in volume), the majority of which was composed of modern root material. Charcoal occurred infrequently and was limited to fragments of too small a size to allow identification. Rare additional items of charred plant material included a seed of *Anthemis cotula* (stinking chamomile), part of a seed head of *Juncus* sp. (rush), and a partial emmer/spelt wheat glume base (*Triticum dicoccum/spelta).* A charred seed of *Bromus/Avena* sp. (brome or oat) was also recovered from the heavy residue. No waterlogged plant remains were observed.

Discussion and Recommendations

C.1.6 An in-depth study of plant macrofossil evidence from Iron Age and Roman deposits at Stanford Wharf Nature Reserve, London Gateway, has previously been completed (Hunter 2012), and it is clear that there is potential for the recovery of significant deposits of charred plant material from the area. The scarce plant remains from the present sample, however, add little extra to our understanding of the local environment; the few items it does contain are species previously identified from the nearby

excavations . Charred seeds of rush were abundant in many features from the adjacent Nature Reserve site, and are a plant typical of this sort of coastal location.

C.1.7 The lack of waterlogged plant remains in the samples is in agreement with observation in the field that the upper layers of alluvium may have seen some drying out (S. Foreman pers. comm). However, good waterlogged preservation was seen in suitable contexts at the main London Gateway site, and further excavation may uncover more deposits of this type; in this case appropriate samples should be taken, ideally after discussion with a specialist.

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Stanford-le-Hope Tithe Map (1840) ERO D/C/T362B

APPENDIX E. SUMMARY OF SITE DETAILS

Site code: COLPEV

Grid reference: TQ 7110 8190

Type: Evaluation trench investigation

Date and duration: 22nd June to 8th July 2015

Area of site: 24.24 hectares

Summary of results: Oxford Archaeology South (OAS) was commissioned by London Gateway Logistics Park Ltd. to undertake an archaeological evaluation of the site of a proposed Heavy Goods Vehicle (HGV) Lorry Park at the London Gateway Logistics Park (LGLP), adjacent to the London Gateway Port alongside the River Thames near Stanford-le-Hope, Essex, centred on NGR TQ 70887 82261. The proposed location for the Lorry Park (the 'application site') is an area of farmland at Great Garlands Farm, located outside the LGLP to the west.

Significant archaeological remains were encountered in two evaluation trenches out of 21, both of which were concentrated along the western edge of the site. However the trenches only investigated the top 1m of the soil sequence, which would be most directly affected by the development. Because of the thick sequence of alluvium covering the site, archaeological features could be present at any depth down to 9.4m below ground level. Based on the results of the evaluation, a number of potential archaeological impacts were identified if the development proceeds as proposed.

The most vulnerable features are a series of well-preserved surface earthwork features of medieval/ post-medieval date that cross the site, which are sea walls and enclosures associated with a 16th - 17th century wharf known as 'Feake's Hithe' and sea walls of medieval or post-medieval date. Construction of the proposed Lorry Park would inevitably have an adverse effect on the upstanding earthwork features. These were not targeted for investigation in this phase of trench investigation as their chronology and significance is sufficiently understood from documentary research and Lidar analysis to inform the EIA process.

The western margins of the historic Carter's Creek have considerable potential for maritime archaeological finds associated with Feake's Hithe, which has produced evidence for ship or boat building activity. Trench 4 contained the remains of a timber wharf, buried at a depth of 1m below ground level. This area is likely to be excluded from the development but any proposed groundworks within the western side of the application site, including ecological mitigation earthworks, would require careful assessment.

It is very likely that significant remains are present at greater depth within the Holocene alluvial sequence. The evaluation produced late Bronze Age finds from one location close to the river terrace edge. These are most likely to have been dug out from the thick alluvial sequence underlying the site, but could conceivably be from an in situ Bronze Age horizon. However, most such remains will be below the proposed level of most construction impacts arising from the proposed Lorry Park development and would be preserved in situ beneath a protective layer of made ground.

Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with Thurrock Museum in due course.

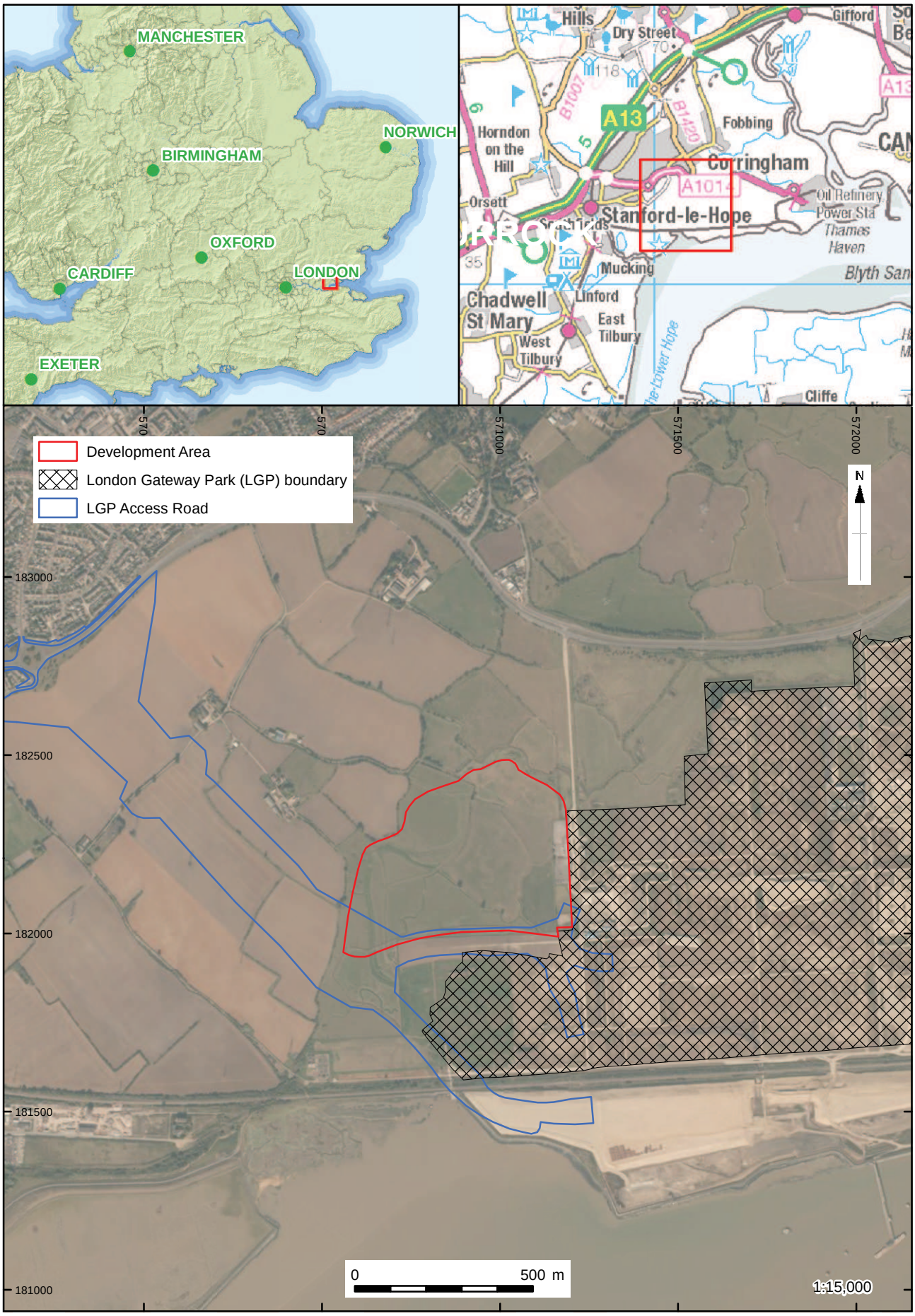

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Figure 1: Site location map

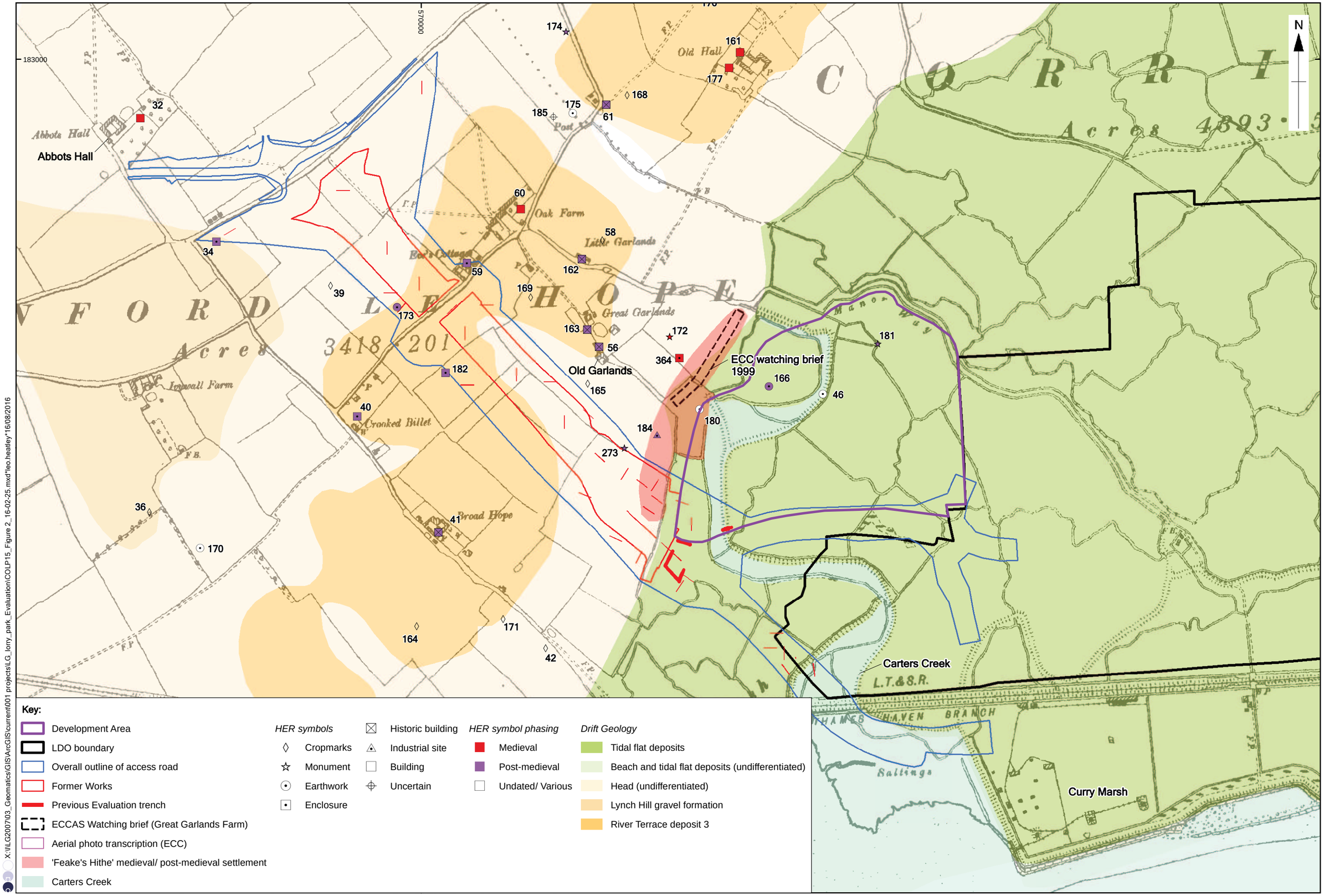

Figure 2: Projected extent of medieval/ post-medieval settlement of 'Feake's Hithe'.

X:\ILG2007\03_Geomatics\GIS\ArcGIS\current\001 projects\LG_lorry_park_Evaluation\COLP15_Figure 3_16-02-25.mxd*gary.jones*18/08/2016

0 200 m

1:2,500 @ A3

Figure 3: Trench location plan overlaid on SLRM (2m)

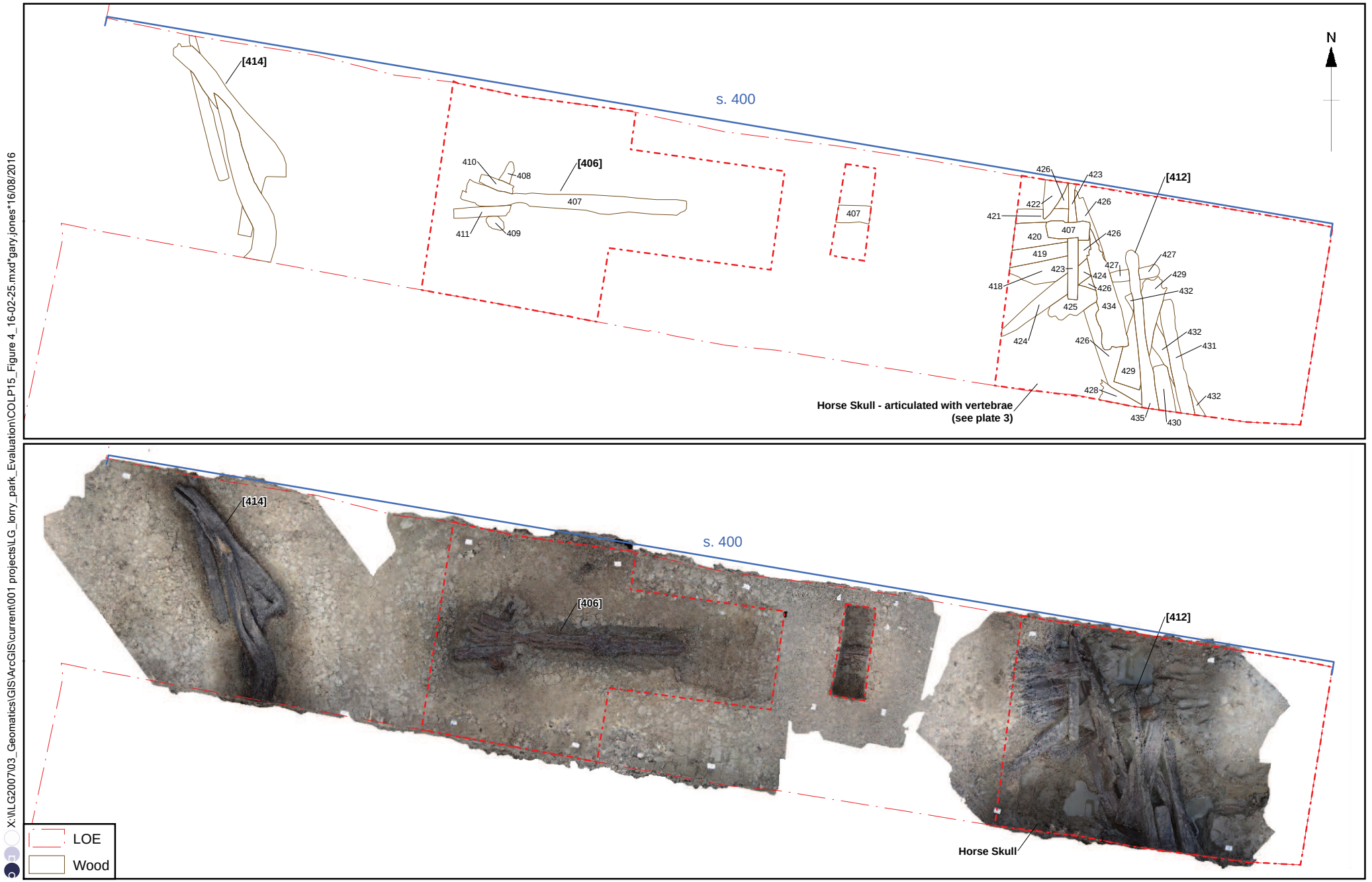

Figure 4: Plan of Trench 4

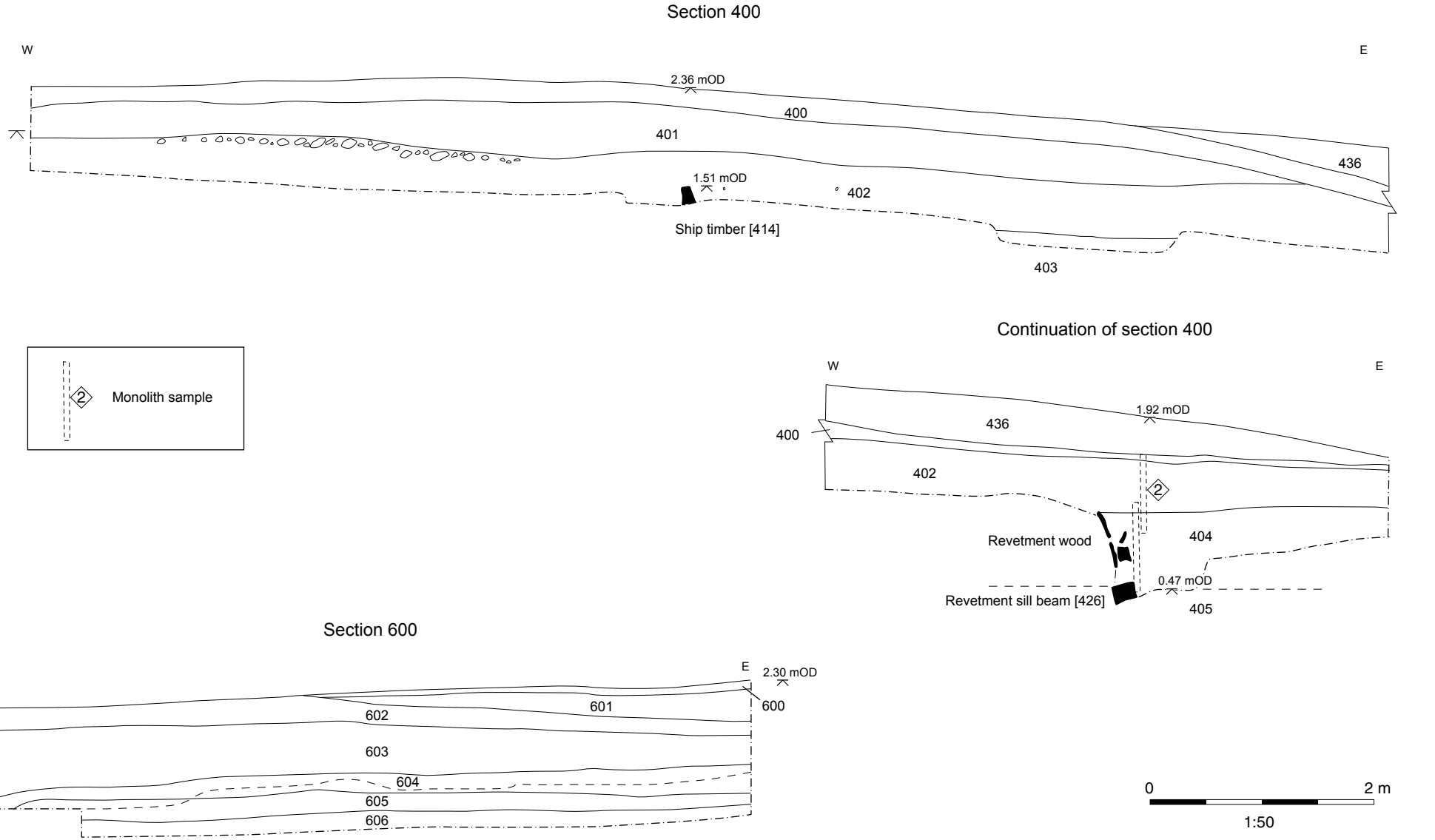

Figure 5: Trench 4, section 400 and Trench 6, section 600

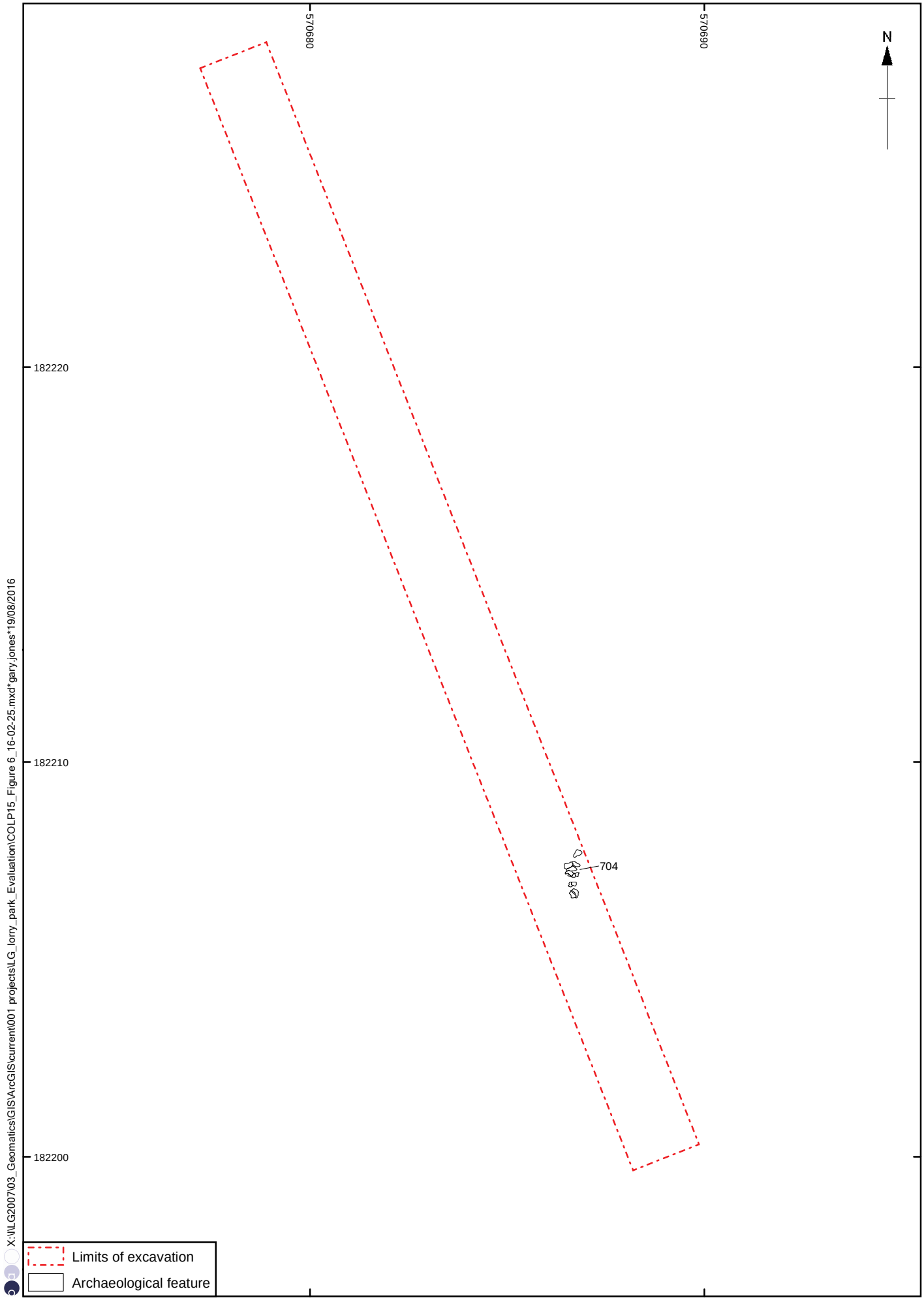

Figure 6: Plan of Trench 7

Figure 7: Trench plan overlaid onto a mid-17th century map of Old Garlands marshlands

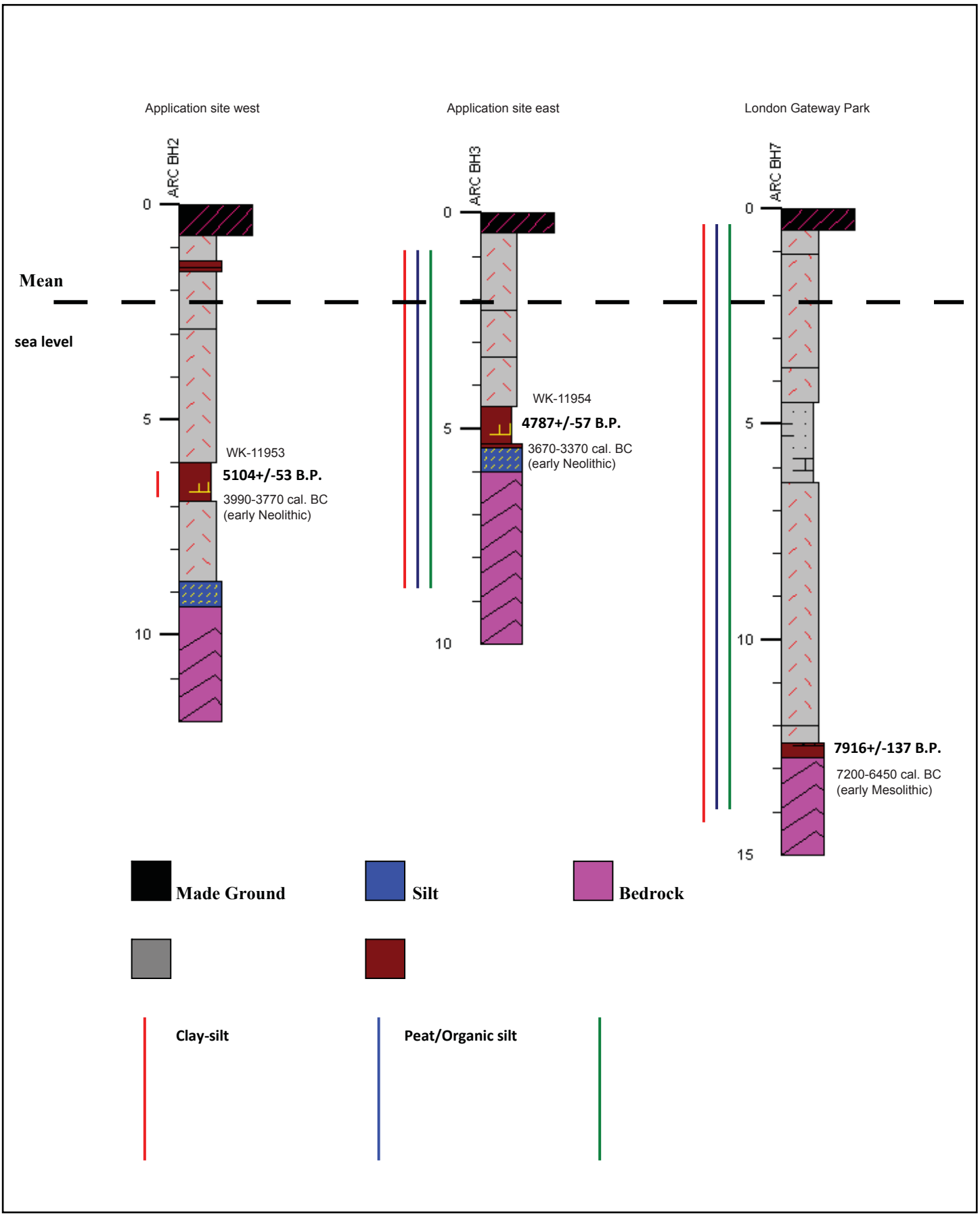

Figure 8: Boreholes referred to in text

Plate 1: Trench 2, looking east

Plate 2: Trench 3, looking east

Plate 3: Trench 4, Structure 412, looking west

Plate 4: Trench 4, horse skull (top of image) and Structure 412, looking south

Plate 5: Trench 4, Structure 412, looking west, showing wharf revetment baseplate as exposed after removal of dendrochronology samples

Plate 6: Trench 4, Structure 414, discarded roughed out ship timbers

Plate 7: Trench 5, looking south

Plate 8: Trench 6, looking north-east

Plate 9: Trench 6, sondage, looking north

Plate 10: Trench 7, looking north

Plate 11: Trench 7, Feature 704, looking east

Plate 12: Trench 8, looking north-west

Plate 13: Trench 9, looking south-west

Plate 14: Trench 10, looking east

Plate 15: Trench 11, looking south

Plate 16: Trench 12, looking east

Plate 17: Trench 13, looking south-west

Plate 18: Trench 14, looking south-east

Plate 19: Trench 15, looking west

Plate 20: Trench 16, looking south

Plate 21: Trench 17, looking south

Plate 22: Trench 18, looking east

Plate 23: Trench 19, looking north

Plate 24: Trench 20, looking west

Plate 25: Trench 21, looking south

Plate 26: Trench 22, looking west

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