Part IV

Synthesis

Chapter 13

Discussion

Prehistoric Archaeology and the Floodplain

Evidence for prehistoric use of the floodplain area by humans has been documented through a number of sources of information in the course of the study (Fig 91). Substantial evidence for human activity was identified at Swanscombe Marsh (Thames River Crossing, Chap 11), Rainham Marsh (East of Ferry Lane, Chap 9) and Aveley Marsh (Tank Hill Road, Chap 10) where HS1, or diversionary works associated with the rail corridor, impacted on floodplain marginal sequences on gravel surfaces or highs. At Swanscombe Marsh the evidence consisted of two distinct groups of material, the more substantial representing a Late Upper Palaeolithic site of unknown extent but probably representing single visit activity. By contrast the evidence for Neolithic activity is probably lower intensity use of the site but over a prolonged period of time. On Rainham Marsh the small Early Neolithic flint scatter, although apparently isolated and probably representing a single knapping episode, is quite possibly associated with more extensive occupation evidence recorded at the nearby Brookway site on the higher terrace (Meddens 1996). At Tank Hill Road on Aveley Marsh a small amount of material was recovered dating to the early Post-glacial period, as well as the Neolithic and Early Bronze Age attesting to occasional visits, but the major phase of activity here is dated to the Late Mesolithic period representing repeated and intensive use of the site for the manufacture of microliths, microburins and tranchet axes.

One of the key horizons associated with human activity on the main Thames floodplain appeared to be the interface between the underlying sands and gravels and the overlying clay-silts or organic sediments associated with the Holocene alluvial wedge. Thus artefacts are resting on a surface that has been exposed for a considerable duration since at least the Late Pleistocene up until inundation has taken place across the surface. Similar situations have also been documented at Slade Green (Bates and Williamson 1995) and Erith (Bennell 1998). What remains unclear, however, is the frequency with which artefacts occur on the sand/gravel to alluvium interface. It is interesting to note that this pattern is similar across the floodplain with the exception of the Neolithic artefacts discovered at Purfleet close to the mouth of the Mar Dyke by Wilkinson and Murphy (1995) where a few artefacts (possibly the result of specialist activity) were located in the clay-silts immediately below the main peat associated with the phase of estuary contraction.

Where significant exposures were observed, little or no direct evidence for human activity was located along the HS1 route on the Thames floodplain within the main body of the thick floodplain peat sequences. This includes geoarchaeological zones previously identified as low, medium and high priority (Chap 6), for example,

- watching briefs on major diversionary works (eg, the Goresbrook diversion and Lamsdon Road at Rainham Creek, Chap 8);
- watching briefs on deep pipeline excavations at road, rail, watercourse and drainage ditch locations from Ripple Lane to Mar Dyke (open cut trenches, cofferdams and caisson chambers)
- archaeological evaluation trenching (eg, Goresbrook, Chap 8; Rainham Marsh, Chap 9);
- where large transects of the alluvial corridor have been impacted on by the construction of the tunnel approaches (eg, Ripple Lane Portal, Chap 8; the Thames River Crossing at Swanscombe, Chap 11).

This is an important observation because of the extensive nature of the works associated with HS1. No evidence for timber structures (eg, trackways, jetties, bridges) or structural remains associated with permanency was detected in the study at any of the locations examined in the main Thames floodplain area. This is perhaps surprising as Bronze Age timber structures have been recorded at several sites in the East London area. Many of these structures commonly occur towards the top of the peat sequences abutting areas of higher ground, often in tributary locations such as the River Roding (eg, Stafford *et al* 2012, fig 10.3; Carew 2009; Meddens 1996). The absence of similar structures over the HS1 route corridor between the River Roding and Mar Dyke might indicate differential use of the floodplain in the later prehistoric period, where contrasts exist between that part of the floodplain associated with trackways and that part without (see Meddens *et al* 2012, 149). Although this pattern may, in part, reflect the extent and level of archaeological visibility along this part of the route, especially for the more deeply buried

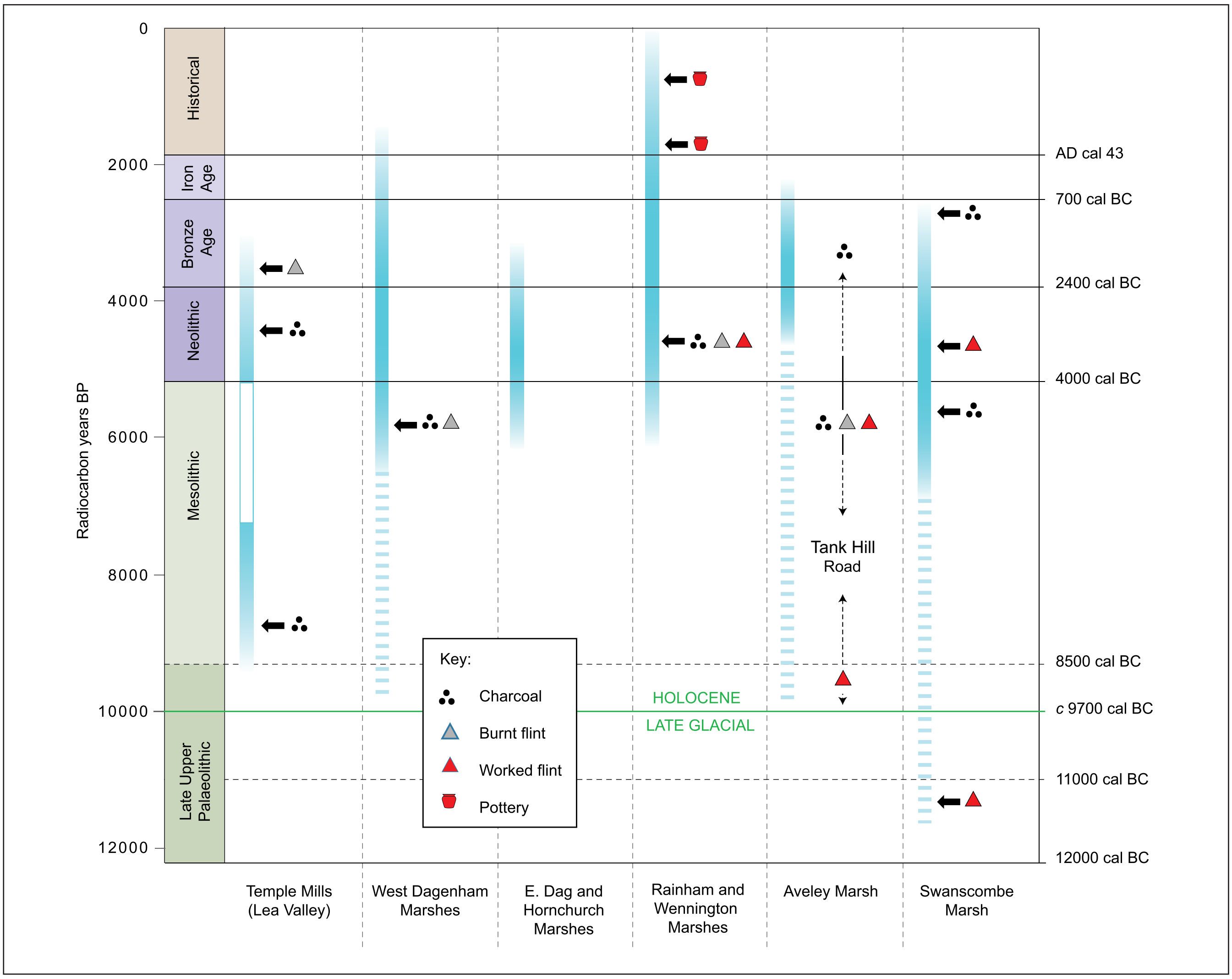

Figure 91 Summary distribution of sequence duration and associated archaeological and human proxy records for key sites and interventions along the route corridor

sequences, it should be noted the upper part of the peat was frequently exposed during the watching brief on service diversions across Dagenham and Hornchurch (Mudlands and Rainham Creek); Rainham Wennington and Aveley Marshes (Chaps 8–10). Here, the excavation of *c* 5.2km of open pipe trench, essentially a linear transect running parallel to the terrace edge, was monitored by a team of archaeologists continually over a period of two years. Trenches were entered frequently in order to carefully inspect the deposits for artefactual and structural remains, as well as for sediment recording and sampling by a geoarchaeologist. The peat often contained large quantities of wood which was consistently checked for evidence of wood working. On occasion, where natural accumulations of wood appeared to resemble some form of linear structure, an ancient wood-working specialist (Damian Goodburn) visited the site to confirm the accumulation to be of natural origin. Exposure of the more deeply buried peat sequences was less frequent but was monitored during the numerous deep excavations at road, rail, watercourse and drainage ditch crossings (see 28.800km, Wennington Marsh, Fig 49).

In contrast to the HS1 route across the main Thames floodplain, investigations in the Ebbsfleet Valley recorded prehistoric material within the alluvial stack. Here, the complex and shifting ecotonal zones of the wetland margins appear to have been a focus of activity during the prehistoric period. The evidence includes a section of a possible Late Neolithic trackway found within the peat during the STDR-4 works, discrete concentrations of coppiced roundwood within the upper part of the main peat body, and in one case a wattle hurdle that was laid down on the peat surface during a period of rising water tables. Radiocarbon dating suggests these concentrations could be contemporary and appear to follow an alignment along the wetland edge during the Middle Bronze Age. A double row of substantial timber piles dating to the Middle Bronze Age were also recorded that may represent the remains of a timber walkway or footbridge traversing a channel. The concentrations of activity may simply be a reflection of the extensive construction impacts and consequently larger scale intensive investigations carried out here (it is perhaps notable a number of the Bronze Age wooden structures were recorded under general watching brief

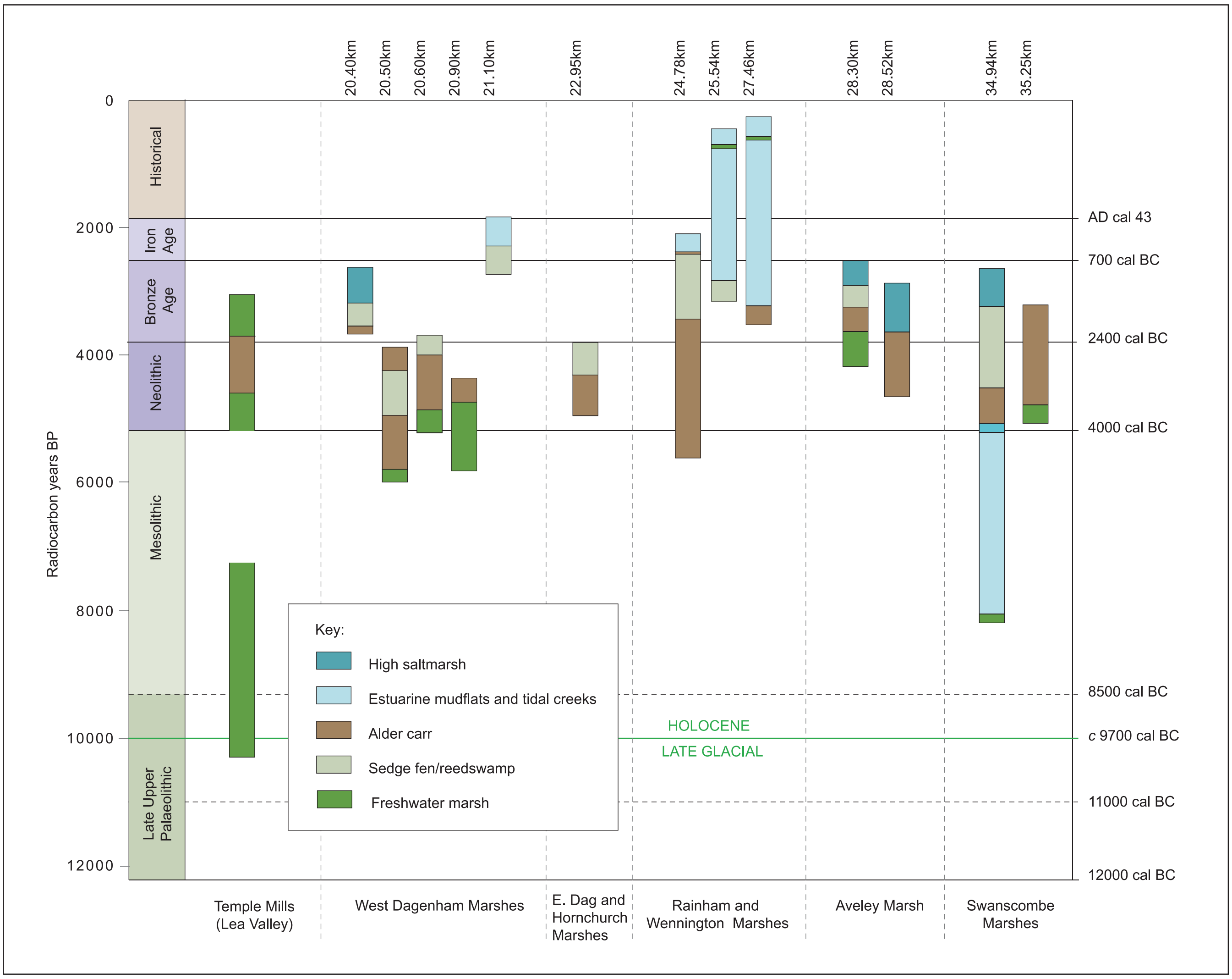

Figure 92 Inferred environments of deposition for selected sequences across the study area

conditions suggesting visibility was sufficient in this case to positively identify such remains). However, it is also clear the unique topography of the valley exerted a huge influence over patterns of sedimentation, hydrological and vegetation successions as well as preservation environments. It might, however, be that the valley was a focal point for activity (a feature that is certainly the case with the establishment of ritual activities at Springhead in the Late Iron Age and Roman periods, Andrews *et al* 2011a).

In addition to direct evidence for human activity, proxy records have been identified in the palaeoenvironmental record at a number of sites. At the Thames River Crossing microscopic charcoal at two horizons in the sequence indicate the possible impact of human activity in the environment that may have been associated with vegetation change and either temporary openings in the forest or more prolonged clearance. Similar evidence, as well as a horizon with burnt flint, was discovered at Temple Mills. It is noticeable that a number of sites contain evidence for elevated levels of charcoal in the Late Mesolithic (Fig 91) as well as in the Neolithic period.

Recent Archaeology and the Near Surface Zone of the Alluvium

Most of the sites investigated in this study, apart from the Ebbsfleet Valley, produced little archaeological evidence for the later prehistoric and historical periods and this is probably a reflection of the low level, seasonal use of the floodplain areas during these periods. Roman activity was detected on Rainham Marsh in the form of an assemblage of redeposited pottery and faunal remains associated with channel deposits. This material probably represents a dump deposit associated with more permanent settlement on the higher drier ground. On Wennington Marsh there is evidence of episodic, probably seasonal, occupation occurring during the medieval period possibly associated with a period of marsh reclamation.

Again the paucity of information from this study contrasts with that from Ebbsfleet where Roman activity is well established in the form of farming and brewing activities associated with the Northfleet villa as well as constructions associated with a waterfront. Saxon occupation is attested to be a series of sunken featured buildings while within the alluvium is the remains of a unique tidal mill (Andrews *et al* 2011a). Without a doubt the abundance of occupation evidence from the Roman and Saxon periods within the Ebbsfleet is in part a function of the ritual activities at Springhead and the urban settlement that grew up around the springs.

Landscape Heterogeneity and Development

Sequences impacted and recorded during the project typically conform to the well-known lithologies and stratigraphies previously documented by Devoy (1977; 1979), Long *et al* (2000), Corcoran *et al* 2011, Powell 2012 and others. These are summarised in Fig 92. However, it is clear from other studies that the nature of the alluvial stack at different locations in the estuary (including the Medway) varies across space (Fig 93, see Fig 94 for profile locations). Devoy himself noted that the peats become less persistent east of Tilbury (Devoy 1977; 1979). This indicates that consideration needs to be given on a site by site basis to the nature of the sequences and their environmental and archaeological relevance.

The evidence gathered at the different locations (*Table 76* and *Table 77*) indicates that, in addition to the well-described alder carr and reedswamp wetland sequences associated with the major peat units of the floodplain, a number of other environments of deposition can be identified within the rivers entering the Thames Estuary. The biological characteristics of these depositional environments in the floodplain vary but the lithologies are strikingly similar (at least in the field situation) and, consequently, have rarely been examined and recorded in detail; particularly where there remains a general perception that the grey clay-silts are of low archaeological potential. Comparison with data gathered from elsewhere within the Thames Estuary (Fig 94) downstream of the Thames River Crossing (eg, at Shellhaven and within the Medway Estuary at Grain (*Table 76*) and the Medway Tunnel (*Table 77*) is interesting. During the HS1 works it has been found that clear differences in the nature of the environments of deposition of minerogenic sediments occur across space and also within a single sequence above and below the main mid-Holocene peat (estuary contraction phase). At the Thames River Crossing this difference is between mudflats below and saltmarsh above the peat. At other locations (Shellhaven/Medway Tunnel) the difference is more marked with mudflats characterised by access to marine waters below and saltmarsh above the main peat units. Furthermore, within the Medway system tidal river sequences are present at depth within the floodplain close to the Isle of Grain; this represents a facies as yet unidentified in the Thames. This evidence suggests that heterogeneity within the floodplain is common and that factors such as proximity to the active channels as well as the relative balance between sediment input and sea-level change are important. For example, at the Thames River Crossing it appears likely that the development of mudflats following initial flooding of the topographic template gradually gave way to saltmarsh development just prior to contraction of the estuary. Here this shift may well be a function of a near balance of sedimentation rates and change in sea-level. Comparison with other areas of the estuary such as Shellhaven/Medway Tunnel), in which marine access to the mudflats was maintained, suggests flooding and deepening of the waters in the estuary may initially have outpaced the ability of the system to infill the basin. The differing interpretations of these signals raise important questions about the precise nature of local palaeogeography, the nature and position of intertidal zones at different times and the distribution of resources in this patchwork environment. This not only influences how we think about resource distribution across such patchwork environments but also communication pathways through this landscape. At present such issues have rarely been articulated in the context of the later prehistory of the Thames Estuary area.

The dating of the sequences (Figs 95 and 96) is also significant. Although the data conform to the broad model suggested by Long *et al* (2000) and Bates and Whittaker (2004), data collected from the HS1 scheme suggest that onset and cessation of peat formation (indicated at a single site in Figure 95 as joined start and end dates for peat formation) varies along the route corridor. Thus, although there is a trend downstream to younger dates for onset of peat formation after 6000 BP, there is considerable variation that is a result of the nature of the topographic template onto which peat has grown.

Processes of Change in the Floodplain

The processes associated with the evolution of the floodplain have, for many years, been driven by the desire to understand regional vegetation changes and the impact, or nature, of sea-level change in terms of transgressions and regressions across the floodplain surface. This has resulted in a tendency to examine sequence and change at an individual site in terms of considering the landscape at the semi-regional scale; where study at a local level has occurred (eg, Sidell 2003), the focus has tended to be on the process of sea-level change but where this might have an effect on tidal regime, etc. Until recently (eg, Powell 2012; Stafford *et al* 2012; Carew *et al* 2009), the exception to this was the work at Purfleet by Wilkinson and Murphy (1995). It is becoming increasingly apparent that, in order to understand human behaviour and, indeed, the reasons for human activity at a particular point in the landscape (or indeed their absence at other locations), more local environmental reconstructions are required that focus on spatial variation in the depositional environment. In this study we have attempted to shift the focus of attention towards the local scale rather than pursuing the well-trodden path utilising the vegetation record to

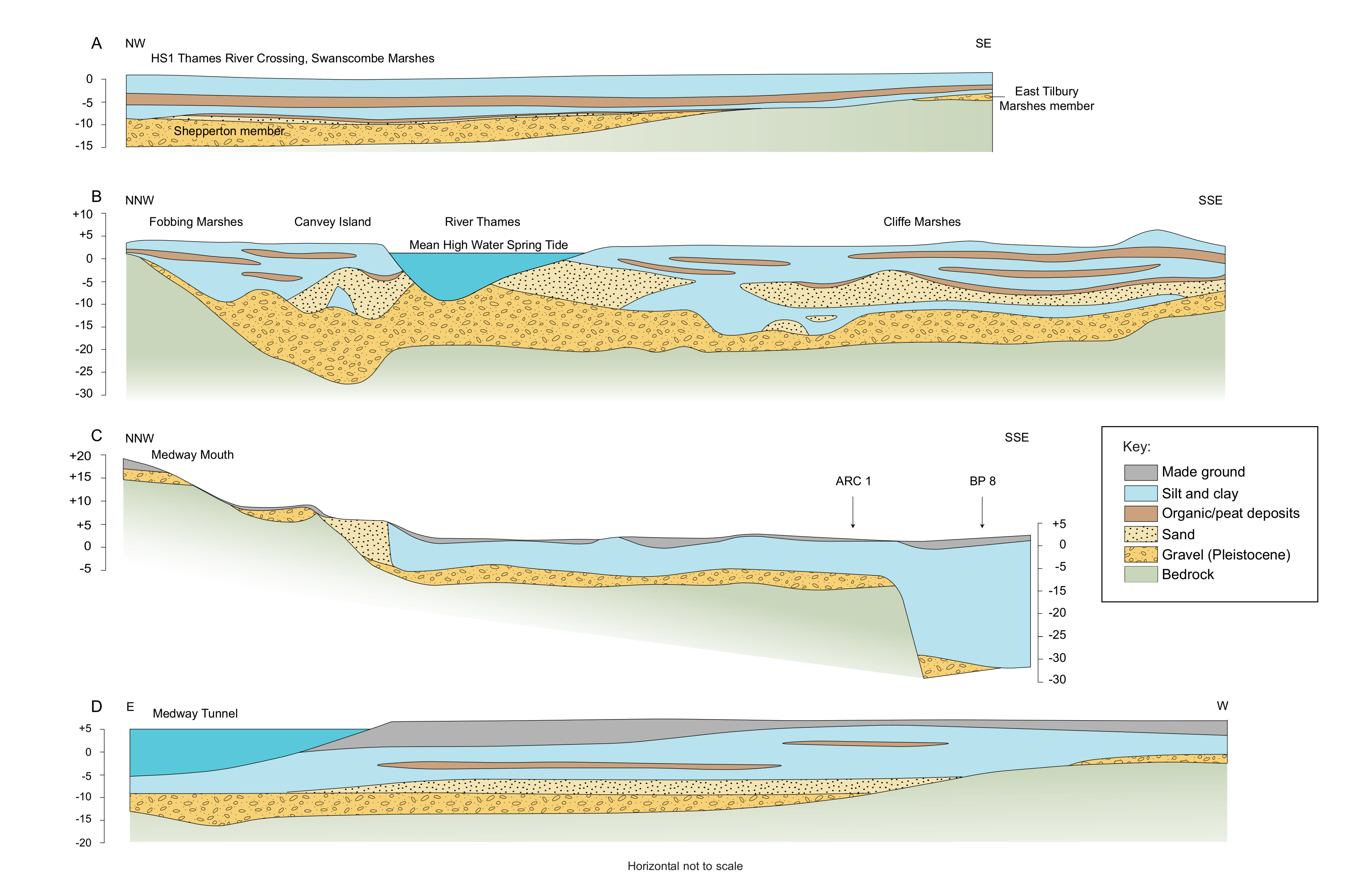

Figure 93 Schematic cross sections based on data from the Thames River Crossing (this study), Canvey Island/Cliffe Marshes (BGS), Medway mouth including the Isle of Grain (Bates unpublished) and the Medway Tunnel site (Bates and Bates 2000)

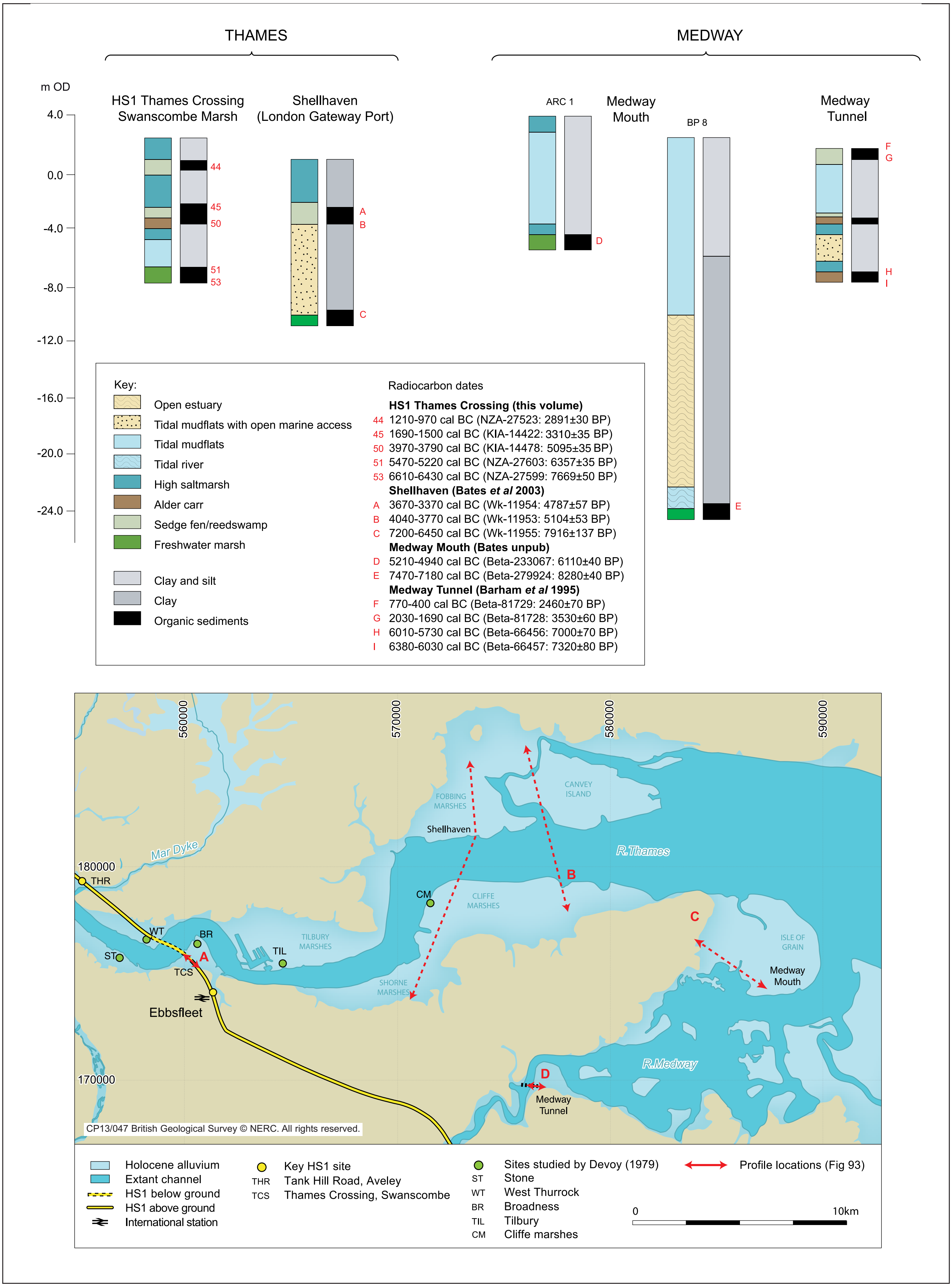

Figure 94 Distribution of lithologies and inferred environments of deposition from key sites in the Thames and Medway Estuaries

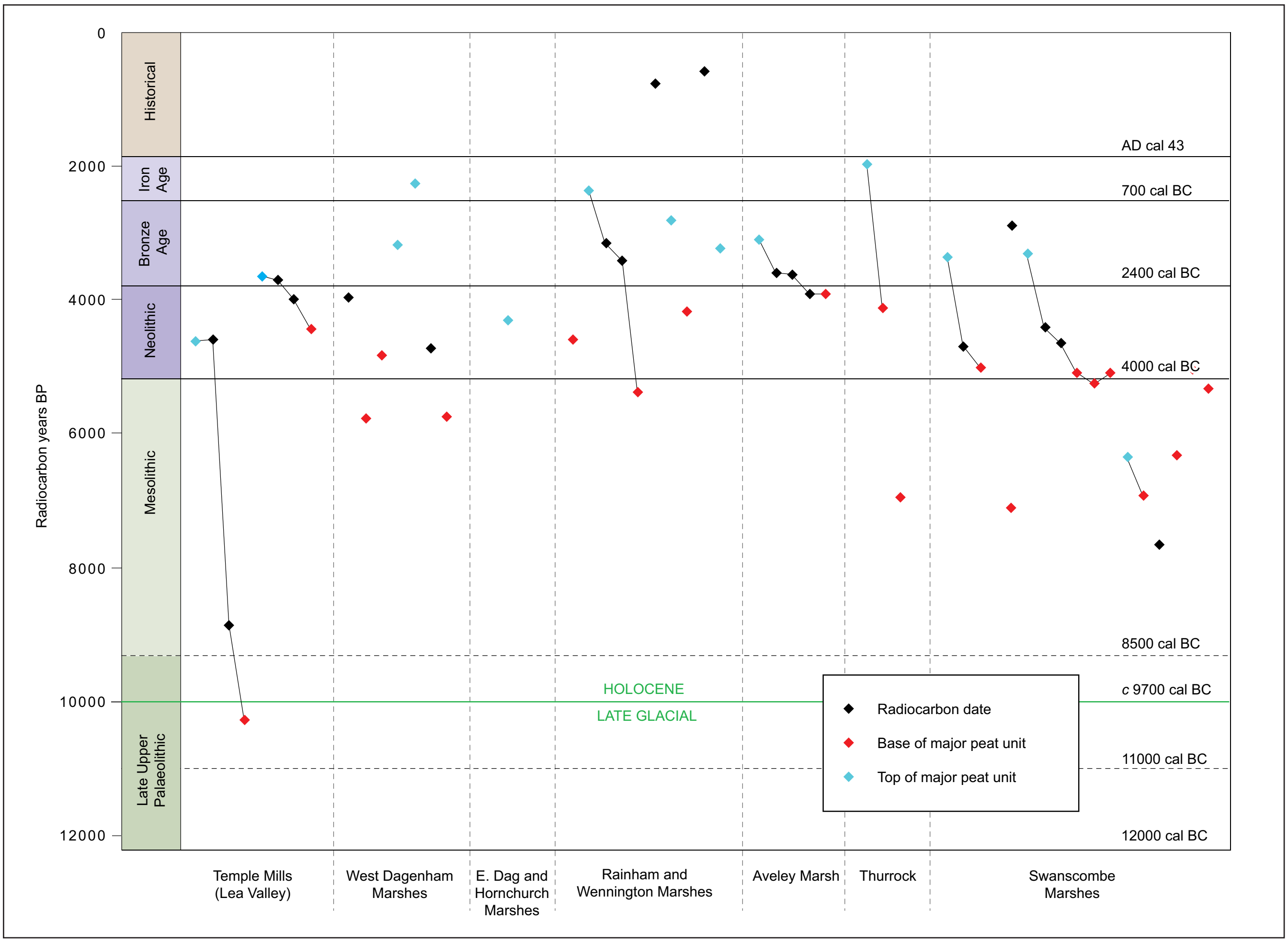

Figure 95 Distribution of route-wide radiocarbon dates

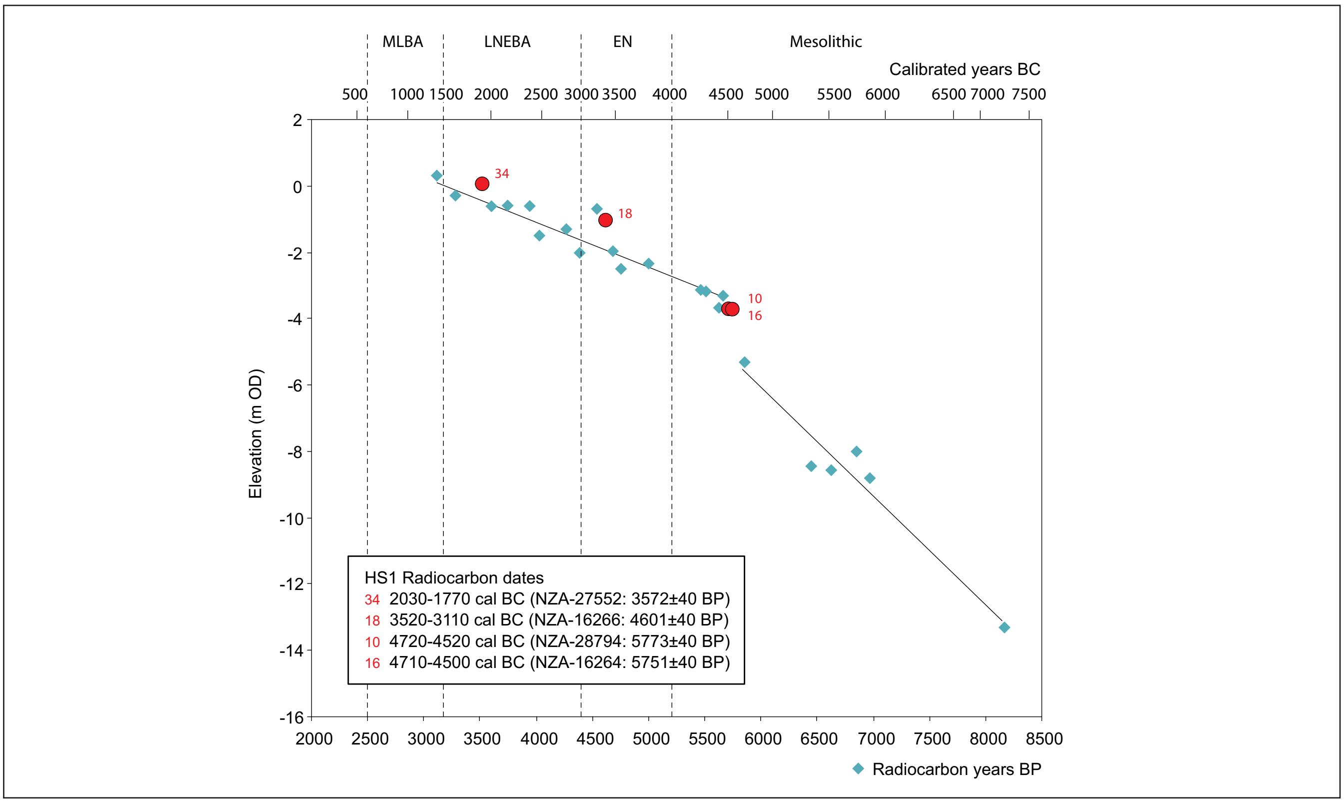

Figure 96 Age versus depth models for onset of sedimentation onto gravel surface in Lower Thames during the Early to Middle Holocene, including data from HS1 investigations

examine the regional signals. In particular, this has focused attention on change in the floodplain with reference to shifts in depositional environment as recorded in sedimentary facies. In other words careful examination of the boundaries between specific units has been undertaken in some cases in order to attempt to document change across that boundary (eg, BH3751 and BH3748 at the Thames River Crossing (Swanscombe), Chap 11). Such an approach is entirely justified, even where artefacts are absent, if we accept the premise that it is likely to be spatial heterogeneity in vegetation, terrain, etc, that significantly influences human behaviour in the landscape (or allows humans the possibility to make decisions about what they are going to do where). The use of this argument is one that is commonly assumed but rarely articulated and is often the basis for justification of investigation of Pleistocene age sites within the framework of developer-led archaeological investigations (Bates and Wenban-Smith 2011).

At the Thames River Crossing, sequences were examined in order to better understand the changes associated with initial flooding of the topographic template and establishment of the tidal mudflat regime as well as the subsequent transformation to alder carr associated with the mid-Holocene phase of estuarine contraction (*sensu* Long *et al* 2000). The shift from estuarine to fresh water within the phase of estuary contraction is of considerable potential significance because it falls around about the time in which the transition from Mesolithic to Neolithic occupation of southern England occurs and hence the context and landscape setting for the earliest Neolithic in the estuary is framed by this event. The progressive shift, as evidenced in the diatom and foraminifera/ostracod record up-profile, from tidal mudflats to mid- and high saltmarsh, within the minerogenic sediment sequence is strong evidence for relative shallowing water depths and the progressive shift towards the river of the intertidal zone (or the progressive creep of fresh water wetlands in a seaward direction) during the Late Mesolithic. The sudden shift to organic sedimentation at the top of the minerogenic requires explanation in order to consider the significance of the transformation. The progressive shift to environments of deposition higher in the tidal envelope (ie, up sequence in BH3751) might indicate that a tidal or fresh water reedswamp should precede the development of an alder carr wetland (as seen in reverse at the top of the main peat deposit). This is not the case here (and at many locations in the Thames) however and, consequently, conditions must have switched quite rapidly towards those suitable for the growth of trees associated with alder carr following the phase of upper saltmarsh development. The concept of a progressive spread of alder carr conditions across the saltmarsh surface suggests unusual conditions pertaining within the estuary for a time. An alternative scenario, based on the evidence from Purfleet (Wilkinson and Murphy 1995), was also examined where the possibility of drying of the saltmarsh surface was considered prior to a return to wetter conditions associated with inundation and formation of alder carr. No evidence was present at the top of the minerogenic sequence for weathering or soil ripening and consequently a phase of emergence of the former saltmarsh surface does not appear to have occurred prior to colonisation by alder carr.

Within the peats the transition towards the phase of estuary re-expansion appears to be associated with the presence of a minerogenic horizon within the peat sequence that indicates a local temporary flooding event. Microfossil data from this organic clay indicate this was probably brackish in nature. This brackish incursion appears to have been of limited duration and its extent, beyond the limits of the Thames River Crossing site, remain to be determined. However, a return to peat formation under freshwater reedswamp subsequently occurred prior to the gradual expansion of the estuary again perhaps in the Middle–Late Bronze Age (Fig 95).