Chapter 3

Regional Background to the Route Corridor

The Lower Thames extends from Blackfriars to the Shorne Marshes and forms the inner part of the Thames Estuary (Fig 3; Pl 1). The estuary of the Thames is classified as a tide dominated estuary (*sensu* Dalrymple *et al* 1992) with major sand bars within the outer estuary area (marine dominated zone) and an inner mixed energy zone with tidal meanders. The floodplain associated with HS1, which is coincident with the mixed energy zone of tidal meanders, is widest between the north bank Roding and Ingrebourne tributaries where a maximum distance of some 4.5km is attained (Fig 2). Today the Thames Estuary extends 100 miles (*c* 161km) from the tidal limit at Teddington to the estuary mouth at Sunk Head where it is 49 miles (*c* 79km) across between Margate and Orford Ness.

Presently the floodplain is managed to prevent flooding during high tides and the history of marshland reclamation is of the sequential construction of sea walls and drying out of the protected land since at least Norman times. The first real evidence of river wall embankments comes from the 13th century (Sturman 1961). Maintenance of the marshlands became an increasing concern over time, yet, despite concerted efforts, many occurrences of breaches in the sea wall are noted throughout the medieval and post-medieval periods (Whitaker 1889). Continual adaptation of the sea walls has seen its most recent manifestation in the construction of the Thames Barrage and 300km of associated sea defences have resulted in the present situation where extensive development is being encouraged in the low lying areas behind the sea wall. This area of the floodplain is today dominated by urban or industrial development, with increasing grassland and agricultural areas, and especially pasture, towards the estuary mouth in the east. Intertidal mudflats fringe the modern channel and expose relicts of former floodplains at low tide, which are subject to increasing amounts of erosion associated with the industrial and leisure use of the river. Today the estuary experiences sediment input from both the freshwater riverine and marine zones. Active erosion is also taking places within the area (where permitted to do so).

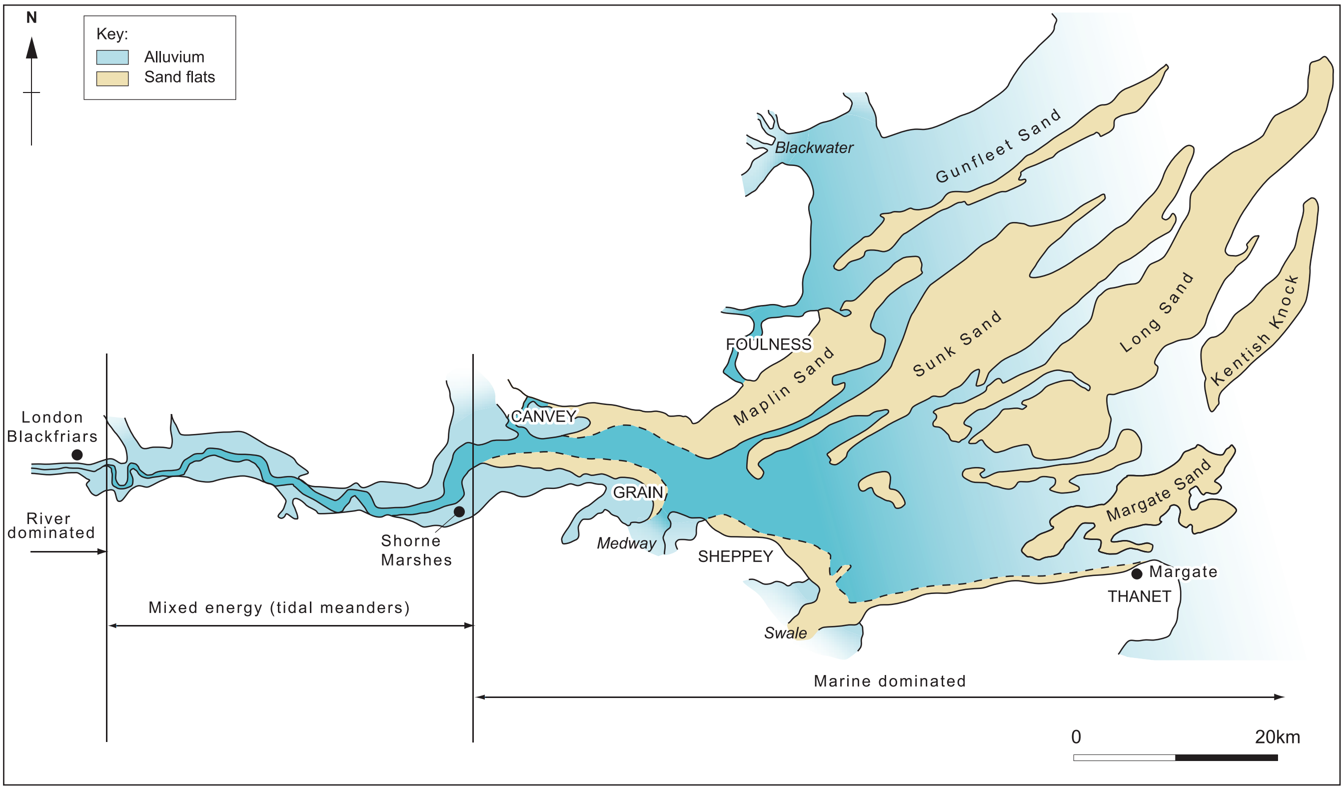


Figure 3 Sub-division of the Thames Estuary and location of different estuary zones

Bedrock Geology

South-east England includes the London Basin and the Weald (Sherlock 1947; Gallois 1965; Sumbler 1996; Ellison 2004) (Fig 4). The Chalk escarpment forming the Chiltern Hills, trending from south-west to north-east through Berkshire and Hertfordshire, dominates the London Basin. The basin is bounded by the North Downs chalk to the south and the Chilterns to the north. In the centre of the basin, within the area of the present day Thames Valley, younger Eocene sediments fill in the axis of the synclinal feature (Sherlock 1947; Sumbler 1996; Ellison 2004).

Bedrock geology within the study area of the London Basin is likely to have played an important role in the formation of the superficial sediments of the route corridor. For example, the soft Eocene sediments (such as the clays of the London Clay) provide the source for the clays and silts forming much of the Holocene lithologies throughout the estuary area (Kirby 1969; 1990). Conversely, the harder chalks of the Chilterns and North Downs have provided source areas for the flints that form most of the Pleistocene gravels now preserved along the valley margins and beneath much of the alluvium. Other factors relating to differences in bedrock type include both the influence on local topography and geomorphology as well as preservation potential within the deposited sediment stack. For example, sediments accumulating close to Chalk outcrops are more likely to contain carbonate based fossils than sequences distant from carbonate sources where ground pH is lower. Structural controls on river behaviour are also noted (for example the position of the Purfleet anticline has influenced the position of the Thames channel (Bridgland 1994).

Critical to our understanding of both the Pleistocene and Holocene sediments in the estuary is the neotectonic history of the region. Progressive (isostatic) uplift of south-east England during the Pleistocene (Maddy 1997; Westaway *et al* 2002; 2006) is attested to by the presence of terraces along the valley sides beneath which fluvial sediments are preserved (Gibbard 1985; 1994; Bridgland 1994, see Fig 5). The degree of effect of isostasy on Holocene sequences is debatable (Devoy 1979; 1982; Bingley *et al* 1999; Sidell 2003; Shennan *et al* 2012) although evidence from the area suggests to some that subsidence characterised much of the last *c* 12,000 years (Churchill 1965; Devoy 1979; 1982; Greensmith and Tucker 1980; Kelsey 1972; Shennan 1983; 1987; 1989a; 1989b; Long 1995).

Pleistocene Geology and Geomorphology

The recent geological development of the area and the establishment of the modern topography, including the Thames Estuary, have been a result of major drainage basin modifications during the Quaternary and in particular events during the last 500,000 years. The early Middle Pleistocene course of the River Thames has been identified far to the north of the modern channel where drainage occurred through the Vale of St Albans and into eastern Essex (Gibbard 1977; 1985) prior to its diversion during the Anglian cold stage. During this time the River Medway drained across the present-day mouth of the Thames northwards to converge with the ancestral Thames in eastern Essex (Bridgland 1983; 1994; 1999; 2003). The creation of the modern Thames Valley downstream of Reading and the deposition of the sedimentary record preserved in the London area today commenced with the advance of the Anglian ice and the blocking of the Vale of St Albans *c* 423–478ka BP.

Plate 1 Aerial view of the Thames Estuary, Swanscombe

Deposition of sediments in the modern Thames Valley began in the Late Anglian stage (Table 1) and continued intermittently throughout the later Middle and Upper Pleistocene (Gibbard 1985; 1994; Bridgland 1994). These bodies of sediment including sands, gravels and silts (remnants of former Thames floodplains) were subsequently incised by fluvial activity during periods of lowered sea-level and uplift to create terraces (Bridgland 2006). The extent of the modern floodplain was primarily defined by fluvial downcutting prior to the Last Glacial Maximum. At this time, erosion of the valley base appears to have been accompanied by erosion of both bedrock and older fluvial sediments along the valley sides. The most recent episodes of gravel deposition, responsible for the formation of the valley bottom gravels (or Shepperton Gravels) form the template onto which most of the alluvial and estuarine sedimentation occurred during the Holocene. These deposits have been traced by Gibbard (1994) as a spread of variable thickness downstream into the HS1 area and are commonly thought to belong to the very Late Devensian period (*c* 12ka–17ka BP).

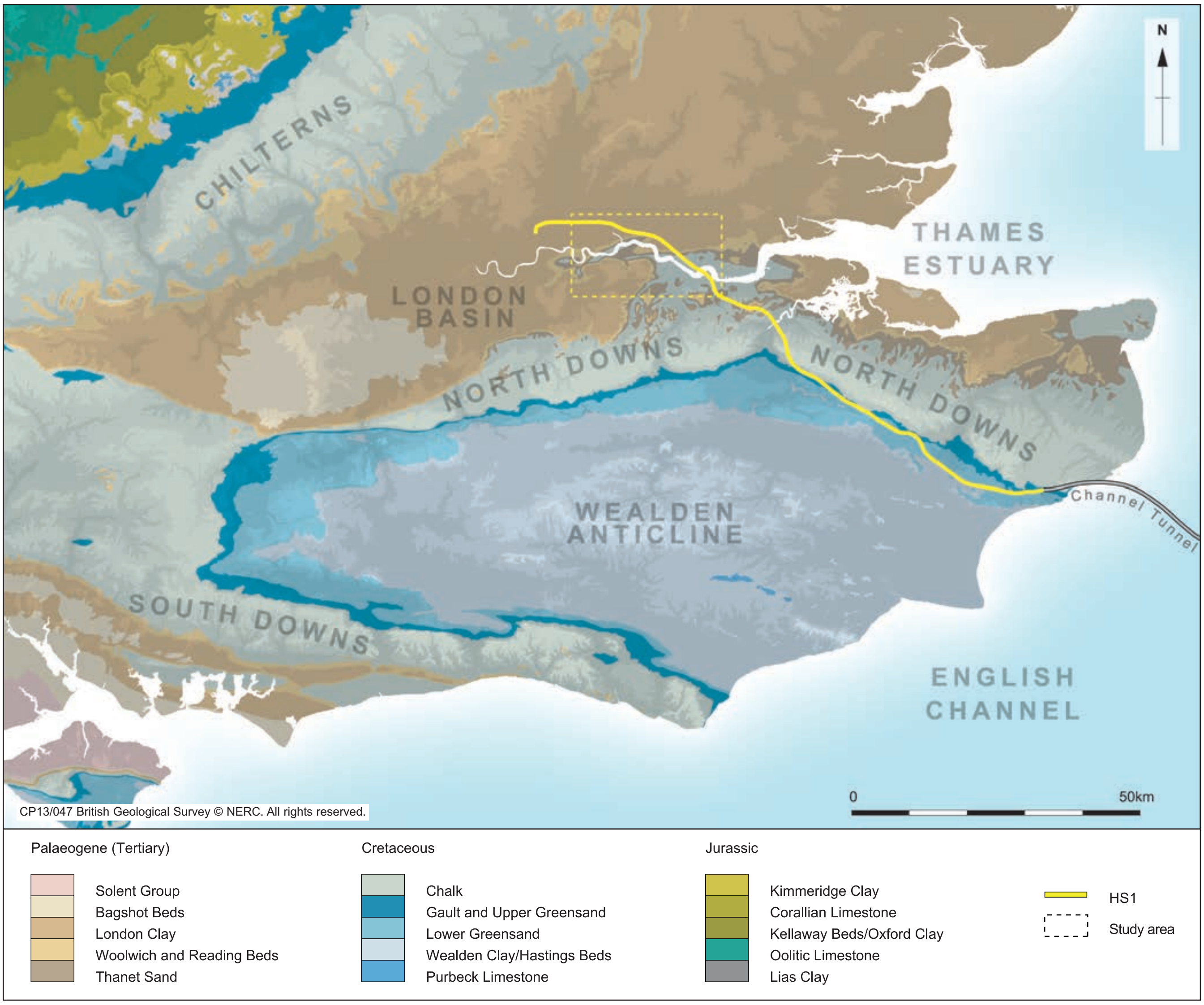


Figure 4 Regional bedrock geology for south-east England

Table 1 The Quaternary sequence in the lower reaches of the Thames (from Bridgland 1995)

Terrace Formation	**Members**	**Climate**	**Age**	**$\delta^{18}O$ Stage**
Tilbury	Tilbury Alluvial Deposits	Warm	Holocene	1
Shepperton	Shepperton Gravel	Cold	Devensian	2
East Tilbury Marshes	East Tilbury Marshes Upper Gravel	Cold	Devensian	5d-2
	Trafalgar Square deposits	Warm	Ipswichian	5e
	East Tilbury Marshes Lower Gravel	Cold	Late Saalian	6
Mucking	Mucking Upper Gravel	Cold	Late Saalian	6
	Aveley Sands and Silts	Warm	Intra-Saalian Interglacial	7
	Mucking Lower Gravel	Cold	Intra-Saalian	8
Corbets Tey	Corbets Tey Upper Gravel	Cold	Intra-Saalian	8
	Purfleet Silts and Sands	Warm	Intra-Saalian Interglacial	9
	Corbets Tey Lower Gravel	Cold	Late Anglian?	10
Orsett Heath	Orsett Heath Upper Gravel	Cold	Late Anglian?	10
	Swanscombe interglacial deposits	Warm	Hoxnian?	11
	Orsett Heath Lower Gravel	Cold	Anglian	12
Black Park	Not presently recognised	Cold	Anglian	12
Lowestoft	Hornchurch Till	Cold (full glacial)	Anglian (Lowestoft Stadial)	12

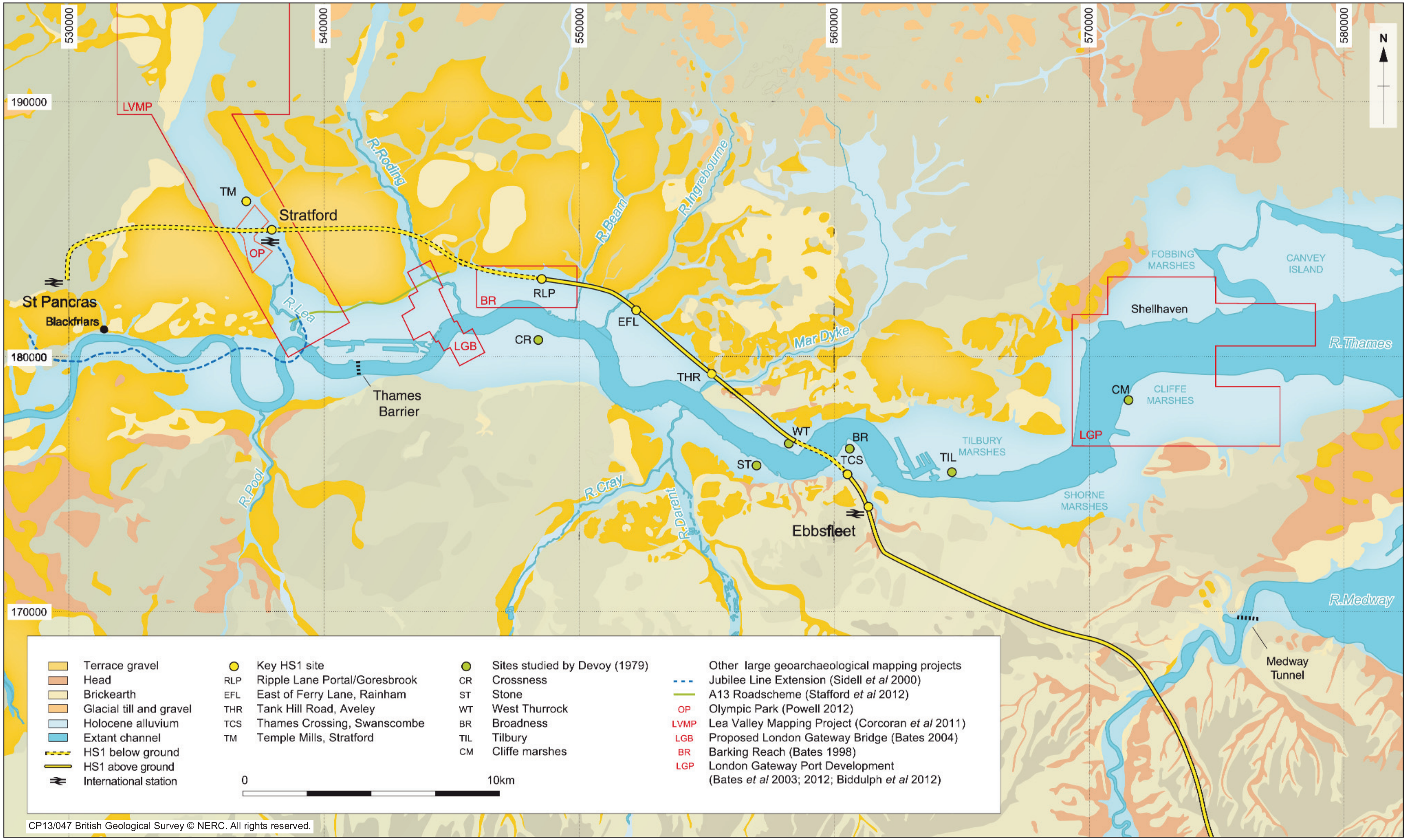


Figure 5 Quaternary geology of the Thames alluvial corridor showing the distribution of the main Pleistocene and Holocene deposits

This template, on which Holocene sediments were deposited, was created by fluvial activity under cold climate conditions during the Late Pleistocene (*c* 12ka–15ka BP). Contemporary global sea-level during these phases was perhaps between 25m and 125m lower than at the present time (eg, Yokoyama *et al* 2000 estimate a level of 120m below present during the Last Glacial Maximum at *c* 26.5ka to 20 ka BP, see also Clark *et al* 2012), rising through the Late Devensian period and into the Holocene. Sedimentary environments characterising this phase were dominated by those in which gravel and sand were the principal sediments deposited. Gibbard considers that the gravels of the Lower Thames were deposited under conditions that closely approximate to those of the River Donjek, Yukon (ie, the Donjek depositional model proposed by Miall 1977; 1996; Gibbard 1994) accumulating in a braided river environment (Fig 6) (Pl 2).

Of particular importance, both in terms of correlation, as well as determining the location of individual sand and gravel bodies in a given area, is the gradient exhibited by these terraces and their underlying sediment sequences. In all cases these sand and gravel bodies are known to dip downstream and individual terraces appear at lower elevation closer to the mouth of the modern estuary. The consequence of this dip is that older, higher terraces (and their underlying deposits) are likely to disappear beneath the floodplain in a downstream direction. For example, the East Tilbury Marshes Gravel lies beneath the floodplain downstream of Stone Marshes and boreholes for the Dartford Tunnel clearly indicate a wedge of sand and gravel buried beneath Holocene alluvium on the south bank of the Thames (Gibbard 1994).

Pleistocene sediments in the area are known to be relatively rich in Palaeolithic artefacts (flint tools) (Wymer 1968; 1999) although there appears to be a tendency towards declining numbers of artefacts in those deposits of younger age occurring at lower elevations in the landscape (Ashton and Lewis 2002) and very little material (if any) has ever been recovered from the sub-alluvial gravel (Shepperton Gravel). Palaeontological material (Bridgland *et al* 2004; Bridgland and Schreve 2004) may also be present in the Pleistocene deposits. A wide range of evidence has been recovered from these deposits including large and small mammals as well as plant, insect and molluscan material (Bridgland 1994). These have been used successfully to reconstruct local environments of deposition, regionally applicable climate signals and sea-level histories.

Holocene Geology and Geomorphology

Holocene sediments form a wedge thickening downstream to reach a maximum thickness of 35m east of the study area at Canvey Island (Marsland 1986). The Holocene deposits bury the complex composite Late Pleistocene surface underlain by Late Devensian gravels (Shepperton Gravels) in places but by older Pleistocene sediments (in all probability the East Tilbury Marshes Gravel) elsewhere. Between these two bodies of sediment colluvial and solifluction deposits may mantle the bedrock surface. Finally bedrock may well directly underlie the alluvium locally (Figs 7 and 8).

Plate 2 Braided river environment Alaska, perhaps similar to the Lower Thames *c* 15ka BP

The nature of the sediments (Fig 7) burying the bedrock or pre-Holocene deposits have, with one exception, only been described superficially or treated on a site by site basis. No floodplain-wide survey has been conducted and consequently our knowledge of these sequences and their temporal evolution remains patchy. It is also recognised that sequences tend to be considered in a relatively simplified way where a generally useful model (such as that developed by Devoy (1977; 1979) or Long *et al* (2000)) is extrapolated by others across the full floodplain from channel margins to floodplain margins sometimes without detailed consideration of the likely complexity in environments across space. For example the presence of major tributaries, areas of impeded drainage or topographic features are all likely to modify the broad estuary based model at the localised scale.

An early account of the alluvium, in particular the buried sub-fossil forest now know to be present through much of the floodplain, was made at Blackwall by Pepys when he wrote in his diary entry on 22 September 1665:

> *… that in digging his late Docke, he did 12 foot under ground find perfect trees over-covered with earth. Nut trees, with the branches and the very nuts upon them; some of whose nuts he*

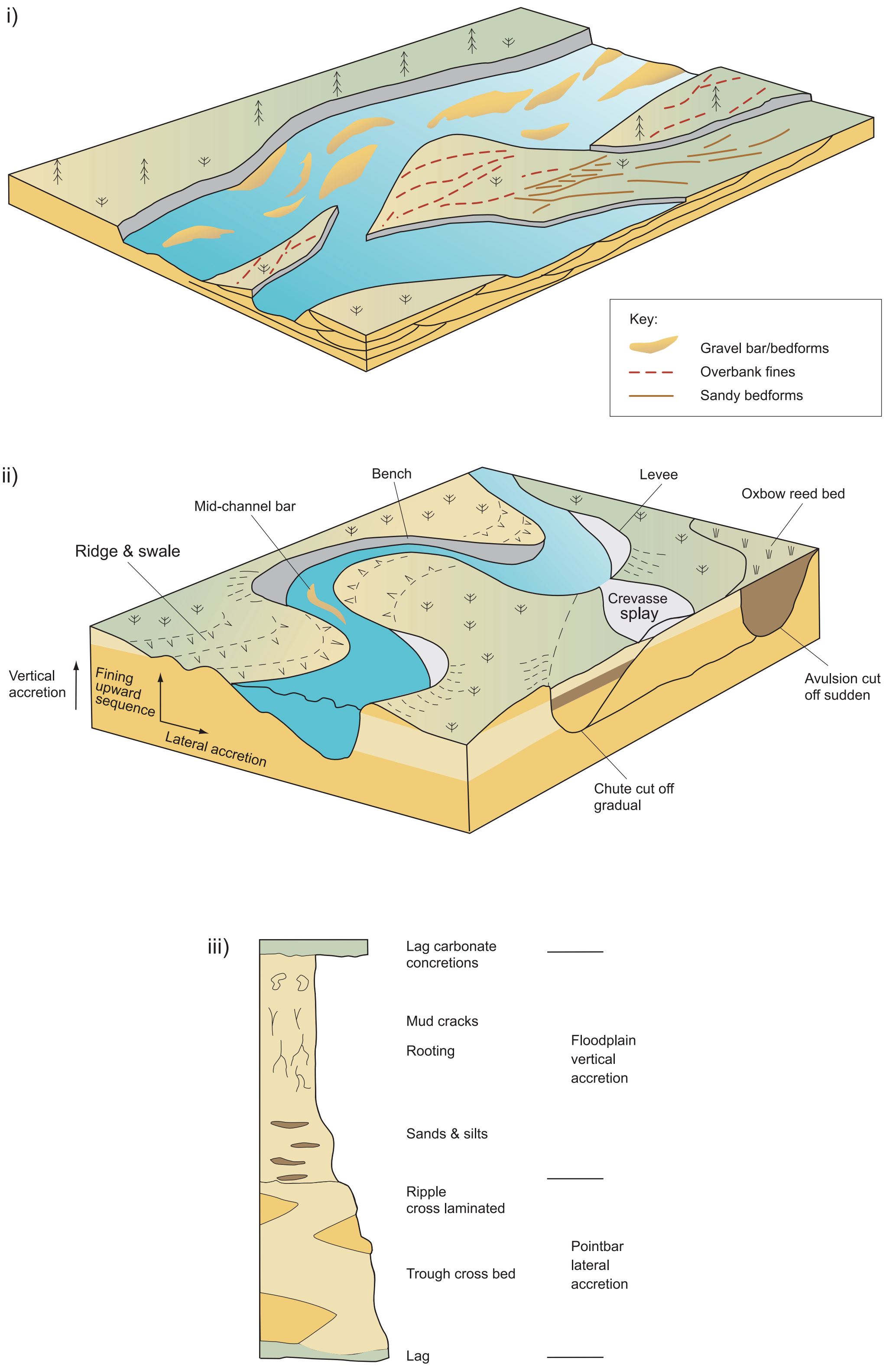


Figure 6 Models for explaining sediment sequences in the Lower Thames Valley: i) Donjek depositional model (low stand phase dominated by braided channel environments within active floodplain) (from Miall 1996); ii) Meandering river model (high stand phase characterised by single channel and stable floodplain) (from Brown 1997); iii) Stratigraphic column through meandering floodplain sequence (from Walker and Catt 1984)

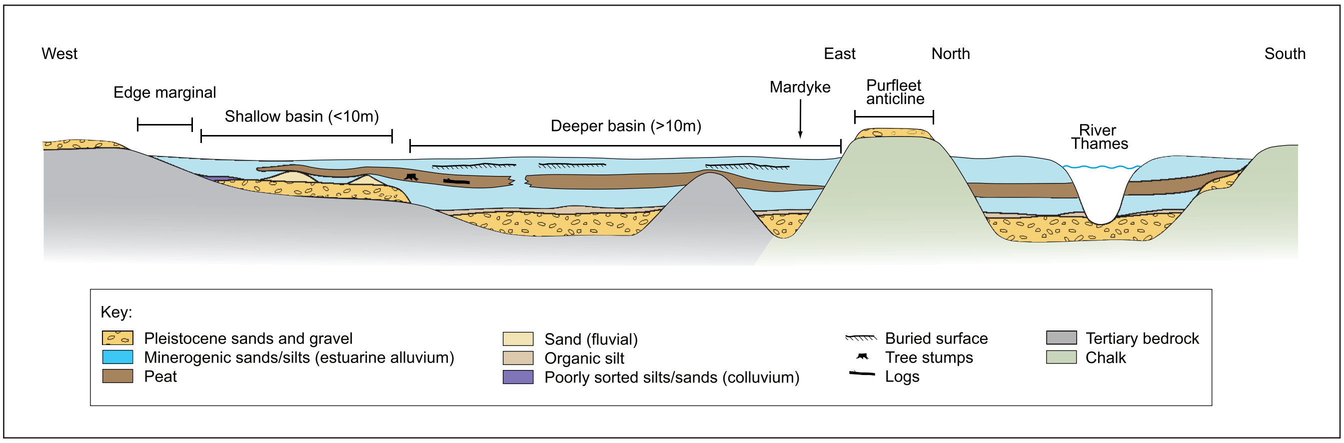


Figure 7 Schematic profile of sediments in the Thames Estuary along the route corridor. Note the distribution of at least two stratigraphically separated sets of buried gravels, the thinning of Holocene alluvium upstream and the intermittent distribution of peats and buried soils within the profile

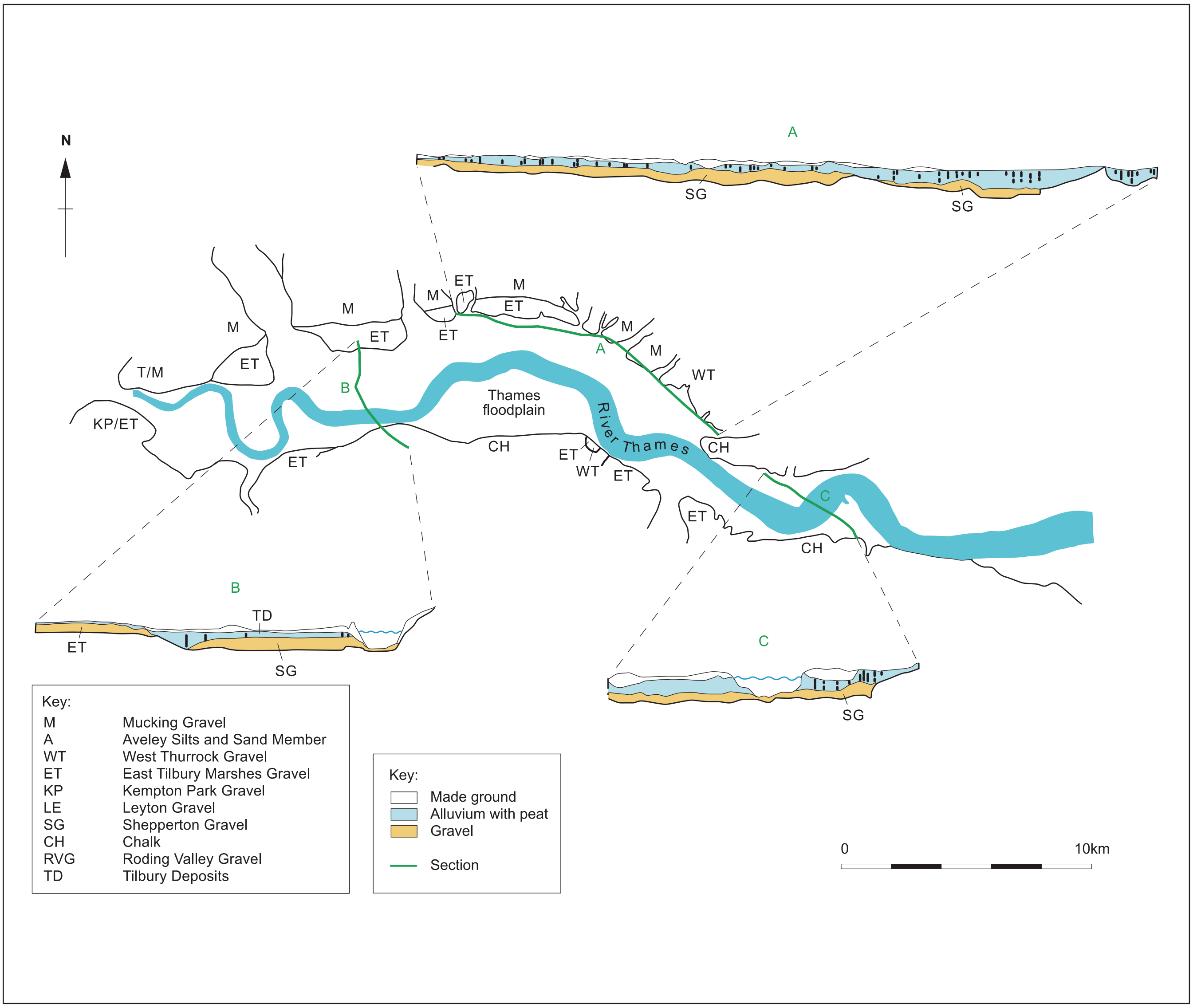


Figure 8 The Thames alluvium and selected profiles through the alluvium for the area of the route corridor. Profiles were generated from borehole information held by the Geotechnical Management Unit (GMU) for the project and the illustrations were constructed at an early stage of the project to enable regional patterns of sediment distribution to be understood within the context of the rail corridor

> *showed us. Their shells black with age, and their kernell, upon opening, decayed, but their shell perfectly hard as ever. And a yew tree he showed us (upon which, he says, the very ivy was taken up whole about it), which upon cutting with an addes [adze], we found to be rather harder than the living tree usually is.*

Additional detail was given by Rev. Derham in 1712 when peat was discovered following a breach of the river in Dagenham and Havering Marshes (Whitaker 1889). Here he describes:

> … *the trees were all, as far as I could perceive, of one sort, except only one, which was manifestly a large Oak, with the greatest part of its Bark on, and some of its Heads and Roots. The rest of the Trees the Country People … take to be Yew: And so did I myself imagine them to be, from the hardness, toughness, and weight of the Wood.*

He goes on to state:

> *I could see all along the Shores vast Numbers of the Stumps of those Subterraneous trees, remaining in the very same posture in which they grew, with their Roots running some down, some branching and spreading about in the Earth… Some of those Stumps I thought had signs of the axe.*

Following this, descriptions have been provided by Lyell (1832), Spurrell (1885a; 1889), Whitaker (1889), Dewey and Bromehead (1921), Bromehead (1925), Dewey *et al* (1924), Dines and Edmunds (1925) and Churchill (1965). However, within the Thames Estuary, the most influential publications on the floodplain are those of Devoy (1977; 1979; 1980; 1982), based on work undertaken during the early 1970s, in which borehole stratigraphies were integrated with biostratigraphic studies to infer successive phases of marine transgressions and regressions. In this scheme peats were indicative of relative falls in sea-level (regressive phases) while clay-silt, minerogenic units were indicative of relative rises of sea-level (transgressive phases).

The work of Devoy typified geomorphological research work in the area at a time when attempts were being undertaken to establish regionally applicable relative sea-level curves, calibrate long term tectonic movements and establish biostratigraphic schemes (Churchill 1965; Devoy 1979; 1982; Greensmith and Tucker 1980; Kelsey 1972; Shennan 1983; 1987; 1989a; 1989b; Long 1995; Long and Shennan 1993; Long and Roberts 1997). Long term trends in sea-level indicate a progressive rise in sea-level datums following the sea-level minimum at the Glacial Maximum at *c* 26.5ka to 20ka (Clark *et al* 2012) to *c* 7ka BP (Late Mesolithic), minor fluctuations occurred within a slowed overall trend of rising levels (Shennan *et al* 2012). These sea-level changes have accompanied climatic change as a consequence of deglaciation and the development of the present climatic regime. However, these regional scale surveys cannot define local environments of deposition or examine spatial heterogeneity in the floodplain during sequence development for the individual sites in question here. More recently a simplified model for floodplain development has been presented by Long *et al* (2000). A similar model was presented by Bates and Whittaker (2004) that examined the likely impact of these changes on human activity.

In contrast to these regional studies the last 20 years has seen a number of more detailed, site-specific investigations undertaken in association with archaeological investigations. These investigations have often been developer-led projects in which recording of alluvial sequences has taken place in conjunction with archaeological excavations. Larger projects include observations along the Jubilee Line Extension (Sidell *et al* 2000), the A13 (Stafford *et al* 2012), the Barking Reach area (Bates 1998; Bates and Bates 2000; Bates and Whittaker 2004), the Lea Valley Mapping Project (Corcoran *et al* 2011), the Olympic Park in the Lea Valley (Powell 2012) and the London Gateway Port Development at Shellhaven, Essex (Bates *et al* 2012; Biddulph *et al* 2012) (locations for these projects are shown in Fig 5). There are numerous individual site reports and some published journal articles (eg, Carew *et al* 2009; Crockett *et al* 2002; Sidell 2003; Sidell *et al* 1997; Sidell *et al* 2002; Wilkinson *et al* 2000). In the majority of cases these are restricted to the London end of the HS1 corridor, or the margins rather than the deeper parts of the floodplain.

Generally, the earliest elements of the sedimentary stack accumulating on the topographic template include fluvial sediments associated with the earliest, pre-transgressive phases of the Holocene record or the inner margin of the estuarine wedge in the lower reaches of the Thames Estuary (Fig 9) (this zone can be expected to migrate up and down stream in relation to changes in relative sea-level rates). Where the sediments form the earliest, pre-transgressive elements of the Holocene stack they will rest unconformably on the Late Pleistocene gravels of the Shepperton Gravel or the incised bedrock surface. Sediments associated with the fluvial elements of the stack are likely to relate to the meandering system type of Walker and Cant (1984) consisting of active channel, point bar, natural levees, floodplain and abandoned channel cut-off environments (Fig 6). Sediment types range from gravels to clayey-silts and peats. Predictable relationships exist between environments of deposition and sediment types across space and up-profile as illustrated in Figure 6. Typically these sediments are thin and intermittently preserved across the region. In addition to the fluvial sediments localised pockets of peat have been shown to be present across the region forming from the Late Glacial period onwards in hollows on the gravel surface (eg, at Bramcote Green in south London (Thomas and Rackham 1996)).

By contrast the estuarine elements of the stratigraphic stack, associated with brackish and marine waters in the estuarine funnel, are thick and well developed. The estuary has been classified as a tide

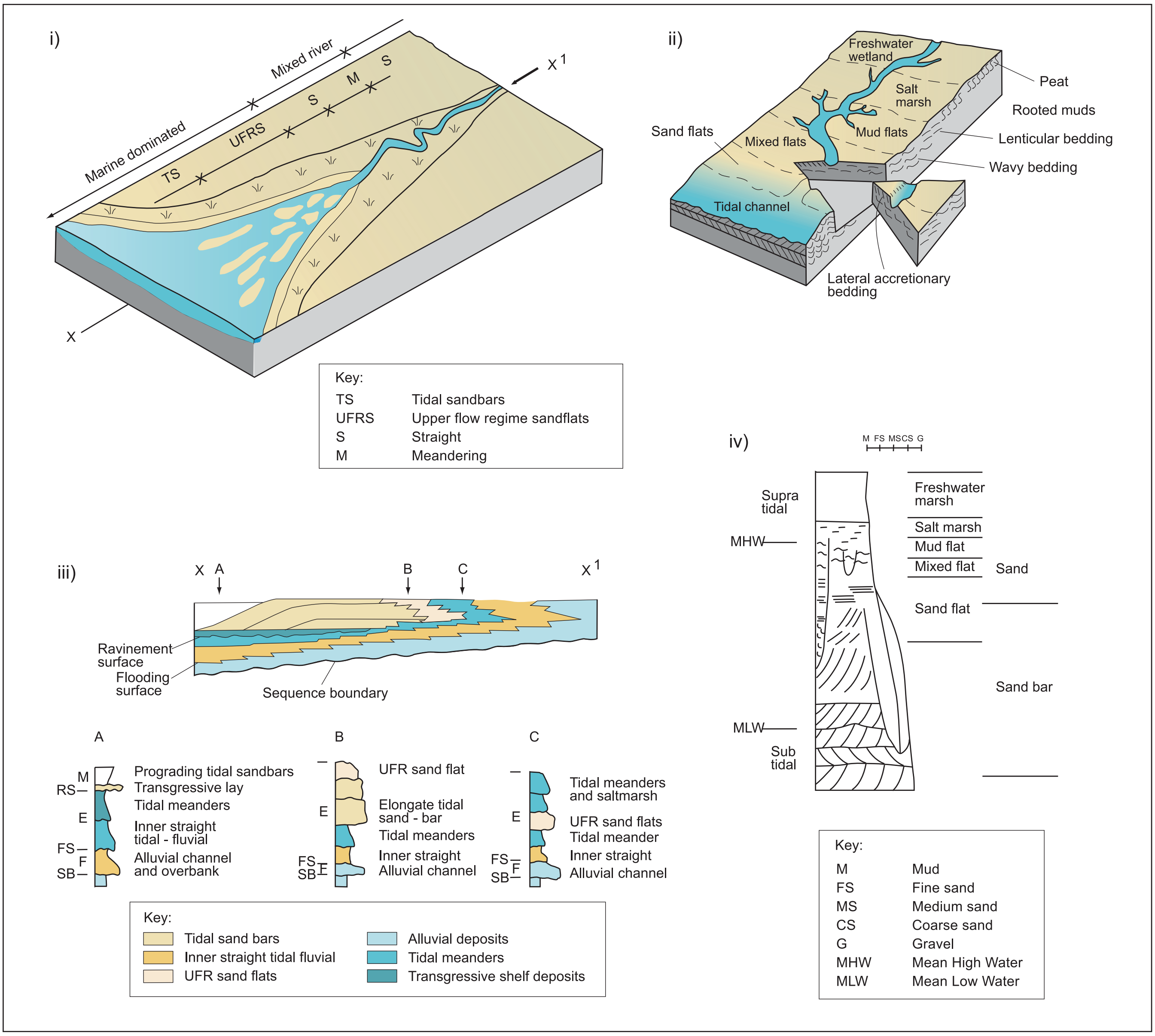


Figure 9 Models for estuarine contexts within the Lower Thames: i) tide dominated estuary model (from Dalrymple *et al* 1992); ii) saltmarsh zonation and cross-section (from Dalrymple 1992); iii) idealised cross-section through a tide dominated estuary (from Dalrymple *et al* 1992); iv) stratigraphic stack through an idealised saltmarsh (from Dalrymple 1992)

dominated estuary within which tidal sandbar (sub-tidal), upper flow regime sand flat (inter-tidal), straight (inter-tidal) and meandering (supra-tidal) segments can be found (*sensu* Dalrymple *et al* 1992) (Fig 9). Additional sub-division of the saltmarsh zones may also be undertaken into sub-tidal, inter-tidal and supra-tidal zones (Fig 9). Interbedded with the estuarine sediments are peats, often up to 3m in thickness, that are indicative of the phases of estuary contraction and the spread of freshwater wetlands and alder carr vegetation across the floodplain. These include the fossil forests of the Erith foreshore (Pl 3).

One particular aspect of much of the work that has been undertaken in the floodplain area has been the focus on the prehistoric landscapes and developments prior to Roman occupation. Where consideration is given to Roman and post-Roman activity (Sidell 2003) nearly all sites considered belong within the confines of the modern City of London, the Westminster area or Southwark, with little or no evidence from the floodplain area downstream. Thus although considerable interest in the Roman city and nature of the river (in particular the tidal head) has been shown since the 1970s (Milne *et al* 1983; Brigham 1990) this has not been translated into study and publication of contemporary sequences within the marshlands themselves. This is despite the well known occurrences of Roman activity at places such as Crossness (Spurrell 1885a). This is similarly true for Saxon and medieval periods, further hindered by notable gaps in the record for this period in East London (eg, Sidell *et al* 2000, 124), caused in part by scour. Consequently, we know little of marshland development within the area including the impact of sea wall constructions and changes associated with the floodplain consequent on human use of the area for cattle grazing, etc.

Plate 3 Fossil forest at Erith, Bexley

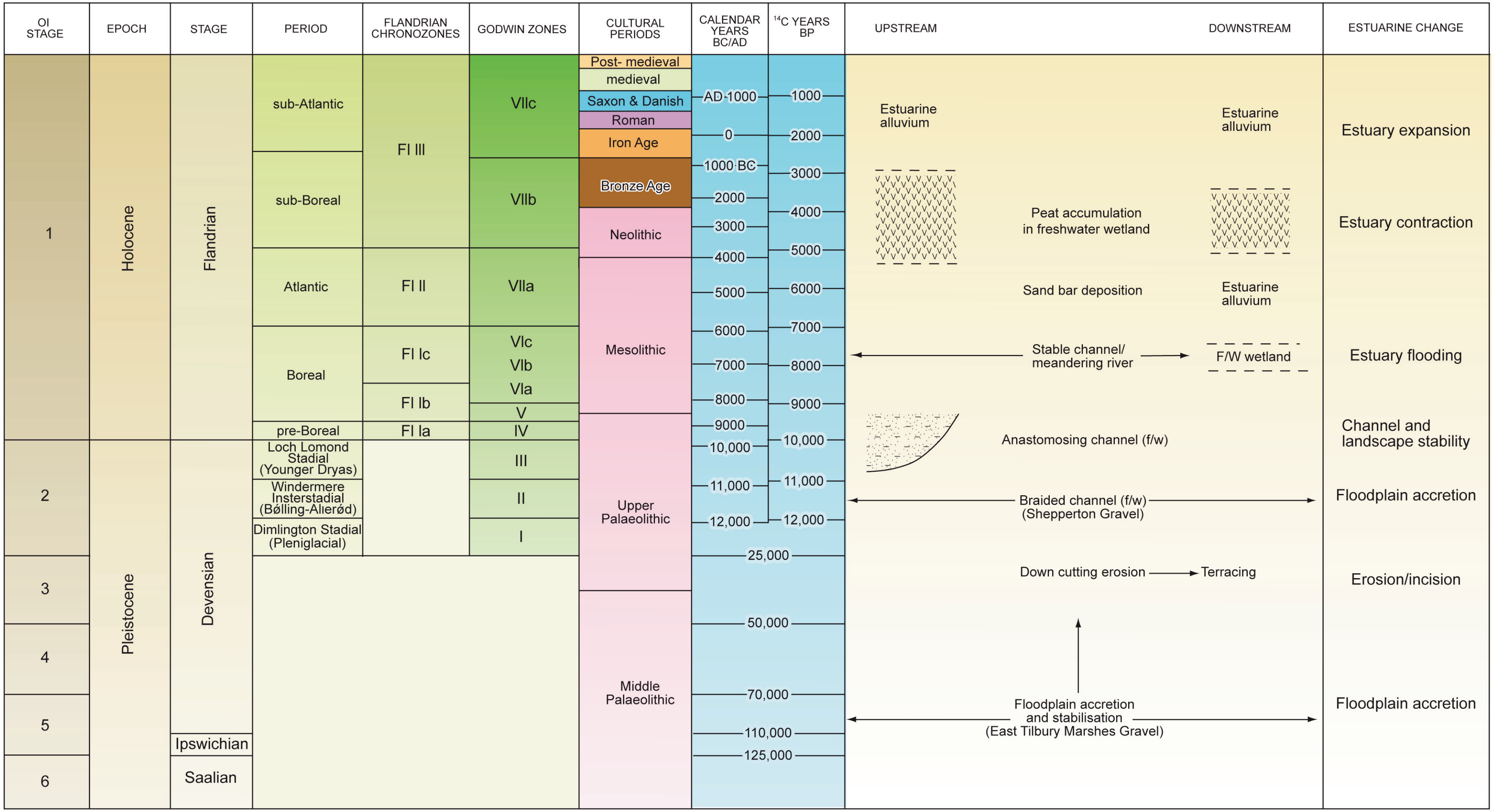
A Framework for Floodplain Development

On the basis of work undertaken in the 1980s and 1990s a model linking process geomorphology, sea-level change and patterns of sedimentation for the sub-floodplain estuarine sector of the Thames across the Late Pleistocene/Holocene period was developed (Table 2). This model incorporated some elements from other on-going research projects, but at the time the HS1 work was being carried out these works were not fully complete or published (eg, Bridgland 2000; Long *et al* 2000; Sidell *et al* 2000; Sidell 2003). The key elements of the model used in the HS1 investigations were:

- Accretion of the sand and gravel sequences associated with the East Tilbury Marshes Gravel occurred during MIS 6 through 5e (the last interglacial, Ipswichian) to MIS 3. Accretion of the sequences therefore happened during both cold climate and temperate events, and represent a variety of different depositional environments from braided to meandering river channels and estuarine situations;
- Down cutting and erosion occurred during or prior to the Last Glacial Maximum, resulting in terracing of the East Tilbury Marshes Gravel. This episode will have included solifluction events and remobilisation of sediments on the margins of the terraces;
- Accretion of the Shepperton Gravel during MIS 2 occurred under braided channel conditions;
- Infilling of hollows and cut-off channels on the Shepperton Gravel surface with organic sediments occurred during the Late Glacial period and Early Holocene. River behaviour shifts towards anastomosing channel patterns with stable channels;
- Establishment of meandering channel forms occurred in the Early Holocene with the development of wetland at lower elevations and at the downstream end of valleys, consequent with a backup of channels resulting from sea-level rise and the approaching freshwater/brackish water interface;
- Flooding of the deeper parts of the estuary by marine waters after *c* 6400 cal BC (7500 ^{14}C BP) and estuary expansion. Upstream in freshwater sector sand bar deposition occurred within stable channels;
- Estuary contraction and the spread of wetlands occurred, with peat accumulating after *c* 5000 cal BC (*c* 6000 ^{14}C BP);
- Estuary expansion occurred after *c* 1300–1200 cal BC (*c* 3000 ^{14}C BP) and re-establishment of estuarine conditions throughout much of study area.

This model is to a degree applicable across the study area where elements of all events can be seen or extrapolated from surface and subsurface data. However, localised erosion and sedimentation (perhaps associated with Thames tributary channels) are likely to

Table 2 Quaternary stages and geological events in the Lower Thames Valley



OI STAGE	EPOCH	STAGE	PERIOD	FLANDRIAN CHRONOZONES	GODWIN ZONES	CULTURAL PERIODS	CALENDAR YEARS BC/AD	^{14}C YEARS BP	UPSTREAM	DOWNSTREAM	ESTUARINE CHANGE
1	Holocene	Flandrian	sub-Atlantic	Fl III	VIIc	Post- medieval					
						medieval					
						Saxon & Danish	AD 1000	1000	Estuarine alluvium	Estuarine alluvium	Estuary expansion
						Roman					
						Iron Age	0	2000			
			sub-Boreal		VIIb	Bronze Age	1000 BC	3000			
						Neolithic	2000	4000	Peat accumulation in freshwater wetland		Estuary contraction
							3000	5000			
			Atlantic	Fl II	VIIa		4000				
						Mesolithic	5000	6000	Sand bar deposition	Estuarine alluvium	
			Boreal	Fl Ic	VIc		6000	7000			
					VIb		7000	8000	Stable channel/ meandering river	F/W wetland	Estuary flooding
				Fl Ib	VIa						
					V	Upper Palaeolithic	8000	9000			
			pre-Boreal	Fl Ia	IV		9000				
2	Pleistocene	Devensian	Loch Lomond Stadial (Younger Dryas)		III		10,000	10,000	Anastomosing channel (f/w)		Channel and landscape stability
			Windermere Insterstadial (Bølling-Allerød)		II		11,000	11,000	Braided channel (f/w) (Shepperton Gravel)		Floodplain accretion
			Dimlington Stadial (Pleniglacial)		I		12,000	12,000			
3							25,000		Down cutting erosion →	Terracing	Erosion/incision
						Middle Palaeolithic					
4							50,000				
5							70,000				
									Floodplain accretion and stabilisation (East Tilbury Marshes Gravel)		Floodplain accretion
		Ipswichian					110,000				
6		Saalian					125,000				

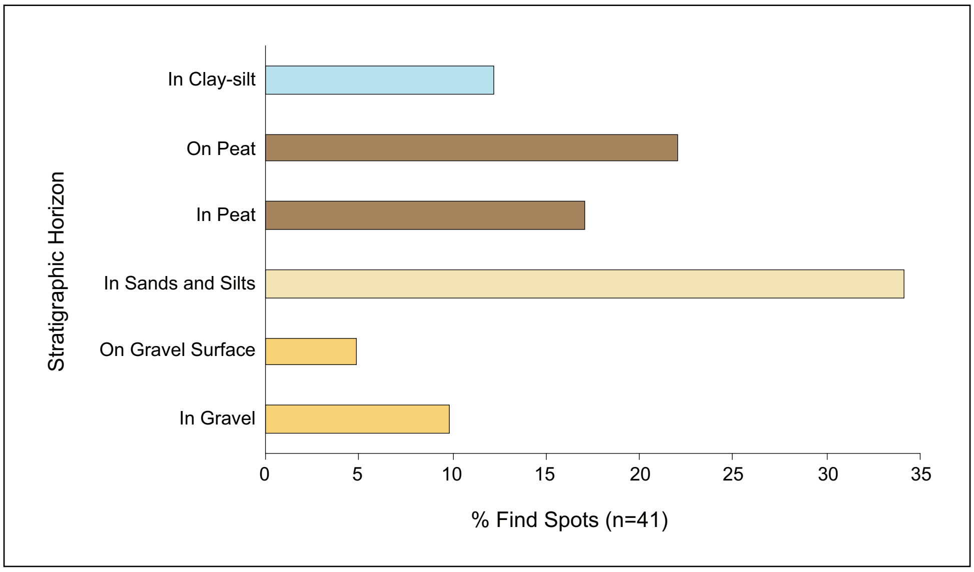


Figure 10 Distribution of all find spots in Thames alluvium by lithology type/stratigraphic position (from Bates 1998)

have influenced sequence development at the site specific level and consequently this model should be treated as applicable primarily at the scale of the floodplain. Additionally, timing of events in the model will vary depending on local geographic position. Thus upstream movement of the tidal head will occur through time resulting in a progressively more recent onset of brackish conditions in the river from Swanscombe Marsh to Ripple Lane. The converse would be expected in a downstream direction during relative sea-level fall when progressively later dates would be recorded for the transition downstream towards Swanscombe Marsh.

Archaeology

Prior to this volume, there was no integrated survey/summary bringing together all observations within the area of interest. However, as part of the HS1 project a summary review of published data was undertaken (to 1996) in order to try to understand the context of find spots. Previous workers, and indeed those responsible for designing many of the developer-funded projects in the region, have often held the assumption that prehistoric archaeological finds are mainly related to the peat stratigraphies or shallow islands within the alluvial tract. In order to test these assumptions archive information was examined for all archaeological find spots (regardless of age/type, etc) to assess their stratigraphic context. This data (total number of useable records = 41) indicates that the largest number of find spots from the Lower Thames have no clear stratigraphic data attached to them. Of those find spots with stratigraphic data it is evident that artefacts have been recovered from a range of deposits including peat, clay-silt, sands and silts and on the gravel surface. Figure 10 illustrates the distribution of find spots by context type. The results of this study show that only 17% of all find spots occur within peat and that 22% of finds occur resting on peat, contrary to generally held expectations that artefacts and sites are associated principally with peat. Artefacts have clearly been recovered from a wide variety of sedimentary contexts not only peats. Significantly 34% of finds derive from sands and silts.

This information is restricted in that only for a few well investigated sites are the stratigraphic contexts of the finds clear in terms of environments of deposition. This information does, however, indicate that artefacts should be expected in most of the major sediment types likely to be encountered beneath the floodplain surface. Clearly the nature of the artefact assemblage, the degree of post-depositional modification and the preservation status of the artefact associations will vary depending on the nature of the sediment matrix from which the artefacts are recovered.