Chapter 2

Time and Place: chronology and landscape

by Stuart Foreman

Geology, topography and hydrology of the High Speed 1 route

From the north the High Speed 1 (HS1) route extends from the Ebbsfleet Valley at Springhead south-eastwards across the dip slope of the North Downs (see Fig. 2.1 below). The first 15km of the route south-east of Fawkham Junction to the River Medway is, apart from Scalers Hill, predominantly through Upper Chalk overlain in the deeper cuts by Thanet Beds and/or Head. East of Scalers Hill there are extensive solution features in the top of the chalk. Scalers Hill is an outcrop of the Lower London Tertiaries consisting of Harwich Formation/Blackheath Beds sands and gravels over Woolwich and Reading Beds clay (BGS 2010).

After crossing the River Medway on a 1.3km bridge and viaduct the HS1 runs up the Nashenden Valley mainly through Upper Chalk and then into the 3.2km North Downs Tunnel under Blue Bell Hill. The crest of the North Downs escarpment, overlooking the Weald, reaches a height of *c* 200m OD and is frequently capped by surface deposits of Clay-with-Flints or Tertiary deposits. Extensive deposits of Quaternary age are mapped as Head on the geological maps, extending from coombes cut into the Chalk escarpment and fanning out onto the plains below. The railway exits the North Downs Tunnel below Bluebell Hill at White Horse Stone and runs in a short cut in Lower Chalk before descending into the Weald of Kent.

Across the Weald the route runs for approximately 4km, at *c* 55–60m OD, through the Gault Clay of Boxley Vale north of Maidstone, before reaching the dip slope of the Lower Greensand at Snarkhurst Wood. The route to Ashford passes through gently undulating topography adjacent to the M20 motorway cutting, mainly through Folkestone Beds sand, and occasionally Sandgate Beds and Hythe Beds, crossing a number of small streams that drain towards the West Stour River. Through the town of Ashford itself, the HS1 alignment runs below ground level, in retained cuts and cut/cover tunnels through reworked Hythe Beds, Atherfield Clay and Weald Clay, before rising up onto a long viaduct to cross the River Stour. From Sevington, for approximately 4km, the railway runs close to the south flank of the Hythe Beds escarpment, in cuttings through the Hythe Beds and the Atherfield Clay. This is a spring line, with many small streams emanating from this area and crossing under the trace. Between Sellindge and Westenhanger, there are two long embankments over the alluvium of the East Stour River Valley, interspersed with cuts through the Sandgate Beds and the Hythe Beds. The last 5km of the route from Sandling up to the interface with the Channel Tunnel is through the more deeply incised topography characteristic of the Folkestone Beds sand.

The rail link crosses two of the major drainage basins of North Kent, those of the Rivers Medway and Stour. The former has a tributary, the River Len, which flows parallel to the line of the Lower Greensand and Gault Clay. The source of the Len at Lenham is separated by only 1.5km from the headwaters of the River Stour, which also flows parallel to the strike of the solid geology and to the route of the HS1. However, in most cases the rail line runs perpendicular to the surface drainage patterns which flow down the scarp slopes or dip slopes of the respective geological bands.

Palaeoenvironment

by John Giorgi and Elizabeth Stafford

Palaeoenvironmental reconstruction is a key theme of the HS1 research strategy, though unfortunately the nature of the sites and soil conditions along Section 1 of the route only rarely provided opportunities for detailed studies of this kind. This situation is in marked contrast to the results from HS1 Section 2, where alluvial sequences in the Ebbsfleet Valley and elsewhere in the Thames Valley have provided a wealth of evidence (see conclusion below). This section outlines the extent of the palaeoenvironmental data recovered from Section 1, and its strengths and limitations in addressing the research aims of the project. The general conclusions from the various specialist studies (Giorgi and Stafford 2006), and the regional environmental background, are discussed by period in the following chapters, in particular Chapter 3.

With reference to paleoenvironmental studies, the project research aims focused on environmental reconstruction, identifying evidence of human impact, exploitation and consumption of natural resources, as well as considering the distribution of social, political and ritual organisation within the landscape.

The main potential of the environmental data from the HS1 project was to provide information on the economic (agricultural) development of the study area through time, mainly crop husbandry on the basis of charred plant remains. Animal husbandry could only be explored at a

very basic level. There was less scope for exploring the development of the local and regional environment with a few notable exceptions, particularly the Late Glacial and Holocene sequence at White Horse Stone.

A wide range of environmental remains was recovered during excavations along the rail link route. These included micro-remains (pollen, diatoms) and macro-remains (plants, insects, molluscs, animal bone). Geo-archaeological studies of soil and sediment sequences included stratigraphic and geomorphological site descriptions, with deposit characterisation supported by techniques such as soil micromorphology and the analysis of chemical and magnetic properties. The detailed specialist reports, including a scheme wide overview by John Giorgi and Elizabeth Stafford, can be found in the ADS digital archive (Giorgi and Stafford 2006).

There were obviously potential strengths and limitations of the environmental dataset. Soil/sediment conditions limited the preservation of many classes of biological remains. The poor representation of 'waterlogged' (anaerobic) soils limited the survival of more fragile biological remains, including pollen, insects and 'waterlogged' botanical material to just a few sites. Acidic soils, for example on the Wealden Greensand, severely affected the preservation of animal bone and molluscs. Another potential problem was the question of residual and intrusive remains, which was noted at a number of sites with charred plant remains.

Charred plant remains were well represented, being analysed from 18 sites, while information from 25 assessment reports was also considered. Charcoal was analysed from eight sites and assessed from nine excavations. Analytical reports were prepared on animal bones from 14 sites. Smaller numbers of reports were prepared on molluscs (five sites) and pollen (one analytical and four assessment reports). There were three reports on 'waterlogged' plant remains, two reports (assessment/analysis) on insects, and single reports on mosses (Thurnham Villa) and diatoms (Parsonage Farm). Twelve sites were assessed by geoarchaeological methods, and seven were re-examined during the post-excavation phase, although only White Horse Stone was subject to detailed analysis.

The best represented periods in terms of environmental evidence were the Late Bronze Age/Early Iron Age, Roman and to a slightly lesser extent, the medieval period, with relatively smaller amounts of material from the early prehistoric and Saxon periods. Consequently, the relative abundance of different classes of environmental material by site and period meant that there was great variation in the temporal and spatial presence of the different biological remains, limiting the potential for significant comparisons between periods and areas.

Charred plant remains made up the bulk of the environmental material recovered from all sites. The preservation of these does not depend on the soils/sediments in which they are deposited, consequently they provided the main source of information on economic data (crop husbandry and processing) and the main focus of the scheme wide environmental project. The small number of 'waterlogged' plant remains that were examined meant that potential reconstructions of local environments were limited. Similarly, the few pollen studies meant that regional environmental reconstructions were also restricted, with no regionally important sequences being identified.

Animal bones consisted mainly of large mammal bone, primarily from domesticates, although there were generally insufficient quantities of material and limited data for the reconstruction of age at death profiles, to provide statistically reliable conclusions on animal husbandry. Evidence for game was noted at many sites, albeit represented by small amounts of material. There were small quantities of small mammal, bird and amphibian bones, which could provide only limited data on the reconstruction of the local environment, although there were several significant assemblages of fish bone from Roman and medieval sites.

Molluscan studies at several sites provided information on the character of the local environment and how it may have changed over time, for example at White Horse Stone, while the insect remains from the Late Roman well at Thurnham also produced some data on the character of the immediate environment.

Wider landscape studies within the HS1 study area were carried out using geo-archaeological techniques, primarily the study of soils and sediments. A very important sequence was uncovered at White Horse Stone, which was studied in detail. Several other geo-archaeological sequences from various other dry valleys in the North Downs were examined but the lack of potential dating evidence, or direct association with archaeological remains, meant that they were not analysed in detail.

Radiocarbon dating

by Michael J Allen

Palaeoenvironmental and landscape reconstruction is reliant on a robust chronological framework. The majority of the Section 1 archaeological sites were shallow, plough-truncated soil sequences, the only significant exceptions being dry valleys in the North Downs landscape Zone, in particular White Horse Stone. This meant that the majority of archaeological contexts have been dated on the basis of artefact typology. Nevertheless, the HS1 assessment and post-excavation project included the largest programme of radiocarbon dating so far undertaken in Kent, encompassing 17 sites and 149 determinations from 158 submissions (see Appendix 3). Most sites received six or fewer determinations but four (White Horse Stone, Saltwood Tunnel, Pepper Hill and Beechbrook Wood), because of their complexity or the detailed chronological resolution required, had between 13 and 54 results, comprising 75% of the radiocarbon programme. Not only was the archaeological selection and scrutiny of the material significantly more rigorous than for many previous projects in Kent and south-east England, but the

precision and accuracy of measurements within the radiocarbon laboratories is now also greater than before. Where error ranges of ±50 to 60 years were common and the norm less than 10 years ago, the majority (116; 78%) of the results from this project, largely submitted in 2004–5, have error ranges ≤40 years, and many (58%) are <40 years. Even during the life of this project measurement precision increased; all 14 radiocarbon assessment results submitted between 1998–2002 had error margins greater than ±40 years, averaging >±55, while during the post-excavation phase (2004–5) the majority were ±30 or less, averaging ±35. This level of precision has facilitated more specific questions and distinction between phases throughout the project.

The suite of 149 radiocarbon results (Appendix 3) is heavily biased against periods and episodes with well-dated artefacts, for which radiocarbon chronology would have been redundant, and against periods where the nature of the events do not require detailed radiocarbon chronology. For instance, the Mesolithic events along the HS1 route are sparse and often only required placing into a broad chronological framework, while a sequence of evolving Bronze Age events and activities could be better articulated via a series of radiocarbon determinations than through often vague and poorly dated artefact chronologies.

Chronology derived from both radiocarbon dating and artefact typologies is discussed in depth in the following chapters. Further details are contained in a series of dating reports on each of the 17 Principal Sites with radiocarbon dates, which are available on the Archaeology Data Service (ADS) website (CTRL Specialist Report Series – Dating Reports) and a scheme wide overview report, on which this section is based (Allen 2006).

Landscape zones

The landscape zones used for the project were those defined in the Character Map of England (Countryside Commission and English Nature), and the following are relevant to Section 1.

North Kent Plain

North Downs

Wealden Greensand (with some Low Weald)

The original landscape zones were found to be too broad in some respects to provide a useful basis for comparison and have therefore been sub-divided into a series of eight 'zones' for the purposes of this volume (see Table 2.1 and Fig. 2.1).

The smaller 'zones' predominantly reflect finer distinctions in geology, drainage and topography. Drainage/water sources are likely to have been a key determinant of land-use and settlement location in all periods. The Wealden Greensand Zone is sub-divided into route sections with predominantly clay soils (Zone 4, Gault Clay; Zone 7, varied soils but predominantly based on Atherfield Clay) and areas with predominantly sandy soils (Zones 5, 6 and 8, Folkestone and Sandgate beds).

Apart from geology and drainage, a range of other topographical factors are considered in defining the eight zones, including the location of the rail link route in relation to rivers and the coast, historic communication routes and major historic settlements, all of which might be expected to play a part in the intensity of settlement in different locations and periods. River valleys in particular might be expected to be a major factor in the character and definition of territories and boundaries. For instance the River Medway forms the traditional Boundary between East and West Kent, while the River Ebbsfleet was a lathe and hundred boundary in the Late Saxon period. As discussed in relation to the Ebbsfleet Valley and the West Stour below, rivers are likely to be one of the most significant determining factor in the location of major settlements and core agricultural areas.

The zones are not of equal size but some basis for comparison is provided by identifying the length of the route section in km, the number of historic parishes crossed, and the number of HS1 archaeological fieldwork events undertaken within it. The latter figure is intended as a rough indication of the relative intensity of archaeological investigation. It would be preferable to quote absolute areas investigated, which is possible for the mapped excavation areas, but is impossible as far as far as the general watching brief goes, due to the highly variable visibility in different route sections (see Chapter 1, Methods). The extent of investigation is illustrated in the Gazetteer mapping (Appendix 1).

The 'number of fieldwork events' includes excavations and watching brief areas but not evaluations, as the extent of excavation involved in evaluation trenching is not comparable with open area soil stripping. In addition most evaluations that contained significant archaeology were subsequently subject to some level of archaeological mitigation, so there is a large degree of overlap between the excavation and evaluation areas. Watching brief route sections in which no finds at all were made are excluded because that generally indicates very poor archaeological visibility.

Chronology and landscape

The Section 1 sites are widely distributed and mostly comprise rural sites of well-known types. There are exceptional sites, such as the White Horse Stone Neolithic longhouse, or the Pepper Hill Roman cemetery (which properly forms part of the Ebbsfleet Valley landscape) but the main contribution of Section 1 lies in the extent to which a range of 'ordinary' rural sites have been exposed and investigated across a broad range of landscape zones. The sheer number of sites studied within a consistent research framework has offered a unique opportunity to examine change and development in a very specific transect through the rural landscape of Kent. While the transect is not one that would have been chosen were this purely an archaeological research

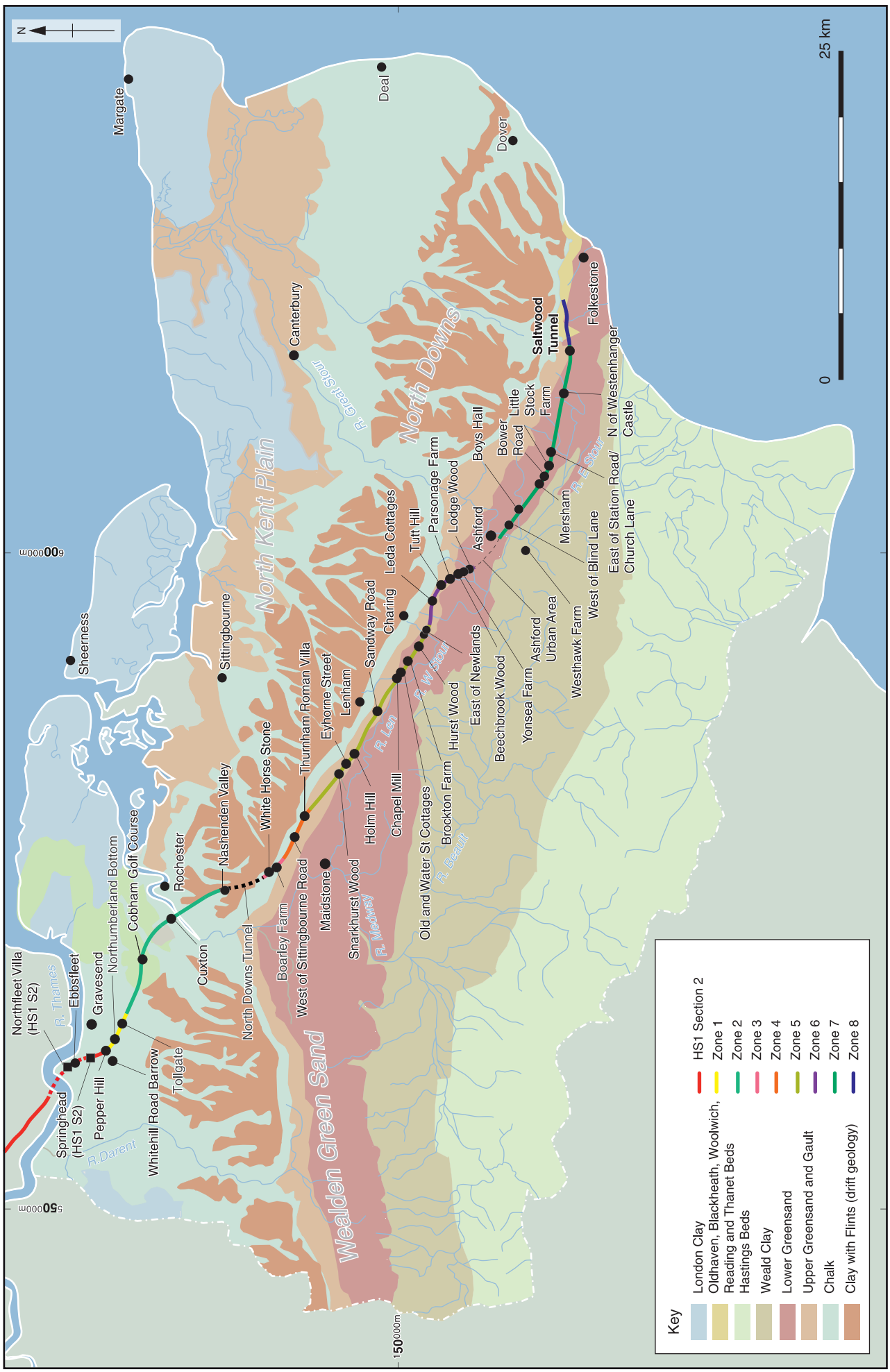


Figure 2.1 The route of High Speed 1 showing landscape zones, Principal Sites and historic buildings (of all periods) investigated along the route, in relation to geology

Table 2.1 Landscape zones within the HS1 project

Zone	UPD Landscape Zone	Principal Sites	Predominant geology	Drainage	Nearest major historic settlements	Principal long-distance communication routes	East Kent/ West Kent	Parishes crossed	Length (km)	No. Fieldwork events considered (excl evaluations and watching brief route sections with no recorded finds)	Comments	FW events per km
HS1 Section 2	North Kent Plain	Ebbsfleet Valley including: STDR4; Northfleet Villa; Springhead;	Alluvium/ terrace gravels overlying Upper Chalk	Ebbsfleet Valley; Thames Estuary	Springhead Roman settlement; Hinterland of Dartford; Gravesend	Watling Street/ A2/ River Thames	West Kent	Northfleet; Southfleet; Swanscombe	3.0	5	HS1 Section 2	1.7
Zone 1	Boundary of North Kent Plain/ North Downs dip-slope.	Pepper Hill, Whitehill Rd./ S.of Station Rd; Northumberland bottom/ Hazells Rd; Tollgate	Upper Chalk overlain by head deposits in some areas	Ebbsfleet Valley; Thames Estuary	Hinterland of Springhead Roman settlement; Dartford; Gravesend	Watling Street/ A2	West Kent	Longfield and New Barn; Northfleet; Southfleet; Gravesend; Ifield; Cobham	11.0	8		0.7
Zone 2	North Downs (dip slope)	Cobham Golf Course; Cuxton; Nashenden Valley	Upper Chalk overlain by head deposits in some areas	Medway Valley (north-west flank of Medway Gap and Medway crossing)	Hinterland of Rochester	Watling Street/ A2; (Pilgrim's Way)	Both (either side of River Medway)	Cobham; Cuxton; Rochester; Wouldham	5.0	3	Length excludes North Downs Tunnel = 3.2 km	0.6
Zone 3	North Downs (scarp slope)	White Horse Stone/ Pilgrim's Way; Boarley Farm West and East	Middle Chalk overlain by head deposits in some areas	Medway Valley (eastern flank of the Medway Gap)	Hinterland of Aylesford/ Maidstone.	Pilgrims Way/ A20 (Rochester to Maidstone Roman Road).	East Kent	Aylesford; Boxley	8.5	5	Length excludes North Downs Tunnel = 3.2 km	0.6
Zone 4	Wealden Greensand (Vale of Holmesdale)	West of Sittingbourne Rd; Thurnham Roman Villa/ Hockers Lane	Gault Clay	Between the North Downs escarpment and the River Medway.	Hinterland of Aylesford/ Maidstone.	Pilgrims Way/ A20	East Kent	Boxley; Detling; Thurnham; Hollingbourne	7.0	6		0.9
Zone 5	Wealden Greensand	Snarkhurst Wood; Eyhorne St., Sandway Rd., Chapel Mill, Old and Water St.Cottages; Brockton Farm; Hurst Wood/ E.of Newlands	Lower Greensand predominantly Folkestone and Sandgate Beds	Between the Downs escarpment and the River Len	Hinterland of Charing/ Lenham	Pilgrim's Way/ A20	East Kent	Hollingbourne; Harrietsham; Lenham; Charing	13.0	10		0.8
Zone 6	Wealden Greensand	West of Leda Cottages; Tutt Hill; Parsonage Farm; Yonsea Farm; Beechbrook Wood; Lodge Wood	Lower Greensand predominantly Folkestone and Sandgate Beds	Between the Downs escarpment and the River West Stour	Hinterland of Westhawk Farm Roman settlement/ Ashford	Pilgrim's Way/ A20	East Kent	Charing, Westwell, Hothfield, Ashford	8.5	6	length excludes Ashford and Sevington WB section = 5.5km	0.7
Zone 7	Wealden Greensand	Boys Hall Balancing Pond; No.2 and 4 Boys Hall Rd; W. of Blind Lane; Bridge House Mersham; Mersham; Bower Rd.; Little Stock Farm; Church Lane/ E.of Station Rd. Talbot House; N. of Westenhanger Castle	Lower Greensand predominantly Atherfield Clay	East Stour Valley	Hinterland of Westhawk Farm Roman settlement/ Ashford	A20 (Stone Street Roman Road)	East Kent	Sevington; Mersham; Smeeth; Sellindge, Stanford	12.0	9	length excludes Ashford and Sevington WB section = 5.5km	0.8
Zone 8	Wealden Greensand	Saltwood Tunnel (all fieldwork events)	Lower Greensand predominantly Folkestone and Sandgate Beds	Coastal Zone - Saltwood plateau - South of the Downs escarpment	Hinterland of Folkestone and Hythe	Pilgrim's Way/ A20 (Stone Street Roman Road)	East Kent	Saltwood; Newington	3.5	2		0.6

project, it is nevertheless a very useful one which stretches from the Thames estuary to the channel coast, and passes through a range of landscape zones, which (including the Ebbsfleet Valley in Section 2) are more-or-less representative of Kent as a whole.

While the following chapters (3–7) examine the evidence by period, this section attempts to model and compare the intensity of land-use within each landscape zone, as evidenced in the archaeological record from the HS1 transect through Kent. Some of the individual sites are unimpressive and did not in themselves warrant detailed analysis, yet when taken as a group they offer important insights into the general chronology and distribution of sites within the zones crossed by the rail link route, which inform general discussions of the evolution of the settlement pattern of Kent as a whole.

The data for these figures has been generated using a simple scoring system, which assesses the intensity of activity in a given period (as evidenced in the HS1 archaeological record) for each Principal Site on a scale of 1 to 4.

1 = Isolated or widely scattered features
2 = Lower level occupation
3 = Main intensive/complex period of activity
4 = Exceptionally intensive and extensive period of activity

Scores were entered into a spreadsheet matrix listing the Principal Sites, with data columns representing 100 year time blocks from 4000 BC to AD 2000. The resulting cumulative scores for each landscape zone are shown graphically in Figures 2.2 to 2.4 (the data sheet is available in the digital archive). This is a simple means of comparing the archaeological chronologies of different combinations of Principal Sites at a landscape level.

The scores for intensity of activity at each site in different periods are based on the period-specific chronological summary charts presented in the following chapters (simplified as rounded to the nearest century), which in turn are based on the chapter authors consideration of all available chronological evidence, the most important sources of evidence being artefact typology in conjunction with radiocarbon dates. The chronology of sites in the Ebbsfleet Valley (HS1 Section 2), although not discussed in detail in this volume, is included in this section for comparison with the Section 1 data, and to complete the HS1 transect through Kent.

This approach is an attempt to summarise change and complexity in the archaeological record in a consistent manner. However, sites that are unusually complex for their period, such as the Neolithic Longhouse at White Horse Stone, or the Anglo-Saxon tidal mill in the Ebbsfleet Valley, are given slightly greater weight than, say, Roman sites of strictly equivalent complexity, which are relatively commonplace. Thus the Neolithic longhouse phase at White Horse Stone, and the Early Roman phase at Thurnham Roman Villa are both given a score of '3', even though the Roman villa structures are considerably more complex and extensive in absolute terms than the Neolithic longhouse. As this example illustrates, the scores are subjective, and incorporate all of the inherent problems of bias discussed elsewhere in this volume, but it nevertheless provides a useful means of visualising and systematically comparing the archaeological chronologies of a diverse collection of sites at the landscape level. While the precise scores applied to particular cases may be questioned, it is hoped that the cumulative scores across groups of sites reflect real patterns in the archaeological data, if not necessarily real patterns in rural settlement.

In interpreting the graphs it is important to remember that the rail link route runs for the most part with the grain of the landscape, following distinct and rather narrow geological bands, whereas historic units of settlement as exemplified by documented Anglo-Saxon estates and medieval parishes in Kent, typically run against the grain, encompassing as wide a range of geological zones as possible. By focussing on one landscape zone at a time we are confining our interest to one of several zones available to any given community, and not necessarily the most important.

Figure 2.2(a) illustrates the overall chronological distribution of activity for the HS1 transect through Kent (all landscape zones), while Figure 2.2(b–d) shows the distribution for each of the overall landscape zones. Figures 2.3 and 2.4 show the distribution for sub-regional zones 1–8.

Overall chronological spread of activity for the HS1 data (all landscape zones)

This section reviews the overall chronological trends apparent in the HS1 transect through Kent, including the Section 2 sites in the Ebbsleet Valley. Chapters 3 to 7 contain detailed analysis of the trends by period, including discussion of the basis of the dating evidence and the possible reasons for the major peaks and troughs in the activity levels in the archaeological record. The graphs in Figures 2.2–2.4 omit the Palaeolithic and Mesolithic periods, as the number of sites of those periods is too small, and the time periods too long, to model at the same scale as the Neolithic and later periods (See chapter 3 for Paul Garwood's detailed analysis of activity during these periods). *In situ* contexts datable to the Mesolithic are found on just three sites on Section 1 (Sandway Road, Beeckbrook Wood and Saltwood Tunnel). The earliest evidence for human activity from the HS1 Section 2 work in the Ebbsfleet Valley extends as far back as the Middle Pleistocene / Clactonian (the estimated age of the Southfleet Road elephant butchery site is *c* 400,000 BP) (Wenban-Smith *et al.* 2006). In contrast, the earliest single artefact identified from the Section 1 sites is a later Upper Palaeolithic burin dating from *c* 10,000 BC. The main reason for this great difference in timescales is the absence from the Section 1 route of deep/complex stratified alluvial deposits, whereas these are a characteristic feature of the Section 2 investigations in the valley of the Thames and its tributaries, including the Ebbsfleet.

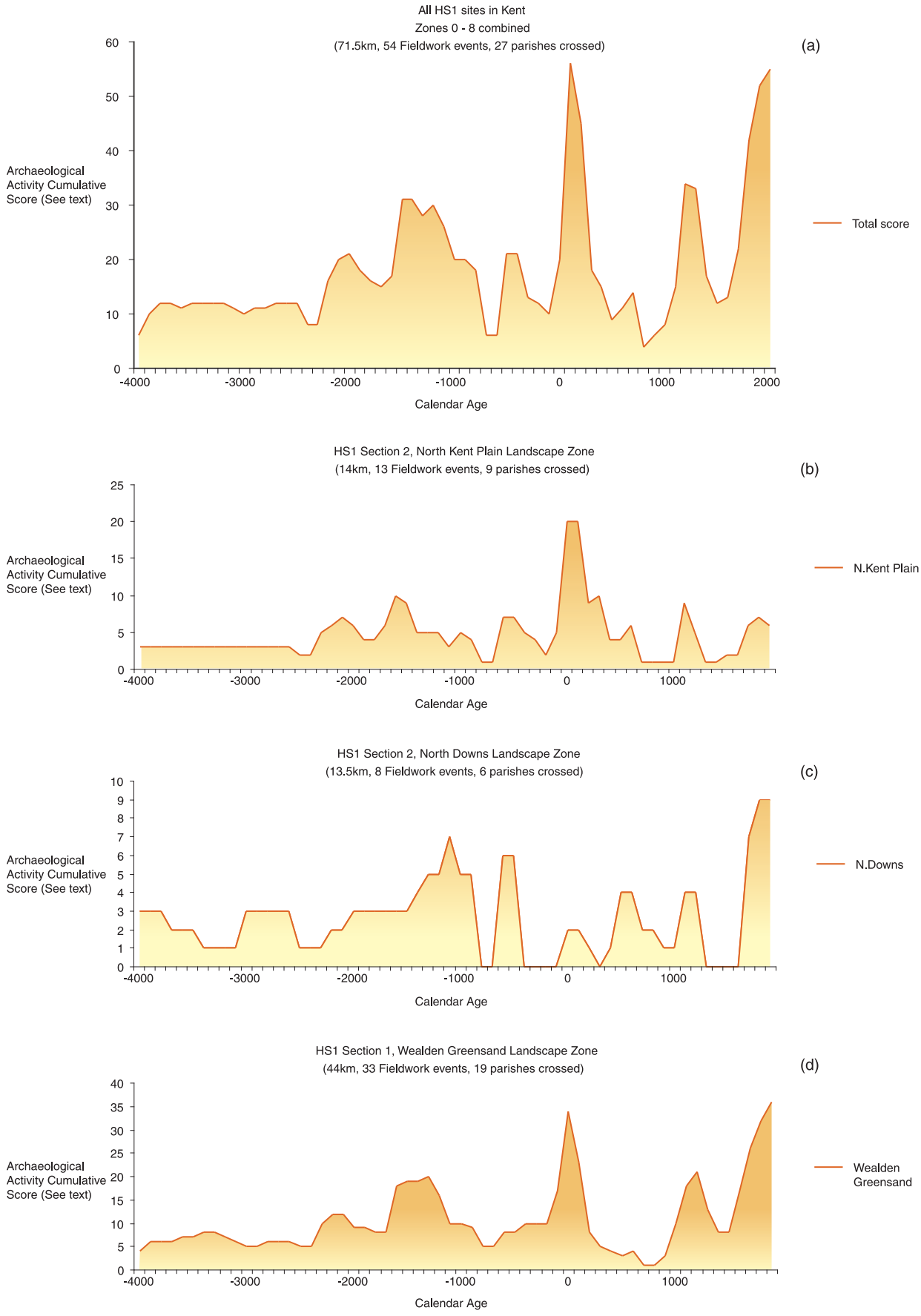


Figure 2.2 Comparison of the chronological distribution of archaeological evidence by landscape zone, showing (a) The route as a whole (b) The North Kent Plain Landscape Zone (c) The North Downs Landscape Zone (d) The Wealden Greensand Landscape Zone

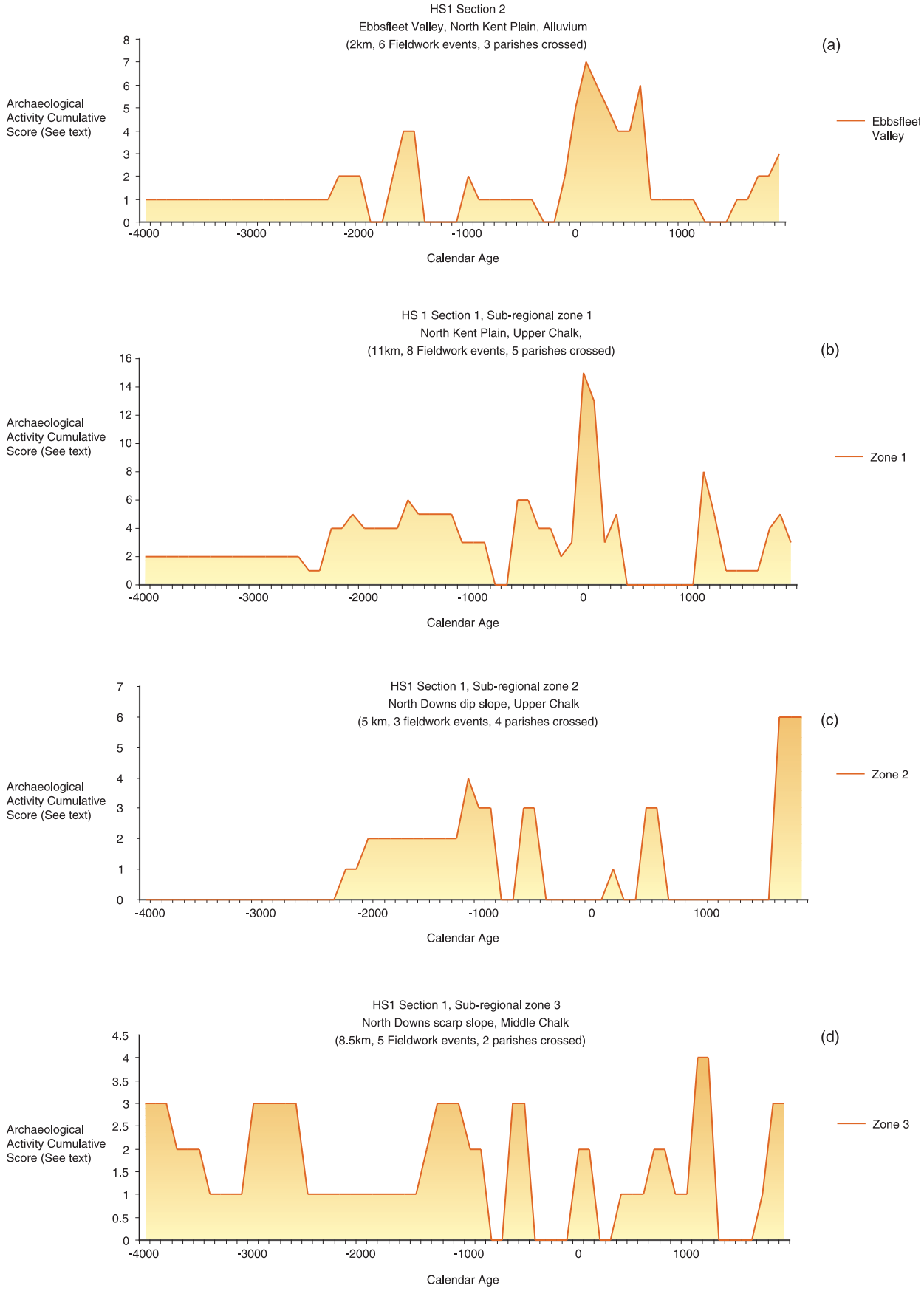
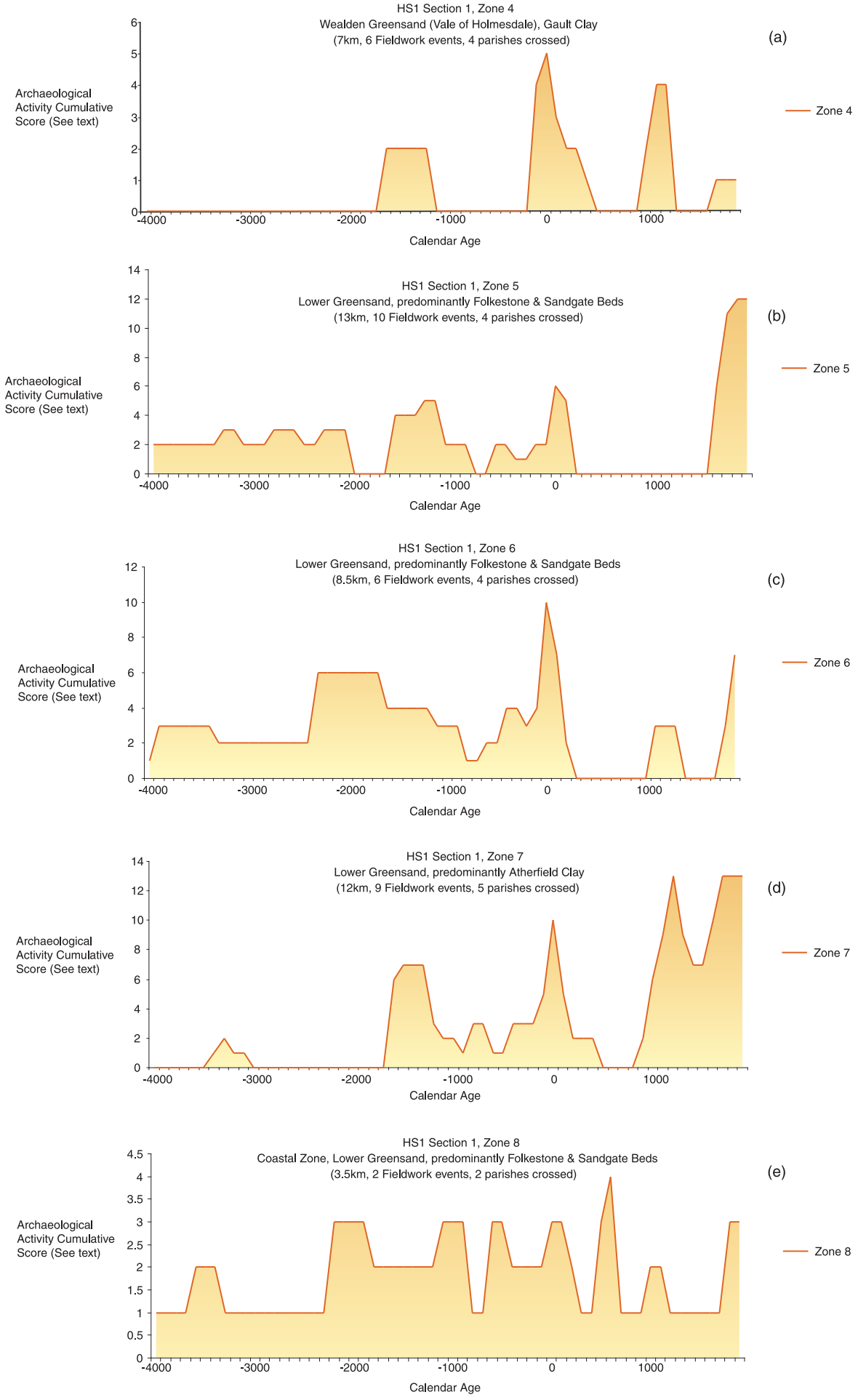


Figure 2.3 Comparison of the chronological distribution of archaeological evidence by sub-regional zone, showing (a) Zone 0 (Ebbsfleet Valley) (b) Zone 1 (c) Zone 2 (d) Zone 3

Figure 2.4 (facing page) Comparison of the chronological distribution of archaeological evidence by sub-regional zone, showing (a) Zone 4 (b) Zone 5 (c) Zone 6 (d) Zone 7 (e) Zone 8


HS1 Section 1, Zone 4
Wealden Greensand (Vale of Holmesdale), Gault Clay
(7km, 6 Fieldwork events, 4 parishes crossed)
(a)
Zone 4
Archaeological Activity Cumulative Score (See text)
Calendar Age
HS1 Section 1, Zone 5
Lower Greensand, predominantly Folkestone & Sandgate Beds
(13km, 10 Fieldwork events, 4 parishes crossed)
(b)
Zone 5
Archaeological Activity Cumulative Score (See text)
Calendar Age
HS1 Section 1, Zone 6
Lower Greensand, predominantly Folkestone & Sandgate Beds
(8.5km, 6 Fieldwork events, 4 parishes crossed)
(c)
Zone 6
Archaeological Activity Cumulative Score (See text)
Calendar Age
HS1 Section 1, Zone 7
Lower Greensand, predominantly Atherfield Clay
(12km, 9 Fieldwork events, 5 parishes crossed)
(d)
Zone 7
Archaeological Activity Cumulative Score (See text)
Calendar Age
HS1 Section 1, Zone 8
Coastal Zone, Lower Greensand, predominantly Folkestone & Sandgate Beds
(3.5km, 2 Fieldwork events, 2 parishes crossed)
(e)
Zone 8
Archaeological Activity Cumulative Score (See text)
Calendar Age

From the start of Neolithic the earlier prehistoric periods show relatively little differentiation by period across all landscape zones. The important Neolithic sequence at White Horse Stone notwithstanding, earlier prehistoric settlement sites have a relatively slight effect on the graphs in Figures 2.2–2.4 due to the relatively small number of such sites and ephemeral nature of the evidence at most sites. Very broadly dated ploughsoil artefact scatters (from fieldwalking) tend to result in low but persistent scores at several sites. White Horse Stone, Eyhorne Street, Sandway Road, Tutt Hill, Beechbrook Wood, and Saltwood Tunnel all show evidence for *in situ* early Neolithic activity. White Horse Stone and on a smaller scale Eyhorne street are particularly notable for their diverse and lengthy early prehistoric ceramic sequences, which have been calibrated for this project using radiocarbon dates.

There is a marked increase in activity in the Early Bronze Age, with the most common class of monument in this period being ring-ditches and other funerary features (Whitehill Road Barrow, Cobham Golf Course, Tutt Hill, Beechbrook Wood and Saltwood Tunnel). The primary period of construction for barrows is generally given a score of 2 or 3 depending on the known extent of the cemetery, and intensity of burials in particular periods, and a score of 1 to reflect persistent presence of the barrow as a significant landscape feature. However, the phases are mostly very broadly dated, which tends to give an impression of long, continuous use in these figures, which may not reflect real patterns of activity, or bear much relation to settlement activity.

A more substantial increase in activity occurs in the Middle Bronze Age extending into the Mid–Late Bronze Age, significant sites being White Horse Stone, Thurnham, Sandway Road, Tutt Hill, Beechbrook Wood and Saltwood Tunnel. Thereafter, activity apparently drops to almost nothing in the 'earliest Iron Age', except for a single settlement at Little Stock Farm, if the identification of this phase is to be believed (see Tim Champions discussion of this issue in Chapter 4). The levels of activity recover to a limited extent in the Early Iron Age, before a further apparent hiatus in the Middle Iron Age, the main exception in this period being the settlement at Beechbrook Wood. The chronology for the Iron Age is largely reliant on ceramic typology, as a result of the 'radiocarbon plateau' covering this period and the scarcity of diagnostic coins and other metal finds from the route. Consequently there remains considerable uncertainty in the detailed chronology of this period. The later prehistoric ceramics have been subject to detailed study for the HS1 project (E Morris, in Booth *et al.* 2006).

Activity initially continues at an apparently low level, if the ceramic chronology is correct, up until the late 1st century BC, with just three sites showing signs of occupation. From that point there is a rapid increase in rural settlement activity, with a major peak in the 1st century AD, the highest level of any period other than the modern. Within the Section 1 transect there is substantial evidence for occupation at 18 sites of all types by the end of the 1st century AD, continuing at a similarly high level until the early or mid-2nd century AD. Sites beginning in this phase include the Pepper Hill Cemetery, Thurnham Roman Villa, and a wide range of lesser rural settlements and burial sites in Section 1. In Section 2, the main phase of occupation at Springhead, and the beginnings of Northfleet Villa also lie in the 1st and 2nd centuries AD. During the course of the 2nd century there is an apparent gradual drop in the number of sites occupied, to *c* 14 by the late 2nd century, predominantly among low status rural settlements.

The 3rd century sees a dramatic fall off in activity of most kinds within the HS1 transect—by the end of the 3rd century only six sites in Section 1 show any sign of occupation, mostly at a lower level than their respective Early Roman phases, for example at Thurnham Roman villa one of the central rooms of the main house was in use as a smithy in the late 3rd century (Lawrence 2006).

A large Late Roman crop-drier at Hazell's Road (part of the Northumberland Bottom Principal Site, near Springhead), stands out as the only exclusively Late Roman site on the whole Section 1 route (see Booth, Chapter 5). Masonry crop-driers/malting ovens were also built at Thurnham Villa and Northfleet Villa in the 3rd–4th century, suggesting a radical change in the organisation of the rural landscape in this period, and a focus of agricultural production away from small rural farmsteads to a small number of villa sites. While the degree of organisation and investment reflected in the appearance of crop-dryers/malting ovens implies continuing large scale demand for foodstuffs, this has to be set against widespread evidence for decline in rural settlement and small towns in the Late Roman period in Kent and the south-east England generally (see Chapter 5). Crop-drying is commonly used by modern farmers as a means of extending the harvest season at times of high labour costs, allowing the harvest to be gathered by fewer workers, and also reduces dependency on weather conditions for harvesting (Hellevang 1994). In a Late Roman context the appearance of such structures could perhaps be seen as evidence either for shortages in rural manpower or climatic deterioration, or both. Whatever the reasons, the ubiquitous appearance of such structures across much of southern Britain suggests that the changes extended far beyond Kent.

Northfleet Villa, strategically located near the Thames Estuary and Watling Street, is the only site in the HS1 transect which shows substantial evidence for development and continuing intensive settlement during the Late Roman period (Andrews *et al.* 2011). By the end of the 4th century it is difficult to find any clear evidence for activity within the HS1 transect, again with the probable exception of Northfleet Villa, which may have received pottery (but not coins) beyond the end of the 4th century. Possible residual activity is suggested at Springhead, on Section 2, and at Pepper Hill, Thurnham, Bower Road and Saltwood Tunnel on Section 1, most commonly evidenced by occasional finds of late 4th century coins from terminal contexts.

In the Early Anglo-Saxon period, activity appears to sink to a very low level, comparable in general terms with

early prehistoric levels, if not lower. Settlement contexts of the period are limited to sunken-featured buildings only broadly dated to the 5th–7th century, the majority of those concentrated in the Ebbsfleet Valley on Section 2 (Andrews *et al.* 2011). Nine sunken-featured buildings were found at Northfleet Villa alone, which is more than the rest of the HS1 route put together, although the artefact chronology, such as it is, suggests that there may have been a hiatus in occupation of perhaps fifty years in the 5th century between the Late Roman and Early Saxon occupation (ibid.). The construction of the Anglo-Saxon tidal mill at Northfleet Villa is dated by dendrochronology to AD 691–2, and it is thought to have had a short working life of about thirty years. It was apparently abandoned because of accumulating alluvial deposits in the Ebbsfleet Valley, which at some point after the mid-7th century cut the site off from tidal influence.

The chronology of the Anglo-Saxon cemeteries in the Ebbsfleet Valley broadly corresponds with the suggested settlement chronology. The cemeteries at Springhead, at the head of the Ebbsfleet Valley, are predominantly of 7th century date, but a cemetery believed to be of late 5th century date is known outside the HS1 excavations in the vicinity of Northfleet Church. The authors suggest that the evidence from the valley represents low density occupation, with a pattern of continuous shifting settlement within the Ebbsfleet Valley from the 5th to the mid-7th century (Andrews *et al.* 2011). In comparison, the Cuxton and Saltwood Tunnel cemeteries on HS1 Section 1 both appear to start in the late 6th century and continue through the 7th century. Of the three Anglo-Saxon cemetery sites identified in the HS1 transect, it is notable that Saltwood Tunnel is located near the Channel Coast, Cuxton is located on the River Medway and the cemeteries at Springhead in the Ebbsfleet Valley are located near the Thames Estuary, supporting indications that settlement by this period may have contracted into core settlement areas based mainly around the navigable rivers and the East Kent coastal zone.

The HS1 investigations tend to support the suggestion that the section of Watling Street to the West of Rochester, including the Ebbsfleet area, fell into disuse during the Saxon period, due to the inundation of river crossings along the Roman road due to rising water levels along the Thames and its tributaries. The route may only have been revived in the Late Saxon period due to the reuse of Rochester and Canterbury as *burhs* (fortified towns), part of a chain of defences against the Vikings linked to London. Documentary evidence suggests that the revived land route went from Strood via Gravesend to Dartford (Tatton-Brown 2001).

Although intriguing evidence for activity in the Mid–Late Saxon period was found at White Horse Stone and Saltwood Tunnel, very little Mid–Late Saxon settlement archaeology was identified in the Section 1 transect as a whole, or on Section 2 in the Ebbsfleet Valley for that matter. This was probably partly the result of the avoidance by the rail link route of historic village centres where evidence for Late Saxon rural settlement is perhaps most likely to be found, probably coupled with continuing low levels of rural settlement and agricultural activity in this period. It is probably no coincidence that one of the few sites with evidence for Late Saxon activity was found in the village of Mersham, which is the only point that the rail link route passes through a Domesday village centre. The fate of settlements in the Ebbsfleet Valley in the Mid–Late Saxon period is considered below.

Evidence for 11th–13th century settlement was considerably more common, with a peak in activity in the 13th century as shown on Figure 2.2(a). This appears to reflect wider patterns in the region and is perhaps best explained by an increase in temperatures in western Europe attributed to the 10th–13th century (Mann 2002; Mann *et al.* 2009). The key sites investigated include a moated manorial complex at Parsonage Farm and a variety of low status rural settlements, including three separate locations in the Northumberland Bottom site on the North Kent Plain. Tangible signs of settlement in the North Downs are elusive in this period as in others, but there is extensive evidence for an expansion of settlement in the Wealden Greensand Zone. A particularly notable feature is an expansion onto clay soils such as the Gault Clay strip and Atherfield Clay (see landscape zone discussion below). Non-settlement agricultural features also become more common in this period, such as a crop-dryer and a trackway marking a parish boundary at the White Horse Stone/ Pilgrim's Way site (Hayden 2006a). The drop in activity from the 13th century peak is clearly also a very widespread phenomenon, probably best explained as settlement contraction caused by population decline, possible causes being deteriorating climatic conditions at the start of the 'Little Ice Age' (Mann 2002; Mann *et al.* 2009), the successive impact of severe famines across north-west Europe in 1315–22 (Kershaw 1973; Jordan 1997) and the onset of the Black Death from 1348 (Horrox 1994).

The levels of activity thereafter remains low until *c* 1600, followed by a rapid increase through the post-medieval period, by which time the archaeological record includes increasing numbers of surviving standing buildings. The earliest historic building investigated is Talbot House, which originated as a Wealden Hall, probably in the late 15th century—Kent has numerous examples of such buildings which reflect late medieval and post-medieval colonisation of the Weald. Archaeological investigation of the building footprint found no evidence that the site had been occupied prior to construction of the hall (OA 2002). The chronology of this expansion is something of an anomaly, as the 15th century otherwise appears to have been a period of low and possibly declining population in the region. The fact that Kent, in particular between the Rivers Medway and the Stour in the Vale of Holmesdale, has more buildings of this type than anywhere in Western Europe suggests that particular regional economic factors are likely to be at play. The appearance of Wealden Halls has been associated with the rise of the economically independant Yeoman farmer in the aftermath of the Black Death. Historical analysis of available documentary sources for Kent suggests that the wealthy landlords of the late

medieval period (such as Christchurch, Canterbury), whose wealth was based predominantly in the North Kent Plain and the main river valleys, gradually withdrew from their interests in their outlying lands in the Weald. As they did so, individuals with initiative moved into the gap and exploited the natural resources of the region, particularly timber and firewood, for their own benefit. Iron production, tanning and cloth production also developed into significant industries in the Weald in the late medieval period (Pearson, 1994). Other buildings investigated along the route which date broadly from the 15th–17th centuries include Old Parsonage Farm, Old and Water Street Cottages, Brockton Farm and Bridge House, all of which are fairly typical rural domestic dwellings.

Agricultural buildings of the 19th century are represented by Yonsea Farm, a model farm built *c* 1820, which exemplifies the impact of the agricultural revolution on approaches to farming in Britain at the time, but is a rare example in Kent (OA 2000a). The range of archaeological features and buildings identified in the HS1 Section 1 transect broadens out beyond the agricultural for the first time in the late 19th and 20th centuries, encompassing small scale industrial sites such brick kilns and quarries (Askew 2006), as well as landscaped parks and gardens, railway infrastructure, and defence structures dating from World War II (MoLA 1999a, MoLA 1999b, OA 2000b, OA 2001b,). The intensity of late 19th–20th century activity is under-stated by a large margin on Figures 2.2–2.4, as the dataset only considers sites that were recorded as 'archaeology' along the rail link route. Historic buildings and landscape features investigated along the route are considered in the scores for each principal site, but other modern buildings and structures that were affected by the railway construction are not reflected in this dataset. Most obviously the route passes through the middle of the Ashford urban area, which was largely excluded from archaeological investigation.

The characteristics and chronology of the archaeology is discussed in the following section by landscape zone:

The North Kent Plain Landscape Zone (Zone 1)
(Figs 2.2(b) and 2.3 (a, b))
This landscape zone falls into two parts, firstly the Ebbsfleet Valley including Springhead and Northfleet Villa (which were excavated as part of HS1 Section 2 and are published in a separate series of volumes; Andrews *et al.* 2011); secondly the principal sites in the immediate hinterland of the Ebbsfleet Valley, namely Whitehill Road Barrow, Northumberland Bottom, Tollgate and Pepper Hill (Bull 2006a; Askew 2006; Bull 2006b; Davis 2006). Figure 2.2(b) models the changing intensity in the North Kent Plain Landscape Zone as a whole (including the Ebbsfleet Valley).

Ebbsfleet Valley (Fig. 2.3(a))
It has not been possible to incorporate detailed consideration of the Ebbsfleet Valley into the main chapters of this volume. Nevertheless it is important here to summarise the results and consider them in this discussion of landscape and chronology, as the Ebbsfleet completes the HS1 transect through Kent. Only there does the rail link pass directly through a site that can be described as major settlement, at least in the Late Iron Age, Roman and possibly the Early/Mid Anglo-Saxon periods. Even here the settlement sequence is not continuous. The scale of impacts caused by construction of the High Speed 1 Ebbsfleet International Station resulted in a very large, complex and intensive archaeological project, encompassing most of the valley (Andrews *et al.* 2011).

The Ebbsfleet Valley has produced evidence for an exceptional range and quality of archaeological material, some of it unique in character and concentrated in a small geographical area. In many respects the complexity of the main sites at Springhead and Northfleet Villa complements the predominantly rural, plough-eroded 'typical' sites that characterise the Section 1 transect. The valley bottom is infilled by a deep sequence of alluvial and colluvial sediments dating from the Pleistocene and Holocene, associated with internationally important archaeology of various periods. Headline discoveries include:

- a Clactonian (Lower Palaeolithic) elephant butchery site at Southfleet Road, dating from the Hoxnian Interglacial (*c* 400,000 BP); extensive geoarchaeological and palaeoenvironmental investigations elsewhere in the valley have helped to place earlier well-known Palaeolithic discoveries into context (Wenban-Smith *et al.* 2006).
- Neolithic, Bronze Age and Iron Age archaeology associated with palaeoenvironmental evidence from deep Holocene alluvial sediments in the valley bottom (principally along the KCC-funded South Thameside Development Route 4). These also provide a context for earlier important Mesolithic and Neolithic discoveries. It is much less clear with the prehistoric evidence whether discoveries are the result of preferential preservation in the alluvial sediments, or unusually intensive activity. As with the later periods it is perhaps most likely to be a combination of the two (Wenban-Smith *et al.* in prep.).
- extensive excavations at Springhead Roman temple complex, roadside settlement and waterfront (Andrews *et al.* 2011).
- extensive excavations at Northfleet Roman villa, including a major waterfront (ibid.).
- important new Anglo-Saxon sunken-featured buildings and cemeteries found in the valley at both Springhead and Northfleet, the most spectacular find being the best-preserved and earliest Anglo-Saxon tidal watermill found to date in the UK (ibid.).

The quantity and quality of archaeological evidence from the Ebbsfleet Valley in comparison with the more 'typical' range of archaeological sites found along HS1 Section 1 can be explained by a combination of factors.

The valley of this minor tributary of the Thames forms a 'sump' in the landscape, which has been subject to periodic tidal influence from the Thames. In the Mid-

Saxon period the valley bottom seems to have been subject to silting, which resulted in the Ebbsfleet no longer being navigable. Settlement shifted elsewhere leaving the valley bottom relatively undeveloped and undisturbed until large scale gravel and chalk extraction commenced in the early 20th century. The history of archaeological discovery in the valley begins at that point. In the areas that have survived the quarrying, the waterlogged deposits in the valley bottom provide exceptional preservation conditions, suitable for preserving organic artefacts and biological remains that are rarely preserved in archaeological contexts.

Unusually intensive human settlement within the valley, especially in the Late Iron Age, Roman and Anglo-Saxon periods, can probably be explained by the 'ecotonal' location of the valley, with ready access to an exceptional variety of environments and resources, including a spring-fed freshwater river, and the resources of a tidal estuary. The range of geology and soil types confined in a small area, including chalk ridges, gravel terraces and alluvium/marshland, would have supported a wide range of natural vegetation and crops. Waterpower could be harnessed directly, as the discovery of the Anglo-Saxon tidal mill demonstrates.

In addition the location formerly had exceptionally good communications via the Thames Estuary and Watling Street. The Ebbsfleet River is considerably smaller than the most of the rivers cutting the North Kent plain, and little more than a ditch today, but there is clear evidence from the Section 2 excavations that it formed a navigable link from the Thames to Watling Street in the Roman and Early–Mid Saxon period, serving substantial Roman waterfronts at Springhead and Northfleet Villa. A number of the Kentish towns which show the most convincing evidence for continuity of settlement from the Roman period—such as Eastry, Wingham, Canterbury, Faversham, Milton Regis, Rochester, Dartford and Crayford—are located along Watling Street, on watercourses cutting the North Kent Plain. Ebbsfleet, being in a comparable topographical position, could be regarded as the early phases of a Kentish town that never made it to the modern era, primarily because the watercourse on which it was located ceased to be navigable at some point in the Saxon period. The case of the Ebbsfleet emphasises the extent to which water courses, in particular navigable ones, are central to understanding the framework of the landscape of Kent. Ironically the construction of High Speed 1 has put the Ebbsfleet firmly back on the map as a key communication hub—most travellers in the ticket hall at Ebbsfleet International Station will be unaware that they are standing by the Roman waterfront at Northfleet Villa.

In spite of a dearth of Late Saxon archaeological evidence in the Ebbsfleet Valley, as in most of the rest of the HS1 route, there are documentary hints that the valley fell within large and important estates in the late 7th and late 8th centuries. Firstly, a late 7th century charter (dated AD 677, for 687 or 688) from Eorcenwold, bishop of the East Saxons, to the nunnery of Barking, grants privileges and confirms a grant of 40 hides (cassatae) at Swanscombe and Erith (among a list of other estates). The lands were apparently originally granted to the nunnery by King Æthelred of Mercia (Electronic Sawyer S 1246). The tidal mill at Northfleet Villa, it should be noted, lies close to the present village of Northfleet, but actually on the Swanscombe side of the River Ebbsfleet. It's construction is dated by dendrochronology to AD 691–2, just a few years after the date of this charter. Secondly a decree of the Synod of Clofesho dating from AD 798, refers to an estate of 60 hides ('cassati') called 'Fleet', among a group of North Kent estates involved in a transfer of property between Abbess Cynethryth of Cookham Abbey in Berkshire (widow of King Offa of Mercia) and Æthelheard, Archbishop of Canterbury (Electronic Sawyer S 1258). 'Fleet' is usually identified with Northfleet, which remained an important Canterbury manor until the dissolution of the monasteries. The estates mentioned in these charters appear much larger than the Domesday estates in the area (for comparison, of the three Domesday manors encompassing the Ebbsfleet Valley, Northfleet was assessed at 6 sulungs (or 12 hides) in 1086, Southfleet at 6 sulungs (or 12 hides) and Swanscombe at 10 sulungs (or 20 hides)).

Given the apparent size and importance of these estates in the late 7th and 8th centuries, it seems unlikely that the abandonment of the tidal mill and cemeteries in the Ebbsfleet Valley around the late 7th century reflects abandonment of the whole area. More likely, as the valley silted up there was a shift in focus to satellite settlements on either side of the valley, perhaps ultimately resulting in the definition of the smaller estates listed in the Ebbsfleet Valley area in the Domesday survey. By the time of the Domesday survey, and possibly earlier, the River Ebbsfleet was both a hundred and a lathe boundary—Swanscombe and Southfleet lie in the Domesday Hundred of Axtane, in the lathe of Sutton-at-Hone, whereas Northfleet lies in the Hundred of Toltingtrough, and the Lathe of Aylesford (Page 1932). Taken together these sources suggest at least one major episode of settlement and territorial reorganisation during the Mid–Late Saxon period.

The Ebbsfleet Valley example partly supports but mostly refutes the suggestion that the settlement patterns and estate boundaries apparent at the time of the Domesday survey are derived from Roman estate structures. A degree of continuity in the selection of core settlement sites between periods is to be expected, but this does not imply continuity in population, as rural population levels in the region may have fallen so low in the Late Roman period that it is entirely possible to envisage groups of Anglo-Saxon settlers in equally small numbers moving into vacant villa estates in the course of the 5th century. The Ebbsfleet Valley also supports Andrew Reynold's suggestion (see Chapter 6) that the framework of estate and territorial boundaries is likely to be a post-Roman imposition, subject to periodic reorganisation, notably in the Late Saxon period.

Hinterland of the Ebbsfleet Valley (Fig. 2.3(b))
The hinterland of Springhead lacks the alluvial sediments present in the Ebbsfleet Valley. The predominant geology is upper chalk overlain by head deposits (usually clay-with-flints) in some areas, and some areas of terrace gravel. The landscape is characterised by chalk ridges crossed by dry valleys infilled with colluvium. The A2 Watling Street runs immediately to the North of the rail link in this area. Downs Road and Wrotham Road, which cross the region from north to south, following the line of the major dry valleys, are believed to be examples of long-established routeways from settlements on the North Kent Plain to the Weald of Kent.

Figure 2.3b models the changing intensity of archaeological activity from the Early Neolithic to the present (excluding the Ebbsfleet Valley). This part of Landscape Zone 1 includes the Whitehill Road Barrow site, multi-period agricultural and funerary landscapes at Northumberland Bottom and Tollgate, and the Roman cemetery at Pepper Hill. There are no *in situ* Palaeolithic or Mesolithic finds from this zone. From the Early Neolithic the chronological profile of activity, as illustrated in Figure 2.3(b), is very similiar to that for the overall HS1 route described above (Fig. 2.2(a)). The archaeological evidence in total suggests a comparatively intensively settled landscape from the Early Bronze Age onwards, and a mixture of funerary and settlement features. There is an apparent gap in the earliest Iron Age, which may not be real (see Champion, Chapter 4), and a major spike in activity in the Early Roman period, emphasised by the presence of the Pepper Hill cemetery. Most of the other activity of this period was originally interpreted as rural settlement and agricultural activity in the Northumberland Bottom site report (Askew 2006), but recent excavations along the adjacent A2 Bean to Cobham Road Improvement discovered two very high status Early Roman burials in amongst enclosures that were previously thought to be agricultural in character, which has led to a general reinterpretation of the Roman landscape in this area (Allen forthcoming). As noted above and discussed in Chapter 5, the Hazells Road site is the only exclusively Late Roman site on the HS1 route, and one of only of only six or so showing any signs of activity beyond the 3rd century (Askew 2006; see Booth Chapter 5). In contrast with the Ebbsfleet Valley there is a complete absence of Anglo-Saxon settlement or burials in this zone. The medieval period is particularly well represented considering that the rail link deliberately avoids centres of historic settlement, with three separate activity areas of 12th–13th century date within the Northumberland Bottom Site Area, including a possible precursor to the modern Hazells Farm (Askew 2006).

The North Downs Landscape Zone (Zones 2–3;
Figs 2.2(c) and 2.3(c, d))

Zone 2—the North Downs dip slope (Fig.2.3(c))
This zone extends on either side of the Medway Gap where it cuts through the North Downs. The solid geology consists of the Upper Chalk of the North Downs overlaid locally by the silty sands and sandy clays of the Woolwich, Blackheath and/or Thanet Beds. The topography consists of undulating land on the northern dip-slope of the North Downs (see Fig 2.1) and broad dry valleys. In general, modern land-use corresponds with the type of topography and soil cover with pasture and fields in the dry valleys on soils derived from the eroded Thanet Beds, and coppiced or mature woodland covering the areas of higher ground that are capped with the Oldhaven, Thanet Beds and Glacial Head. Watling Street, and its successors, the A2 and M2 run through the Cobham Golf Course route section.

Zone 2 includes includes the Cobham Golf Course, Cuxton and Nashenden Valley Principal Sites. Figure 2.3(c) shows the chronological distribution of activity in this zone, which indicates low levels of archaeological activity in all periods, in spite of very extensive investigation. Earlier prehistoric archaeological features identified in this zone comprise a large ring-ditch, land divisions, a track or holloway, and occupation deposits spanning the Early, and Middle to Late Bronze Age, all found at Cobham Golf Course (Davis 2006), indicating a community sufficiently settled to invest in monument building, although settlement remains are slight. This site lies adjacent to Watling Street, which might indicate that the Roman Road in this section broadly follows the line of a long-established prehistoric trackway. The excavation at Cuxton included an Iron Age settlement and an Anglo-Saxon cemetery, but these were located on the north-west bank of the River Medway, which may have been the main determinant of settlement location in this case. There is hardly any evidence for Roman or medieval activity, which is a striking reversal of the pattern in the other zones. It should be noted that the area between Cobham Golf Course and Knight's Place Farm consisted of alternating cuttings and embankments, which allowed for the deeper deposits near to the valley floors to be preserved *in situ,* possibly masking archaeological features, but this does not effect the overall conclusions.

Due to the drainage characteristics of the chalk, the dip slope of the chalk downs is largely lacking in surface water, except for seasonal streams (winterbournes), and is physically separated from adjacent zones by the chalk escarpment. It may have been less attractive for settlement and agriculture for those reasons.

Zone 3—the North Downs escarpment (Fig. 2.3(d))
Zone 3 lies at the foot of the North Downs escarpment, on the eastern side of the Medway Gap, between 92m and 50m aOD (the top of the escarpment at Warren Road lies at 170m aOD). Below the escarpment, the ground descends gently to the west towards the Medway which, at its nearest, lies around 2km away. The scarp slope lies relatively close to the spring line at the foot of the escarpment, although no evidence for a spring was found in the HS1 excavation areas.

The underlying geology consists of Cretaceous Middle Chalk, with extensive drift deposits, mostly clay with

flints, covering the plateaux to the north and west (BGS 2010). Late Pleistocene and Holocene deposits filled the dry valleys forming stratified sequences, whereas the chalk ridges on either side had very shallow soil cover. A feature of the White Horse Stone and Pilgrim's Way sites was an extensive naturally occurring sarsen field in the dry valley bottom, redeposited by periglacial and solifluction processes, which presumably provided the raw materials for constructing the eastern group of the Medway Megaliths, which are clustered in the vicinity of the site. In later periods the sarsens seem to have been a significant obstacle to agriculture and much effort has been expended by farmers since the medieval period removing them from the ploughsoil (Hayden 2006a).

The White Horse Stone site is one of the few Section 1 sites from which significant evidence for the local environmental change was recovered along the HS1 route. In summary, the landscape contemporary with the Early Neolithic longhouse appears to have been covered with mixed woodland with some clearings. Most of the woodland was cleared progressively from the locality in the Late Bronze Age and Early Iron Age, resulting in an increase in colluvial erosion. Thereafter the site has retained its largely open, agricultural character, with woodland remaining on the Downs above (Giorgi and Stafford 2006).

This zone includes the White Horse Stone, Pilgrim's Way, Boarley Farm East and West principal sites, all of which are reported together in the 'White Horse Stone' integrated site report (Hayden 2006a). Figure 2.3(d) shows the chronological distribution of activity in this zone. The values are low because this is a very short route section with only a small number of fieldwork events, although these were extensive excavation areas. The graph shows unusually high levels of earlier prehistoric settlement from the Early Neolithic, with an almost continuous sequence of activity, reflected in both the radiocarbon dates and ceramic chronology. A succession of Neolithic settlements, including two Early Neolithic longhouses, and an extensive Iron Age settlement on the chalk ridge to the west of the dry valley make this site highly unusual for Kent and suggest that this was a location of great importance for prehistoric communities. The Late Iron Age and Roman periods are poorly represented in comparison with other landscape zones, although occasional features and finds from an extensive buried soil within the dry valley indicate that the area remained under cultivation. Anglo-Saxon evidence was unusually extensive in this zone—animal burials and other features suggest very rare evidence for Middle Saxon activity in the West of Boarley Farm excavation area (identified by radiocarbon dating and a small number of pottery sherds), although the nature of the site is unclear. Medieval remains include further non-settlement activity at White Horse Stone—a crop drier and a trackway on the parish boundary between Aylesford and Boxley.

The zone at White Horse Stone lies at a crossroads of great antiquity, although the exact alignment of the roads and tracks at this location have changed several times over the centuries. HS1 excavations at the crossroads have shown that the route of the Pilgrim's Way at this point has been in existence since the Early or Middle Anglo-Saxon period, following a roughly NW-SE route along the base of the North Downs escarpment. An isolated burial of a woman radiocarbon dated to the Mid–Late Saxon period was found beside the crossroads. The Roman road from Rochester to Hastings via Maidstone and the Weald, follows a north-south route along the eastern flank of the Medway Valley. This route has been in existence on this general alignment since at least the Roman period. The line of the road was recognised in the excavations as a pair of ditches running along the bottom of the dry valley, dated by pottery finds and the relative position of the ditches in the stratigraphic sequence of colluvial sediments (Hayden 2006a). Paul Garwood (see Chapter 3) suggests that there may have been a track on this alignment as early as the Neolithic period, based on the linear arrangement of Late Neolithic structures along the dry valley in exactly the same alignment. The trackway was diverted at some point after the Roman period by a track which approached the escarpment via the chalk ridge to the west of the dry valley. Further re-alignments include a late 18th-century turnpike road and the late 20th century cutting of the A229. The HS1 designers, faced with similar geographical constraints, chose to cut a tunnel directly through the chalk escarpment.

The chronological distribution of archaeological activity in this zone appears almost the opposite of the settlement peaks and troughs observed elsewhere along the HS1 route. The main peaks in this zone occur in the Early and Late Neolithic, the Early Iron Age, and the Mid-Saxon periods, periods which are all very rare along the HS1 route as a whole, whereas the usual peaks in activity in the Middle Bronze Age and Late Iron Age/Early Roman periods are much less marked. This anomaly perhaps hints at a completely different pattern of landscape use in the periods of lowest activity levels, which is discussed further below, or it could simply reflect a preference for settlement along the chalk escarpment in those periods. In any case White Horse Stone is clearly not a typical location and it is difficult to say how representative it is of activity along the chalk escarpment.

The Wealden Greensand Landscape Zone (Zones 4–8) (Figs 2.2(d) and 2.4)

Zone 4—Gault Clay strip/Vale of Holmesdale (Fig. 2.4(a))
The HS1 route from Sittingbourne Road to Crismill Lane lies *c* 1km south of, and parallel to, the North Downs on Gault Clay with localised overlying areas of Chalk Head. A drift deposit of yellowish-brown silty clay with flints covers the solid geology to varying depths (BGS 2010). A gently undulating landscape typical of downland areas characterises the route along the foot of the North Downs. The extensive historic woodlands of Horish Wood and Honeyhills Wood are located within this Zone.

Figure 2.4(a) shows the chronological distribution of activity in this zone, which includes the West of Sittingbourne Road and Thurnham Roman Villa/Hockers Lane principal sites (URS 2000a; Lawrence 2006). This zone is notable for a general scarcity of earlier prehistoric activity, with the only significant exception being a Middle Bronze Age 'waterhole' near Thurnham Roman Villa, dated by metalwork finds and radiocarbon dating. A Mid–Late Iron Age rural settlement at Hockers Lane is the earliest evidence for settlement found, predating the earliest activity at Thurnham Villa for the most part, with occupation extending up to the Roman conquest period but not much beyond. The evidence suggests that Thurnham Villa was initially established as a typical Iron Age enclosed farmstead in the 1st century AD, was rebuilt in Roman style as a 'proto-villa' shortly after the Roman conquest and developed to its full extent by the mid 2nd century. Occupation of the site continued until at least the end of the 4th century, although there is no indication of high status occupation after the early 3rd century. Trenching and watching brief work within Honeyhills Wood, which abuts the villa complex on two sides, found no evidence for Roman features extending into the woodland, which suggests that it may have been in existence at the time (Lawrence 2006). Palaeoenvironmental data from a well within the villa complex suggests that the feature was surrounded by trees by the time and was in-filled in the late 4th century. After the end of the Roman period there is no further evidence for occupation or land-use until the establishment of the former Corbier Hall moated manor (SAM KE 309) on the low lying ground to the east of the former villa. Evidence from this area included peripheral features of the moated manor, containing artefacts of 12th to 13th century date.

Elsewhere within this zone, a small 11th–13th century site of uncertain character was found near the parish boundary between Boxley and Detling to the west of Sittingbourne Road, which also seems to have built originally in an area of historic woodland (URS 2000a).

The evidence from this zone suggests that the settlements were relatively short-lived foundations carved out of predominantly wooded areas during the usual main peaks in settlement activity, with little or no evidence for continuity between periods. There is slight evidence for land-use in the Bronze Age, with the main peaks occurring in the Late Iron Age/Early Roman period and early medieval periods respectively. The foundation of Thurnham Villa and Corbier Hall at different locations suggests that they reflect independent episodes of expansion into areas of woodland/clay soils, probably in times of high population pressure. It is interesting that in both of these cases the settlements appear to be relatively high status ones from the outset. Perhaps colonisation of this kind in both periods required a degree of initial investment only possible for those with access to considerable surplus resources. Further research a little way to the north, around the Springline near the modern villages of Thurnham and Detling, would be particularly helpful in placing these sites in their broader landscape context.

Zone 5—the Len and West Stour Valleys (Fig. 2.4(b))

This zone follows the narrow band of the Folkestone Beds, bordered to the north by Gault Clay and to the south by the Hythe Beds, and is covered by silty sand soils (BGS 2010). It is situated just over 1km south-west of the North Downs escarpment, in an area of gently undulating land, between *c* 50–60 m OD, which descends gradually towards the river Len. Occasional tributary streams drain from the spring line below the escarpment. Historic woodland occurs extensively, including Snarkhurst Wood and Hurst Wood. The River Len drains towards the Medway Valley, and the headwaters of the river Stour also rise in Lenham parish, draining eastwards towards Ashford. The poor acidic soils are not well suited to arable farming, although this would not necessarily have been a concern to hunter-gatherer and pastoralist communities.

Figure 2.4(b) shows the chronological distribution of activity in this zone, which is the most extensive of the zones at 13km long, but also subject to the least intensive investigation. It includes the principal site of Sandway Road (Trevarthen 2006), a major Mesolithic occupation site, with some Neolithic and slight evidence for Bronze Age activity. Eyhorne Street (Hayden 2006b) is difficult to characterise due to the limited area exposed and ephemeral nature of the remains. It has features and artefacts mainly dating from the Neolithic and the Iron Age, but with a long prehistoric ceramic sequence suggesting a persistent use of the site over a long period. South of Snarkhurst Wood (Diez 2006c) had slight traces of Mesolithic, Early and Middle Bronze Age activity, but most of the evidence related to Late Iron Age/Early Roman rural settlement. Chapel Mill (URS 2000c) included a single Bronze Age feature and a series of Late Iron Age boundary ditches. The Hurst Wood principal site serves as an umbrella for various scattered groups of features of various date, with no well-defined site focus. The most tangible evidence in this route section was from a Late Iron Age/Early Roman trackway investigated at East of Newlands.

The general impression is of a landscape in sporadic low intensity use, but with certain locations revisited repeatedly over a long period of time. There are slight peaks in activity in the Middle Bronze Age and Late Iron Age/Early Roman period, small groups of features of these dates often occurring in conjunction at the same location. Examples of this phenomenon were found at Chapel Mill (URS 2000c) and Hurst Wood (URS 2001b) in Zone 5, and in other zones in the Wealden Greensand, as discussed further below. It is difficult to explain unless the general framework of the landscape—in particular local trackways—remained in continuous use in the intervening period, so that Roman inhabitants moving around within a territory looking for the optimum location for a particular activity, would tend to make the same decision as their Bronze Age predecessors. The Early Roman peak in activity is less marked here than in most of the other zones. No evidence at all was found for Late Roman, Anglo-Saxon or medieval activity in this zone. Core settlement areas for later periods are more

likely to be found close to the Spring Line to the North, near the medieval settlements at Harrietsham and Lenham (the latter settlement dates back at least to the early 9th century on the basis of charter evidence).

The standing building investigations at Old and Water Street Cottages and Brockton Farm fall within this zone. The construction of these timber framed rural dwellings in the 17th century may reflect an expansion of settlement into more marginal land in response to wider population pressure and economic changes in that period.

Zone 6—the West Stour Valley (Fig. 2.4(c))

The zone is located between the North Downs escarpment and the River West Stour, north-west of Ashford and is very similar in its geological, topographical and land-use characteristics to Zone 5. The main difference is perhaps in its proximity to the Great Stour Valley, which cuts a gap through the North Downs to the north-east. The route in this section follows the Folkestone Beds, which are bordered to the north-east by Gault clays and overlain by sandy silt soils (BGS 2010). The River Stour is typically *c* 1km south-west of the HS1 route in this zone and several tributary streams drain towards the river. Typical modern rural land-use is predominantly pasture. To the south of Tutt Hill is Beechbrook Wood, where the remains of an ancient coppice woodland survive. Further remains of ancient woodland in the vicinity include Ripple Wood, Balls Wood, Lodge Wood and Godinton Park to the south. The cultivation of chestnut coppicing was, historically, a common way of utilising the poor acidic soils of the area. Most of the excavated sites in this zone lie within the parish of Westwell. The village lies to the north of the rail link at the foot of the Downs escarpment in an area with numerous springs (which are believed to give the settlement its name).

Figure 2.4(c) shows the shows the chronological distribution of activity in Zone 6. Principal sites in this zone include multi-period remains of Mesolithic to Early Roman date at two separate locations within the Beechbrook Wood excavation area (Brady 2006a); a Bronze Age barrow cemetery and Early Iron Age field system at Tutt Hill (Brady 2006b); a Late Iron Age/Early Roman ironworking site at West of Leda Cottages (Diez 2006a); a second site of similiar date but indeterminate function at Lodge Wood (URS 2000d); a medieval moated manor at Parsonage Farm (Hill 2006); and a 19th century model farm at Yonsea Farm (OA 2000a).

A low but persistent prehistoric presence is suggested from the Early Neolithic, which increases significantly in the Late Neolithic/Early Bronze Age with the construction of a series of round barrows at Tutt Hill and Beechbrook Wood respectively.

The appearance of small scale Late Iron Age/Early Roman ironworking sites at Leda Cottages and Beechbrook Wood is of particular interest in building up a picture of the important ironworking industry of the period, located in the Weald, *c* 15km to the south. The Roman small town at Westhawk Farm, just to the south-east of Ashford, appears to have been an important centre for the industry (Booth *et al.* 2008).

The extensive size of the Beechbrook Wood site has resulted in the identification of two spatially separate locations within the excavation area (*c* 700m apart), both of which appear to have been occupied at least sporadically from early prehistory to the 3rd century AD. If the medieval and post-medieval settlements at Parsonage Farm and Yonsea Farm are considered successors to these settlements, it is possible that we have here something approaching a representative settlement sequence for the Wealden Greensand zone. It appears not to be a continuous sequence however, and is worth outlining here in some detail for that reason. The Beechbrook Wood site is located on a spur projecting from the North Downs, overlooking the Great Stour Valley, between two tributary streams (Brady 2006, fig. 2). It is possible that each of the locations relates to one of the streams.

The northern location includes one of only three *in situ* assemblages of Mesolithic flint from the HS1 route, probably a short-lived camp site dating from the Late Mesolithic (6500–4000 BC). After a substantial gap in evidence the next recognisable phases comprise Late Neolithic and Early Bronze Age pits and ring-ditches, then a distinct phase of Mid to Late Bronze Age settlement and slight traces of co-axial field system, thought to have been laid out at some time between the Late Bronze Age and Late Iron Age. However, there is no direct evidence for Early or Middle Iron Age activity at this location.

A minor Late Iron Age/Early Roman settlement with evidence for ironworking was established, probably in the 1st century BC or 1st century AD, which would have been contemporary with a brushwood platform uncovered on the bank of the nearby stream in the adjacent Parsonage Farm excavation (Hill 2006). The pottery associated with this activity is mainly Late Iron Age in date but includes post-conquest material that could extend as late as the 2nd or 3rd century AD. The range of types present indicates that the inhabitants were of low status. There is then a long hiatus in activity, probably from around the 3rd century AD until the early medieval period. The latest activity within the Beechbrook Wood excavation are fragments of ditch containing 13th century pottery in the northern edge of the site near the documented medieval settlement of Parsonage Farm. The Parsonage Farm excavations revealed a moated manorial site initially constructed next to the northern stream in the late 12th century (see Munby, Chapter 7). It was completely reconstructed in the mid- or late-13th century and occupation thereafter continued into the 14th century, possibly as late as *c* 1380. The rectory was appropriated to Canterbury Cathedral in 1397 and Parsonage Farm was subsequently leased out to farmers and the site may have been abandoned until a new farm was built on the opposite side of Water Lane in the 16th century. Late medieval and post-medieval was not recognisable archaeologically within the Parsonage Farm site and may have been ephemeral in nature, although a 19th-century smithy was uncovered outside the northern moat.

The earliest evidence at the southern location includes Late Neolithic/Early Bronze Age ring-ditches, and a distinct phase of Mid to Late Bronze Age settlement. Unlike the northern location this site has a definite Iron Age phase, one of the few examples of Middle Iron Age settlement in the HS1 transect, consisting of a series of enclosures familiar from examples in other parts of southern England, but so far unique in Kent (see Champion, Chapter 4). A Late Iron Age or Early Roman cemetery was established near the enclosure entrance, which seems to have continued in use to some extent, although there is no sign of settlement during this phase. As with the northern location there is a long hiatus after the Early Roman period. The latest activity at the southern location are fragments of ditch dating from the 13th century, found along the southern edge of the site, in the vicinity of Yonsea Farm. This Farm is first referred to in documentary sources dating from the 13th century (Walker 1998). There is no archaeological or documentary evidence for its subsequent history, until it was rebuilt in the 1820s as a model farm.

The evidence from this zone, in particular Beechbrook Wood, clarifies the evidence from less extensively excavated locations elsewhere along the route. There appears to be a degree of continuity between periods in the choice of location, but considerable gaps in the chronological sequence, and practically no continuity in the range of activities represented. The hiatus from around the 3rd century to the 13th century is striking and reinforces a general pattern in the HS1 data. The re-establishment of settlements in the early medieval period, peaking in the 13th century, is also seen more widely in the HS1 data, especially the North Kent Plain at Northumberland Bottom.

As discussed further below, the repeated return to these two general locations in spite of lengthy periods of apparent inactivity is most easily explained if the framework of topographically constrained trackways remained in more or less continuous use. There is no evidence for such a trackway within the excavated area, but the present Water Lane, which follows the northern of the two streams flanking the site, is a prime candidate for a long-established route that has survived into the modern era. It runs from the crossroads and springline settlement at Westwell and southwards to the River West Stour.

Beechbrook Wood may be a fairly typical site sequence for this landscape zone. Hints of similar sequences are apparent elsewhere along the rail link at numerous locations within the Wealden Greensand. The chronological sequences vary in completeness but most include superimposed evidence for Mid–Late Bronze, Late Iron Age and early medieval activity, coinciding with the main peaks in settlement activity shown on Figure 2.2(d). In this case the very extensive investigation area has allowed a more complete view of the development of the landscape. The presence of Mesolithic and Iron Age Phases, which are rare in the HS1 transect generally, perhaps suggests a more intensively used location than most. The site lies close to the gap through the North Downs created by the River Great Stour, so may have lain along a particularly favoured and long-established routeway.

Zone 7—the East Stour Valley (Fig. 2.4(d))

The geology of this zone is varied, but generally crosses the southernmost fringes of Cretaceous Lower Greensand Hythe Beds which overlie Atherfield Clay of the same geological period (BGS 2010), the Atherfield Clay being the predominant geology encountered in most of the excavation areas (there are exceptions, noted below). To the south of the rail link the drainage pattern is dominated by the west-flowing East Stour River, which converges with the Great Stour at Ashford. Various minor tributary streams flow southwards to meet it. Ashford was not subject to archaeological investigation as the rail link made use of the existing London to Folkestone railway line through the town. Consequently this zone begins to the east of Ashford in the vicinity of Boys Hall Road.

Principal sites in this zone included excavations at Boys Hall Balancing Pond (URS 2000a), Church Lane/East of Station Road (URS 2000f), West of Blind lane (URS 2000g), Mersham (Helm 2006), Bower Road (Diez 2006b), Little Stock Farm (Ritchie 2006) and North of Westenhanger Castle (Gollop 2006). This zone also includes building investigations Numbers 2 and 4 Boys Hall Road, Bridge House and Talbot House (OA 2002; OA1999b; OA 1999c).

At Boys Hall Balancing Pond a single sherd of Late Bronze Age pottery provides very tenuous evidence that a series of ditches on the same alignment may be part of a Bronze Age field system. Later ditches and a group of cremation burials date from the Late Iron Age and Early Roman phase, and it is clear from previous investigations that this site is part of a more extensive landscape of this period (Booth and Everson 1995). The site lies next to Boys Hall Moat (Kent SAM 146), which was the site of the manor of Sevington, probably dating originally from the 13th century.

Church Lane produced surface scatters of Mesolithic and later prehistoric flints on the margins of the stream, and two Middle or Late Bronze Age ditches draining towards the stream. On the opposite side of the same stream, at East of Station Road, the main phase of activity comprised drainage ditches dating to *c* 100BC–AD100, with hints of contemporary occupation in the corner of one of the enclosures. Some useful palaeoenvironmental data was recovered from a trench in the adjacent stream valley bottom. The branch of an oak tree recovered from near the base of the sequence produced a Mesolithic radiocarbon date (7060–6680 cal BC; NZA-12234), while the upper part of the sequence was associated with Late Iron Age/Early Roman pottery. Assessment of the pollen, although not studied in detail, broadly suggests an environment of damp grassland in this valley bottom location, with some arable components, contemporary with the Late Iron Age/Early Roman activity. There is some evidence for re-colonisation by alder carr woodland in the subsequent period,

which was not dated. Post-medieval drainage ditches were also present.

Little Stock Farm included isolated pits of Middle Neolithic date and two pits of Late Bronze Age to Early Iron Age date, one containing several pots in a placed deposit. However, most of the evidence was of Iron Age date, comprising enclosures, droveways and a small enclosure containing a possible roundhouse, as well as two burials. A single probable sunken-featured building of Anglo-Saxon date was found, one of the very few from the HS1 Section 1 route. The latest activity comprised a medieval quarry and ditches.

The sequence at Bower Road may represent a shift in settlement from Little Stock Farm, as the sites have no chronological overlap and are only 400m apart. Apart from a small assemblage of redeposited worked flint, ranging in date from the Mesolithic to the Early Bronze Age, the main element of the site is a Late Iron Age/Early Roman settlement with a peak of activity in the 2nd century AD. The site is distinguished by large rectangular posthole buildings, which suggest that it may be the outskirts of a villa (see Booth, Chapter 5). This agricultural complex seems to have been in use until the late 3rd century and, unusually for the rail link sites, may have continued into the 4th century, although at a much reduced level.

The excavations at Mersham are important as the only excavation on the HS1 transect which took place within a medieval village centre, and one of the very few to produce evidence for Late Saxon activity (Helm 2006). The excavation was located in a pasture to the south of the church of St John the Baptist. The village lies on the north bank of the East Stour, on a slight spur formed by the Hythe Beds. The Late Saxon features comprised five pits and a shallow gully containing smelting and smithing waste (see Reynolds, Chapter 6). The date range of the pottery starts *c* AD 950 and the latest evidence from the excavation included domestic and metalworking activity dating from the 11th to mid-12th century. Documentary evidence confirms that Mersham was a market and an important manor in the hands of Christ Church, Canterbury, iron forming part of its dues (Riddler, in Lawson and Killingray 2004).

Archaeological and standing building investigations at Bridge House Mersham suggest a late 12th to 14th century occupation phase underlying the building including postholes, pits and a gully. Further archaeological evidence suggests that Bridge House was built towards the end of the 17th Century, and it thereafter continued to be used and modified to the present. The latest phase in its development (which may test the skill of future archaeologists) involved underpinning the building and sliding it 50m away from the railway cutting.

Taken together, the chronological range of sites encountered in this zone is markedly different from those in the other zones in the Wealden Greensand. It is possible to suggest that Little Stock Farm, Bower Road and Mersham (including Bridge House) together represent an almost continuous sequence of activity in the valley of the East Stour from the Late Bronze Age to the present, with hints of more sporadic occupation extending back to the Middle Neolithic (to the Mesolithic if surface artefact scatters are taken into consideration). These three sites are all significant settlements located close to the river within 1km of each other—it is not impossible that they represent a single settlement that has periodically relocated along the valley. The usual problems of identifying Early–Middle Saxon activity result in very little evidence from this time, although Little Stock Farm includes one of the very few sunken-featured buildings from the rail link route and this zone is just a few miles from the Anglo-Saxon cemeteries and probable hundred meeting place at Saltwood Tunnel (see below). It is particularly striking that the only rail link investigations within a medieval village centre has provided the only uninterrupted settlement sequence extending from the Late Saxon to the present day. The reasons for this unusually complete chronological sequence may well lie in the proximity of the rail link route to the East Stour. Part of the explanation may also lie in the soils, which are particularly varied in this area, but dominated by Atherfield Clay. The sites are also within a few km of Folkestone and the Channel Coast to the south and east, as well as being in the hinterland of Ashford and its possible Roman predecessor at Westhawk Farm.

Zone 8—the channel coast (Fig. 2.4(e))

The solid geology in this zone comprised the Folkestone Beds, typically friable quartz-sands, sometimes interbedded with seams of pebbles or clay, or with sheets of glauconitic calcareous sandstone known colloquially as ragstone (BGS 2010). Across the zone the upper exposure of Folkestone Beds had weathered to unconsolidated and often highly mobile sands, and ragstone sheets outcropped in its north-west corner. At the eastern end of the zone a bed of fossiliferous clay-marl gave rise to heavy clay-rich soils.

North of the M20, the natural dip-slope of the Greensand and the overlying Gault Clay form a broad, shallow and predominantly dry vale, beyond which the steep chalk scarp of the North Downs rises to Tolsford Hill *c* 1.1km away.

This zone includes just the Saltwood Tunnel principal site, which investigated a *c* 0.8km long transect across the broad, flat top of a spur known as the Saltwood plateau. West of Folkestone several deeply incised north-south aligned valleys dissect the coastal exposure of the Greensand, and the Saltwood Tunnel site lies between two of these valleys (Sandling to the west and Dolland's Moor to the east). Much of the site lay at *c* 95m aOD although ground dipped locally to *c* 91.5m aOD at its far-western end. The southern edge of the Saltwood plateau drops irregularly and sometimes precipitously southward towards Saltwood village and, beyond that, to the steep ancient cliff-lines at Hythe. A localised coombe bifurcates the southern edge of the plateau and this appears to have facilitated access from the south since prehistoric times. More recently the coombe carried a

single-track road linking Saltwood village with the A20 at Stone Farm. The site contained no natural water sources and no groundwater was encountered during excavation. However, springs arising at the foot of the North Downs feed a small stream (the Slay Brook) which discharges past Dolland's Moor *c* 0.4km east of the site.

A complex multi-period site was revealed, with evidence for ceremonial and funerary land use as well as for settlement and agriculture. It is worth summarising the sequence in some detail as this site provides the best example from the HS1 transect of continuity in the evolution of a local landscape (see Riddler and Trevarthen 2006 for further detail).

Activity earlier than the Bronze Age was mainly restricted to unstratified or residual flint and pottery, but a group of eight Mesolithic Horsham-type retouched points was found in a small pit-like feature and three Early Neolithic pits were identified. In the Early Bronze Age a barrow cemetery consisting of five barrows and a flat grave developed. Limited Middle Bronze Age evidence suggests that the barrow cemetery was respected until the late 2nd millennium BC but, in the Late Bronze Age, a settlement and field-system were established. Early to Middle Iron Age agriculture is also attested, while in the Iron Age an inhumation cemetery and a square enclosure, perhaps a mortuary enclosure, were established at some time between the 8th and 4th centuries BC, although no contemporary settlement remains were discovered. A Middle Iron Age inhumation grave of 2nd to 4th century BC date also lay near the western end of the site. Early Roman domestic finds abounded at the western end of the excavation, and together with the presence of two small cremation cemeteries strongly suggests that a small rural settlement lay close by. That this settlement waned after the mid–late 3rd century is inferred from a greatly reduced suite of remains.

Early Anglo-Saxon evidence from Saltwood Tunnel is dominated by three separate inhumation cemeteries (217 burials), each located in the vicinity of a Bronze Age barrow, and dating to the 6th–7th centuries (with two cemeteries in use at any one time; see Reynolds, Chapter 6).

Several early medieval ditches and pits mark the location of a small rural site, probably 10th or 11th century in date. Other medieval and post-medieval pottery was recovered from features and topsoil in the north-western corner of the excavation, where elements of the ancient Roman landscape may have been exploited as rectilinear fields, or possibly stock-pens. Remains associated with construction of the Saltwood railway tunnel in the early 1840s and relating to the presence of a military barracks in the earlier 20th century were also discovered.

Although many phases of landuse have been identified on the Saltwood plateau, it is not necessarily possible to conclude that this represents continuity of occupation, or that earlier landscapes were necessarily maintained by later generations. Revealed instead are a number of abrupt discontinuities of landuse, some of them chronological whilst others mark significant re-ordering of the landscape. The later 2nd millennium BC, for example, witnessed a transition from Early and Middle Bronze Age funerary use to secular Late Bronze Age agriculture and settlement. A similar situation was also seen at Tutt Hill near Ashford in Zone 6 (Brady 2006a).

The Late Bronze Age landscape was, in turn, overwritten by evidence for Early–Middle Iron Age agriculture, with an imprint of trackways and enclosures that has shaped the area to the present day, and the Late Iron Age to Early Roman period saw the growth of a rural settlement, probably on a minor local routeway. In the Anglo-Saxon period the site reverted again to funerary use, albeit with a settlement to the north, largely beyond the limit of excavation. The presence of Middle Anglo-Saxon occupation is important in local terms, lying as it does between a small port at *Sandtun* to the west, and further rural settlement at Dolland's Moor to the east.

The early medieval evidence from the site is not easily interpreted, but suggests that, by the time of the Norman Conquest, the Anglo-Saxon cemeteries were forgotten, or irrelevant, and that the plateau had, at least in part, reverted to agricultural use.

Some aspects of landuse did, however, exert a repeated influence on the organisation of later landscapes and, perhaps most notably, the Early Bronze Age barrow cemetery. The earthworks of at least three barrows may have influenced the alignment of the Iron Age and Roman trackways, while the placing of 6th to 7th century burials, some of high status, in direct association with three of the barrows conforms to a nationally observed tradition (Williams 1997). The large pen-annular ring-ditch 10045 around grave C1081 seems to have been appended to an existing barrow ditch, and it is perhaps significant that at least two of the cemeteries lay at the intersections of the barrows with Iron Age or Roman tracks. One of these tracks was perpetuated into the modern era, and was recorded as a bridleway on the early edition Ordnance Survey mapping. It is suggested here that the bridleway was visible as a feature in the Early Anglo-Saxon period, and was still used as a routeway. The central cemetery was sited at the head of a small coombe, which has probably facilitated north–south movement over the Greensand escarpment since at least the late prehistoric period. In the Anglo–Saxon period, this route may have formed part of an important link between the manor of Saltwood (immediately to the south) and the royal manor of Lyminge to the north. Burial on and around barrow mounds at a prominent topographic point on such an axis may have carried significant prestige, and it may be no coincidence that the most lavishly furnished Anglo-Saxon burials were established parallel to this route (see Reynolds, Chapter 6 for further discussion).

Continuity in patterns of settlement and routeways

It is clear from documentary studies, for example from the mapping of settlement and population as deduced from the Domesday Survey, that early medieval settle-

ment in Kent was predominantly concentrated in the North Kent Plain, broadly along the line of Watling Street and on the Isle of Thanet, with another band of settlement along the foot of the North Downs escarpment. A larger concentration of population in East Kent is apparent, while the Weald was an area of secondary and tertiary settlement, much of which was only colonised in the late medieval and post-medieval period, but which was used in the Late Saxon period for swine pasturage and as a source of timber, and as hunting grounds. The line of settlements along the springline at the foot of the North Downs escarpment, which are of central importance to the HS1 transect, are also core settlements, most of which were in existence at the time of the Domesday Survey, and some of which can be traced back at least to the Late Saxon period in other documentary sources (eg Lenham and Charing). It has long been suggested that the majority of historic roads in Kent run broadly from north-east to south-west, from the North Kent Plain to the Weald of Kent (eg Witney 1976; Everitt 1986) linking areas of primary settlement with pastures and woodland in the North Downs and the Weald. These are crossed by a much smaller number of long-distance north-west to south-east routes of varying degrees of antiquity, such as Watling Street and the Pilgrim's Way. A key question for the HS1 project is the extent to which this pattern is real and whether it applied in earlier periods.

The one really major problem with the transect is that, for the most part, it deliberately avoids historic centres of settlement. This leaves us wondering how typical the range of archaeology found really is. If the comparative scarcity of Saxon, medieval and post-medieval settlement evidence along the rail link route can be at least partly explained by its avoidance of historic centres of settlement, can the same be said of earlier periods?

In the eastern part of the route, the historic village centres for the most part lie to the north-east of the rail link, on or near the spring line at the foot of the North Downs escarpment, which are intrinsically likely locations for early settlement (eg Detling, Thurnham, Hollingbourne, Harrietsham, Lenham, Charing, Westwell, Sevington, Smeeth, Sellindge and Stanford). Only at Mersham, located on the River East Stour rather than the spring line, was there an opportunity for investigation along the rail link route in the immediate vicinity of a Domesday village centre. Perhaps unsurprisingly it was the only location which revealed a continuous sequence of occupation from the Late Saxon period through to the modern (taking the Mersham and Bridge House investigations together).

The White Horse Stone sequence, if it is a typical settlement location at all, suggests that some of the more elusive archaeology, of Neolithic, Early Iron Age and Middle Saxon date, should be sought along the foot of the chalk escarpment, quite likely at Spring sites underlying the medieval and later settlements. In the Roman period the HS1 data in isolation appears to show rural settlement declining dramatically in the 3rd and 4th centuries AD, but it is plausible that core settlements were located along the springline throughout the Roman period, in which case the decline may not have been as severe as it appears in the HS1 data. Clearly this raises questions for future research that can only be addressed through investigation along the springline.

The chronology of settlement in the Wealden Greensand suggests that this zone is not and never has been a preferred settlement area. Settlements occur, but the HS1 evidence suggests that they are generally short-lived and coincide with periods of apparently high levels of settlement activity throughout the transect, most commonly the Middle Bronze Age, Late Iron Age/Early Roman period and early medieval period. There are distinct signs of occasional expansion onto clay soils, carved out from woodland, including Thurnham in the 1st century AD, Corbier Hall and Boys Hall in the 12th–13th centuries. These examples are relatively high status settlements, perhaps reflecting the level of investment involved in clearing and preparing the ground for agriculture. On the whole the range of features encountered in each period is similar to other zones. There are few clear examples of activities particular to the Wealden Greensand. Possible examples include the Iron Age enclosure at Beechbrook Wood which is unusual for the region and suggestive of a livestock corral, and small scale Late Iron Age/Early Roman ironworking sites at Leda Cottages and Beechbrook Wood (Brady 2006), outliers of the main Wealden ironworking industry of that period. The significance of Talbot House Wealden Hall is discussed above.

It was observed at a number of sites that Middle or Late Bronze Age features were found in close conjunction with Late Iron Age/Early Roman features, with no evidence for occupation in the intervening periods. Examples of this phenomenon were found at South of Snarkhurst Wood, Chapel Mill and Hurst Wood in Zone 5, and West of Blind Lane and Church Lane in Zone 7. However, this is very likely a factor of the narrow transect investigated—further phases may well be found just outside the rail link route on either side. Beechbrook Wood (described above) provides perhaps the most typical and complete model for settlement patterns in the Wealden Greensand due the very large area investigated.

There are several sites in the HS1 transect where the origins of trackways have been subject to archaeological investigation. Perhaps the most convincing evidence for continuity in a network of local trackways comes from Saltwood Tunnel (Riddler and Trevarthen 2006) where it appears that the network of local trackways mapped by the 1st Edition Ordnance Survey in the late 19th century is much as it was in the Iron Age, presumably explained by the persistent importance of the place as a burial ground and communal meeting place, and proximity to areas of settlement.

Maintenance of trackways on the same alignment is not universal however. In the North Kent Plain landscape zone there are examples of holloways/trackways of Late Iron Age/Early Roman date at Northumberland Bottom and Tollgate (Askew 2006; Bull 2006b) and Pepper Hill

(Biddulph 2006) which appear to fall out of use in the Late Roman period. The cemetery site at Pepper Hill is a particularly striking example as the road in question was clearly an important one in the Late Iron Age and Early Roman landscape, carrying traffic into Springhead from the south. It seems to have faded gradually out of use at much the same time as Springhead and the cemetery. A few Late Roman coins were found in the silts infilling the holloway.

Apart from Saltwood Tunnel (Riddler and Trevarthen 2006), surprisingly few trackways were found in the Wealden Greensand zone, which lends support to the suggestion that many may have survived in the modern network of lanes and roads. An isolated example at East of Newlands was a shallow holloway which produced only Late Iron Age/Early Roman pottery.

The repeated selection of roughly the same location by successive groups of settlers when there is no evidence for continuous occupation at a site, as suggested at Beechbrook Wood and several other sites, could possibly be explained by the existence of long-established routeways. However, there may be no need to invoke this explanation, as topographical constraints of the Kent landscape, and the tendency for successive groups to select optimum ecotonal occupation sites with convenient nearby water sources, would probably have had much the same effect. The key topographical constraints for north-east to south-west routeways in the case of the HS1 transect are the North Downs escarpment and the rivers running parallel to it, the Len, the West Stour and the East Stour. Routeways through this transect are most likely to run between settlement sites at the springline (dictated by the location of natural springs unless wells are dug) and the nearest suitable crossing point of the river, following the line of least resistance. An example is Water Lane, (between Parsonage Farm/Beechbrook Wood), which starts at the crossroads and springline settlement at Westwell and follows a stream valley to a crossing of the River West Stour to the south of Hothfield. Such routes are very likely to have been consistent elements of the landscape for as long as the location of each of those features (spring, settlement, crossing point) has remained more or less unchanged. The HS1 demonstrates that the location of settlements in this part of Kent are particularly prone to change, although springline settlements *may* have been more stable, but springs can dry up or shift location. As the Ebbsfleet Valley example shows even rivers can change their characteristics resulting in substantial changes to the organisation of the surrounding landscape.

One possible explanation of the unusual chronological sequence in Zone 4, at White Horse Stone, is that in periods with apparently low activity levels across all zones, such as the Neolithic, Early Iron Age and Anglo-Saxon, settlement may have been largely limited to core settlement locations in the major river valleys or at spring sites. In periods of settlement contraction, such as the Late Roman, the trackway network would presumably also have contracted so that a smaller number of important trackways linking those core areas would have retained their importance, while most others declined in use or disappeared. This would help to explain the particular significance of the White Horse Stone site in those periods, as it lies at a natural crossroads on a routeway linking the upper and middle reaches of the Medway Valley, one of the two major rivers of Kent.

General conclusion

The results from the HS1 excavations have already begun to re-shape many long-held assumptions about the archaeology of Kent and southern England. The project features heavily in the recently published Kent History Project volume, *The Archaeology of Kent to AD 800* (Williams 2007) and the results have greatly influenced the development of the regional research strategy for the south-east, which will shape the direction of archaeological fieldwork in the region for at least the next decade. Some important recent works of synthesis at a national level have singled out the HS1 transect as particularly informative, such as Taylor's *Atlas of Roman Rural Settlement* (Taylor 2007).

The period covered by the HS1 planning, design and construction, from 1989 to 2007, saw numerous developments in the way in which archaeological work was undertaken in a developer-funded environment. The very large scale and duration of the project has meant that many of the professional archaeologists working today in southern England have had some direct or indirect involvement with the project, such that it will have a lasting legacy for decades to come. Perhaps the greatest contribution the project has made has been to open the eyes of the current generation of archaeologists to what can be achieved in a developer-funded environment, given an appropriate level of planning and funding. HS1 has presented an opportunity for broad scale excavation of the rural landscape on a scale beyond the dreams of most university-based research projects. The project has also emphasised the enormous contribution that large scale open area excavation can have to understanding the development of the man-made landscape. Further projects on a similar scale in different landscape zones have the potential to revolutionise our understanding of the region's history. Most recently, excavations along the East Kent Access Road have exposed a very large transect through Thanet, an undoubted core settlement area and the agricultural heartland of Kent, offering great potential for comparative studies.

It is hoped that this volume will encourage researchers to explore the large archive of digital reports on the individual sites and specialist analyses to be found on the Archaeology Data Service website (see Appendix 2).