ELMS FARM

HEYBRIDGE, ESSEX

PROJECT DESIGN

JANUARY 1994

Planning

Field Archaeology Group

ELMS FARM

HEYBRIDGE, ESSEX

PROJECT DESIGN: FIELDWORK - ASSESSMENT

Authors: CP Clarke and M Atkinson

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ESSEX COUNTY COUNCIL
PLANNING DEPARTMENT

FIELD ARCHAEOLOGY GROUP

County Hall
Chelmsford
Essex
Tel. 0245 437641

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ELMS FARM, HEYBRIDGE, ESSEX

SUMMARY

This project design presents a detailed sampling strategy for the recording of a 13 ha (32 acre) area within an undisturbed Roman small town. Those aspects of the site which offer exceptional potential for advancing our knowledge and understanding derive from the opportunity to study the morphological development of a small town throughout the Roman period, and the opportunity to study the processes of change both from a Late Iron Age antecedent to the early Roman and from the late Roman an early Saxon settlement. The entire area, which has been permanent pasture, is threatened by housing development and a bypass.

The vastness of the unexcavated Stage III of the development area (13 ha / 32 acres) presents an unparalleled opportunity. Recording will enable significant advances in our understanding of settlement morphology and change within the nucleus and periphery of a Roman small town and of economic, social and organisational change from the throughout the first millennium BC and into the Saxon period. The enormous potential of the scale and date range of the site is significantly enhanced by excellent preservation of archaeological contexts, artefacts and important environmental data.

Arrangements for funding and access agreed from 1988 (and therefore pre PPG16) have proved wholly inadequate in the light of current knowledge. Bovis have refused to increase funding levels. No evaluation apart from geophysical survey was allowed until the period of a licence to enter the land had commenced on September 20 1993.

Although the ground level of the development area is to be raised with gravel after topsoil stripping and short term damage to the archaeology is likely to be relatively small, the long term loss of information will be vast. In particular, there will be a near total loss of archaeological legibility. The site's contribution to our understanding of the morphology of the Roman small town and the periods of change (Late Iron Age to early

Roman and late Roman to early Saxon) lies largely in exploration through large scale excavation. Even if substantial deposits were preserved, it is very doubtful that the legibility would be preserved with it. Other identified effects on the archaeological deposits comprise damage subsequent disturbance, compaction by gravel, de-watering of wet organic deposits and contamination of the underlying sediments.

If these deposits are not excavated now their potential value to questions of major national importance will be lost forever.

1 BACKGROUND

1.1 SITE DESCRIPTION

1.1.1 Location

The Elms Farm site (NGR TL847082) is located on the western periphery of Heybridge, to the north-west of Maldon, in Essex (Fig.1). It covers a total area of c.29 hectares (71.6 acres) which extends northward from the Chelmer and Blackwater Navigation as far, in places, as Langford Road.

1.1.2 Topography and Geology

The site lies in a large meander of the River Blackwater on a gravel terrace, which slopes gently down to the river, below the 5 m contour. The topography has to some extent been altered and obscured by the construction of the Chelmer and Blackwater Navigation, built in 1797, the now disused railway and, most recently, the Maldon By-pass which has cut the site off from the river.

Several springs rise along the northern edge of the Stage III area of the development area (see Fig.2) at c. 3.3 m OD, and with the presence of underground stream channels, there is a tendency to seasonal flooding of the most northerly and southerly fields within the Stage III area (Fig. 8). Natural drainage from the southernmost field, where the level above OS datum drops to around 2.5 - 2.7 m (Fig.2), is poor. The central and largest field is slightly higher, and well drained through the pervious subsoil. Over the development area as a whole the ground level gradually rises from c. 2.5 m OD in the south and east to c. 5.3 m OD in the north. In areas of clayey impervious subsoil, drainage of surface water is via ditches defining the edges of the fields.

Geologically, the northern part of the development area (Stages I and II) is firm gravel. Both aerial photographs and current excavation reveal geological features, of likely glacial origin, in the form of sporadic pockets of brickearth and more extensive areas of

clay. Some of these clay areas appear to be waterlaid and may be associated with the springs along the northern periphery of Stage III and with the flooding, as noted above. The geology of the site, known from excavation toward its east end (Drury & Wickenden 1982), is a gravel subsoil overlain by patchy brickearth. This is covered by approximately 0.25-0.40 m of pebbly loam topsoil.

However, visual inspection in 1993 of the field drainage ditches which run across Stage III, has shown that the geology, at least of the southern half of the site, is more mixed. Although generally gravelly, there is a higher incidence of an alluvial deposit of mixed gravel and silt-brickearth subsoil. At the southern extreme of Stage III, this becomes predominantly alluvial.

1.1.3 Current Landuse

The development area is currently farmland. Most of Stage I and northern part of Stage II is under arable cultivation, the remainder pasture. Documentary and cartographic evidence indicates that this division, based upon the topography and level of the watertable, has remained much the same since at least the early 19th century.

1.2 REASONS FOR THE PROJECT

1.2.1 The Development

The development comprises the construction of approximately 540 houses with associated roads and services, and a bypass extension taking through traffic away from Heybridge. A quarry on site will provide gravel as required.

Bovis Homes have divided the development area into three stages (Fig.1) as follow. Only the positions of the bypass and quarry area are yet determined.

Stage I (Fig.1) is a c. 8 ha area located at the northern end of the site. The housing is to be constructed to a density of 14 per acre (5.6 per hectare), using conventional strip foundations.

Stage II (Fig.1) is a c. 8 ha area to the west of the dismantled railway line. Two ha of this total area is to be quarried to provide gravel to raise the ground level of Stage III. The resulting excavation is to be left as a pond feature and the surrounding land either left as it is (to the north) or given over to formal recreational uses, including football pitches, involving the raising of ground levels with topsoil (no reduction in level).

Stage III (Fig.1) is a roughly triangular, c. 13 ha, area to the south of Crescent road, with the canal to the east and the intended bypass to the west. This area of pasture is prone to seasonal flooding and will require the raising of the ground surface by as much as a metre (Fig.2) with material from the Stage II quarrying. The preferred construction technique is piling (average of six piles per house).

The overall sequence in the construction programme is a) quarrying in Stage II, b) raising of levels with topsoil in the south of Stage II, c) raising of levels with gravel in Stage III, d) completion of the bypass extension, e) building in Stage I and f) building in Stage III.

Possible mitigation measures in the Stage III area are considered to be very severely compromised by a range of factors and uncertainties (below, 1.2.3). Substantial damage to the archaeology with associated large scale knowledge loss is inevitable.

1.2.2 The Planning Background

Development of the site, by Bovis Homes Limited, was first proposed in 1988 (and therefore predates PPG16), when outline planning permission was sought from Maldon District Council for a housing development. The Archaeology Section of Essex County Council entered into negotiations with Bovis Homes over access and funding.

The area subject to the application was either under arable cultivation or used for grazing of livestock and no access was allowed other than for its visual inspection. Based upon this, and information gained from the Sites and Monuments Record, an outline assessment of the site's potential and costings for a programme of limited excavation was submitted to Bovis in April 1988.

This entailed the notional investigation of the site during three seasons of 6 months each and associated post-excavation costs to a total of £ 207,750. The offer in response to this (April 1988) was for funding to a total level of £ 36,250 for examination of the Stage I area only. Two further rounds of negotiation followed with an eventual agreement of £ 170,000 in October 1989 to cover a watching brief and small scale excavation where the ground level was to be raised with gravel (Stage III), watching brief and small scale excavation along the line of the bypass, excavation in the Stage I area where strip foundations were to be used, and all post-excavation costs. This was an intrinsic part of the construction process, and prior access to the land was denied.

Maldon District Council were kept fully informed, and it was agreed in April 1989 that the results of the progressive negotiations would be appended to a Section 106 agreement as an Archaeological Licence. The unfavourable economic climate and associated down turn in the construction industry which followed a resolution by Maldon District to grant outline planning consent Council led to the suspension of the housing project by Bovis Homes. Progress on the terms and conditions of the Archaeological Licence was

therefore also suspended until after the decision by Bovis Homes in 1992 to make further progress toward the submission of detailed applications planning consent.

An archaeological licence has been entered into which embodies negotiations over access and funding made as part of the consultation process undertaken mainly during 1989-90. It has been impossible to withdraw from agreements previously reached, and Bovis Homes have refused to increase funding levels. Maldon District Council have refused to treat the application as post-PPG16. No evaluation apart from geophysical survey has been allowed until the 40 week licence period for access had started (September 20 1993). The term of the original licence period extends to 24 June 1994, but negotiations have resulted in an agreement to extend this until the end of October 1994.

The renegotiated period of access to the site is for a rolling programme of work across the development area as follows:

Stage I : 0-12 weeks
Stage II : 0-24 weeks
Stage III: 0-54 weeks

The programme for archaeological work is driven by requirement of Bovis to avoid any delay to their construction programme from archaeology. It was stipulated that the 40 week period would begin when agricultural tenancy arrangements relating to the Stage III area had been terminated.

The licence period and therefore archaeological investigation of Stage I began on the 20th September 1993.

1.2.3 Scope for mitigation

To date no detailed applications for housing have been submitted to Maldon District Council.

Stage I. The whole of Stage I, as outlined on plan (Fig.1), is currently being excavated. The aerial photography plot shows that linear features delineating Roman field systems extend across the whole of the previously arable land and suggest that they extend into the area of pasture to the north, toward Langford Road. Stage I is crossed by the line of the proposed bypass and is the site of housing for which no ground plan has been produced.

There are no plans to raise ground levels in the Stage I area. Destruction of archaeological deposits from strip foundations, roads, drains, service trenches and so on will be very extensive. Where possible, full excavation is being employed. However, a number of overhead electricity cables cross the site which will not be diverted until construction work is underway. For health and safety reasons it has been necessary to leave 12m wide baulks below their line.

No mitigation measures are possible without knowledge of layout, and it must be assumed that destruction will be total across Stage I.

Stage II. Although Stage II covers an area of approximately 9 ha in its entirety, it is proposed that only the location of the quarry area is archaeologically investigated. This involves the excavation of a 2 ha area in the middle of the area. As destruction will be total in this quarry area, no mitigation is possible. The surrounding area is to be either left as rough grassland or raised to create playing fields.

Stage III. The bypass extension in the south of the Stage III area will involve total destruction of archaeological features over an area of 13 ha. The level of the rest of the Stage III area is to raised with gravel before house construction; Bovis cite destruction levels below the gravel to be c. 0.5 % by area from piling and a further c. 1 % by area from drains and other underground services. There is however a possibility that strip foundations will be used for some structures if the preferred method of piling is found to be unsuitable.

Superficially, therefore if piling is used the destruction of archaeological features in the short term will be slight, and it would appear that the site can be largely preserved in situ. There are however a number of complicating factors:

1) Bovis will be stripping the entire 13 ha area of what they describe as 'organic deposits'. This will not only include topsoil, but also mixed underlying deposits. This will result in a substantial loss of information: the area has been permanent pasture, and the very large and unabraded nature of the ceramics suggest that the site has never been ploughed. It is difficult to estimate the extent of the information loss, especially as it is dependent upon the rigour of the Bovis stripping which is not under archaeological control. It is likely to be in the order of 20 - 40%.

Past experience suggests that such stripping is always more damaging than the contractors claim. In the first instance there is simply the damage caused by the heavy machinery itself, and secondly it is often the case that the area would be stripped to, or into, the top of natural to ensure that all 'organics' would be removed. This may also include the removal of larger features filled with 'unstable' organics, such as palaeo-channels. Given Bovis' clear concerns over the stability of the area, it is likely that stripping will be rigorous.)

2) The de-watering effects of the gravel extraction of Stage II, the draw-down from the piles, and the drainage works associated with the housing, are difficult to predict. The lack of truly waterlogged Roman or Saxon deposits at a high level might suggest that the site could stand a significant drop in the water level without affecting archaeological deposits in the base of deeper features (wells, pits etc). The case, however, is difficult to judge as there is no adequate data on what the normal water table is, nor the potential of the above to reduce it.

3) The extent to which deposits will be preserved under gravel dumping is not clear. The amount of gravel to be deposited varies across the area (Bovis' aim being roughly to level the ground). The spot heights shown on Fig.2 indicate that the depth of gravel will vary between 0.4 and 1.3 m (allowing for topsoil removal). Naturally, the areas with the

shallowest coverage are those under most risk from subsequent disturbance (trees, drains, extensions etc): this applies to most of the large field in Stage III. Conversely, the areas with the greatest dumping (perhaps 1m+) are most likely to be effected by compaction problems: these include all the low-lying wet areas, where a fully saturated and soft soil is likely to lead to cumulative compression. Thus the long-term survival of the deposits in both areas is questionable.

4) Perhaps the biggest problem is one of archaeological legibility. The land currently has one owner. When the land has been compartmentalised into 500+ units it is likely that piecemeal development will take place in the future which will be difficult to monitor archaeologically. There is no doubt that the national importance of the site lies in its ability to make a substantial contribution to the understanding of the morphology of the Roman small town (zonation, economic basis etc) and to the questions of periods of change (land-holding in the Late Iron Age to early Roman period, and the late Roman to early Saxon occupation patterns). These can be explored at present through large scale excavation. Even if substantial deposits were preserved, it is very doubtful that the legibility would be preserved with it. Areas of even 30 by 30 m would yield little information that we do not already know about this sort of settlement - yes, there were houses, pits, industrial activity etc, but it would not inform economic or social patterning without a considerable number of such observations. Even then, the nature of the land-holding and the piecemeal nature of development (sewers, drains, cables, property extensions and rebuildings etc) and gradual erosion (trees etc) would almost certainly result in a very incomplete and fragmentary picture. Overall, archaeological legibility is the single most important reason for excavating the deposits, with a consistent and rigorous sampling policy, now.

5) It is conceivable that the deposition of allochthonous deposits over archaeological features could result in contamination of the underlying sediments by extraneous microfossils, including pollen. No research has been conducted to indicate the likelihood of this occurring.

Viability of excavation in Stage III

The central and at 8.1 ha by far the largest field of the three comprising the Stage III area (Figs.8,9) is relatively high, is dry and can be easily excavated.

The other two fields (combined total of 4.9 ha), to the north and south (Figs. 8,9) are lower, and prone to flooding. The situation is accentuated by underground stream channels and springs, especially in the northern area. Experience with the trial trenches in these areas has indicated that excavation will be difficult in these fields, particularly the northern. Although there is no doubt that the fields tend to be wet, the degree of waterlogging experienced in the trial trenching may well give a false impression as the extremely wet weather in September and October has certainly made the water table artificially high.

It seems unlikely that pumping could cope with the inflow of ground water in the northern field especially, and any more elaborate dewatering system would be prohibitively expensive over the area in question.

In the event of excavation proving impossible in all or parts of these areas, the majority of the academic goals would be relatively unaffected because the sample area, although less spatially complete, would still be very large. It is clear from the geophysical survey that the potential sample offered by the central field still covers the important zones of axial street, secondary streets, street frontages, backyards, areas well away from street access, and settlement periphery. The main implication of the northern field not being examined would be in the likely loss of information relating to the transition from the late Roman to early Saxon phases, though the presence of early Saxon pottery in the evaluation trenches in the central field and the likely identification of some features on the geophysical plot as grubenhäuser indicates that this loss would be partial.

In spite of the potential problems in the wet fields, it is essential to attempt excavation, the more so as damage to archaeological deposits from the range of factors outlined above is likely to be even more acute in these areas where the ground will be less stable than in the central field. The immediate damage from stripping, longer term effects of

disturbance and compaction, and the loss of archaeological legibility are likely to be very high.

There will be some reduction in the excavatable portion of the Stage III area because of the need to leave a 12 m easement under the overhead power lines crossing the site (Fig.10).

2 CURRENT ARCHAEOLOGICAL KNOWLEDGE

2.1 THE SITE IN ITS REGIONAL AND LOCAL CONTEXT

Late Iron Age: the site lies in a boundary position with regard to a number of artefact types (eg coins (Haselgrove 1987, Collis 1984). The site lies in the outer core area of Collis' local trading zone based around Camulodunum (Collis 1984, 155-61, Fig. 9-21), where direct contact with the oppidum is assumed, the periphery of which zone is defined by the distribution of gold coinage resulting from exchange of food and raw materials for gold. In addition it is peripheral to a north Essex zone where imports are common and a south Essex zone where they are virtually absent (Rodwell 1976 Figs 18, 43-4).

An extensive cropmark landscape extends for several kilometres along the gravel terraces on the north side of the Blackwater, from Ulting and Woodham Walter in the west to Goldhanger in the east. The present site lies in the south-central part of this complex. Many of the cropmark enclosures and field systems appear to be of Late Iron Age and Roman date, indicating intensive exploitation of the fertile soils of the terraces. Sample areas of this complex have been examined in advance of gravel quarrying, most notably at Lofts Farm, Slough House Farm, Chigborough Farm and Howells Farm (Wallis and Waughman in prep.). These excavations have confirmed the Late Iron Age and Roman dates of many cropmark features. However, they have also demonstrated that cropmark features can only be securely dated by excavation.

Roman: the territory of the Trinovantes includes a large number of 'small towns' or secondary settlements located on a developed road network, particularly at river crossings. Despite a previous review of these settlements (Rodwell 1975), their part in the 'romanisation' of the area, functions, and relationship with rural sites has yet to be properly understood. Large-scale excavations in Chelmsford have showed that development there was strongly influenced by the government mansio, and the same may be true of Kelvedon. Colchester and Great Chesterford are also atypical, as a colonia and probable military base respectively. Elsewhere in the region excavation on small town

sites (eg Coggeshall and Braintree) has produced insufficient data to adequately address the question. Heybridge itself is considered to be an important trading centre, linking the rural hinterland with coastal trade (Wickenden 1986, 46, 64).

The major cropmark complex mentioned above includes a possible villa and possible temple compound at Langford, 2km to the north-west of the present site. Many other elements of the cropmark landscape undoubtedly date from this period.

The evidence of the gravel quarry excavations indicates that the Roman Conquest had a varying effect on the rural settlement of the area. For instance, at Slough House Farm, a large settlement and its field system were abandoned at or soon after the Conquest; whilst at Chigborough Farm, about 1km away, the Late Iron Age agricultural activity continued uninterrupted (Wallis and Waughman in prep.). Numerous Red Hill sites are known from the Blackwater Estuary. The local context of the site is shown on Fig. 3.

Saxon: the site lies on the north side of the valley of the River Blackwater. It is not surprising to find Saxon settlement in the Blackwater estuary at Heybridge as the river provides an excellent access route to agriculturally viable land. Saxon settlement in Essex shows a distinctly riverine distribution occurring along the major river valleys of the Thames, Roach, Crouch, Colne and Blackwater. The major settlement at Mucking is sited on the Boyn Hill gravel terrace on the north side to the Thames river valley, good quality arable and marsh for grazing lie close to hand. Likewise, in the Blackwater estuary had resources to exploit: arable land, marsh and the river itself. Extensive systems of mid Saxon fish weirs are known from the Blackwater Estuary. In addition to agriculture, a major early Saxon iron-working complex has been excavated at Rook Hall (Adkins 1989). This complex extended onto the adjacent Slough House Farm site, where, under waterlogged conditions, two contemporary timber-lined wells were recorded, providing excellent environmental data (Wallis and Waughman in prep.).

2.2 THE IMMEDIATE VICINITY OF THE SITE: CURRENT ARCHAEOLOGICAL KNOWLEDGE

2.2.1 Documentary Evidence

A number sources, mainly cartographic with supporting documentation, were examined to establish the degree of continuity and change in the landscape within the development area over recent centuries.

Both the 1st and 2nd edition 25-inch Ordnance Survey maps (1874 and 1897) illustrate that little change has taken place regarding the field boundaries within the development area, apart from disruption by road and railway.

The tithe maps for both Heybridge and Langford parishes were examined for land utilisation information as well as evidence of field boundaries c.1840. Unfortunately, damage to the Heybridge tithe map has obscured the area relating to the northern part of the study area (Stage I). The surviving maps however again show little change, with all of the major field divisions continuing to the present day. Only one feature, a building and associated ditches, in the corner of a surviving field in Stage II, is now missing from the landscape. The apportionments relating to these tithe maps were also examined as they include the contemporary land use. Again, this was found to be very similar to that of today, with the decipherable areas of the study area recorded as being 'pasture' or 'grass' (Stages II and III) and land to the north being 'arable'. This no doubt reflects the topography and geology, with crops being grown on the higher, better drained gravel and the poorly drained alluvium of the southern area of the study area being suitable only for grazing.

An earlier tithe map of c.1815 did, however, indicate field boundaries which were not present by 1840. In general, the field system across the survey area was very similar to that of today, apart from some subdivision into allotments in the ownership of The Dean and Chapter of St. Pauls. These allotments collectively defined the relatively narrow fields which survive along the eastern edge of Stage I and the northern edge of Stage III. Undulations in these areas, defining slightly raised rectilinear platforms survive. It is

likely that they are the remains of the allotment plots and indicate that little surface disturbance has taken place since they were allowed to revert to pasture.

These cartographic sources were also examined with a view to identifying any late features within the area of cropmarks across Stage I. Only one feature on the aerial photograph plot could be related to one on the 1815 map. This was a ditch running roughly east-west, differing in alignment to those features identified as a probable Romano-British field system.

2.1.2 Aerial Photographic Evidence

Two areas of cropmarks on the arable land within and around the development area (SMR Nos. 7801 and 7988) have been identified from the aerial photographs examined (Fig.5). NMR reference numbers of the photographs are: TL8408/1/196, TL8408/3/413 and TL8408/4/425.

SMR No. 7801 comprises a series of linear and discrete cropmarks covering approximately 8 ha, the majority of which fall within the Stage 1 area south and southeast of Langford Place (Fig.4). The linear cropmarks are interpreted as probable Late Iron Age and Romano-British field systems. A large number of pit-like cropmarks are clustered in the south-eastern corner of this complex; these appear to be roughly rectangular and to share a common alignment, and to overlie the linear features.

The second area of cropmarks, SMR No.7988, is located to the north-west of the development area and comprises a less extensive complex of possible trackways and what has been interpreted as an old stream bed.

2.2.3 Antiquarian / Casual Finds and Modern Excavation

Prior to the present Stage I investigation (2.3.3 below) and Stage III trial trenching (2.3.5 below), no excavation has taken place within the development area.

The Essex Sites and Monuments Record shows that many casual finds of prehistoric, Late Iron Age, Roman and Saxon date have been made all around the development area

during the course of gravel extraction and small-scale development since the late 19th century (see Appendix 1 & Fig.4). These finds include cemetery evidence and very large quantities of finds. However, little recording was undertaken, other than that of the type, date and general location of the artefacts recovered. The most prolific of these was to the immediate south of the Stage III area at Langford Junction (Fig.4, NMR ref.7786) where 'barrowloads' of pottery comprising Belgic pottery including imported wares and (predominantly) Roman pottery, hundreds of coins and many other finds were salvaged in 1888 during railway line construction; there are also VCH references to early and late Roman cemeteries in the same area.

Excavation resulting from house building activities has taken place at three sites on the northern edge of the Stage III area, at Crescent Road (rescue excavation, 1972), Boucherne's Farm (small scale excavation and watching brief, 1983) and Holloway Road (evaluation, 1993).

2.2.3.1 Crescent Road and Boucherne's Farm excavations

The Crescent Road site is directly relevant to the development area, lying to the immediate north of the Stage III boundary (Figs.4 & 5). This excavation took place under rescue conditions on a building site to the south of Crescent Road (now Elizabeth Way) in 1971-2 (Drury & Wickenden 1982, Wickenden 1986). Features spanning the Late Bronze Age to early Saxon periods were recorded, comprising numerous post-holes, pits, ditches and gravel surfaces. Material from the Iron Age features included a sherd of Glastonbury ware, which is the only example of this distinctive West Country type of pottery known from East Anglia (Wickenden 1982, Fig.15.34). Evidence of Roman occupation spans the whole of the 1st to 4th centuries AD and elements of this have been interpreted as a street frontage. The early Saxon occupation was represented by five Grubenhäuser and a postulated post-built structure, all dated to the early 5th century AD. 19th century gravel quarrying was found to have destroyed all earlier remains in the eastern area of the site. However, it is likely that this activity was very localised (a conclusion supported by the results of the geophysical survey, 2.3.2 below).

At Boucherne's Farm, some 200 m to the northeast of the Stage III area (Figs.4 & 5) small-scale excavation and a watching brief (SMR No.7803-7809) was conducted in 1983 by the Maldon Archaeology Group. The site produced evidence of both Late Iron Age and Romano-British occupation in the form of boundary ditches and a concentration of unstratified pottery.

2.2.3.2 Holloway Road excavation

The limited evaluation of a building plot to the south of Holloway Road (Fig.5), on the perimeter of the development area, was undertaken by the Cotswold Archaeological Trust Ltd in March 1993 (Timby 1993). Trial trenching on the positions of proposed buildings exposed a number of Middle Iron Age pits sealed by a deposit of gravel, thought to be of Roman date, and Roman ditches. It was concluded that the vicinity had not been significantly disturbed since the Roman period. Further excavation was not undertaken as the ground surface was to be raised prior to construction.

2.3 WITHIN THE DEVELOPMENT AREA: CURRENT ARCHAEOLOGICAL KNOWLEDGE

2.3.1 Contour Survey

A contour survey of the development area (Stages I-III) site has been obtained from Bovis Homes (Fig.2). Plotted at 0.25m intervals, it illustrates the general topography, sloping down to the south, and records the undulations already noted from field visits. Apart from a very obvious dip in the extreme north-east corner of Stage III, attributed to post-medieval quarrying of the kind identified at the Crescent Road site from the 1972 excavations, the data collection and plotting is too coarse to record slight and discrete variations in level.

2.3.2 Geophysical Survey

The denial of access requests for trial trenching prior to the start of the Archaeological Licence period led to a successful request for access (and funding from the Bovis contribution) for geophysical survey in the Stage III area. Selected from a shortlist supplied by AML, Geophysical Surveys of Bradford were commissioned to undertake a

pilot geophysical survey in July 1993, and full survey of Stage III in September 1993. The report, Report on Geophysical Survey: Elms Farm II, details the results of a gradiometry survey covering the entire Stage III area.

The gradiometer survey identified a very high density of anomalies interpreted as representing archaeological features across the whole of Stage III. These are shown on a composite grey-scale plot (Fig.6) and a simplified interpretive plan (Fig.7). Within the data, two distinct trends in alignment can be clearly discerned, one running SW-NE and the other NW-SE. Many of the anomalies indicate linear ditches which follow this trend, some of which may form enclosures (A) This is particularly evident in the north and the south extremes of the survey area. The alignment of these features is similar to that of the cropmarks in Stage I (Section 2.2) (Fig.5), suggesting that they are all part of the same complex.

Part of the postulated Roman road (B) was located by the survey, highlighted by apparent flanking ditches and by the lack of anomalies along its length, perhaps suggesting a surface of some kind. However, the composite plot shows that it was not detected in the northern field of Stage III. This is likely to be due to the waterlogging of this vicinity which has deposited a layer of clay across parts of the site (Section 2.3.5). A number of junctions, roughly at right angles to the road, may also be discerned. These correspond with many of the long linear anomalies and are taken to indicate minor roads or trackways along which the enclosures lie.

The survey report draws attention to a 60m wide band of strong pit-like anomalies (C) running NE-SW across the site. Within this there appear to be distinct quieter areas (D) which are aligned NW-SE and are devoid of anomalies. It is suggested that the strong responses are associated with buildings and that the quiet areas represent streets, though natural causes such as magnetic gravels from an old river course cannot be discounted. Due to their orientation, it is most likely that they are archaeological.

It is suggested that several large pit-like responses (E) may be Grubenhäuser; these are close to the excavated examples on the northern periphery of Stage III (Section 2.2.3).

The survey identified a curving area of strong responses in the northern area of Stage III. This coincided with a depression in the ground and was interpreted as a likely former stream channel, perhaps of significance to the Roman settlement. However, recent observation of the field shows that the stream is in fact at least seasonally active and probably associated with the known springs in the vicinity (Section 1.1.2).

Areas of ferrous disturbance were also identified in the survey, resulting from the positions of fences, pipes, pylons, and disturbance from the Maldon Bypass and dismantled railway. One other large area of anomaly, in the extreme north east corner of the survey area is probably the result of post-medieval quarrying, an interpretation supported by evidence from the contour survey and observation of the field surface.

2.3.2.1 Limitations of the geophysical survey

The geophysical survey has clearly established the overall extent of horizontal stratigraphy, essentially encompassing the whole area and no doubt beyond. However, it has only been able to highlight the more substantial features such as roads, ditches and large pits and gives no reliable detail as to the nature of the large areas of anomaly nor the content of the 'blank' areas.

The fact that blanks in the geophysical plot do not necessarily represent blanks in the archaeological deposits is shown very clearly in the trial trenches, none of which is devoid of archaeology. Trench 4 seems to suggest a decrease in the density of features eastward across the large expanse of the site away from the Roman road. However, this is contradicted by the evidence of Trench 6, at the extreme east of Stage III, which contained in excess of 50 features.

The positions of trial trenches 1, 2 and 8 (Fig.8, 2.3.5) are in relatively quiet areas of response in the northern and southern parts of Stage III. They are prone to seasonal flooding, and archaeological features have been masked by deposits of waterlain clay.

2.3.3 Stage I Excavation

The excavation of the Stage I area by the ECC Field Archaeology Group is in its final stages. The cost of this phase of the work to assessment stage is borne entirely by the developer.

Approximately 0.3-0.4m of plough and subsoil have been removed to reveal the natural gravel subsoil into which the archaeological features are cut. Roman features occur mainly to the south of Stage I, where enclosure ditches, pits, postholes and several scattered cremation burials have been identified. Most significant are the well preserved remains of two small kilns; though truncated by the plough, they survive to a depth of approximately 0.4m. It is likely that they were used for pottery manufacture as their linings are extremely vitrified and several waster sherds have been excavated from the fill of a ditch which cuts one of the structures; an internal structure, probably a central pedestal, survives within one of the kilns. Both contain quantities of kiln furniture fragments.

Amongst the Roman features in the south east extreme of the site, alongside Beeches Road, a number of Saxon features have also been exposed. These include a large grubenhaus which, though as yet unexcavated, appears to contain a significant quantity of occupation deposit. Sherds of 5th-7th century pottery have been collected from the surface of an adjacent post hole.

To the north, the density of Roman features is reduced, largely being linear ditches running NE-SW and NW-SE which coincide with those of the cropmark complex identified from the aerial photographs (Section 2.2). However, another possible kiln structure and a T-shaped 'corn-drying oven' have been identified.

While the Roman features reduce in density northward, those of prehistoric date intensify. A large number of small post-holes, many of which contain charcoal-rich fills yielding later prehistoric pottery and worked flints, and occasional large circular pits are scattered across the site. None of these are apparent on the aerial photographs. They are concentrated on the higher ground toward the northern end of the site, where use of the

area for burials over a long period of time is suggested by a the recovery of an East Anglian beaker in close proximity to a Middle Bronze Age ring ditch containing three cremation burials and a series of Late Bronze Age pits.

2.3.4 Stage II Trial Trenching

The evaluation of Stage II was completed on 29th October 1993. A series of seven trial trenches (1-7, Fig. 8) totalling some 1500 sq m were excavated at regular intervals across the 2 ha area of the proposed extraction pit/lake. The combined area of these trenches constitutes approximately 7.5% of the total area to be quarried.

Trenches 1 and 3 were positioned along the northern and western edges of the quarry area with the intention of locating any linear archaeological features crossing the area. This was thought to be likely considering the alignment of ditches in evidence on the aerial photographs. A further five NE-SW aligned trenches were placed at regular intervals.

None of the trenches contained any archaeological deposits or features. No unstratified artefactual material was collected from the topsoil stripping either. In view of this, the location, depth and geology of each trench has been recorded and backfilling undertaken.

Further archaeological investigation of Stage II is not envisaged.

However, the seven trenches have established the nature of the geology within Stage II. Machine stripping removed a cover of 0.20 - 0.25m of topsoil and a sterile light brown subsoil to reveal the surface of the natural. That exposed in Trenches 1 and 2 is predominantly gravel in a clayey matrix while the more southerly trenches contained a clean light brown clay which overlay the gravel and becomes thicker southwards. Machining in Trench 3 revealed it to be in excess 0.5 metres thick at this point.

Groundwater is clearly a major problem in Stage II. Once opened, the trenches quickly filled with water, especially toward the canal. The water table is reckoned to be approximately 0.40 - 0.45m below present ground level (c.3.70m OD), though it is not known to what extent this has been exaggerated by recent heavy rainfall.

2.3.5 Evaluation Trenches in the Stage III Area

Concurrent with the excavation of Stage I, a programme of evaluation trenching has very recently been undertaken across Stage III. Eight trenches, totalling some 675 sq m in area, were positioned to elucidate the geophysical survey results by examining areas in which magnetic anomalies were present (to gain further data about known probable and possible features), and also areas where anomalies were absent (to test whether archaeological deposits were present).

The trenches were machine-stripped on to what was considered to be archaeologically significant deposits. The exposed surfaces were then cleaned and recorded. Due to extreme time constraints no excavation of these deposits was conducted though, where possible, artefactual material was collected from their surfaces.
The results of the trial trenching are as follows:

Trench 1 was a north-south aligned trench, measuring 2 X 20 m, located in what the geophysical survey found to be a relatively blank area in the north west corner of Stage III. 0.3m of turf and topsoil overlay dirty grey gravel natural at the north which graded into a light blue-grey pure clay over the southern two thirds of the trench. No archaeological features were observed in this, although a single sherd of Saxon pottery (dated to range 6th-7th century) was collected from its surface. At the southern extreme, the trench impinged upon the stream identified by the geophysical survey. As this was an active watercourse, which appears to run over the clay, the trench filled with water to ground surface level. A sondage was excavated by machine in to the clay deposit to a depth of 0.5m; no artefacts were observed within it and it is concluded to be a natural deposit, perhaps associated with flooding from the stream.

Trench 2 was also located across the stream channel. 0.25-0.30 m of topsoil was machined from a 2 X 20 m area. A waterlogged deposit of dark grey silty clay and gravel was exposed throughout the majority of the trench, except where the stream crossed. The clay and gravel deposit contained small tile and pottery fragments of probable Roman date. A sondage was machined into it at the southern end of the trench and larger Roman

tile fragments were recovered from a depth of approximately 0.8m below ground surface. However, no features were visible in the surface or exposed sections through the deposit.

Where it crossed the trench, the watercourse was denoted by a thin band of cleaner, browner clay. Water actively flowed across the top of this and filled the rest of the trench. No artefacts were observed in the watercourse.

Trench 3 was located in what the geophysical survey appears to indicate is the core of the Roman settlement. The 10 x 10 m area was positioned immediately to the east of the main north-south aligned road and between two apparent side roads or tracks in order to assess likely roadside occupation activity.

Between 0.35 and 0.45 of topsoil and the top of the subsoil were removed to show poorly defined features, which became clearer on cleaning. A total of sixteen probable features were present, though none were excavated. A large ditch appears to run north south through the middle of the trench. Due to the limited size of the trench it is difficult to relate these features directly to those detected by the geophysical survey. Various pits and post holes, some of which cut the ditch, are also present. A large group (>100 sherds) of very large unabraded sherds of mostly early Roman pottery (some late Roman) were present in the exposed surfaces of these features, together with tile, animal bone fragments, briquetage and pieces of quernstone.

Trench 4 was a 20 X 5 m area positioned further to the east of the postulated to examine one of the areas blank in the geophysical survey plot. The southern half of the trench exposed an expanse of natural gravel below 0.3-0.4m of topsoil and subsoil. An edge of a probably linear feature crossed the southern extreme of the trench but further machining could not be employed to investigate its horizontal extent due to the close proximity of overhead electricity cables. However, Roman pottery and tile fragments were visible on the surface of its fill.

The northern half of the trench contained a uniform expanse of mid-grey clay and gravel which also contained small Roman tile fragments. Neither of these features was

excavated. However, this trench appears to support the conclusion of a lower density of features in this area.

Trench 5 was a 10 X 10 m square area excavated to a depth of 0.35-0.45. A total of eighteen likely features was identified following surface cleaning. These were mostly large intercutting pits and postholes which yielded a large group (>100 sherds) of unabraded Late Iron Age - early Roman transitional and some early Roman sherds, some of which were very large. Poorly preserved animal bone, Roman brick and tile fragments and a piece of beehive puddingstone quern were also retrieved.

Trench 6 was also a 10 X 10 m square positioned in the north east corner of Stage III. The geophysical survey located various pit-like responses but no clear pattern at this location. The machine removal of 0.40-0.45 m of topsoil and mixed subsoil exposed a very high density of features. In total, some 54 deposits and features were recorded following hand cleaning. These were mostly small posthole-like features with dark fills, some of which may represent a fenceline running across the trench. Part of a shallow curving gulley, perhaps the remains of a circular structure, was also identified. Three pits may be cremations of an unusual type: each comprises a central area of clean gravel surrounded by a dark, charcoal-rich deposit within a sub-rounded or oval cut; one of these features clearly contains the damaged remains of a Roman ceramic vessel in the central deposit of gravel with small fragments of burnt bone around it. These features have not been excavated. Groups of pottery recovered from the surfaces of the features are dated to the Late Iron Age, LIA - early Roman transitional, and early Roman periods.

Trench 7 was a 10 X 9m area positioned on the edge of the broad band of strong anomalies identified by the geophysical study across the southern end of the central field in Stage III, and at the intersection of two linear anomalies. A high density of apparent features and deposits were exposed at a depth of approximately 0.45 m below ground surface. Intercutting of what is probably a very large pit with likely linear features and smaller pits or postholes, make interpretation difficult in such a small area. The surfaces of most features contain Roman pottery and tile, however a group of postholes and

irregularly shaped cuts contain abundant struck flints and a sherd of prehistoric pottery of Late Bronze Age / Early Iron Age date.

Trench 8 was a 10 X 10m square area positioned in the lowest lying field at the south end of Stage III, in the vicinity of a pair of NW-SE aligned linear features, probably denoting a trackway. 0.3 m of topsoil was removed to expose a 0.10-0.25 m thick deposit of clean waterlaid blue-grey clay which contained no artefacts. This layer was removed by machine to expose a uniform deposit of waterlogged dark grey silty clay and gravel across the whole trench containing small fragments of Roman pottery and tile. One corner of the trench was further reduced by machine and a large animal bone, probably the unarticulated leg of a cow, was observed at a depth of approximately 1.0 m below ground surface. No features were observed within this deposit.

3 POTENTIAL

A site of enormous potential and outstanding national importance is about to be destroyed by housing.

The very size of the area to be stripped of topsoil for Stage III (23 ha / 57 acres), and the proven density of archaeology over the whole area, presents an unparalleled opportunity. In the context of late first millennium BC / early first millennium AD landscape studies, this will lead to substantial advances in our understanding of settlement morphology and change within the nucleus and periphery of a Roman small town, and of economic, social and organisational change during the transitional phases from the Late Iron Age to early Roman and late Roman to early Saxon periods. The prospect is an immensely exciting one. The development presents a rarely afforded opportunity to redress the lack of large scale investigation of this kind of site bemoaned by Drury at the 1993 'Archaeology in Essex' conference.

The great potential of the scale and date range of the site is greatly enhanced by excellent preservation of both archaeological contexts and artefacts resulting from a lack of ploughing in all of the critical Stage III area (13 ha / 32 acres) where land has been pasture since records began (2.2.1).

Furthermore, the survival of important environmental data in deep deposits waterlogged since the Roman period will, in conjunction with carbonised remains, produce extremely valuable artefactual and ecofactual results to enrich the knowledge derived from other sources.

The evidence to demonstrate its existence has been given in Sections 2.2 - 2.3 above. The principal areas of potential are itemised below.

3.1 THE SETTLEMENT EVIDENCE

3.1.1 The Prehistoric

Current excavation within the 8 ha of Stage I (2.3.3) has produced evidence for features datable to the later prehistoric period over a large area. In the northwest of the Stage I area there is a dense concentration of pits and post-holes representing a later prehistoric settlement site, provisionally dated to the early Bronze Age, and if this is so constituting one of an extremely rare site type in East Anglia. Elsewhere within the Stage I area there is a widespread light scatter of unstratified worked flint and occasional sporadic features of probable Late Bronze Age date, and an isolated ring-ditch containing three cremation burials.

This extends the evidence for prehistoric occupation in the immediate vicinity of the site, which consists of chance finds from all around the development area (2.2.3), and, to the immediate north of Stage III, Neolithic flintwork and Late Bronze Age post-holes from the Crescent Road site (2.2.3.1) and Middle Iron Age pits from the Holloway Road site (2.2.3.2).

The presence of numerous struck flints and a sherd of later prehistoric pottery recovered during the surface cleaning of post-holes and other features in trial trench 7 in the southern part of the Stage III area (2.3.5) suggests that this kind of evidence will be very widespread across the development area and will produce important data on changing later prehistoric landuse, settlement form and economy.

3.1.2 The Late Iron Age and Early Roman Periods

It is now known that the Late Iron Age settlement to the immediate north and south of the Stage III area, consisting of building remains and other features, field systems and large quantities of finds (2.2.3), extends into the development area. A Late Iron Age enclosure system is present in the Stage I area (2.3.3), sharing the alignment of a Roman one, with pits and other features also present. An unstratified Gallo-Belgic B1 gold stater has been recovered from the Stage I area. In Stage III, Late Iron Age pottery has been recovered

from trench 3, and Late Iron Age / early Roman transitional period pottery groups is present in trenches 5 and 6 (2.3.5).

The geophysical survey has detected two differing enclosure alignments in the Stage III area, especially to the west of the Roman Road (Figs.6 & 7). One is parallel to the road and presumably Roman, but other ditches, on a more NW-SE alignment, appear to be cut by it and may represent earlier Iron Age trackways going southwards to a crossing point of the river.

The size of the area to be stripped will obviously allow study of the Iron Age settlement per se, but of crucial importance is the opportunity of detailed study of changing settlement focus and type, land division, economy and trade through the little understood period of transition from the Late Iron Age into the early Roman period.

3.1.3 The Roman Small Town

Geophysical survey and trial trenching prove that a very large area of Roman small town covering an area of 13 ha (32 acres) lies within the Stage III area of development. The trial trenches demonstrate that the archaeology is exceedingly dense, and is present in quantity in the areas blank in the geophysical plot. All of the archaeological remains within this area will be destroyed or seriously damaged.

One of the key areas of national importance of the site lies in its ability to make a prominent contribution to the understanding of Roman small town morphology, which can be explored here through large scale excavation. The geophysical survey results (Figs 5,6,7) are extremely exciting as they show the presence within the threatened area of the important zones of axial street, secondary streets, street frontages, backyards, areas well away from street access and settlement periphery.

There is therefore huge potential for study of the evolution of the town throughout the Roman period through exploration of aspects of continuity and change in land division, organisation and control, zonation within the settlement plan, industrial areas and activities, building types and positions, relationship of town to countryside, and a whole

host of other areas addressed in the research design. The likelihood of cemeteries in the eastern (2.3.5, trial trench 6) and southern (Langford Junction, 2.2.3) parts of the Stage III area will also enable study of cemetery positioning and populations.

The vast potential of the site from the sheer scale of the study area is enhanced by the exceptional state of preservation occasioned by the absence of plough damage and truncation of features in this area of pasture. Trial trenches 3 and 5 (2.3.5) exposed quantities of very large sherds of unabraded pottery dating right through the Roman period; other artefact types are similarly undamaged. In trenches 3, 5, and 7 there are dense concentrations of unabraded Roman tile, which surely overlie the buildings which hold so much promise for furthering the understanding of zonation and ownership patterns.

3.1.4 The Late Roman and Early Saxon Periods

The evidence from the presence of five Grubenhäuser and probably also post-built structure to the immediate north of the Stage III area (2.2.3.1), a Grubenhaus in the southeast of Stage I (2.3.3), early Saxon pottery from two of the trial trenching in Stage III (2.3.5) and large pit-like anomalies in the north of Stage III on the geophysical survey (2.3.2) are clear indications both that the settlement is very extensive (at least 250 m east-west by 200 m north-south) and that it partially overlies the Roman town.

The site is thus rich in potential to inform our understanding of changes in land-holding, settlement position and type, land division, economy and trade through the transitional period

3.2 FINDS GROUP POTENTIAL

The trial trenching in the Stage III has shown that artefacts are preserved exceptionally well due to the use of the land as pasture with consequent lack of plough disturbance and damage. Many of the trial trenches (2.3.5) contain very large sherds of unabraded pottery in the surface fills of features. Building materials including large tegula and imbrex fragments, briquetage, stone, metalwork and many other find types are abundant.

The quality of the artefact preservation in conjunction with a high density of features and by analogy finds, will provide high quality stratified groups of finds. These will provide the raw data for a study of typological development and change, and address specific research objectives including the much needed tightening of dating for Late Iron Age / early Roman pottery in Essex. There is great potential for the recovery of good quantified groups of pottery to contribute to the sort of ceramic synthesis which is aimed at throughout Roman Britain (cf Fulford and Huddlestone 1991, 34), and also high potential for improving dating of the form, fabric and surface treatments of Saxon pottery.

The site also presents a unique opportunity to recover large assemblages of material from a settlement situated at the head of an estuary and well located to receive imported material. If a port was in existence at Heybridge there is very high potential in assemblages both for detailed study of imported artefacts with consequent increase in understanding of trading patterns, and for analysis of their distribution across the site for information on intra-site organisation and zoning. Indeed, the ability to undertake the proposed spatial analysis of finds through the use of GIS linked to databases containing context and artefact data will provide an extremely powerful tool for analysis of the kinds of activity undertaken in different parts of the site with concomitant acquisition of knowledge about settlement organisation and functioning.

The tile assemblages are, on the basis of the trial trenches, likely to be prolific, and will make a very important contribution to the county wide survey of tile.

The site further has the potential to inform on certain questions regarding quernstones, particularly the date range for lava and puddingstone quernstones, and the geographical range of pecked surface querns.

3.3 ENVIRONMENTAL EVIDENCE POTENTIAL

The project's environmental consultants visited the site during topsoil removal in Stage I and shortly after completion of the trial trenching in Stage III. A detailed statement of potential is not possible because of the limited degree to which excavation had been undertaken; at the time of writing no excavation has yet taken place in the Stage III area. However a number of useful comments were made which in conjunction with subsequent observations show that the environmental is very high, and will be extremely valuable in addressing many of the research objectives of the project.

3.3.1 Waterlogged Deposits

This very low-lying site must have been dry during the period of its occupation and the current waterlogging of parts of the site is caused by impeded drainage resulting from a rise in the saline water table. It is however likely that deeper features such as pits and wells will have remained wet continuously since the Roman period, and there is therefore a high potential for the survival of organic deposits and wooden structures in the lowest parts of the site.

Analysis of pollen and macrofossils in any waterlogged organic deposits in Stage III may be expected to provide information on landscape development.

Recovery of samples of waterlogged material will provide very important information from plant and wood remains, artefacts made from organics (eg leather , wood, textiles) which are rarely recovered and will provide information about a number of questions posed in the objectives for the project, particularly those related to economy and function of areas within the site. Further, waterlogged riverside structures may be preserved anywhere along the eastern side of the Stage III area near the Chelmer and Blackwater Navigation, a canalised stretch of tributary. If evidence is recovered for native provincial religion associated with water from continuously waterlogged contexts, the data could be quite spectacular.

3.3.2 Burnt Deposits

There is clear potential for recovery of large quantities of highly important environmental data from the bulk sampling of burnt deposits. This process will lead to the recovery of

charred plant remains, which will be important for furthering several research objectives particularly those relating to agriculture, economy and intra-site area / activity analysis. Data will enhance the understanding of the site during the Roman period, but will be particularly valuable for improving our knowledge and understanding of the economies of the Late Iron Age and Saxon periods. New data on early Saxon agriculture would, moreover, be of national significance, for extensive flotation has only rarely been undertaken at sites of this date.

3.3.3 Animal and Human Remains

Animal bones, though not preserved in the Stage I area, are much better preserved in Stage III than expected, where they are fairly common in surface fills. The site does thus have potential for recovery of substantial amounts over the entire area of Stage III, and the assemblage will clearly be significant for issues relating to the agricultural economy of the site, activity patterning, and manufacturing activities where bone is involved.

Inhumation graves have not yet been located, but cremated bone survives in the Stage I area as well as in Stage III. If the survival of human bone in Stage III is similar to that of the animal bone, the potential is there to address the objectives relating to the population. Important information about longevity and sex, diet and activity may be forthcoming from the inhumed remains.

Mollusca if present have the potential to inform on site formation processes and environment, and, in the case of marine molluscs, diet and economy through use of marine and riverine resources.

3.3.4 Microfossils

Pollen is likely to survive in wet contexts (above), but it is also possible that pollen assemblages will be present in dry feature fills to enable some landscape reconstruction.

3.3.5 Soils

Micromorphological study of buried occupation soils and their contents has the potential to demonstrate any zoning of activity areas within the Roman town.

4 AIMS AND OBJECTIVES

Section 4 places the site within the framework of the national research agenda (4.2), then lists general and specific research objectives for the site (4.3). The specific objectives listed in 3.4 are then directly addressed by the Method Statement (Section 5).

4.1 OVERVIEW

The area of development, the date range for settlement evidence and quality of the surviving archaeological record means that the site has a quite exceptional potential to produce information to elucidate a range of national research questions. The priority areas for research listed below are identified both in 'Exploring Our Past' ((EOP) HBMC, 1991) section 7.1 and from the advice of academic consultants (Dr A.S. Esmonde Cleary (University of Birmingham), Dr M. Millett (University of Durham) and Dr B. Burnham (University of Wales)).

Specifically, the evidence for continuous settlement within the threatened area from at least the first century BC to the fifth century AD means that the transitions from the Iron Age to Roman and Roman to Saxon periods can be studied, and a detailed record of the development of a large proportion of a small town throughout the Roman period can be made.

4.2 ACADEMIC AIMS

4.2.1 Processes of Change: Briton into Roman (EOP, p.36)

The high level of continuity in settlement and land use from the Iron Age into the Roman period has implications for social and economic organisation. The site provides potential to study the process of transition and to follow within the archaeological record the trend toward a Romanised socio-economic group through the first century, allowing an assessment of the degree to which this was a natural or voluntary assumption, and to what extent it may have been imposed. The model of Roman impact on native societies

suggested by Millett (1990, 65 ff) suggests that in areas where LPRIA society was centralised and hierarchical and the nature of the Roman impact reinforcing, that the Romanised society was characterised by the presence of successful towns and early villas. Within the tribal area of the Trinovantes, the success of this early Roman town can be tested.

4.2.2 The Roman Small Town

Burnham has recently suggested (1993) that small towns without defences have a complex settlement hierarchy, and has proposed a threefold distinction between upper, middle and lower order settlements based on a range of structural and functional indicators. Current evidence suggests that within this scheme Elms Farm belongs to the class of lower order settlements, characterised by an absence of defences, specialised functions and or degree of sophistication, while sharing some of the characteristics of middle order settlements including ribbon development and increasing agricultural emphasis. He comments (p.12) that such sites are very poorly known, though they are crucial to our wider understanding of the distribution of 'small towns' or 'local centres' as defined by Hingley (1989). The site therefore offers the possibility to examine a range of questions about the town and its relationships with its environs and farther afield.

4.2.3 Processes of Change: The Early Medieval Period (c.350-700 AD) (EOP, p.36)

"The nature of the Roman decline in the province of Britain is not well understood. Neither is the influx and settlement of immigrants from across the North Sea." (EOP p.36). Millett (1990, 227 ff) contrasts the longevity of Romanitas in archaeological and historical sources, pointing out archaeological evidence for abrupt change between c.400 and 420 while historical sources illustrate a longer drawn out process emphasising survival of Romanitas during the period of arrival of Germanic groups. In contrast to the evidence from Gaul where much of the transfer of land to the barbarians was by treaty, in Britain the territory taken by the Saxons was more often than not taken by force.

The evidence for continuing settlement during this phase of transition is provided by the existence of Saxon sunken floored buildings to the immediate north of Stage III, and the presence of at least one in Stage I, representing a settlement area of perhaps 400 by 150

m on the northern edge of the Roman small town. There is therefore the potential to examine the process of change within the area of development.

4.2.4 The Saxon Settlement

The academic aim is to study the nature and development of the Saxon settlement. Saxon settlements of this type have rarely been recorded using modern methodologies. In East Anglia early Saxon settlement sites have been examined by large scale open area excavation only at Mucking and West Stow, and are not well known as a type. Further examination is needed to extend the current dataset.

4.3 RESEARCH OBJECTIVES

The specific objectives, following each block of general objectives below, form a continuous sequence SO1 - SO53. The artefactual and ecofactual objectives listed below are an intrinsic part of the general research strategy.

These are addressed individually in the Method Statement (5.0).

4.3.1 Objectives: Briton into Roman (EOP, p.36) (SO1 - SO13)

Spatial Interrelationship (SO1 - SO4)

It is proposed to establish the position, extent and form of the Late Iron Age settlement recognised from previous finds to exist in the immediate vicinity of the known area of the Roman small town, and to map features of the early Roman settlement onto those of the Late Iron Age to establish continuity or change in spatial organisation.

Organisation (SO5 - SO6)

To identify the organisation of the settlements, particularly to discern any aspects which signify continuity or change which might indicate imposition of a Roman administrative system upon that of the Iron Age site.

Status (SO7 - SO8)
To establish the status and type of the Late Iron Age and early Roman settlements.

Economic Base (SO9 - SO12)
To determine the economic base of the settlements and identify aspects of continuity and change.

Speed of Change (SO13)
To identify the speed of transition during the first century AD, paying particular attention to elements within the archaeological record which suggest either continuity, or gradual or sudden change.

Specific Objectives
SO1 To plan and sample all features of Late Iron Age and early Roman date, and record their stratigraphical relationships.

SO2 To map settlement features of the early Roman period onto those of the LIA settlement to establish continuity or change in spatial organisation.

SO3 To examine the relative positions of cemeteries.

SO4 To date the road system, and record the spatial relationship of buildings and enclosures and other features to it.

SO5 To examine all aspects of settlement morphology paying particular attention to changes in alignment, building position and building types.

SO6 To establish any official administrative or military function for the site

SO7 To examine and record house and other building forms.

SO8 To recover sufficient artefactual material to reflect status insofar as it can be inferred from the assumed contemporary value of items of material culture, or from the differential distribution of pottery fabrics and forms.

SO9 To examine the settlement in the Late Iron Age and early Roman periods in relation to their surrounding landscapes.

SO10 To determine the relationship of the settlement sites to communication routes by land and river.

SO11 To establish the significance of trade both inland and overseas.

SO12 To determine whether industrial or other manufacturing activity was undertaken, and if so to determine its type and scale.

SO13 To determine the precise chronology of all features belonging to the transitional period.

4.3.2 Objectives: the Roman Small Town (SO14 - SO24)

Chronological Development, Organisation and Status (SO14 - SO18)

It is proposed to produce a fully phased plan of the small town within the selected sample area to enable a detailed study of morphological changes of a large proportion of a Roman small town and its peripheral areas. It is necessary to establish the way in which the town has grown, developing an initial hypothesis that the settlement is essentially ribbon development along the Roman road; traces of deliberate planning will be identified. The spatial organisation of the town through time will be examined. On Burnham's model, deliberate planning is rare at lower order settlements, but the geophysical survey plot suggests an overall planning rather more formal than might be expected; The project represents an opportunity for Burnham's model to be tested and hypotheses to be generated to explain the nature of any planning that is recognised.

It is proposed to establish the status of the town and any changes therein throughout the Roman period, and to identify and study any evidence for zonation within the area of the town.

Economic Base And Relationship with the Countryside (SO19 - SO21)

The basis of the economy of the settlement through time will be examined and should establish whether it is essentially mercantile/artisan, agrarian, industrial or other, and whether there is any significant shift in the economic base. Insofar as Burnham suggests that the economy of lower order settlements in the Roman period is likely to be largely agrarian in nature, the relationship of the town to the countryside will be examined. The function of the enclosures fronting the road system will be examined to demonstrate any tendency for the functions of outlying enclosures to become increasingly related to farming activities.

The importance of marine and riverine resources to the economy will be examined.

Association with the River and Communication (SO22 - SO24)

Heybridge has been proposed as a Roman port (eg Wickenden 1986, 64-5), though no waterside installations to support this have been located, or any convincing supporting artefactual evidence. It is therefore desirable to establish whether there is any evidence to support this hypothesis, and to gain indirect evidence for its importance through and beyond the Roman period.

It is desirable to attempt to establish the importance of the river as a communications route for the inhabitants, and to contrast this with use of the road system.

Native provincial religions seem often to be associated with water, and it is proposed to examine the evidence for these at Elms Farm.

Specific Objectives

SO14 To produce a fully phased plan of the small town within the selected sample area.

SO15 To establish the spatial organisation of the town, and identify any traces of deliberate planning.

SO16 To establish the status of the town and any changes therein through the Roman period, including the type and positions of official or public buildings and areas

SO17 To identify and study any evidence for zonation within the plan, including cemetery usage

SO18 To establish the functions of the enclosures visible in the geophysical survey plot to test whether an increasing distance from the nucleus of the settlement reflects an increasingly agricultural function.

SO19 To examine the economy of the settlement through time and to establish whether it is essentially mercantile / artisan, agrarian, industrial or other including the investigation of areas of industrial activity

SO20 To establish the relationship of the town to the countryside through examination of morphology, enclosures and ecofacts

SO21 To establish the importance of marine and riverine resources in the economy

SO22 To collect data, if present, capable of demonstrating involvement in overseas trade

SO23 To establish the importance of the river as a communications route for the inhabitants

SO24 To examine evidence for native provincial religions associated with water

4.3.3 Objectives: The Early Medieval Period (EOP, p.36) (SO25 - SO33)

Chronology, Spatial Interrelationship and Organisation (SO25 - SO28)

The 1971-72 excavations to the immediate north of Stage III (Wickenden, 1986) showed Saxon sunken floored buildings to be contemporaneous with sub-Roman occupation of the small town into the fifth century. With the likelihood of early Saxon occupation contemporaneous with continued occupation in the town it is desirable to study the interface between the two periods at Elms Farm in as much detail as possible.

It is proposed to study the ways in which spatial organisation, and use or abandonment of areas within the area of the small town changed at the end of the Roman and into the Saxon periods. It is proposed to identify the organisation of the settlements, particularly to discern any aspects which signify continuity or change which might elucidate the disintegration of Romanitas and organisational changes into the Saxon period.

It is intended to establish the position, extent and chronology of the Saxon settlement known to occupy at least an area of 400 by 150 m on the northern edge of the development area.

Status (SO29 - SO30)

The status and nature of the late Roman and Saxon settlements will be explored. An attempt will be made to establish whether the Saxon settlement is causally or functionally involved with the Roman, and to establish whether there was any military involvement during the transitional period.

Economic Base (SO31 -SO32)

Data to enable determination of the economic base of the settlements will be recovered, and aspects of continuity and change identified. Any evidence of economic involvement of the early Saxon settlers with the late Roman will be sought

Speed of Change (SO33)

It is intended to establish the speed of change during the fifth century AD, paying particular attention to elements within the archaeological record which suggest either continuity, or gradual or sudden change.

Specific Objectives

SO25 To establish the position, extent and chronology of the early Saxon settlement.

SO26 To record the range of buildings and other features present.

SO27 To map features of the Saxon settlement onto those of the late Roman settlement to establish continuity or change in spatial organisation.

SO28 To establish the order in which areas of the late Roman town were abandoned

SO29 To establish the status and nature of the late Roman and Saxon settlements.

SO30 To establish whether the early Saxon settlers were militarily involved with the late Roman.

SO31 To determine the economic base of the settlements and identify aspects of continuity and change.

SO32 To establish whether the early Saxon settlers were economically involved with the late Roman.

SO33 To identify the speed of transition during the fifth century AD, paying particular attention to elements within the archaeological record which suggest either continuity, or gradual or sudden change.

4.3.4 Objectives: the Saxon Settlement (SO34 - SO39)

Development (SO34 - SO37)

The known size of the Saxon settlement suggests that is was long-lived, and perhaps of a shifting hamlet type as suggested for Mucking. The objective is therefore to study the process of change from a settlement on the periphery of an existing site occupied by a sub-Roman population to one increasingly absorbed into Saxon culture.

Economy (SO38 - SO39)

It is proposed to elucidate the economy of the settlement, and changes therein through time, and to establish trading and cultural associations of the settlers and their descendants.

Specific Objectives

SO34 To establish the morphology of the Saxon settlement

SO35 To establish the chronology and horizontal stratigraphy of the settlement

SO36 To study the full range of features present including buildings

SO37 To determine the manner and date of demise of the settlement.

SO38 To study the economy of the settlement and chart changes throughout the period of occupation, including identification of industrial activities

SO39 To discern contact with Germanic or other groups, and To establish trading and cultural associations of the settlers and their descendants.

4.3.5 Objectives: Artefacts (SO40 - SO48)

The very high quality of the artefactual evidence outlined in Finds Group Potential (3.2 above) leads to the formation of the following general and specific objectives. The artefacts and ecofacts are key to a majority of the objectives identified above. A number of questions from specialists consulted (H. Major, C. Wallace, S. Tyler) on particular artefact classes are articulated below as specific objectives.

4.3.5.1 Roman Pottery (SO40 - SO46)

The recovery of large groups of well stratified pottery is clearly absolutely essential for dating features of all periods, and to provide data with which to address other specific objectives.

SO40 To recover large, securely stratified groups of pottery of all periods. Using the current county-wide standard for classification and quantification and building on previous work, there is a high potential in Essex for the sort of ceramic synthesis which is aimed at throughout Roman Britain (cf Fulford and Huddlestone 1991, 34). From this site, we need good quantified groups of all periods as a contribution to this projected synthesis, as we are still short of quantified data from many site types and areas in Essex. The 1971-72 site produced quantified groups dating to the late fourth century; pursuit of this sort of material through the project's recovery strategy should mean a firmer basis for the site's dating.

SO41 To establish the processes at work in Roman pottery production (eg modes of production - household or workshop industry?), the possibilities of archaeomagnetic dating and the large scale excavation of the whole complex (workshop, clay preparation areas, fuel stores, waster dumps etc) beyond the kilns. In C. Wallace's opinion, greyware industries with a repertoire of basic, utilitarian forms (ie those not requiring modelling, multiple firings, slip-coating and the like) are always going to be more alike than different, so he would dispute the significance of comparisons between the claimed mid-third century pottery production at Heybridge (Wickenden 1986, 47-9) and Thamesside Essex material.

SO42 To obtain worthwhile groups (large, securely stratified, uncontaminated by residual and later material) of associated LIA and LIA / early Roman transitional period imports, local wares and other datable finds for study and quantification to advance our knowledge of pottery chronology - 'the basic framework for establishing any understanding about the duration of occupation, the intensity of occupation, the range of site functions and site status, as well as the development of the economic and political organisation of the later prehistoric period' (PCRG 1992, 5). At present it is still easier to be critical of the existing dating framework (or lack of it) for Late Iron Age pottery in the region than to produce well-dated pottery sequences from it.

SO43 To recover large assemblages of pottery and non-ceramic artefacts to enable study of imported material to indicate the presence or not of a port at Heybridge in order to gain understanding of trading patterns, and for analysis of their distribution across the site for information on intra-site organisation and zoning.

SO44 As yet no fully adequate typological or chronological sequence has been established for early Anglo-Saxon pottery forms. Myres' dating of Saxon pottery forms (Myres 1977) has been shown to be, in some instances, inaccurate, ie too early. A research design is proposed to identify and assign a date range to the major Anglo-Saxon pottery forms detailed as follow: carinated bowls (sixth as well as fifth century ?); faceted carinated bowls (often cited as an exclusively fifth century form but shown to occur in sixth century contexts at Springfield Lyons (Tyler 1987, 18) and Mucking (Hamerow 1993, 22-59); biconical bowls and jars (sixth as well as fifth century, as suggested at Mucking ?); globular bowls and jars: utilitarian type (not thought to be closely datable, but can they be shown to occur mostly in sixth and seventh century contexts ?).

SO45 Improvements to the dating of Anglo-Saxon pottery might also be made from the surface treatment of pots: is 'Schlickung' exclusively a fifth century practice ?; can combing and pinched decoration, which decreases in incidence in sixth and seventh century groups at Mucking, be an indicator of a fifth century date for Essex sites ?.

SO46 Fabric analysis, rare in Essex assemblages, may enable better definition of date ranges for its currency: for example is vegetable-tempered pottery really restricted to the sixth and seventh centuries ? Analysis of tempers and inclusions by thin-sectioning may also help to assign date ranges through horizontal stratigraphy over the area of a shifting village.

4.3.5.2 Other Artefacts (SO47 - SO49)

SO47 Building Materials: To recover large assemblages of building material in order to elucidate details of the superstructures of the buildings in the Stage III area. While the material is expected to be predominantly tile and daub, previous excavations at Heybridge suggested that there were masonry buildings in the area, in part utilising stone from the Lower Greensand Series (Wickenden 1986, 21). The use of such stone (apparently as rubble rather than worked stone) is rare in Essex, (the relatively local septaria was the normal stone used), and may have arrived as ballast in ships trading from Kent and Sussex. Other types of building material which may be encountered are painted plaster and tessellated pavements. In the event of these being found in situ, specialist advice will be sought.

Analysis of the tile from the site as a whole may provide information on the internal chronology of tile types and fabrics. This would be facilitated by the presence of large groups of tile (>10kg) particularly from early Roman contexts, and contexts which can be tightly dated. The material will also contribute to an on-going survey of tile within the County, in which certain aspects of tile have been identified as having the greatest potential for providing significant information. While tile shapes are remarkably standardised throughout the country and throughout the Roman period, there is evidence for regional variation. Evidence from Chelmsford Bath-house (Major in prep.) and other sites in Essex, for example, suggests that the type of tegula cutaway cited by Brodribb (1987, 17) as most common in the country as a whole, is rare in Essex. In particular, variations in the combing patterns on box flue tiles may have significance at a relatively local level. The current survey examines combing patterns on all sizes of sherd, by breaking the patterns up into their elements, rather than only looking at complete or near

complete tiles. The patterns on the latter (as demonstrated at Bull's Lodge, Boreham (Major in prep)) may be atypical of the assemblage as a whole.

SO48 Querns: To recover an assemblage of quernstones. It is hoped that the assemblage will be able to provide data relevant to the functional analysis of the site. A number of other areas of interest may be looked at.

i) Iron Age rotary querns are rare in Essex. Should any be found, they will certainly add to our current, very limited, knowledge. All rotary querns (of any period) found in Essex are made from non-local stone, and provide information about trading patterns. This is particularly relevant for Iron Age querns, which are found in a wider variety of stone than Roman and later querns. In addition, the finding of any puddingstone querns in a secure Iron Age context would be important. This type of quern has been considered to be 'Iron Age' because of its shape; however, none have been found in a pre-Roman context in Essex, and only dubiously elsewhere. In fact, out of 131 examples recorded in Essex, only four come from a securely stratified context.

ii) Roman querns in Essex are almost exclusively made from either Rhenish Lava, or Pennine Millstone Grit. The writer hypothesises that lava querns were the principal type in use in the earlier Roman period, but that disruption to trade with the Rhineland led to a much greater use of Millstone Grit in the later Roman period. Due to a number of factors, such as the frequent reuse of querns in a county poor in stone, it has been difficult to test this hypothesis. Any evidence which might be gleaned from Elms Farm to support/ disprove this hypothesis would be helpful.

iii) On a local level, the writer has observed an unusual form of surface dressing on lava querns from nearby sites on the Blackwater Estuary (Major in prep.), with random pecking used instead of the standard grooved dressing. The presence or absence of pecked dressing at Elms Farm would help to indicate how localised this practice was. If present, it might be considered whether it was associated with the grinding of any particular material. It is possible for traces of ancient organic matter to survive within the vesicular surface of the lava, as has been shown by an examination of a post-medieval

lava quern from Chelmsford, by John Evans of the University of East London (report in prep.). Whilst in the latter case, Dr. Evans was unable to positively identify the substance, he believes that it would be feasible to do so in favourable circumstances.

SO49 Other Artefacts: The quantity and quality of other types of artefact (metalwork, worked bone etc.) varies from site to site, and the objectives at this stage must remain generalised. Two main areas of potential study may be identified initially.

i) Depending on the finds, specific artefact types (eg hairpins), or individual artefacts, may warrant further research.

ii) Consideration of function and spatial distribution. The presence of groups of artefacts (in the same or different materials, and including types of finds such as querns treated separately here) in a particular context may suggest a function for that context. This is particularly relevant to the identification of function for the buildings on the site, but consideration of the distribution of classes of artefacts across the site (e.g. those associated with textile manufacture) may identify areas of specialised activity not directly related to the buildings.

iii) Salt Briquetage:
a) identification of concentrations of briquetage which may indicate areas of the site particularly connected with the salt industry.

The current excavations at Elms Farm have already produced small amounts of salt briquetage, predominantly, if not wholly, from flat sided vessels. This is not unexpected, given the site's proximity to the coast in an area of Essex rich in Red Hills. Over twenty-five Red Hills are known along the shore of the Blackwater estuary east of Heybridge (Fawn et al 1990, 51), although only one has been excavated in recent times (at Osea Road; de Brisay 1972 & 1973). The date range is likely to be late pre-Roman Iron Age through to the 2nd century A.D.

It is reasonable to suppose that the Roman town at Heybridge (and possibly any preceding Iron Age settlement) would have functioned as a collection/distribution point for the salt production industry of the estuary, whence the salt would be distributed to inland Essex via the river system, and to other parts of the country by boat along the coast.

b) Consideration of the size and condition of the briquetage sherds may help to shed light on the processes whereby briquetage is transported to non-Red Hill sites.

The sites at which briquetage is found can be loosely divided into Red Hill (salt production) sites (very large amounts present, all types of briquetage); coastal sites (?secondary processing/distribution) such as Chigborough Farm (see below), producing moderate amounts of briquetage, mainly vessels; and inland (salt using) sites, with small quantities of briquetage, virtually all vessels. A gazetteer of inland sites with briquetage from Essex is given by Barford (1990).

The mechanism whereby the briquetage arrives at the non-Red Hill sites is not fully understood. It is not, however, envisaged that the salt was transported inland in the briquetage vessels. Barford (op cit) suggests that sherds may have become accidentally incorporated in the salt blocks (no doubt much to the annoyance of the eventual purchasers of the salt), or that the briquetage was being deliberately traded as salt licks for livestock. It is, however, likely that the greater incidence of salt briquetage at coastal sites more directly reflects the role of the sites within the salt industry. Some salt may have been initially transported in briquetage vessels, or there may have been secondary processing of the salt prior to trade to the hinterland involving further use of briquetage vessels.

c) Examination of the fabrics and comparison with the material from Chigborough Farm in order to test the hypothesis that briquetage fabrics changed through time in this area.

Comparisons may be made with the nearby sites of Chigborough Farm and Slough House Farm, excavated by E.C.C., where (particularly at Chigborough Farm) significant

quantities of briquetage vessel and fire bar fragments were found (Major in prep), presumed to be from a Red Hill or Hills close to the site, but not identified. Two distinct fabrics were noted, occurring at both sites, and the chronological distribution suggested that one fabric was in use earlier than the other, and the change of fabric may coincide with the 'Romanisation' of the area. In the absence of information from the Red Hills themselves, examination of the fabrics from Elms Farm, which may include material from many Red Hills, might indicate whether the apparent change in fabric is general to the Blackwater Estuary or local to the Chigborough Farm area.

4.3.6 Environmental Data (SO50 - SO53)

SO50 To recover assemblages of charred crop remains to form part of analysis of settlement economy, agricultural practices, zonation and change, particularly for the periods of change from LIA to Roman and late Roman to Saxon. Also to establish whether elements of Roman agriculture persisted into the Saxon period, particularly spelt cultivation or whether there was a rapid replacement of spelt by free-threshing crops.

SO51 To recover assemblages of pollen to form part of analysis of settlement economy, and to provide information on landscape development and reconstruction.

SO52 To undertake micromorphological study of buried occupation soils and their contents, which has the potential to demonstrate any zoning of activity areas across the Roman town.

SO53 To recover samples of timber growing during the late Roman period to plug the gap in the mainland Britain dendro curve.

5 METHOD STATEMENT

5.1 STRATEGY TO MEET SPECIFIC OBJECTIVES

The following section addresses the individual specific objectives (SO1 - SO52) in terms of proposed methodology. One or more strategic method statements are applied to each specific objective. In cases where it is considered that either a general method or one of the several specialised processes described in detail is sufficient, reference is made directly to the appropriate section. Other methodologies are described in detail below.

In most cases below, the standard sampling procedures for the whole site (5.2) will ensure a fully detailed record of all contexts, and adequate data recovery to address the specific objectives of the excavation. Continuous appraisal programmes for all artefact assemblages are built into the standard procedures (5.4) to ensure recovery of adequate assemblages of pottery to enable close dating of features, and to ensure the recognition of artefacts of peculiar relevance to particular research objectives.

5.1.1 Specific objectives: Briton into Roman (SO1-13)

General: To achieve the research objectives for the transitional period features it is essential that they are recognised at an early stage, and in the following it should be assumed that the process of continuous scanning of pottery (5.4.1) from all features is in operation which will identify the significant contexts (first century AD) to produce amendment to the standard sampling methodologies as necessary.

SO1 Standard methodologies (5.2).

SO2 Standard methodologies (5.2) will produce relative and absolute dates for all sampled features for the period; property boundaries are clearly important here. The dating derived from the fieldwork, the matrix (5.2.10) and the digitising will enable a site phasing to be produced which can be refined at any resultant analysis stage.

SO3 Standard methodologies (5.2).

SO4 Standard methodologies (5.2).

SO5 Standard methodologies (5.2).

SO6 Standard methodologies (5.2) to record the features. Indicators would include characteristic building plans, and might also be present in the finds assemblages (5.4.2).

SO7 Standard methodologies (5.2).

SO8 Standard methodologies (5.2) for recording, plus continuous non-ceramic appraisal (5.4.2) to ensure full recovery of significant groups.

SO9 Standard methodologies (5.2) to recover settlement plan and context. Environmental data from the sampling programme (5.5.1) where suitable deposits are present will inform the enquiry by plant and faunal remains.

SO10 To study settlement morphology in relation to the river and the road system. Standard methodologies (5.2).

SO11 Continuous non-ceramic appraisal (5.4.2) to ensure full recovery of apparently significant groups defined as those showing a high proportion of material of overseas origin.

SO12 Standard methodologies (5.2) will expose and record areas of industrial or other manufacturing activity; sampling policy for kilns and other positive features are described in 5.2.7, and these are among the features types identified as subject to extensive bulk sampling. The determination of type of process will result from the 100% artefact recovery policy (5.3.1). Absolute dating by scientific techniques will be applied, and are described in 5.5.2.

SO13 Continuous pottery appraisal (5.4.1) and continuous non-ceramic appraisal (5.4.2) should ensure an adequate level of sampling to enable a closest possible date from the finds to be attributed. Groups of intercutting features belonging to the transitional stage will be targeted for a high level of sampling (the level to be determined by the needs of 5.4.1). Scientific dating techniques (5.5.2) and dendro dating (5.5.1.3) will be employed for suitable contexts.

5.1.2 Specific Objectives: The Roman Small Town (SO14-24)

SO14 As SO2.

SO15 Standard methodologies (5.2).

SO16 As SO2. The ability to undertake spatial analysis of closely datable finds may inform.

SO17 Standard methodologies (5.2) plus data from SO18.

SO18 Standard methodologies (5.2) will result in the recovery of a plan showing the overall plan including the enclosures. It is proposed to select a sample of enclosures for both the early Roman and late Roman periods for detailed examination, the selection criteria being phase and distance from the nucleus of the settlement: selected enclosures will be subjected to phosphate sampling, and magnetic susceptibility to indicate possible uses of apparently blank areas. Environmental sampling (5.5.1) of suitable contexts will be undertaken as a matter of course.

SO19 Standard methodologies (5.2) in conjunction with the environmental sampling programme (5.5.1). Sampling of buildings will be important: where deposits are recognised to belong to a particular organised activity (eg smithing or bone-working) detailed 3-dimensional recording of location of waste material will be undertaken to enable spatial analysis of deposits; this should allow a reconstruction of building functions.

SO20 Standard methodologies (5.2), environmental sampling (5.5.1), and output from SO18-19.

SO21 Through environmental sampling programme (5.5.1), which will inform if deposits contain remains of sea creatures (eg fish bone). Remains of edible shellfish will be collected as routine (100% finds recovery policy).

SO22 From artefact assemblages. The pottery and non-ceramic continuous appraisal programmes will identify contexts containing pertinent material to trigger full recovery.

SO23 Standard methodologies (5.2) will enable conclusions to be drawn from settlement morphology; the only likely data will be in the form of access routes to and from the river, though it is possible that waterlogged riverside remains will be located if the Chelmer and Blackwater Navigation canal represents canalisation of river channel open during the Roman period.

SO24 Standard methodologies (5.2). Spatial analysis of non-ferrous metal artefacts will be enabled through the registered find recording system (5.3.2). Organic samples will be taken as a matter of course (5.5.1).

5.1.3 Specific Objectives: Early Medieval Period (SO25-33)

SO25 Standard methodologies (5.2) to recover the settlement plan. Continuous finds appraisal to ensure adequate sampling levels (5.4). Scientific (5.5.2) and dendro (5.5.1.3) will be employed where suitable contexts and remains are present. It may be possible to use high precision C14 age determination of material securely associated with the stratigraphy to estimate the chronological duration and absolute dates of these phases using Bayesian methodology.

SO26 Standard methodologies (5.2).

SO27 As SO2, though scientific dating is unlikely to be able to contribute significantly. If horizontal stratigraphy containing Saxon material survives within areas of preexisting

Roman buildings suggesting their reuse / adaptation, layers will be removed on a 1 m square grid basis to allow subsequent spatial analysis of artefact distribution, and the environmental sampling and scientific dating strategies employed in consultation with the specialists concerned.

SO28 Standard methodologies (5.2). Data to show the order abandonment of areas of the late Roman town should be a natural output.

SO29 Through analysis of building forms and positions, and through the artefact assemblages: standard methodologies (5.2).

SO30 Through the finds: continuous appraisal of non-ceramic finds (5.4.2) to ensure adequate sampling levels.

SO31 Through standard methodologies (5.2) to establish settlement morphology, and recovery of environmental data (5.5.1).

SO32 Through evidence of trading links and imported material found in the artefact assemblages.

SO33 As SO13.

5.1.4 Specific Objectives: the Saxon Settlement (SO34-39)

SO34 Standard methodologies (5.2).

SO35 Standard methodologies (5.2) in conjunction with continuous appraisal of non-ceramic finds (5.4.2) and the pottery (5.4.1) Absolute dating where suitable deposits are present (5.5.2) and dendro dating for waterlogged wood (5.5.1.3) will be used where possible. It may be possible to use high precision C14 age determination of material securely associated with the stratigraphy to estimate the chronological duration and absolute dates of these phases using Bayesian methodology.

SO36 Standard methodologies (5.2); building features sampled to 100% level.

SO37 Standard methodologies (5.2). Absolute dating by scientific methods (5.5.2) and dendro samples (5.5.1.3) where possible. It may be possible to use high precision C14 age determination of material securely associated with the stratigraphy to estimate the chronological duration and absolute dates of these phases using Bayesian methodology.

SO38 As SO19

SO39 Through artefact assemblages and cemetery evidence.

5.1.5 Specific Objectives: Artefacts and Ecofacts (SO40 - SO53)

The recovery of large groups of well stratified pottery is clearly absolutely essential for dating features of all periods, and to provide data with which to address other specific objectives.

SO40 Through 100 % finds recovery sampling policy and continuous pottery appraisal.

SO41 Recognition of key features and areas, especially those showing evidence of pottery manufacture, consultation with AML staff re. archaeomagnetic dating where deposits recognised as having possible potential are identified.

SO42 Through intensified sampling of significant groups as identified in the continuous pottery appraisal programme (5.4.1).

SO43 As SO42.

SO44 As SO42 in conjunction with stratigraphical analysis; attempts to achieve absolute dates will be made by taking radiocarbon samples where extant from source contexts of the pottery (5.5.2.2)

SO45 As SO44.

SO46 As SO44.

SO47 Through standard sampling procedures (100% finds recovery).

SO48 As SO47.

SO49 As SO47.

SO50 Through bulk sampling programme for charred plant remains.

SO51 By pollen sampling of contexts identified by the on-site environmentalist.

SO52 Sampling by R.MacPhail of soils identified by excavators and resident environmentalist.

SO53 From assessment of timbers recovered through the sampling policy for wet contexts.

5.2 EXCAVATION & RECORDING METHOD

The following is proposed as a standard sampling and recording methodology for the tightly controlled and efficiently executed excavation of the site as a whole. It is designed to ensure a complete and detailed record of a uniform sample of archaeological deposits across the entire site, and to ensure that records are sufficiently full to enable processes which are proposed for the assessment stage and envisaged for any analysis stage to take place.

All archaeological contexts will be sampled, using site-standard sample units (5.2.6-7). A programme of continuous appraisal of all finds (5.4) to ensure recovery of adequate groups of pottery for dating, and to identify any finds directly relevant to the objectives of the excavation will be undertaken; where assemblages are inadequate or of high potential, the sample size for the context in question will be increased by 100% (where possible),

and further if necessary, for ditches. All context information will be recorded in writing on (5.2.9) on pro-forma sheets (Appendix 2), a subset of the data captured being input to a database on site (5.2.11). All features will be drawn (5.2.9) and selectively photographed.

Large scale environmental sampling (5.5) to meet the objectives of the project will be continuous, with sieving and flotation undertaken in parallel with work on site. The sampling programme will be supervised by an on-site environmental scientist, whose responsibility it is to liaise with P. Murphy and other specialists as necessary. Samples will be recorded on a pro-forma (Appendix 2).

Pre-stripping contour survey in the Phase III area

A detailed pre-stripping contour survey will be undertaken to record the slight variations in level in the Phase III area. This will be undertaken with an EDM and PenMap software running on a Samsung PenMaster datalogger. Contours will be generated using DTM software.

5.2.1 Topsoil Stripping Programme of Works

In Stage III, the topsoil will be removed in six stages (two in the northern field, three in the large central field, and one in the southern). These are shown on Figure 9: the sequence for stripping is A1-A2-B2-A2-B1-C.

5.2.2 Topsoil Stripping

Topsoil stripping will be undertaken in a two step operation:

(i) 360-degree, tracked excavators (Hymac or similar) will undertake a rough, initial strip of the turf and topsoil, being careful that the underlying archaeological deposits are not exposed or disturbed.

(ii) 360-degree tracked excavators with toothless ditching buckets will closely follow the progress of the initial

stripping and will carefully remove the remaining topsoil/subsoil to expose the archaeological deposits or, where none are encountered, the surface of the natural.

This system is currently being successfully employed on Stage I, where the ECC Field Archaeology Group's preferred contractor is being used for both steps of the operation. It is intended that this will also be the case for Stage II. However, due to the comparatively large expanse of Stage III to be stripped and the large amount of spoil this will create, it has been agreed with the Developer that they will be responsible for the initial strip and cartage of all material off-site. The fine cleaning will be undertaken by machinery under the complete control of the Field Archaeology Group.

This system will minimise any damage to archaeological deposits and produce a working surface which requires the minimum of manual cleaning by archaeological staff.

All machining will be supervised by archaeologists. Further general criteria are contained in the ECC Field Archaeology Group's guidelines on archaeological machining standards (Appendix 2).

5.2.3 Manual Cleaning

Manual cleaning of large areas will be minimised by the successful operation of the above topsoil stripping strategy (Section 5.2.2). Where necessary, as such criteria as complexity of deposits or poor definition of specific areas of activity or structure dictate, some area cleaning by hoeing and trowelling will be undertaken. Where possible, only the exposed surfaces of features will be hand-cleaned and their edges defined to facilitate accurate pre-excavation recording. Such cleaning is intended to follow and keep apace with machine stripping.

5.2.4 Surveying

As manual cleaning is being undertaken, a 20m grid will be surveyed in on the National OS Grid, using an EDM, by the unit surveyor. Where the density of archaeological features and deposits demand it, this will be developed into a 10m grid to facilitate their

accurate recording throughout the excavation. All grid pegs will be assigned an eight figure reference number, which will be the last four digits of their actual National Grid easting and northing references.

5.2.5 Pre-Excavation Recording

The production of a pre-excavation plan at a scale of 1:50 will be undertaken as soon as surveying and adequate definition of features over an area is achieved. All plans will utilise ECC pro forma planning sheets designed to facilitate the recording of a 20m square at 1:50. All plans will be checked by supervisory staff on completion to ensure accuracy and the observance of ECC Field Archaeology Group drawing conventions (Appendix 2).

Individual features of particular interest or complexity, such as masonry buildings or cremations, will also be planned at a more detailed scale of 1:20 or 1:10 prior to, and as necessary to record significant episodes during, excavation.

5.2.6 Excavated Sample - Negative Features

The investigation of specific deposits and features will involve the stratigraphic excavation of their fills excavation to the following percentages:

5% - linear features such as ditches will be excavated by segments, a minimum of 2m long, across them. This will include samples along their length, at terminals and at intersections with other features to determine stratigraphic sequence where necessary. Sample sizes will be increased where necessary (Section 5.4).

50% - all discrete features such as pits, large post-holes and gullies will be half-sectioned. Where such a sample is deemed to be inadequate, because the feature is revealed to be more complex or reliable dating evidence is lacking, as much as a 100% sample may be excavated. Such decisions will obviously be made in the field as required.

100% - post-holes and other small features will be completely excavated. Such features will be half-sectioned to provide a cross-section for recording purposes and then the remainder also stratigraphically excavated.

5.2.7 Excavated Sample - Positive Features

Positive structural remains, such as masonry buildings, kilns or lined wells are likely to be far more complex and require correspondingly extensive and intensive excavation. Total excavation will be employed with detailed planning and recording being undertaken throughout as necessary.

5.2.8 Burials

Burials, whether inhumation or cremation, will necessitate full and detailed excavation. Inhumation burials will be planned at a scale of 1:10 and photographed after cleaning and before lifting. Cremation burials will sampled to 100% level.

5.2.9 Recording

The recording system is a single context system used by ECC Archaeology Section for many years (copy with EH).

Drawn record:

Following the excavation of a feature, planning will be undertaken at a basic scale of 1:20. All plans will be drawn on ECC pro forma drawing sheets which each facilitate a 10m square area at this scale and will correspond directly to the site grid. Where more detail is required scales of 1:10, 1:5 or even 1:1 will be employed.

Cross-sections of all half-sectioned and segmented features will be drawn to a basic scale of 1:10 on pro forma drawing sheets. Where required, quarter-sections and running sections will be recorded as excavation progresses.

All drawings will adhere to ECC Field Archaeology Group conventions (Appendix 2) and will be checked on completion by supervisory staff.

Digitising: a programme of digitisation of 1:20 post-excavation plans will run alongside the excavation programme to allow a site plan to be built up as excavation progresses (Section 5) and to prepare for the GIS based assessment stage.

Since post-excavation planning is proposed to be undertaken at 1:20 only, complete plans of linear features will only be available from the 1:50 pre-excavation plans. Linear features will therefore be digitised from the 1:50 plans to allow segments to be seen as part of the linear features which they sample.

All 1:20 post-excavation plans and linear features on the 1:50 plans will be digitised onto separate AutoCad drawings using common conventions. All plans will be related to the site co-ordinate system. The edges of features will be digitised in outline only.

Written record:
Each context will be given a written description on Field Archaeology Group pro forma context record sheets (Appendix 2).

Photographic record:
Pre-excavation photography of individual features will be employed as necessary where surface cleaning prior to planning reveals elements of interest. Large area photographs which cover distinctive groups of features or characterise the nature of the site overall will also be taken. Where possible, a photographic tower and/or aerial photography will be used.

Photographs of both work in progress and post-excavation of individual and groups of features will be taken. This will include general views of entire features and of details such as sections as considered necessary.

The photographic record will comprise both colour slides and black and white prints. All site photography will adhere to the ECC Field Archaeology Group's Photographic Record Guidelines (Appendix).

A video camera will be used to create a general record of the site throughout the Stage III work, and to record individual features and activities and of particular interest or importance.

Registers:
Registers for contexts, plan & section drawings, samples, photographs, registered finds, etc., will be kept as recommended in MAP2 on current ECC Field Archaeology Group pro formas (Appendix 2). All registers will be computerised.

A check on stratigraphy and early identification of potential problems will be made through the creation and maintenance of a stratigraphic matrix throughout the fieldwork phase.

5.2.10 Matrix

A check on stratigraphy / early identification of potential problems will be made through the creation and maintenance of a stratigraphic matrix throughout the fieldwork phase. This will be a responsibility of the supervisors. This will form part of the archive as soon as fieldwork has been completed.

5.2.11 Database

It is desirable for purposes of checking completeness of the record during excavation, and speed and efficiency of archive generation to computerise basic context information, taken from the written context sheets, on site. A portable computer and relational database software will be used for this.

The database is system is one that was developed by ECC Field Archaeology Group, and has been used at several sites (Othona, Great Holts, Stebbingford). It consists of 8 linked data files, recording respectively: basic context data (fields captured are - site code, subdivision, context number, category, part of, segment, date, below, filled by, cut by, butted by, within, contains, same as, bonded with, above, fill of, cuts, butts); consists of (table); plans (table with plan no.); sections (table with section no.); photographs (table with photograph index); and samples (table with sample nos).

Security: all records will be removed from site accommodation nightly. All written and drawn records relating to the defined six areas of topsoil stripping in the Stage III area will be copied at the end of fieldwork in that area.

5.3 FINDS

5.3.1 Collection policy

As regards the selection of types and quantities of different artefact groups to be collected during the course of excavation, it is intended that all material will be retained. This includes the collection of unstratified material retrieved from topsoil stripping and initial surface cleaning. Finds will be bagged by context and removed from site for subsequent processing and cataloguing. Where large scale spreads are present, the area in question will be subdivided into a finer grid (1 by 1 m squares as standard) and finds bagged by context number, the number denoting the area as 'part of' the overall source context for the spread. Removal of all finds will be overseen by the Finds Supervisor and Site Supervisors

5.3.2 Registered finds

All registered finds will be recorded 3-dimensionally unless retrieved from spoil tips or similarly disturbed areas. Each will be given a unique number and recorded both on context sheets, where applicable, and on a registered finds register.

This register (Appendix 2) contains the following fields: registered find number (sequence 1..n); source context; description; material; X,Y and Z co-ordinates; date.

A database containing all information in the registered finds register will be maintained during sitework.

Three dimensional recording of registered finds will enable the spatial analysis of finds by type and period at the assessment stage. Surveying will be achieved by EDM or theodolite; input to the GIS will be via file exported from the database containing the

registered find information, into which three dimensional location data will have been keyed with the other fields.

The policy for registering finds will be to register:

all metal objects (except iron nails not in situ, eg in a coffin)
all non-tile and non-ceramic artefacts
tile and ceramic artefacts of intrinsic interest
flint tools

5.3.3 Processing and Cataloguing

The processing and cataloguing of all artefactual material will be undertaken while excavation is in progress. This will facilitate its continuous appraisal as discussed below. Processing will involve washing and marking of finds as appropriate, under the supervision of the Finds Supervisor. Cataloguing and checking of the relevant registers (Appendix 2) will also be undertaken by the Finds Supervisor.

5.4 CONTINUOUS APPRAISAL PROCESSES

The following are proposed to ensure that groups crucial to meeting the project's research objectives are adequately sampled, and are therefore processes which have an impact on sampling because the sample size may be increased. Dating information derived will also be used to assign a provisional date in the computerised context record for use in production of provisional date lists.

5.4.1 Continuous Pottery Appraisal

A programme for the finds viewing of pottery including concurrent appraisal of excavated groups will be undertaken as fieldwork progresses to provide an early input to phasing and ensure that significant / deficient groups are recognised to trigger a return to features for further sampling if necessary. The process should ensure early recognition of key groups, for example those dating to the transitional periods or those containing kiln wasters. The Late Iron Age and Roman pottery will be scanned by C. Wallace; he will separate pottery likely to be Saxon and pass this on to S.Tyler for scanning. Prehistoric pottery will be identified as necessary by N. Brown. The output will be in the form of brief notes indicating the size of the group (large (>100 sherds), medium (30-100) or

small (<30), date of pottery in group (ie assignation to one of the phases listed in section 5), reasons for that assignation (ie based on presence / absence of particular wares or forms), its condition, and note of items of intrinsic interest.

Where absolute dating of Saxon contexts is required either to establish phasing or to address specific objectives regarding the dates of Saxon pottery (SO44-SO46), radiocarbon samples will be taken from source contexts where available (5.5.2.2).

5.4.2 Continuous Non-Ceramic Artefact Appraisal

All non-ceramic artefacts will be viewed as excavation commences for early identification of groups which need to be enlarged by further sampling; this would include for example groups containing significant amounts of imported material, items of military equipment etc, important respectively for throwing light on trading patterns and military presence. All finds will initially be assessed by the site Finds Assistant, who will then refer uncertain material to the Field Archaeology Group Senior Finds Office who may then in turn consult with specialists as appropriate.

5.5 ENVIRONMENTAL SAMPLING AND SCIENTIFIC DATING METHODS

5.5.1 Environmental

The environmental sampling programme is crucial for gaining data to address many of the project's specific objectives. In general, bulk sampling of dry contexts in which charred plant remains are present will recover data on agricultural activities, economy and relationship of the site to the countryside as well as intra-site zonation, and changes therein associated with the transitional periods. Wet samples have the same potential, but will produce a range of other evidence including plant remains, insects and artefacts, and produce data to inform on many aspects of the site and project objectives. The following has been recommended by P. Murphy and other members of the environmental team. The on-site sampling and liaison with external specialists will be supervised by the project's on-site environmentalist.

5.5.1.1 Bulk samples from dry contexts

P. Murphy has advised the bulk sampling of well-defined, closely dated contexts with rapidly accumulated fills (eg refuse pits, hearths, cremations etc). The sampling strategy will comprise large scale sampling by flotation to 300/500 um, sieving samples of 10-30 litres, coupled with coarse mesh sieving to 4 mm of larger samples (100-200 litres) for larger animal bone recovery.

100% sampling of layers apparently rich in burnt organics in Saxon contexts will be taken as possible material for radiocarbon dating (5.5.2.2).

Flotation will be undertaken by experienced Field Archaeology Group staff using sieving units constructed to a specification of P. Murphy (one already in use) under the supervision of the on-site environmentalist.

5.5.1.2 Samples from wet contexts

30 litre samples will be taken from wet contexts in deep features where continuous waterlogging since the backfilling episode is likely (eg wells). The conservationist for the project (N. de Silva) has asked for all wet organics to go straight to her for stabilisation as necessary.

5.5.1.3 Dendro samples

Dendro samples of sufficient size to provide dating (>50 rings) will be taken where present in continuously waterlogged contexts. C. Groves (Dendrochronology Laboratory, Sheffield) has agreed to give short-notice advice as needed, and visit the site if necessary. If large numbers of waterlogged timbers are encountered, R. Darrer has advised taking a representative sample, including those timbers showing signs of woodworking; he has agreed to visit the site as necessary. On advice from N. de Silva and R. Darrer, tanks to hold samples will be brought onto site as needed.

5.5.1.4 Pollen samples

P. Wilshire will sample contexts she feels likely to produce useful pollen assemblages. She has agreed to advise further when more excavation has taken place.

5.5.1.5 Soils

If buried soils survive, R. MacPhail has advised that micromorphological study may demonstrate evidence of zoning within the area of the town. He will be contacted as the need arises.

5.5.2 Scientific Dating

5.5.2.1 Archaeomagnetism

AML advice will be sought where it is felt there may be potential for archaeomagnetic dating of features (eg hearths and kilns): P. Linford will be contacted as soon as a potentially suitable feature is uncovered, and has already been contacted about the kilns in the Stage I area.

5.5.2.2 Radiocarbon

This will be crucial for absolute dating of Saxon contexts to establish phasing and to address the specific objectives for dating of Saxon pottery (SO44-46).

A. Bayliss (AML) advises that for precision better than plus or minus 35 years the following sample sizes are required:

wood	150 g dry (c. 600 g wet)
charcoal	50 g
bone	750 g *

In practice, 100% sample will taken of 'charcoal layers' from hearths that are not datable from archaeomagnetism.

* The above sizes cannot be achieved by bulking together material which may not all be of the same date (eg animal bone from rubbish deposits). Articulated bone will therefore be kept together and recorded as such during excavation.

Radiocarbon dating samples will be taken from prehistoric features wherever they occur, with a decision on their suitability and usefulness taken at the assessment stage.

5.6 INDUSTRIAL RESIDUE SAMPLING

The following strategy is based upon comments by Cath Mortimer and David Starley (AML).

5.6.1 Smithing Areas

Since hammerscale in soil samples may provide the clearest indication of the location of smithing where no hearths survive, sampling of soils is especially critical for the recognition of smithing areas where no hearths survive. Bulk samples will therefore be taken in 30 litre units where hammerscale is noticed during excavation.

5.6.2 Slags and Associated Debris, and Structures

If metalworking debris is found in substantial quantities (ferrous > 50 kg, non-ferrous > 1 kg), or metalworking structures are found in situ CM and DS will be informed and asked to provide advice on the recovery of residues and the interpretation of features. In general all bulk slags and associated debris will be retained unless the quantities are so large that they cannot be stored; if sampling is necessary, CM and DS will be consulted to ensure an adequate level in the circumstances.

5.7 CONSERVATION

The conservator appointed to the project, N. de Silva, will undertake emergency conservation and advise on lifting as necessary. Liaison with her will be the responsibility of the site finds supervisor (L. Wastling). N. de Silva's contribution to the project is further discussed below (7.1.2.1).

Advice and assistance will be given in the lifting of fragile objects using mainly plaster of Paris and expanding polyurethane foam methods. Any large wooden objects/structural timbers will be stored wet whilst being assessed. Any decision on long-term storage and conservation will need to be taken in consultation with the conservator amongst others.

Selection of registered finds for the assessment phase will be carried out on site together with the ECC Senior Finds Officer, Ms Hilary Major. All registered finds except those of post-medieval date will be examined. Selection will take place around the middle and end of the fieldwork phase. The exception will be in the event of recovery of vulnerable materials which will need immediate attention; this category includes organic materials, organic remains on metal, enamelled metal and damp glass.

The selected registered finds will be examined visually under magnification all iron and some non-ferrous metal objects will be x-radiographed. Artefacts will also be examined for information regarding their burial environment. Partial mechanical cleaning will be undertaken to enable identification and drawing for publication in due course. Actively corroding metals, wet organic registered finds and other unstable materials will be treated appropriately.

Certain artefacts in sufficient numbers may be indicative of foreign imports and the analytical services of the AML Technology Section could be used to this end. Investigation of the material, its identification and technology using scientific techniques could be arranged with the AML.

AML specialists will be Dr Justine Bayley (Technology Section), Ms Glynis Edwards and Ms Jacqi Watson (Organic materials, Conservation Section).

6.0 ARCHIVE

6.1 MATERIALS AND RECORDS

6.1.1 Records

The archive will include copies of correspondence relating to fieldwork, the project design, the geophysical survey reports, all plans supplied by Bovis including the contour plan, and plots of the Stage III contour survey.

It will contain the original photographic records, original context records, all manually completed registers, site drawings, original finds records and records of artefact conservation and x-radiography undertaken during fieldwork, and the written output from the continuous artefact appraisal programmes (5.4).

The archive will contain all computerised data files and hard copy as follows:

Context data (specified fields input during fieldwork)
Context data (remaining fields input after fieldwork)
Sample record (input after fieldwork)
Plan register (input during fieldwork)
Section register (input during fieldwork)
Finds register (input after fieldwork)
Registered finds register (input after fieldwork)

AutoCad files from the digitising of 1:20 and 1:50 plans
Data-logger files from survey

The basic finds register will be compiled by the site finds supervisor, and will essentially represent a quantified list of materials present, enhanced where artefacts thought to relate to specific research objectives have been recognised during fieldwork.

The archive will also contain all artefacts, ecofacts and other sample residues.

6.1.2 Security Copy of Archive

At the end of archive work a security copy of the entire site archive will be deposited at the Castle Museum, Colchester.

6.2 MATRIX AND SUMMARIES

A brief objective statement will be produced to summarise the nature and quantity of the various classes of data collected.

This will comprise:

6.2.1 Site Matrix

The site matrix compiled during fieldwork (5.2.10) will be cross-checked and the stratigraphic sequence of the site firmly established. This will be undertaken by one of the project supervisors.

6.2.2 Summary Account of Context Record

The account will briefly describe the site and synthesise the context record. It will include a summary of preservation, main characteristics of the record, and a summary totalling the number of features by type. The data to enable this will be contained in the context record database.

6.2.3 Summary Account of Artefact Record

The account will be a brief statement of the range, quality and condition of the assemblages, drawn from the finds register, registered finds register databases, as well as from the continuous finds appraisal records.

6.2.4 Summary account of environmental record

This will be brief statement of the range, quality and condition of the environmental sample assemblages, derived from the database containing sample data. This will be produced by the project's environmental scientist.

7.0 ASSESSMENT AND UPDATED PROJECT DESIGN

7.1 ASSESSMENT

The assessment will be conducted by means of context based, materials based and specific objective based processes. The key personnel necessary for the tasks will form a project team, consisting of the project manager, all in-house area managers, the computing supervisor, the on-site environmental scientist and external specialists, the conservator, artefact specialists (in-house and external), and a member of the Colchester Museum staff (as necessary). The entire project team will meet at the outset of the assessment stage and when the provisional dating stage has been completed, when the specialist assessment reports are all available and any adjustments to the provisional phasing have been made, and when work on the updated project design is to begin.

The principal tool in the assessment phase will be a computer system with basic GIS functionality which will be used for manipulating data in the computerised databases created during fieldwork and at the archive stage, and the AutoCad plans digitised during fieldwork.

7.1.1 Context Based Assessment

The purpose of this process is to assign a provisional date to each context to enable the production of provisional phase plans using the GIS.

7.1.1.1 Method of date assignment

The scale of the excavation is such that it will be exceedingly difficult for specialists to gain a sufficiently clear insight into the site to be able to understand the point of origin of artefacts and to assess significance of artefacts recovered in spatially or chronologically related groups. It is therefore essential to produce phase plans for provision to the specialists along with their assemblages and their data.

It is therefore proposed to date the phasing at this stage on pottery alone, though provision is made to review the phasing in the light of other artefacts types (notably

coins) where these can be easily and closely dated in their assessment. An adjusted provisional phasing plan is thus produced.

The assignment of initial date to contexts and features will be achieved by the project manager, finds supervisor and pottery specialists. Dating of features will involve examination of the context data, the stratigraphical matrix and the records made during the continuous pottery appraisal programme during fieldwork. After taking residuality and contamination into account, a date for the feature will be assigned. Phasing data will then be input into date field in the context database for all contexts (ie features and constituent fills / layers etc).

The phase plans will then be plotted via the GIS type system.

Where insufficient pottery has been recovered from a feature, consideration will be given through examination of the finds and sample registers to other means of dating (eg finds or radiocarbon)

7.1.1.2 Phasing scheme

It is proposed to provisionally phase the site as follows, using this scheme from the outset and thus including the continuous pottery appraisal programme during fieldwork.

Phase		
1	Prehistoric (undetermined)	-
2	Pre-Neolithic	c. - 4000 BC
3	Neolithic	c. 4000 - 2000 BC
4	Early Bronze Age	c. 2000 - 1500 BC
5	Middle Bronze Age	c. 1500 - 1000 BC
6	Late Bronze Age	c. 1000 - 750 BC
7	Early Iron Age	c. 750 - 300 BC
8	Middle Iron Age	c. 300 - 50 BC
9	Late Iron Age	c. 50 BC - c. AD 30
10	LIA / early Roman transitional	c. 30 - c. 70

11	Going Ceramic Phase 1	c. 60 - c. 80
12	Going Ceramic Phase 2	c. 80 - c. 120/125
13	Going Ceramic Phase 3	c. 120/125 - c. 160/175
14	Going Ceramic Phase 4	c. 160/175 - c. 200/210
15	Going Ceramic Phase 5	c. 200/210 - c. 250/260
16	Going Ceramic Phase 6	c. 260/275 - c. 300/310
17	Going Ceramic Phase 7	c. 300/310 - c. 360/370
18	Going Ceramic Phase 8	c. 360/370 - c. 400+
19	Late Roman / early Saxon trans.	c. 400 - c. 450
20	Saxon	c. 360 - c. 1050
21	Medieval	c. 1050 - c. 1500
22	Post-medieval	c. 1500 +
23	Uncertain	-

7.1.2 Materials Based Assessment

The purpose of the processes described below is to gain the specialist assessment of potential for all classes of artefactual and ecofactual data recovered. The apparent significance of this data may be modified by looking at the distribution of data classes over the site as a whole (7.1.3).

7.1.2.1 Conservation

The conservation process will begin during fieldwork; the timing of this and basic methodology are discussed above (Section 5.7). The conservator (Nerina de Silva) will examine registered finds by type and produce a brief report setting out requirements for
In general the order of examination by material will be determined by the stability of the material, specialists' programmes, and the likelihood of dating coming from groups (coins, copper alloy objects) to allow minor modification of the phasing.

Material, or a subset thereof, will later (below) be reexamined by the conservator and specialists to identify any material for which cleaning is required by the specialist.

7.1.2.2 Artefact and ecofact assessments

All specialists will examine their groups to assess to its potential to address the specific objectives of the project and to identify any new research objectives for assemblage, and produce reports thereon which will include an assessment of the potential value of the data collection to address national, regional and local research priorities.

All specialists will be provided with a copy of the project design, copies of the archive phase summary reports on the site, environmental and finds data, context data, phase plans, notes on possible contamination/residuality, and the recording method. In Artefact specialist will also be asked to provide dating information on finds where this can be very rapidly and closely achieved (eg coins) which can then be used to review the pottery based phasing.

Where relevant, specialists will meet with the conservator to consider the need for conservation or cleaning of particular objects; similar finds types (eg non-ferrous metals) will normally be examined together. The significance and enhanced potential of finds resulting from their spatial or chronological association with other types is considered below.

7.1.3 Specific Objective Based Assessment

After any amendment to the provisional dating of features arising from comment by the specialists on particular artefacts, an assessment of the potential of the data to address the specific objectives of the project will be undertaken by the project team. The specific objectives will examined individually, using the all classes of information now available. This will include the context data in the archive, the phase plans, sample, artefact and ecofact plots, and the assessment reports.

All specialists will be supplied with copies of all assessment reports. A meeting, or series of meetings as the data determines, of the project team will then be held to consider the enhanced potential that may arises from a coincidence of finds types. The tool to enable this assessment will be the GIS.

The process will result in an assessment of the potential value of the site to address national, regional and local research priorities. New potential research topics will also be identified at this stage.

The process will lead to an integrated statement of potential, which will form the basis of the updated project design stage.

All reports, X-radiograph plates etc will be added to the archive.

7.1.4 Spatial Patterning: GIS Type Application

Software with basic GIS functionality will be essential for handling the very large datasets the fieldwork will generate for the assessment work, and will ensure that the data has been stored to facilitate analysis when required. A full-blown GIS (eg Arc/Info) is not envisaged, but rather a basic functional tool to allow the large amount of data to be managed easily, and to take full account of its spatial patterning when framing the research strategies and assessment potential. Software options are being examined, with the view that the requisite interfacing and functionality will be provided by GeoSys. System development will be commissioned as recommended by English Heritage's computer consultancy, Cultural Heritage Information Consultants. Hardware costs are included in the equipment requirements, and a sum has been allowed for system design and build, and training.

The GIS system will be loaded with a) all data in the context database, b) all data in the computerised registers (finds, registered finds, samples) input during the fieldwork and archive stages, and c) the AutoCad drawings created by digitising all 1:20 post-excavation and 1:50 pre-excavation plans during fieldwork.

The tool will be used to produce the provisional phase plans and to produce distribution plots of any of the data by type / date / association etc.

7.2 UPDATED PROJECT DESIGN

The updated project design will be formulated after completion of the assessment report, following the specifications given in MAP2; Appendix 5.

All project team members to be involved in the analysis phase will contribute to the formulation of the updated project design. Planning for the programming and activities in this stage will be identified as early as possible.

Additional information will be sought from relevant parties as necessary, and academic comment will be requested at initial draft stage.

8.0 RESOURCES AND PROGRAMMING

8.1 STAFFING

8.1.1 Management

The ECC Field Archaeology Group management system comprises a group manager, C.P. Clarke (the only staff member salaried by ECC) and a tier of three area managers; H. Cooper-Reade (fieldwork), H. Major (finds) and P. Allen (post-excavation).

8.1.2 Key Project Personnel

The key personnel for the project are as follows:

FAG Management:	
Field Archaeology Group manager	C.P. Clarke
Fieldwork manager	H. Cooper-Reade
Finds manager	H. Major
Post-excavation manager	P. Allen
Field Staff:	
Project manager	M. Atkinson
Site Supervisors	D. Kenny/S.Preston + 5
Finds Supervisor	L. Wastling + 1
Environmentalist	to be appointed
Surveyor	V.W. Foo
Computing Supervisor	to be appointed
Planning Supervisor	to be appointed
1:50 planners	to be appointed
Photographer	to be appointed
Finds Specialists:	
Prehistoric pottery	N. Brown (ECC)
Roman pottery	C. Wallace (ECC)

Roman brick & tile	H. Major (ECC)
Saxon pottery	S. Tyler (Freelance)
Metalwork	H. Major
Coins	P. Guest
Quernstones	H. Major
Conservation:	N. De Silva (EH)

Environmental consultants:	
Plant macrofossils	P. Murphy (EH)
Insects	M. Robinson (EH)
Pollen	P. Wiltshire (EH)
Soils	R. MacPhail (EH)
Wood	R. Darrah (EH)
Faunal Remains	R. Luff (EH)

AMLab Consultants:	
Archaeomagnetic dating	Paul Linford
Metalworking residues	Dr Justine Bayley
Conservation (organic materials)	Ms Glynis Edwards and Ms Jacqi Watson

8.1.3 Staff Duties

Field Group Manager: Head of the Field Archaeology Group of ECC Archaeology Section. Overall responsibility for all aspects of the Group's work.

Project Manager: Responsible for the day to day management of the excavation. Coordination of all aspects of the project, including excavation, finds processing and assessment and specialist input, with a view to ensuring that the excavation methods are effectively addressing the stated aims and objectives. Coordinating archive collation and production of the assessment report and updated project design.

Site Supervisors: Responsible for the supervision of all aspects of day to day site work. Management of Site Assistants. Responsibility for effective implementation of excavation methods. Liaison with Finds Supervisor, surveyor and computer technician to ensure coordination of activities. To ensure quality control and consistency of record prior to data input, and release blocks of context sheets for data input to computing supervisor as soon as ready.

Site Assistants: Responsible for the undertaking of all aspects of excavation procedures as outlined in the methods statement. This includes cleaning, planning, excavating and recording under the supervision of the Site Supervisors; surveying and computer input under the supervision of the relevant designated technicians; collection of finds and samples under the supervision of the Finds Supervisor. Also to undertake processing of soil samples when necessary under supervision of the Field Group's wet-sieving technician.

Finds Supervisor: Responsible for overseeing the effective collection of artefactual material during excavation. Supervision of processing and of any site assistants undertaking this task. Production of a catalogue of all material. Liaison with relevant specialists and Site supervisors..

Planning Supervisor: To liaise with surveyor and co-ordinate 1:50 planning programme. To supervise all planning work. To check all 1:50 pre-EX plans and 1:20 PX plans. To liaise with digitising staff and release plans for digitising when complete.

Environmentalist: Present on site to undertake and advise on all aspects of environmental sampling in the field. Also organise and supervise the processing of samples by site assistant staff. Liaison with all external specialists to ensure adherence to strategy and coordination of associated activities.

Surveyor: Responsible for laying out the site grid and locating trenches areas and features as necessary, using theodolite and EDM. Will supervise any personnel assisting them in their work.

Computing Supervisor: Responsible for supervising digitising programme and data input, GIS load, test and use.

Finds Specialists: undertake the continual assessment of artefactual material as the excavation is conducted. Liaise with Project Manager and Site and Finds Supervisors to advise on collection strategy, provide spot dating and identify significant groups which apply to the project aims and objectives. Provision of overall finds assessments on completion of the excavation.

Environmental consultants: to liaise with Project Manager and Site supervisors. To advise on sampling procedures, excavation and recording where appropriate. They will provide a very an important contribution to the assessment report.

8.1.4 Staffing levels for Stage III.

8.1.4.1 Fieldwork

For the purposes of the following the Stage III area has been subdivided into the six distinct topsoil stripping areas shown on Figure 9.

The presence of all key staff (project manager, supervisors, finds assistants) etc. will be essential for the duration of the project. The main determining factors for all fieldwork resource requirements are that of a) time/area/complexity of the site, b) need for efficient execution of the project design to a very tight deadline and c) also for efficiency and speed, the need for concurrent processing with finds appraisal, data input and digitising occurring simultaneously with the fieldwork.

Estimates for the numbers of staff required are based on a calculation that Site Assistants will be able to record the archaeology over an average area of 10 square metres per day per person. This calculation is based on what is known about the Stage III area from the evaluation trenches and geophysical survey, and recorded excavation rates on other

excavated sites. The number of site assistants required is thus derived from the ratio between the size of each topsoil stripping area and the time available for its investigation.

The estimate of the number of supervisors required, who will necessarily spend a large proportion of their time undertaking checks for the completeness of the record on a context by context basis as well as determining the programme for their own areas, and liaising with other staff as necessary, is based on a ratio of 1 supervisor : 12 site assistants.

Table: Calculation of Numbers of Site Assistants for Fieldwork

	Area B1	Area B2	Area A1	Area A2	Area A3	Area C	Total
Weeks available	3	4	10	6	5	4	
Days available	15	20	50	30	25	20	
Area (sq m)	12,000.00	16,455.00	34,095.00	25,000.00	19,100.00	15,350.00	122,000
Unexcav-atable area	1,560.00	1,680.00	660.00	3,120.00	1,200.00	1,500.00	
Excavate-able area	10,440.00	14,775.00	33,435.00	21,880.00	17,900.00	13,850.00	
Sq m/day	696.00	738.75	668.70	729.33	716.00	692.50	
Target sq m/day	10.00	10.00	10.00	10.00	10.00	10.00	
No. site assistants	79.00	83.85	75.90	82.78	81.27	78.60	

* All calculations of numbers take due account of time on site lost through sickness, poor weather, training and leave (13.5% total).

NB The area marked as 'bypass' in Figure 10 is included in the calculations of area for B2 and A1.

8.1.4.2 Archive and Assessment

The estimates of time for archive and assessment work are inevitably difficult and are based on broad estimates of the quantity and complexity of the data. The strategy of concurrent data input, digitising, finds processing, finds appraisal and environmental sample processing will ensure that resourcing for the archive and assessment stages is as low as possible. Backlogs in all of these areas from the last few weeks of fieldwork will kept as small as possible.

The resourcing for the 16 weeks allowed for the archive phase takes into account the requirements of staff for a holiday at the close of fieldwork and also for the Christmas 1994 break. It also allows for clearing the minor backlogs in data entry etc..

8.2 EQUIPMENT AND OTHER COSTS

8.2.1 Site Plant

The only machining costs to be met out of the project budget are those for the two 360 degree excavators which will undertake the final 'fine' strip of Stage III. These will be hired in by the Field Archaeology Group and be separate from those excavators and dumpers supplied by the developer.

Judging from the machining progress realised for Stage I, it is estimated that fine stripping will be undertaken at a rate of 10,000 sq m per week using two hymacs or similar. A budget of £ 12,000 is allowed in the project estimate.

8.2.2 Site Accommodation

Portable cabins will be necessary:

- 1 site office; administration, checking, computerised data input.
- planning offices; day storage of all recording equipment and primary archive.
- staff mess rooms; 20 staff per cabin.
- toilets

Secure stores will be needed to contain general site equipment such as tools and materials. 20 ft metal containers are most suitable for this purpose. Prices for all site accommodation are based on levels paid during Stage I and for other sites over the past 6 months; cabins and toilets currently cost in the order of £ 25 per week plus delivery.

8.2.3 Off-Site Accommodation

Warehousing

It is impractical to attempt to undertake processing of finds and samples on site. Portable cabins are restricted in space and the absence of facilities such as running water and electricity would severely limit productivity.

Both Essex County and Maldon District Councils have been approached about the availability of free or reduced rate off-site accommodation. However, neither have been in the position to offer such premises.

It is therefore necessary to rent some form of warehouse accommodation. There are industrial units located in Heybridge, close to the site. This would be an ideal situation in which finds processing could be undertaken in a stable environment in close contact with the site, rather than some 12 miles away at the Field Archaeology Group finds store in Chelmsford. It is estimated that a total floor space of 2,000-3,000 sq ft is required, for which a budget of £ 12,000 is allowed. Possible units have been identified in close proximity to the site.

Housing subsidy

An allowance of £ 15 per week is made for all temporary staff taken on for the projects on contracts of 6 months or less. Of the accommodation options open to Field Archaeology Group, the hostel accommodation available for staff is likely to full to capacity with longer term staff on contract for other projects. The Elms Farm staff must therefore have alternative provision of leased houses or rooms in houses in the area. An advertisement in the local newspaper group for accommodation offers has had a good response, and the outcome is likely to be a combination of houses on 6 month lease and rooms in privately occupied houses. However both options are expensive, and the

weekly cost will be considerably greater than that to be charged in the two houses used for hostels by the FAG. Rooms are being offered in the range of £ 50-65 per week for board only, and leased houses are usually in the range £ 400-500 per month. A subsidy is considered essential during fieldwork as a prerequisite for recruitment and retention of staff. Subsidies will be paid either directly through salary transfers (for staff rooming in private houses) or paid by the FAG at the same level of subsidy per person to the letting agency concerned.

8.2.4 Tools

The expansion of the project team from 15 to over 80 Site Assistants represents a very significant increase in demand on tools and other equipment required for the day to day excavation process.

While the Field Archaeology Group has additional items these are used on a range of smaller projects which will run simultaneously with Elms Farm. It will therefore be necessary to enlarge the site tool provision very considerably. This will include shovels, mattocks, buckets, wheelbarrows, measuring tapes, etc.

8.2.5 Transport

Two county crew buses are currently being used on Phase I of this project. Each seats a total of 15 people. With a staff totalling 110, further such transports will be needed.

A county car is also currently on hire. This will be kept for the duration of the fieldwork to allow supervisors and other appointed members of staff to undertake such tasks as the observation of machine stripping outside the normal working hours of 8am to 4pm.

8.2.6 Photographic Equipment

Additional sets of cameras will be required. A video camera would also be useful to record both the site in general and the excavation of particular features of interest such as roads, kilns and graves.

8.2.7 Information Technology (Hardware / Software)

PC (66 Mhz 486DX) for GIS (20" SVGA monitor)
Tape backup for same
A0 digitiser
Software (relational database)
Software (relational report writer)
Database development
GIS development
A1 plotter (pen)

The software costs itemised in Appendix 3 reflect the need for multi-user licences.

8.2.8 Other Equipment

Other items of equipment required during the course of the project are as follows:

- water pumps. The Field Archaeology Group possesses small petrol driven pumps. These are adequate for emptying ditches and pits. However, a much larger pump would be needed to cope with the amounts of water observed during the trenching of the waterlogged areas of Stage III.

- shelters. Although it will be impossible to protect the vast majority of the site from the elements, the use of 'polyspans' to cover crucial features such as the kilns in Stage I will ensure that at least limited excavation can be undertaken on these important elements of the site in any weather.

8.3 TIMETABLE

8.3.1 Fieldwork: Cascade Diagram

	1994												**1995**	
	* 28/1		* 14/3							21/10*				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
EH Agreement	*													
Setup	*	****												
Area A1			**	****	****	**								
Area A2						**	****							
Area B2							****							
Area A3								****	*					
Area B1									***					
Area C										****				
Archive											****	****	****	**
Conservation						**	**				****			

<u>Overall programme: weeks / dates</u>

Fieldwork: 32 weeks, 14/3/94 - 21/10/94

Archive: 16 weeks, 24/10/94 - 10/2/95

Assessment: 26 weeks, 13/2/95 - 11/8/95

8.3.2 Assessment: Cascade Diagram

	1995						
	*13/2/95						11/8/95*
	Feb	Mar	Apr	May	Jun	Jul	Aug
Context based assessment	**	****	**				
Materials based assessment	*	****	****	**			
SO based assessment			****	****	****		
Assessment report					**	**	
Updated PD						**	**

8.4 HEALTH AND SAFETY

It is the policy of the Field Archaeology Group to follow the Essex County Council Planning Department statement on health and safety at work and the SCAUM policy document on health and safety in field archaeology as amended to take account of the 1993 EC directives. C.P. Clarke is the Field Archaeology Group's nominated Health and Safety Officer.

Essex County Council has employer's liability insurance and third party liability insurance in respect of any incident on site involving County Council employees. All excavation and site work will comply with the Construction (General Provisions) Regulations of the Factories Act 1961, and with the Health and Safety at Work Act 1974.

The safety requirements regarding overhead electric cables will be adhered to as set out in the Heath and Safety Executive's Guidance Note GS6. Eastern Electricity have also been consulted as regards safe clearance heights for machinery and spoil heaps, etc. Negotiations are being conducted with Bovis Homes as regards their diversion. However, this is unlikely.

Public safety is also being considered at the moment. The areas of the site under pasture all have public rights of way across them. The most significant is Footpath No.12 which runs east-west across the middle of Stage III. Negotiations are under way regarding its temporary diversion for an initial 6 month period using another footpath which runs outside the site perimeter.

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