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Section 4: Archaeological Resource

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4.1 Investigations by WHEAS in the Lower Lugg Valley

Introduction

4.1.1 *Objective*

This report provides a summary of work undertaken over the past 20 years in the Lower Lugg Valley, Herefordshire by Worcestershire Historic Environment and Archaeology Service (WHEAS) and its predecessor organisations.

4.1.2 *Scope*

The principal focus of the report is the long-term programme of investigations undertaken by WHEAS since 1986 at Wellington Quarry, Marden on behalf of a succession of quarry operators including the current owners Tarmac Limited. Operations at the quarry are still ongoing and the report includes information from recent phases of work ensuring that the summaries are as current as possible.

Work at further quarry sites at Lugg Bridge, Hereford and at St Donat's Farm, Burghill is also covered as is a programme of recording undertaken along the Lugg Bridge to Withington pipeline. More general studies covering the Lower Lugg catchment completed as part of the English Heritage commissioned *Herefordshire Valleys Survey* undertaken in the late 1980s are also briefly considered.

4.1.3 *Outputs*

The report presents a chronological overview of archaeological results from each of these projects as well as a summary of geoarchaeological and palaeoenvironmental studies accompanying the investigations. The latter support understanding of landscape development and change within the Lugg Valley as well as of the contextual and depositional environment for the archaeological evidence of phases of human activity in the valley.

Lastly, a comprehensive bibliography of both published and grey literature is provided (**Section 6.1**), the latter being made available to the project team through the production of PDFs of all reports for which WHEAS hold copyright. These will also be made available to a wider professional and public audience through addition to the WHEAS web library (http://www.worcestershire.gov.uk/home/wccindex/archeo_dr_index.htm).

Wellington Quarry Project Summary

4.1.4 *Location*

Wellington Quarry is situated within the lowland area of central Herefordshire, a bowl-shaped depression into which the surrounding hills drain. The site is located at NGR SO 508 479 and lies between the villages of Marden and Wellington, 7km north of Hereford. It is situated on the broad floodplain of the River Lugg, to the west of the current course of the river (Figure 22). The Wellington Brook runs through the centre of the site and joins the Lugg a short distance to the south. The western boundary is formed by the main Hereford to Leominster road (A49), while the eastern boundary is formed by the Hereford to Leominster railway.

4.1.5 *History of investigations*

Archaeological investigations by the Field Section of Hereford and Worcester County Archaeological Section, (now the Historic Environment and Archaeology Service of Worcestershire County Council; henceforth the Service), have been undertaken at Wellington Quarry, Marden Lane, Marden, Herefordshire since 1986 (Figure 22).

Over the 20 years of work at the quarry a number of County Sites and Monuments Record numbers have been allocated to different phases of the workings:

- HSM 5522 covers the original permitted area, the northern extension and Phases 9 and 10 of the southern extension;
- HSM 32267 covers Phases 8, 11 and 12 of the Southern extension;
- HSM 31835 and HSM 32268 covers evaluations of the Moreton Camp extension; and
- HSM 43223 covers the first stages of salvage recording within Moreton Camp.

Work has been undertaken in advance of sand and gravel extraction on behalf of Redland Aggregates Limited, their successors Lafarge Aggregates Limited and most recently Tarmac Limited. Projects supported by English Heritage have also been undertaken both at the quarry and relating to the quarry within the wider context of the River Lugg. Lastly several post-graduate research initiatives have focussed upon various specific elements of the site record.

The overall programme of work and site area affected can be divided into four main blocks (Figure 22):

- The original application area (1986-96);
- The Northern extension;
- The Southern extension; and
- Moreton Camp.

A desk-based assessment of a proposed north-west extension was also undertaken (Jackson 2001) though an application has not been submitted and the area is currently understood not to be under consideration for extraction.

4.1.6 *The original application area 1986-96 (Figures 23 and 24)*

Archaeological deposits were first identified at Wellington Quarry during preliminary groundworks undertaken for the construction of the site processing plant in 1986. During a brief visit, substantial stone walls and Roman pottery were observed by Ron Shoesmith, Director of the City of Hereford Archaeology Committee who informed the Service of their presence. As a result, a geophysical survey was commissioned from the Ancient Monuments Laboratory in 1987 (Gater and Gaffney 1989) and in 1988 the Service undertook an evaluation (funded mainly through the Manpower Services Commission with a contribution from Redlands; Taylor 1987; Clarke et al 1988).

This work established a ‘core area’ for the Roman settlement encompassing a stone building and a surrounding area of settlement activity. A temporary agreement was reached to enable the preservation of the ‘core area’ below the plant and storage areas, and this arrangement has now been made permanent with the area excluded from extraction proposals and preserved within restoration proposals.

Subsequent to the identification of the 'core area', archaeological investigations were undertaken following successive seasons of quarrying work extending to the south and west of this 'core'. These were funded by Redlands under a voluntary agreement and comprised a brief programme of salvage recording and production of an interim report accompanying most stages of stripping (SR1 to SR9; Figure 23).

Although the work undertaken in the original application area had many limitations and some areas received little or no archaeological input, an extensive spread of regionally and nationally significant archaeological deposits was revealed across an area of some 37ha. These ranged in date from the early prehistoric through to medieval periods. In addition, work on alluvial sediments was undertaken as part of an English Heritage Project (Herefordshire Valleys Survey; Dinn and Roseff 1992; Dinn 1996; Dinn and Moran 1996; Hemingway and Dinn 1996) and also as part of a doctoral thesis (Roseff 1992). These provided information on the landscape and geoarchaeological history of the area and formed a framework for the understanding of the results of the salvage recording.

The funding provided voluntarily by Redland Aggregates for the original application area enabled some processing and limited analysis of results leading to production of interim reports for each phase of work (SR1, Edwards 1989; SR2, Shelley 1989; SR3, Edwards 1990; SR4, Brown 1992; SR5, Fagan et al 1993; SR6, CAS 1995; SR 7, CAS 1996; and SR8 and 9, Napthan et al 1997). In addition, Redlands provided further funding to allow for more detailed analysis and publication of a Beaker burial recorded in 1996 (Harrison et al 1999).

It was, however, not possible within the circumstances of the work carried out during this period to undertake any synthetic or detailed analysis. Consequently in 1999, in the light of the significance of the results, an application was made to English Heritage for a grant to fund an assessment of the fieldwork archive for work undertaken between 1986 and 1996. This was approved and funding for a programme of detailed analysis was subsequently secured through the Aggregates Levy Sustainability Fund (ALSF) in November 2002. This project has now been substantially completed, a draft publication report (Jackson and Miller 2004) having reached the stage of refereeing and approval having recently been received from English Heritage for editing of the report with publication intended during 2007.

Since the completion of extraction within the original 1986-96 area, two further archaeological projects have also been undertaken in this part of the site. These have been carried out in accordance with current archaeological planning practice. Firstly, a small area within the 'core' of the site was evaluated on behalf of Lafarge in 2000 as part of proposals to establish an environmental reprocessing plant at the quarry (Jackson et al 2000; Figure 24). This produced additional evidence for Romano-British activity and results were incorporated in the 1986-96 report (Jackson and Miller 2004). Most recently, evaluation has been undertaken in advance of construction of a new access road within the quarry plant and storage area and is subject to a separate report (Potten 2006; Figure 24).

4.1.7 *North extension (Figures 22 and 25)*

In 1996 Lafarge applied for permission to extend the quarry to both the north and south of the original application area. In the light of previous discoveries at the quarry and due to the implementation of PPG16, the new application areas were subject to a planning condition requiring a pre-determination archaeological evaluation (Jackson Pearson and Ratkai 1996). Permission was granted for both extensions but as a result of the evaluation quarrying operations were now subject to a planning condition requiring the completion of an agreed

programme of archaeological fieldwork in advance of extraction. The resultant archaeological fieldwork occurred in response to several stages of topsoil stripping and overburden removal.

In the North extension, work covered approximately 7.9 ha within Phases 6 and 7 of the overall quarry operation. This was undertaken between June 1997 and October 1999. Phase 6 stripping covered an area which had been defined by evaluation as having zones of low and moderate archaeological interest while Phase 7 covered an area which had been defined as being of high archaeological potential (Jackson, Pearson and Ratkai 1996). This area occupied land that gently rose to the west and where the gravel deposits were situated closest to the surface. A thin scatter of features and possible former watercourses or ponds had been identified during the evaluation and these were associated with pottery and flint of a possible Bronze Age date.

All areas were subject to archaeological monitoring and salvage recording during topsoil and overburden stripping, with the areas of low potential receiving less input than those of moderate or high potential. Within areas of high potential, the archaeologist monitoring the stripping operations had control over levels to which material was removed allowing areas of potential importance to be revealed in plan. Work on all areas also included contingency provision (both time and resources) to allow rapid excavation and recording of any significant deposits identified. Upon completion of each area the fieldwork archive was checked and an interim statement summarising results was produced (SR6, Cook, Jackson and Pearson 1998; SR7, Jackson 2000).

In summary, the salvage recording and contingency excavation confirmed and extended the predictions of the evaluation, providing evidence of a late glacial palaeochannel fragment as well as of a series of former watercourses of prehistoric and later date both containing, and associated with deposits and features containing, Beaker, Late Bronze Age, Iron Age and Romano-British cultural material.

Results from both the North and South extensions are now subject to an ongoing programme of post-excavation and analysis and it is intended that reporting should be completed in 2007 for publication in 2008.

4.1.8 *South extension (Figures 22 and 25)*

The South extension was also permitted following evaluation (Jackson Pearson and Ratkai 1996). Monitoring and salvage recording here covered Phases 8, 9, 10, 11 and 12 of the overall quarry operation. These were completed over the 5 year period from 2000 to 2005 and covered an area of some 15.9ha of low lying ground close to the confluence of the Wellington Brook and the River Lugg.

Evaluation had suggested that a palaeochannel containing well preserved organic remains ran on a north-south alignment through the centre of the area. To either side of this former channel, deposits were anticipated to include sporadic evidence for prehistoric seasonal occupation of the floodplain, possibly focussed on gravel islands. Water management features had also been identified and were considered to reflect the presence of either watermeadows or even possibly a watermill of Roman or later date. Phase 9 work was undertaken during a period between March and September 2000 and affected an area of the site which evaluation had identified as being of both low and high interest. Phase 10, covering areas of low, moderate and high interest, was undertaken over the following two years mainly during the periods May to August 2001 and May to July 2002. Phase 11 work spanned the period December 2002 to October

2003 and covered an area defined as of moderate to high potential, while Phases 8 and 12 were undertaken in parallel over a period spanning March 2004 to September 2005, covering an area defined largely as of high potential.

The level of archaeological response covered by the agreed programme of work was altered reflecting the growing understanding of the archaeological potential of the site and following consultation between Lafarge, the Service and advice from Dr Keith Ray, the Archaeology Officer for what was at the time the newly formed Herefordshire Council. All areas received a comparable level of monitoring and salvage recording to that which the areas of high potential had received in the North extension. This allowed stripping to archaeologically determined horizons within the alluvial overburden with almost daily monitoring and salvage recording of areas revealed in plan. Contingency provisions were increased and a geoarchaeologist was involved for the first time (David Jordan, Terra Nova). The latter made visits to the quarry to record sequences and also established a system for recording alluvial sequences for the field team and trained them in its use (Terra Nova 2002).

Upon completion of each area the fieldwork archive was checked and an interim statement summarising results was produced (SR9, Griffin 2001; SR10, Miller 2002; SR11, Patrick 2004; and SR8 and SR12, Sworn 2006). As within the northern extension, results confirmed and extended those of the evaluation. The course of the main palaeochannel was confirmed and the presence of a second lesser palaeochannel and several other potential channels was established. Widespread and dispersed earlier prehistoric activity was also demonstrated with Middle Neolithic and Beaker activity especially well represented. Perhaps most significantly the potential watermill site was confirmed and dated to the early medieval period, and a second potential mill site of similar date was recorded.

Results from both the North and South extensions are now subject to an ongoing programme of post-excavation and analysis and it is intended that reporting should be completed in 2007 for publication in 2008.

4.1.9 *Moreton Camp (Figures 22 and 26)*

The most recent extension to the quarry has been westwards into the area of a former military base, Moreton Camp. The area covering some 33ha was subject to evaluation in 2002 and 2003 (Miller and Griffin 2002; Griffin and Jackson 2003). Thirty five evaluation trenches were excavated and demonstrated the presence of further early and later prehistoric and Romano-British deposits within the extension. On the basis of the evaluation the extension has been divided into three areas, Areas A, B and C (Figure 26).

Evaluation suggested that Areas A and C would present similar conditions to those encountered across much of the Original permitted area and the North and South extensions. These were considered to have a high archaeological potential and include evidence of well preserved prehistoric and later deposits and further palaeochannels sealed beneath and within accumulations of alluvium. Of particular importance were deposits associated with what was provisionally interpreted as a funerary or other form of monument of Middle Bronze Age date comprising a substantial pit surrounded by posts (though see below).

Area B covers much of the northern half of the extension and the evaluation indicated that was of low to moderate potential due to lesser thicknesses or absence of any of alluvial accumulations preserving and protecting earlier deposits (though see below). Considerable

truncation has also occurred in this area as a result of levelling undertaken during construction of the military base.

Permission was granted for the extension subject to a planning condition requiring an agreed programme of archaeological works being undertaken in advance of each phase of topsoil and overburden stripping prior to extraction. Established levels of monitoring and salvage recording are anticipated to be variable depending upon the predicted archaeological potential of any given area and also upon the results from previous areas as the programme of work proceeds in advance of extraction. However, at minimum all areas will be covered by a watching brief and the archaeological team will retain control over the stripping levels in any given area. Contingency provision will be available (both time and resources) to allow rapid recording of any areas of significant deposits identified. This allows a high degree of confidence that where present archaeological deposits can be identified and rapidly recorded. Further, an area focussed upon the potential funerary or other form of monument of Middle Bronze Age date is currently subject to an ongoing excavation (August/September 2006).

To date, two phases of investigation have been completed within this programme of work and a further is underway (completion due September 2006). An initial programme of recording was undertaken in 2003 within part of Area B during the establishment of a rail loading facility at the site (Miller 2003). This recorded little of interest. Subsequently topsoil and overburden stripping prior to extraction commenced in the northern part of Area B in November 2005. Although the evidence from this phase of recording has yet to be analysed, archaeological deposits encountered exceeded the anticipated low to moderate potential for the area. A well preserved Roman and later road surface was recorded to the east (adjacent to the original permitted area) while across much of the central and western parts of the stripped area widely dispersed early prehistoric pits and hearths were recorded, some of which were associated with Middle Neolithic pottery. Preliminary results from the ongoing excavation of the potential Middle Bronze Age monument indicate that it may in fact represent a waterhole, however, posts and stone packed pits surrounding it suggest that it has a more complex function than simply providing water for animals.

Wellington Quarry geoarchaeology and flood plain development (see also Section 3.2)

4.1.10 *Background*

From an early stage of the investigations efforts were made to record the deep alluvial sequence and infilled palaeochannels that were present and associated with evidence for phases of human activity.

Within the Original permitted area the most substantive work was that undertaken by Rebecca Roseff as part of a doctoral thesis (Roseff 1992). This work was supported by programmes of augering and other surveys undertaken as part of the Herefordshire Valleys Survey (Dinn and Moran 1992; Dinn 1996; Dinn and Moran 1996; Hemingway and Dinn 1996). Together these provided an interpretive framework for the understanding of the alluvial sequence and development of deposits across the valley floor. This has been constantly tested and revised as fieldwork has progressed (see especially Terra Nova February 2002).

Initially, during work across the Original permitted area and in the North extension, records were restricted to the regular recording of cleaned 1.00m wide sample sections along long standing sections established across and at the limits of each phase of stripping to gravel. Clearly visible divisions in the alluvial sequence were treated as ‘typical’ archaeological strata,

being assigned context numbers and recorded accordingly. Stratigraphic relationships between archaeological features and alluvial horizons were also systematically recorded, although in places features were revealed sealed within apparently undifferentiated alluvial horizons making it evident that the accumulation of these was a considerably more complex process than the visible record suggested. The records made and numerous photographs taken from the Original permitted area have since been assessed and analysed by Terra Nova and as part of the wider programme of stratigraphic analysis (Payne and Jordan in Jackson and Miller 2004).

Since 2000, the project has involved regular formal geoarchaeological input to fieldwork by David Jordan and his colleagues Richard Payne and Claire Wilson from Terra Nova. This has resulted in the production of a series of specialist reports that have guided recording of alluvial and channel sequences and supported their interpretation during:

- small-scale evaluation within the original permitted area (Terra Nova July 2000);
- salvage recording across the South extension (Terra Nova February 2002); and
- evaluations at the Moreton Camp extension (Terra Nova January 2002; Terra Nova October 2002).

One of the key impacts of their input has been the development of an alluvial recording system and associated training for the WHEAS field team. This allows the field archaeologists undertaking monitoring in areas where alluvial sequences and palaeochannels are present to understand and record the deposits according to geoarchaeological principles alongside more traditional archaeological recording. This helps to avoid the potential pitfalls caused by post-depositional processes, which have considerably affected deposits. In brief, alluvial or channel fill deposits revealed in section are drawn, and detailed alluvial profiles are recorded at regular intervals using a specially designed pro-forma. Alongside a ‘traditional’ context-based stratigraphic record, these objectively record details of subtle variations in sediment structure, ped structure, staining, mottling, panning, coatings and evidence of rooting, cracking and worm action. Photographs, box samples and monoliths are taken to accompany the record. Periodic visits by the specialist team ensure that the system is being properly used and that atypical alluvial strata can be examined. This ensures that the resultant archive can be used to determine whether the boundaries of texture and colour relate to parent material and depositional or post-depositional processes, rather than conventional archaeological interpretations of readily visible stratigraphy.

4.1.11 *Results*

The most succinct summary of the current state of understanding of the alluvial sequence and valley floor development is provided by Terra Nova’s report on the early stages of work in the South extension (Terra Nova February 2002) from which much of the following has been drawn.

The Devensian gravel being extracted at Wellington quarry overlies and is largely derived from Raglan Mudstone. The Holocene deposits overlying these contain buried archaeological remains and at Wellington fieldwork has explicitly combined the study of archaeological deposits and of the sediments in which they are found. Previous work by Roseff (1992) and others has shown that the sediments are largely overbank flood alluvia laid down away from the main Lugg channel.

The current model of valley development for the Lower Lugg in this area indicates that the late glacial Lugg Basin was crossed by a pattern of braided streams. These laid down deep gravel

beds and resulted in an undulating surface to the natural gravels with an overall gradient that slopes across the quarried area gradually from north and west to the south and east. Dating of a palaeochannel fragment within the North extension has produced a date of between 18,000 and 14,000 yrs BP for the deposition of the terrace into which this palaeochannel was cut (Brown et al 2005). It is also suggested that the incision of the river that formed the Holocene floodplain occurred during the later Younger Dryas (Brown et al 2003) rather than the Holocene date implied by Dinn and Roseff (1992).

Analysis of Holocene dated sediments overlying the gravels has provided a relatively clear picture of subsequent valley floor development in this part of the catchment. The valley floor would probably have initially consisted of multiple channels divided by constantly shifting gravel islands. However, the end of glacial conditions and the growth of the early Holocene forest gradually caused the overland flow of water to be reduced because more water was able to infiltrate into the ground. As the fluvial energy dropped through the Holocene so did the particle size of the deposits and consequently the River Lugg gradually rationalised into fewer channels and, finally, into a single main channel which runs to the east of the quarry. This seems to have remained stable ever since because early Holocene deposits (at least in the centre and west of the valley floor) have not been reworked by movements of the river.

Within the area quarried to date, at least one major palaeochannel depression (Palaeochannel A), one well defined lesser palaeochannel (Palaeochannel B) and numerous channel fragments have been recorded (Figure 27). Some contain coarse deposits often concentrated to their sides or base and frequently including tufa, shell and organic material. These represent material deposited by fast flowing water. Bone and cultural debris are sometimes included within these and occasionally have clearly been specifically deposited into the channel margins rather than simply being material eroded and redeposited by the fast flowing water. The deepest of these include peat deposits formed as the channel silted up and choked with vegetation. For periods of time these would have survived as sinuous depressions and the deepest may have remained as seasonal streams for considerable periods of time. All were gradually filled by silt and clay deposited during periods of overbank flooding. Some of these depressions continued as watercourses because smaller channels were recut within them as a part of active water management during the Roman and later periods. Thus ditches and ‘leats’ have been identified lying within much earlier, natural channels – the most obvious place to keep the water flowing. Further, it has become increasingly evident that during phases of active channel incision on the floodplain, newly forming watercourses often partially followed the line of the depressions and softer fills left by their predecessors

The major palaeochannel (A) was at first understood to be a single broad channel incision but is now believed more likely to be a broad depression created by one or more meandering channel incisions related to the river Lugg. Dating of peat and organic rich sediments within the broad depression at various points shows that channels within the depression were filling with peat (ie starting to becoming inactive) and organic silts from the late Mesolithic onwards, while dates from organic debris in alluvial deposits towards the top of the depression fill sequence provided an Early medieval date. Smaller palaeochannels such as the one that runs north to south through site (Figure 27; Palaeochannel B) are considered most probably to represent former courses of the Wellington Brook. Artefacts recovered from these suggests that they date from the late Neolithic/early Bronze Age through to the early medieval period with Palaeochannel B being an active channel during the later prehistoric (Late Bronze Age onwards) and Roman periods and then being maintained as watercourse through the early medieval period prior to being abandoned to silt up sometime towards the end of the first millennium AD.

The alluvial sequence associated with these palaeochannels becomes increasingly complex towards the deeper sediments in the south-east part of the site, however, the typical alluvial sequence across much of the investigated area comprises three well defined deposits or alluvial units. At the base are the deep gravels above which are usually found a band of red-brown material, which varies greatly in texture (often including a substantial gravel component) and depth – although thicknesses greater than 30cm are not common. This is termed Unit 3. Above this is Unit 2, a silty clay deposit varying from yellow to grey in hue (often referred to as buff-coloured) and frequently more than 1 metre in depth. At the top is another red-brown layer, Unit 1, containing silt and clay, which can be up to a further metre thick though it is usually less than this.

Within the Original permitted area, a brown, finds rich and apparently more humic deposit (Unit 4) has been extensively recorded between Units 1 and 2 in the area of the Roman settlement core. This is considered to represent a late prehistoric through to early medieval deposit, perhaps a buried soil resulting from a period of relative stasis in this part of the valley floor.

Darker bands have been commonly recorded in the lower half of the section (within Unit 2) and have been interpreted as former soil surfaces – the dark colour being the remains of humified organic matter. These are usually termed Unit 5. Fine sedimentary laminae have also been noted in patches over much of the valley floor in Unit 1 and Unit 2 deposits.
3.2.10 Rises in the gravel are overlain by deposits, which may entirely lack any of the alluvial units where the gravel is closest to the surface as towards the northern side of the Moreton Camp extension. Elsewhere, higher areas of gravel may lack the uppermost units while depressions may have an anomalous and altogether more complex sequence of units. Recent studies at the valley edge (Terra Nova January 2002; Terra Nova October 2002) have shown that the shallower deposits here may likewise lack the uppermost unit. This may indicate that, by the time the upper unit was deposited, the alluvium had already become deep enough that such higher points stood above most of the floods.

4.1.12 *Unresolved problems/outstanding research issues*

Dating of alluvial units - especially Units 2, 3 and 5. Thermoluminescant dating may provide an option – considered too imprecise in the past though tested by Herefordshire Valleys Survey. Need to revisit this and any other dating options.

Unit 3 is understood to be early post Glacial/early Holocene – needs confirming to support understanding of date at which the alluvia started forming and date of the river channel incision that formed the Holocene floodplain.

Despite appearance, Unit 5 has little or no organic content as recent sampling for pollen has demonstrated. This means that the date of the formation of this widespread deposit is not known. It clearly forms a separate horizon within Unit 2 indicating at least 2 major phases for that deposit and perhaps a need to divide Unit 2 into at least 2 separate events wherever possible. Dating of this is therefore highly important.

Rates of accumulation/deposition – periods of stasis/periods of rapid accumulation are poorly understood. This requires careful analysis/sampling of deposits with surviving laminar structures – these have not been encountered since this was realised. Also very important to ensure that dating of any organic horizons and relationships with dateable archaeological

horizons are carefully recorded, sampled and understood – Arrow Valley work has demonstrated this potential.

Refine understanding of main channel (Palaeochannel A) incision/s to support current hypothesis that this in fact represents a depression in the valley floor created by a series of meandering lesser incisions over a long period of time – avoid over simplifying models.

Produce surface and sub-surface deposit models based upon the extensive archive information held by the Service and tie these to wider valley floor modelling to better understand the depositional sequence and valley floor formation process.

Opportunities to study the rates of accumulation and refine dating of sequences are liable to arise during work within the southern half of the Moreton Camp extension and possibly as a result of evaluation of potential further southern extensions. Further study of the main channel incision/s is unlikely to arise within currently envisaged quarrying phases.

Further benefit will come from the results of the work at Lugg Bridge Quarry (see below). These will provide a sequence from lower down the river and alluvial units here may potentially be compared with those at Wellington to strengthen understanding. Organic deposits from paleochannels and other deposits at Lugg Bridge will also be important providing dating horizons and further palaeoenvironmental information to support and extend the Wellington sequences.

Wellington Quarry chronological overview

4.1.13 *Introduction*

Evaluation and salvage recording at the site has revealed a long history of human activity on the floodplain of the River Lugg. Associated geoarchaeological evidence and environmental remains have provided a model for the changing landscape of the valley floor, thus giving a wider context for periods of occupation. Supported by evidence from adjacent sites, an important insight has been gained into settlement and land-use histories and adaptation in this river valley from the Mesolithic onwards.

4.1.14 *Late glacial*

During the Late Glacial period, evidence indicates that the quarried area was crossed by a pattern of braided streams (predecessors of the River Lugg and Wellington Brook) that drained to the south and the east. These deposited deep gravel beds and created an undulating surface to the natural gravels.

No evidence of pre-Holocene human activity has been recovered, however, late glacial organic deposits have been recorded surviving in a palaeochannel fragment in the North extension (Brown et al 2005; Figure 27). A pollen diagram shows initial wetland conditions with scrub invasion and heathland development in the later part associated with ameliorating climatic conditions. The open, species rich grassland evidenced at this period was probably maintained by natural grazing and would have provided excellent hunting grounds for exploitation by human populations moving north and west during the Upper Palaeolithic.

Dating indicates deposition spanning the later Dimlington Stadial/older Dryas-Windermere Interstadial boundary (14,400-11,700 cal BC; Brown et al 2003) corresponding to the Late

Upper Palaeolithic period and the Creswellian tool tradition. Unfortunately no faunal remains, tools or other evidence of human activity have been recovered from the Wellington area to expand the evidence for this period. However, it may be notable that the nearest contemporary sites with evidence of human occupation are the Wye Valley cave sites some 30km distant, and which are well situated to exploit both the coast and estuarine landscapes to their south and this river valley to the north (Brown et al 2005).

4.1.15 *Mesolithic*

The lower elements of the alluvial sequence and gravel surface indicate that the early Holocene valley floor would have been traversed by multiple channels of fast flowing water divided by constantly shifting islands of gravel. Subsequently, as the rate of water flow reduced, the particle size of the deposited sediments dropped and the river rationalised into fewer channels and eventually into the single main channel of the River Lugg running to the east of the quarry. Beyond the main river channel, the valley floor was characterised by the cut-off meanders and ox-bow lakes of the former channels surviving as sinuous depressions. Some of these probably remained as seasonal streams or wet hollows recharged every year by rising water levels or overbank flooding, the latter also laying down widespread alluvial deposits and sediments which gradually infilled these depressions and raised the level of the valley floor.

At least one large relict channel crossed the eastern side of the site (Palaeochannel A), and peat and overlying organic alluvial units from this have provided several pollen sequences. The base of the sequence has been dated to between 5900-5500 cal BC (6790 $\pm$ 80 BP, OxA-2880; 6930 $\pm$ 80 BP, OxA-2881) within the Later Mesolithic. This shows that the valley floor was wet and occupied by dense alder carr forming a peat bog with hazel and oak accompanied by aquatic and wetland plants. Beyond this on the drier higher ground to either side was dense woodland, dominated by lime with oak and elm and an understorey of hazel. Limited pollen from other trees and shrubs suggest that some more open spaces or clearings were present in which these more light demanding species could grow and it is possible that both these and the rare occurrences of weed and herb species (and possibly cereals) reflect the creation of limited openings in the woodland canopy by humans towards the end of the Mesolithic or early in the Neolithic.

Evidence for Mesolithic activity is restricted to occasion finds. Bladelets and bladelet cores of Meoslithic or possibly very early Neolithic date have been recovered from within the original application area (Jackson and Miller 2004) while a microlithic backed blade and point have been recorded from the North extension (Jackson 2002) and Moreton Camp respectively (Griffin and Jackson 2003). These indicate at least sporadic, short-term occupation by Mesolithic hunter-gatherers, probably reflecting exploitation by local populations attracted by the wide range of resources available.

4.1.16 *Neolithic to Early/Middle Bronze Age (Figure 28)*

The geoarchaeological record indicates that this was a flat, low lying area characterised by subtle variations in level created by low gravel islands or ridges and the shallow sinuous depressions and hollows incised by former watercourses some of which still flowed at least on a seasonal basis, perhaps during or following periods of overbank flooding.

These deposits include a large peat and organic rich alluvium filled depression interpreted as a broad relict channel crossing the eastern side of the site. Dating of a section recorded in 1989 indicated that this channel depression had steadily filled with peat and organic rich alluvial

deposits from 2560-2300 cal BC through to about 1950-1740 cal BC (3535 ± 29 cal BC, OxA-12663), after which there was a reduced accumulation through to cal AD 610-690 (1379 ± 32, OxA-12639). Subsequent recording has suggested that this depression does not represent a single channel with fills spanning the Mesolithic though to the early medieval periods but rather was formed by incision and re-incision of a series of channels meandering across the valley floor. Consequently, separately located and sampled sections across the broad depression have the potential to provide detailed geoarchaeological and palaeoenvironmental evidence for shorter episodes of accumulation and deposition within these smaller channels. This potential has been demonstrated through analysis and dating of samples from a section recorded on the east side of the overall depression which relate to a channel incised and filled during the Middle to Late Neolithic period. Rapid accumulation in the base of the channel dated from 2930-2840 cal BC, 2820-2670 cal BC (4249 ± 43 BP, Wk-15099). About 200 years later (2860-2810 cal BC, 2750-2720 cal BC, 2700-2470 cal BC; 4069 ± 43 BP, Wk-15098) deposition slowed with finer silts accumulating in the channel through to 2620-2390 cal BC, 2380-2340 cal BC (3984 ± 41 BP, Wk-15097).

Organic samples from deposits within these channels have yielded plant macrofossils, pollen and coleopteran assemblages. These show increasing signs of woodland disturbance from the Early Neolithic through to the Beaker period. Small clearances were established and there is evidence for phases of regeneration with secondary woodland developing in abandoned clearings (Greig in Jackson and Miller 2004; Mann nd; Katie Head pers comm.). Clearings may have been created by use of fire, a possibility indicated by charcoal found within the deposits sampled for pollen at Neolithic levels. Such clearings would have provided grazing for stock, which where regularly present would have maintained them by eating the new shoots of trees trying to re-establish themselves. The evidence for phases of regeneration may therefore indicate that the creation and use of clearances was sporadic at this time. Another use for clearings could have been for long fallow cultivation of small stands of cereals, the pollen of which appears regularly for the first time in the record, along with herbs/weeds indicative of disturbed and cleared land. From the start of the 2nd millennium BC, the pollen record increasingly includes evidence for cereals and grassland indicative of an increasingly open and cleared landscape beyond the floodplain, although fluctuations also indicate periods of woodland regeneration while on the floodplain, limited clearance and re-colonisation is also evidenced

The most important direct evidence for human activity during this period derives from a mid 4th millennium BC pit group (Early Neolithic) and associated finds and environmental material recorded within the Original permitted area (SR5; Fagan et al 1993; Jackson and Miller 2004). Quartz tempered pottery representing at minimum 22 vessels was recovered and comprised open and carinated bowls and a small cup (Gibson in Jackson and Miller 2004). Absorbed residue analysis, flint and stone artefacts, microwear analysis, plant macrofossils and a small animal bone assemblage suggested that the pit group represented one or more periods of domestic occupation with a wide range of activities undertaken. Domesticated animals, cereals and wild products were utilised by people exploiting the resources of a heavily wooded landscape of dense alder carr, on the wet valley floor, and lime woods beyond (Jackson and Miller 2004). Four radiocarbon determinations from charred plant remains recovered from within these pits provide a pooled mean of the results of 4811 ± 16 BP, which corresponds to a calibrated date range of 3650–3620 cal BC (30% probability) or 3580–3530 cal BC (65% probability). Other certain Early Neolithic activity has not been widely recorded at Wellington although a single pit identified during the evaluation of the Moreton Camp extension produced a radiocarbon date of the earlier 4th/latest 5th millennium BC (4050-3700 cal BC; Wk-12257, 5100±79 BP; Griffin and Jackson 2003). Although only a single date was produced and that

from a single fragment of wood charcoal, a reworked fragment of a polished stone axe, a small assemblage of flint and a sherd of quartz tempered pottery were also recovered and broadly support this date. Given the necessarily limited extent of the fieldwork, the pit may not be an isolated feature and this is supported by the wider presence within alluvial horizons and palaeochannel fills across much of the quarried area of scatters of finds including flint and stone axe fragments of probable Early through to Later Neolithic/Beaker date. Surface scatters of further similarly dated material have been recovered by fieldwalking of areas to the north-east of the quarry which are unaffected by alluvium and are under arable cultivation (Samuel Meadows pers comm.). These provide further evidence of early prehistoric activity extending across the dryer land beyond the floodplain and the current quarry boundaries.

Evidence of Middle Neolithic through to Later Neolithic/Beaker activity is more widespread across the quarried area than that for the Early Neolithic although no comparably wealthy pit group assemblages are present. Activity includes a Middle Neolithic pit circle recorded in the South extension (Phase 11, Patrick 2004), and widely dispersed features and small clusters of features elsewhere. These include pits, hearths and postholes, which have been recorded across much of the quarried area but especially on gravel islands, adjacent to or within palaeochannels or depressions, and across the higher ground to the west (especially within Phase 9, Griffin 2001; Phases 8 and 12, Sworn 2006; and within the Moreton Camp extension, Andy Mann pers comm). Ceramics and other artefacts date these to the Middle/Late Neolithic and Beaker periods but perhaps notably no Grooved Ware has been recorded suggesting either an absence of a Grooved Ware phase (or possibly even that the local population did not adopt this style of pottery).

Funerary monuments have also been recorded including a wealthy Beaker burial and three ring-ditches within the quarried area while further ring-ditches are known to the north-east from cropmark evidence. Neolithic and later flint and Beaker pottery has also been widely recovered from alluvial deposits and more significantly dumped into palaeochannel margins along with large quantities of animal bone perhaps reflecting deliberate deposition of feasting or domestic debris.

Evidence for early to Middle Bronze activity has only been recorded at one location within the Moreton Camp extension (Griffin and Jackson 2003). Here, a substantial pit was recorded with an apparent ‘robber’ cut into it. A plank surviving in the waterlogged base of the primary cut hinted at the presence of a timber structure and sherds from a Middle Bronze bucket urn were present in the fills of both the primary cut and ‘robber’ feature. Several postholes suggested the presence of a circle of posts surrounding the pit. Dating of a charred residue from the urn and of wood charcoal from one of the posts confirmed a Middle Bronze Age date (1610-1400 cal BC, Wk-12255, 3220±41 BP; 1690-1650 cal BC or 1640-1430 cal BC, Wk-3269±42 BP; Griffin and Jackson 2003). This has been provisionally interpreted as a ceremonial site possibly a funerary monument, an impression reinforced by the presence of two poorly preserved features which included tiny charred bone fragments and may tentatively be interpreted as secondary cremation deposits. Associated ecofactual remains indicated that the immediate environment of the feature was wet, with the surrounding area comprising damp grassland with open grassy meadow and some arable land beyond. A formal programme of excavation scheduled for Summer 2006 will provide more certain evidence of the character and setting of this potentially highly important monument.

4.1.17 *Later prehistoric (Figure 28)*

By this period, although swampy areas of reeds and sedges survived in the wettest parts of the floodplain, the remaining oak and alder woodland had been cleared and meadow, pasture and areas of cultivated land covered most of the valley floor. The main channel depression may have been largely filled by this period but probably held standing water following overbank flooding during the winter. The main Lugg channel (or channels) now appears to have run to the east of the site while a lesser palaeochannel (Palaeochannel B; probably related to the Wellington Brook) ran north to south across the site, in part incising into deposits along the western margin of the older main channel depression.

The most extensive and significant deposits dated to this period have been recorded in the North extension, although the Original permitted area and the South extension also include important evidence. Later Bronze Age activity was well evidenced in the North extension with pottery, flint (?residual), animal bone and occasional human bones deposited into the lesser palaeochannel and to its east within the seasonally wet hollows of cut-off meanders and ox-bows of former watercourses (Phases 6 and 7; Cook, Jackson and Pearson 1998; Jackson 2002). The pottery assemblage provisionally dates this activity to the 9th to 8th centuries BC. The nature of the activity represented is uncertain but some form of ritual perhaps associated with excarnation and subsequent disposal of human remains appears likely. A single base sherd of Late Bronze Age pottery from the Original permitted area hints at activity extending to the south.

Evidence of Iron Age activity was more limited in many respects, and presents considerable problems of interpretation, but it nonetheless suggests localised activity in two very different contexts. In the North extension, through the Original permitted area and across the South extension, the evidence suggests ritual activity focused to the east of and within the lesser palaeochannel (stream), thus in many respects reflecting the distribution and character of the Late Bronze Age activity. In contrast, to the west and south-west, the evidence suggests agriculture within a pattern of fields while to the far east, adjacent to the railway line there is evidence potentially indicative of settlement within enclosures.

The ritual activity included a double burial made in the eastern margins of the lesser palaeochannel within the original permitted area (Jackson and Miller 2004). The pooled mean of the two radiocarbon dates secured on these provides a middle to late Iron Age date (2129 $\pm$ 53 BP, 360 cal BC to cal AD 1). Two isolated skulls deposited within the channel itself both within the Original permitted area (SR3, Edwards 1990; Jackson and Miller 2004) and in the South extension (Phase 9; Griffin 2001) are considered liable to be of comparable date or possibly represent further Late Bronze Age activity. Other rituals in the vicinity involved the deposition of selected pottery, bone and other artefacts comparable to the Late Bronze Age activity and similarly deposited within or to the east of the lesser palaeochannel.

Notably no evidence has been identified for settlement or agriculture in the immediate vicinity of this former watercourse, suggesting that it was set apart physically as well as conceptually from these spheres of Late Bronze Age and Iron Age life. The type of agriculture practiced to the west of the palaeochannel, within the west and south-west parts of the Original permitted area (Jackson and Miller 2004) is impossible to determine, as is the nature of the field system that structured and enabled it. However, in an environment in which pastoral resources are likely to have been naturally abundant, it seems likely that the creation of ditched and banked fields set apart from the rest of the landscape may signify arable farming and especially grain production and that this dates to the end of the Iron Age. This arrangement also implies that

some form of settlement existed nearby and rather closer than the either the enclosure site at St Donats, over 2km to the south-west (Jackson et al 1999) or the similarly distant hillfort, 2km to the south-east at Sutton Walls. In the absence of settlement or field system evidence from either the North or South extensions or within Moreton Camp to date, it seems reasonable to infer a settlement either to the south or north-east of the quarried area, or on its very eastern margins and beyond as inferred by residual material recovered from within the later Roman site 'core' and particularly within evaluation trenches close to the railway line (Jackson et al 2000; Potten 2006).

Taken together, the evidence suggests that the most of the area incorporated within quarry areas examined to date was uninhabited grassland and marsh, although some land in the south was farmed by people living nearby while the stream was visited often and marked out as a place of spiritual significance.

4.1.18 *Romano-British (Figure 28)*

Evidence for Roman activity during the latter half of the 1st century AD is largely absent, however, it is clear that by the 2nd century, a large area to the east of the lesser palaeochannel (Palaeochannel B), and perhaps some land immediately to the west, was settled and formed a focus for intensive agricultural and industrial activities. The settlement seems to have expanded in later centuries to cover an area of in excess of 4.5 hectares, and by the 4th century at least some of its inhabitants were highly romanised, as indicated by the presence of substantial, well-appointed stone buildings and a wider range of artefacts than is found on most rural sites of this period in Herefordshire (Jackson and Miller 2004; Potten 2006).

Whether the later Roman settlement can be called a villa is a moot question. In the sense that the site clearly includes one or more highly romanised domestic buildings, then the term villa could be applied, however, it does not necessarily follow that the inhabitants belonged to a certain social class, or that the settlement lay at the centre of a large agricultural estate. The finds assemblage certainly does not suggest that the inhabitants were particularly discerning in their choice of material culture, despite the opportunities that were open to them, although caution should be exercised with this assumption since this could simply reflect local, cultural preferences. In contrast, evidence for the site's economic basis to some degree supports an argument that this did lay at the centre of a large agricultural estate. Two corndriers and associated charred plant remains suggest grain production on a considerable scale.

Elements of Roman dated field systems are widespread in the investigated areas to the west and south of the 'settlement core' and their alignment mirrors that of the buildings and enclosures of the settlement suggesting at least a coherent pattern of land division laid out on an axis based on the north-west to south-east alignment of the lesser palaeochannel. These seem to have been maintained throughout much of this period and include evidence from the Moreton Camp evaluation of a similarly aligned large ditch established to drain a marshy area further to the west (Griffin and Jackson 2003). This may reflect marshland reclamation to increase available grazing and was maintained through the 3rd and 4th centuries, though had silted up possibly by the end of the 5th century AD. This area and much of that investigated was almost certainly used as pasture by livestock, an impression given support by environmental information from the Moreton site drainage feature, most notably in the form of dung beetles. Further evidence of activity compatible with a substantial estate lies with a well-constructed cobbled track or road, flanked by drainage ditches and aligned on the same axis as the field systems (Andy Mann pers comm.). This may form one element of a local infrastructure that also included a metalled and ditched trackway recorded at the nearby St

Donats site (Jackson et al 1999), the alignment of which suggests it heads towards Wellington on a consistent axis with the field systems and road identified there.

Looking further afield, the basic pattern of Roman settlement and agriculture represented at Wellington seems to be repeated across the lower Lugg Valley, though the evidence is limited, especially in terms of its chronology, and there are no sites closer than Huntsham or Kenchester with similar buildings and artefact assemblages. It is therefore difficult to reconstruct even the outlines of a sub-regional settlement pattern for any part of the Roman period, though it is reasonably clear from sites such as Wellington, Huntsham, Kenchester and St Donat's that the late Roman pattern did not continue much beyond the 4th or early 5th century.

4.1.19 Early Medieval (Figure 28)

Information from the Moreton Camp evaluation shows the silting up of a Roman field drainage system and a return to wetter ground conditions and more regular flooding of the western extents of the quarrying area towards the end of the 5th century. In contrast the lesser palaeochannel (Palaeochannel B) appears to have been maintained and possibly canalised at this time. Evidence for this was recorded within the original permitted area (Jackson and Miller 2004) but was poorly understood until the discovery in the South extension of a wheel pit and surviving base of the timber frame for the wheel of a vertical watermill (Griffin 2001; Watts 2002, 81-2). It is now evident that this watercourse was actively managed to provide power for this mill. Dendrochronology has dated the timbers to the late 7th or early 8th century, making this one of the earliest post-Roman watermills to have been discovered in England. Subsequently, further significant evidence of activity of this date has been identified and may represent a second watermill (Patrick 2004). The presence of one, and possibly two, mills indicates that grain production continued on a large enough scale to warrant the investment that such structures represented. It is therefore reasonable to assume that at least some of the Roman fields continued to be cultivated throughout the post-Roman centuries, although the evidence of silting of the Moreton Camp drainage ditch indicates that this was not wholly the case.

Apart from the importance of the mill (or mills) in economic and technological terms, this high status indicator of early medieval activity is of particular interest in the light of the possible status of the Romano-British occupation at the site. Furthermore the mill/s may potentially represent the appurtenances of a royal estate centred upon Sutton, which is known from documentary sources to have existed by the late 8th century, if not before (Sheppard 1983, 31-32). If this estate was of a comparable size to others of known extent, it is likely to have included Wellington and its environs. The outlines of land-use within this estate have been traced by Sheppard on the basis of place-names and regressive plan-analysis: this suggests a core area of arable land in the vicinity of Sutton and Marden and a more pastoral landscape of wood, meadow and marsh in the areas to the north and east (Sheppard 1983, 30-32). The evidence from the Moreton Camp drainage ditch allied to recent entomological studies (Mann nd) and preliminary pollen analysis (Katie Head pers comm.) from deposits within the lesser palaeochannel provide strong support for Sheppard's model indicating marshland reversion in the Moreton/Wellington Marsh area but also for the persistence of a landscape dominated by grazed pasture and hay meadows across much of the area quarried to date.

4.1.20 *Medieval (Figure 28)*

The site has, perhaps surprisingly given its low lying location and susceptibility to flooding, produced fairly extensive and widespread evidence for ridge and furrow indicative of medieval arable cultivation. This has been recorded both to the west and east of the lesser palaeochannel (B) and west of the Wellington Brook. Along with two ovens and a group of other crop processing deposits/features these suggest that by the 13/14th century, a significant area in and around Wellington was under arable cultivation. Although arable land clearly spread across considerable extents of the quarry, much of this cultivation must have lain to the north-west of the quarry where higher quality and better drained land exists (land which extends into the north-west corner of the quarry where the ovens were located). This situation must certainly have been the case by the time overbank alluviation resumed from the Lugg and its tributaries sometime during this period (Roseff 1992; Terra Nova 2000) sometime during the medieval period, burying much of the lower lying ridge and furrow within the site. A similar pattern can be inferred from observations made to the south at Eau Withington on the Lugg Bridge to Withington pipeline where a probable mill of 12th to 13/14th date was abandoned and buried by renewed alluviation by the end of the 14th century (Hurst and Pearson 1995)

Overall at Wellington Quarry despite the fairly extensive evidence for ridge and furrow, it is unlikely that arable fields dominated the local landscape at any time during the medieval period. For one thing, the Domesday survey frequently under-represents meadow, and the West Midland returns omit pasture entirely (Welldon-Finn 1963), and for another, later historical and cartographic evidence suggests that wet grassland and woodland bordering the Lugg and the Wellington Brook were retained as necessary components of a mixed agricultural economy. This pattern appears to have persisted throughout the medieval period, and in some respects beyond, with much of the area to the north being in near-continuous cultivation and much of the quarry area being under pasture.

4.1.21 *Post-Medieval and Modern (Figure 28)*

The medieval pattern of landuse appears to have persisted into the early post-medieval period, however, there may have been a temporary hiatus in cultivation in the 16th century, and perhaps an expansion in the 17th century into areas not ploughed since the Roman period.

Finally, it seems that the later post-medieval landscape and field pattern owes very little to the medieval and early post-medieval pattern, suggesting that the enclosing landowners took full advantage of their opportunity to bring about significant change. Later activity includes a sheepwash of 18th century date identified adjacent to the Wellington Brook in the north-west of the original permitted area (SR4, Brown 1992; Jackson and Miller 2004). This provides a useful counter-balance to the more readily identifiable evidence for cultivation, and re-affirms the likely importance of not just sheep, but also other livestock to the local agricultural economy. Fieldname and cartographic evidence, allied to emerging archaeological evidence for the maintenance of water meadow systems, shows an enclosed landscape of pasture and meadow indicative of a shift away from arable cultivation during the post-medieval period, a pattern maintained until the onset of mineral extraction. Lastly, mapping of cropmarks and earthworks recorded through aerial photography has identified a system of watermeadows within the area to be affected by the Moreton Camp extension (Air Photo Services 2001). These can be related to surviving earthworks noted during evaluation (Griffin and Jackson 2003) and will be recorded in advance of future programmes of site preparation.

Other WHEAS work in the Lower Lugg

4.1.22 *St Donat's Quarry*

St Donat's Farm, Burghill lies some 7km north of Hereford (centred on NGR SO 488463) on the second terrace of the River Lugg. Permission has been granted for quarrying sand and gravel on the condition that a programme of archaeological works is carried out prior to, and alongside the mineral extraction. An agreed programme of works was devised comprising evaluation of the entire site prior to quarrying, and provision of a contingency to enable appropriate treatment of any significant archaeological remains identified through the evaluation and/or during the course of quarrying.

The evaluation was completed during the autumn and winter of 1998/9 on behalf of Lafarge Redland Aggregates Limited but to date no extraction has been undertaken. The site is currently owned by Tarmac Limited.

Evaluation comprised documentary research, geophysical survey, fieldwalking and trial trenching. This identified significant deposits of Roman date (1st to 4th century AD) concentrated at the eastern end of the quarry and along the proposed access road where it leaves the quarry (Jackson et al 1999). Deposits included the remains of a pebble surfaced minor road or track, further surfacing representing another track or small yard, and a series of ditches and gullies which would have provided drainage and bounded areas of activity and/or small fields. An area of buried Roman soil was also recorded along with a single posthole which suggests that evidence for timber structures may survive.

Deposits were associated with pottery and other finds indicative of occupation from the later Iron Age or early Roman period (1st century AD). The main period of activity was in the 2nd and 3rd centuries AD and the site appears to have been abandoned in the 4th century. These remains are clearly related to a previously known cropmark site lying just beyond the eastern end of the quarry and skirted by the proposed access route. The cropmark shows an irregular D-shaped enclosure surrounded by two ditches. On morphological grounds this was already felt to represent the site of an Iron Age or Roman settlement and the evaluation has confirmed this identification. It has also provided important evidence of the dating of the occupation and of the survival of remains relating to peripheral activity, around what would have been the settlement focus. The metalled track or minor road would have been an important communication route for the settlement. It runs south-west towards the route of Watling Street West, a major Roman road which followed the line of the current A4110. In the opposite direction it appears to be heading north-east towards Wellington Quarry where it would meet the projected alignment of a more substantial north-west to south-east aligned Roman road recorded in 2005 (Andy Mann pers comm.).

The majority of the excavated finds from St Donat's are believed to represent redeposited midden material from within the enclosure. Roman pottery was also found thinly scattered across the surrounding area during fieldwalking and is likely to result from the practice of manuring arable land with domestic refuse. Environmental samples taken during the course of the evaluation have produced charred cereal crop remains and it seems that cereal cultivation may have formed an important part of the settlement economy. A Roman ditch recorded in the area proposed for the siting of the quarry plant provided further evidence of landuse and division relating to this settlement.

Apart from Roman deposits no other significant features were identified. However, a thin scatter of worked flint and two sherds of potentially Neolithic pottery recovered from a Roman ditch provided indications of earlier activity in the vicinity. It is unlikely that any intensive activity or extensive settlement was present since only a few finds were recorded and apart from a number of small undated features no potentially associated deposits were recorded. However, given the relatively small trenching sample, there is the potential for small discrete pockets of earlier prehistoric remains to survive.

The site provides an important contrast with that at Wellington representing a typical farmstead enclosure of the type well represented across much of the Welsh Marches (Whimster 1989) and as recently sampled at nearby Lyonshall by the University of Cardiff (Guest forthcoming). In terms of development of an understanding of the nature of preservation and survival of archaeological deposits in the Lugg Valley, St Donat's also provides an important contrast to Wellington. The site is located on the Lugg 2nd Terrace and thus surviving deposits are not buried beneath deep accumulations of alluvia but are located directly below the modern ploughsoil and subsoil and are thus vulnerable to plough damage.

4.1.23 *Lugg Bridge Quarry (see also **Section 4.2**)*

The Service undertook an evaluation and earthworks survey at this quarry in 1996 as the first stage of a programme of works completed for Ready Mixed Concrete UK Limited (RMC) and designed by their consultants.

The evaluation (Jackson and Pearson 1996) comprised an auger survey of 184 augerholes, the results from which were used to model surface and sub-surface topography including of the surface of the sand and gravel deposits and of alluvial horizons overlying them. Samples were taken for magnetic susceptibility during the survey. A geophysical feasibility study and field observations and sketches were also completed.

A basic sequence of five deposit units was identified across much of the study area:

- topsoil,
- reddish brown clayey alluvium,
- yellowish brown silty clay loam alluvium,
- gleyed silty clay loam alluvium, and
- gravel.

Organic deposits interpreted as palaeochannel fragments were recorded regularly across the site (29 instances in 184 augerholes) principally at the base of the lower gleyed alluvial unit or at the top of the gravel. These contained plant macrofossils and insect remains which were particularly well preserved in some areas.

Assessment of the results recognised that the actual pattern of deposition at the site was liable to be considerably more complex than could be recorded through augering but identified a high potential for the survival of important palaeoenvironmental remains within low lying areas and former channel alignments. It was also suggested that areas of well preserved former activity were potentially present on parts of the site where rises in the gravel surface were present. Periods of stasis (ie less regular flooding) within the formation of the alluvial sequence could also have provided opportunities for more intensive the use of the area. Given the significance of deposits recorded on the floodplain at Wellington within similar alluvial horizons it was suggested that potentially important deposits relating to prehistoric or later activity might be

present, however, the restricted scope of the evaluation meant it was possible to determine this with any certainty.

The evaluation also recorded a stone structure in the banks of the river and identified this as potentially representing the remains of a documented medieval mill. Lastly, earthworks were noted in areas of the site which were considered liable to represent former courses/channels of the Lugg and the remnant of early post-medieval (pre-enclosure) water management systems, possibly parts of a watermeadow system. Assessment also determined that further geophysical survey was unlikely to be of use in this deeply alluviated environment.

The Service subsequently completed earthwork survey of the site (Cook 1996), providing a record of these features. The survey concluded that shallow depressions along the eastern side of the site represented hollows over the line of former channels of the Lugg. The other earthworks noted during the evaluation were also recorded and identified as the remains of watermeadow systems pre-dating enclosure and potentially including elements of medieval date.

Salvage recording during ground preparation works prior to sand and gravel extraction followed. Despite the fact that the agreed scope of the evaluation did not allow determination of the presence or absence of well preserved remains of periods of human activity within the quarry, RMC's secured agreement from the county council that salvage recording be limited in scope and that this should focus on palaeoenvironmental deposits. This work was undertaken initially by Archaeological Investigations Ltd (AIL) and latterly by Cotswold Archaeology. The Service has provided environmental services for both, although only the results of assessments completed for AIL are currently available (Pearson and Greig 2000; Pearson 2001). These assessments demonstrated the high research potential of organic deposits sampled during the salvage recording for constructing models of environmental change in the Lower Lugg during the early post-glacial period onwards though plant macrofossil, pollen, insect and molluscan analyses.

The quarry is understood to be fully worked out (or at least is dormant, see **Section 2.6**).

4.1.24 *Lugg Bridge to Withington Pipleine*

In 1984 the Service undertook salvage recording along the route of a pipeline being constructed for British Gas (Hurst and Pearson 1995). A specific aim of the project was to record the presence and character of alluvial deposits and to identify and record any archaeological deposits revealed.

Alluvium was recorded along most of the 2.4kms of pipeline observed, while at Eau Withington substantial medieval remains were recorded buried beneath up to 0.75m of reddish brown alluvium. The remains comprised a series of stone walls and an associated flagstone surface providing evidence of at least two buildings occupation of which could be dated from the 12th to 13/14th century. Abandonment of the site appeared highly likely to be related to the onset of a major phase of flooding and associated alluviation no later than the 14th century. 5.3.3 Apart from the occupation described above, only very limited deposits or quantities of artefacts were recorded along the pipeline.

4.1.25 *Herefordshire Valleys Survey*

The Herefordshire Valleys Survey was largely undertaken in the Winter of 1989-90 and was completed in 1996 with the production of three reports (Dinn 1996; Hemingway and Dinn 1996; Dinn and Moran 1996).

The survey was funded by English Heritage and aimed to:

- assess the quantity and quality of the Roman and earlier archaeological resource in the valley areas of Herefordshire;
- test and assess various archaeological survey and evaluation techniques within these alluviated areas; and
- make proposals for the best management of the archaeology of these areas.

Four river valleys were selected, the Frome, the Lugg, the Wye and the Worm Brook with fieldwork undertaken during 1989-90. Augering was the principal technique tested with 10 auger transects completed, although limited geophysical survey, fieldwalking and background research were also undertaken. Three of the auger transects were undertaken within the Lugg Valley, at Wellington, Kingsland and Kinsham, although only that from Wellington falls within the Lower Lugg and thus is relevant here.

At Wellington, a 1590m auger transect comprised 79 auger holes extending across the western side of the valley floor between the A49 and the river (Hemingway and Dinn 1996) as well as an extensive auger survey within the quarry (Dinn and Roseff 1992; Dinn and Moran 1996). This allowed modelling of a valley profile and of buried horizons within the intensively studied quarrying area. These were linked to, and supplemented by, phosphate and magnetic susceptibility analysis of samples taken during augering and by a programme of geophysical survey, test pitting and examination of exposed sections. These were further augmented by desk-based assessment and the results of salvage recording being undertaken alongside the quarrying process.

Sources, approaches and specific techniques assessed by the project included preliminary survey through:

- desk-based assessment,
- aerial photographic mapping,
- specialist geomorphological and sedimentological input,
- use of historical mapping,
- examination of borehole logs, and
- use of local knowledge.

Non-invasive fieldwork techniques considered were:

- targeted aerial photography,
- multispectral imaging and remote sensing,
- fieldwalking,
- earthwork survey,
- examination of exposed sections,
- geophysical survey,
- magnetometer survey,

- magnetic susceptibilty survey, and
- ground probing radar.

Invasive fieldwork techniques examined comprised:

- test pits,
- excavated trenches, and
- augering.

Specialist analytical approaches were also examined including:

- geochemical techniques (phosphate),
- contouring (both surface and sub-surface),
- soil studies,
- palaeoenvironmental analyses, and
- scientific dating techniques (carbon-14, optical luminescence and archaeomagnetism).

Assessment of these techniques resulted in a range of conclusions including that alluviated areas can only be properly evaluated through a staged programme of work and the use of multiple survey techniques with specialist consultation (notably geoarchaeology) allowing each stage to be reviewed thus informing subsequent ones. Ten years have now elapsed since the completion of this project, however, this primary conclusion remains valid although considerable advances have been made in the assessment and investigation of alluviated landscapes especially as a result of advances made in the application of many techniques, refinement of the understanding of the efficacy of these techniques and the development of important new techniques such as LiDAR.

Figure 22: Wellington Quarry – main phases of operation

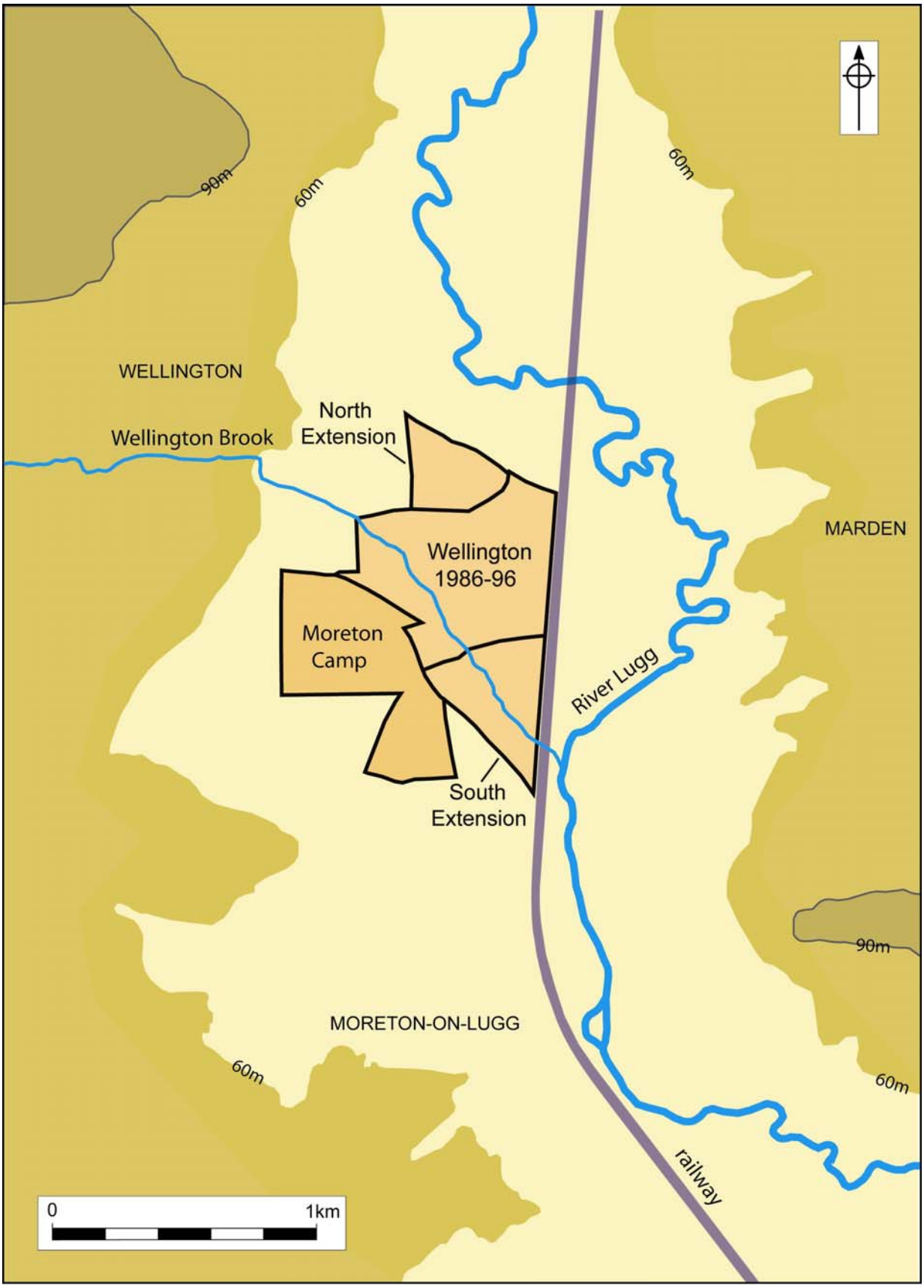


Figure 23: Original application area – sequence of fieldwork

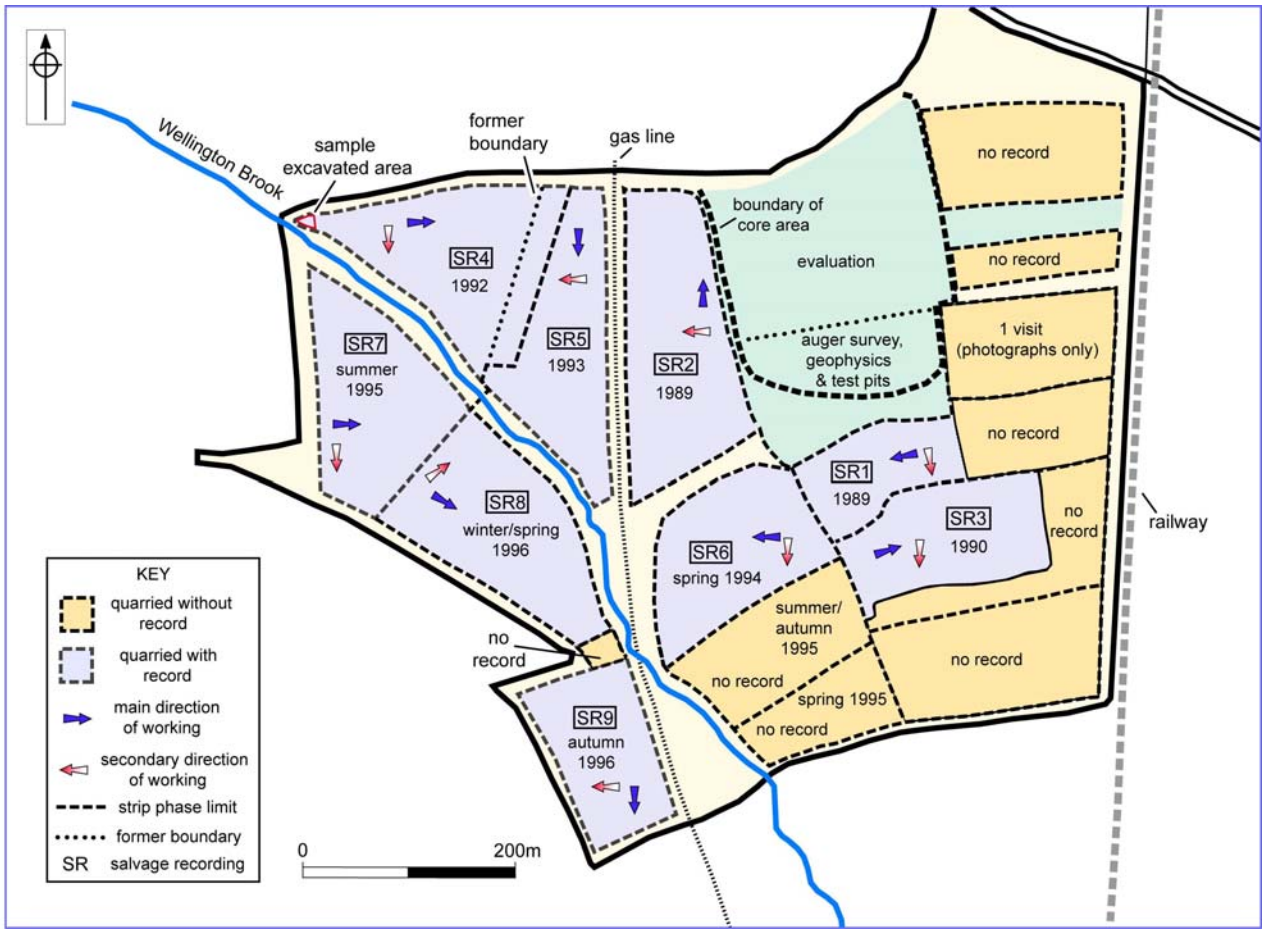


Figure 24: Original application area – work in the 'core' area

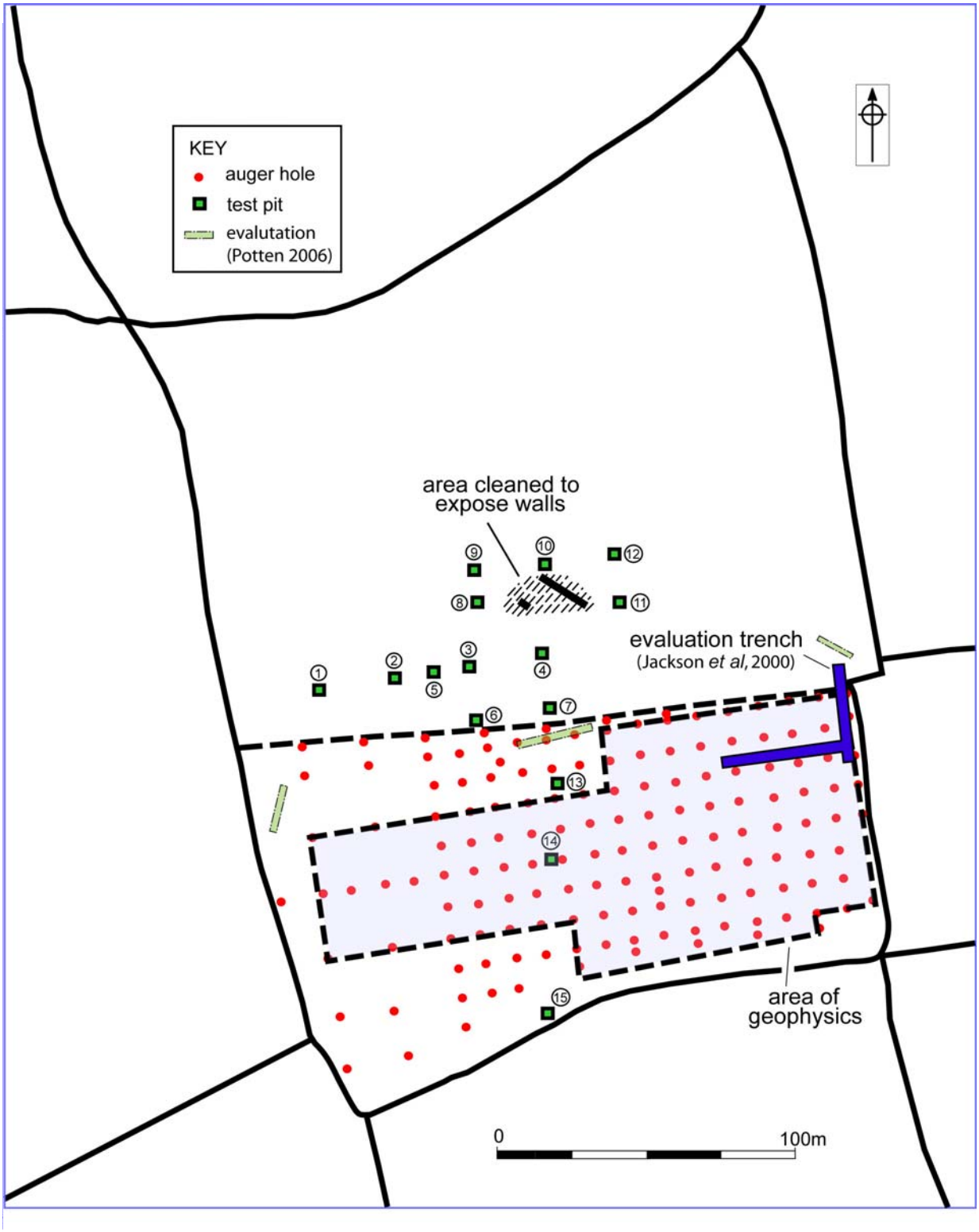


Figure 25: North and South extensions – sequence of fieldwork

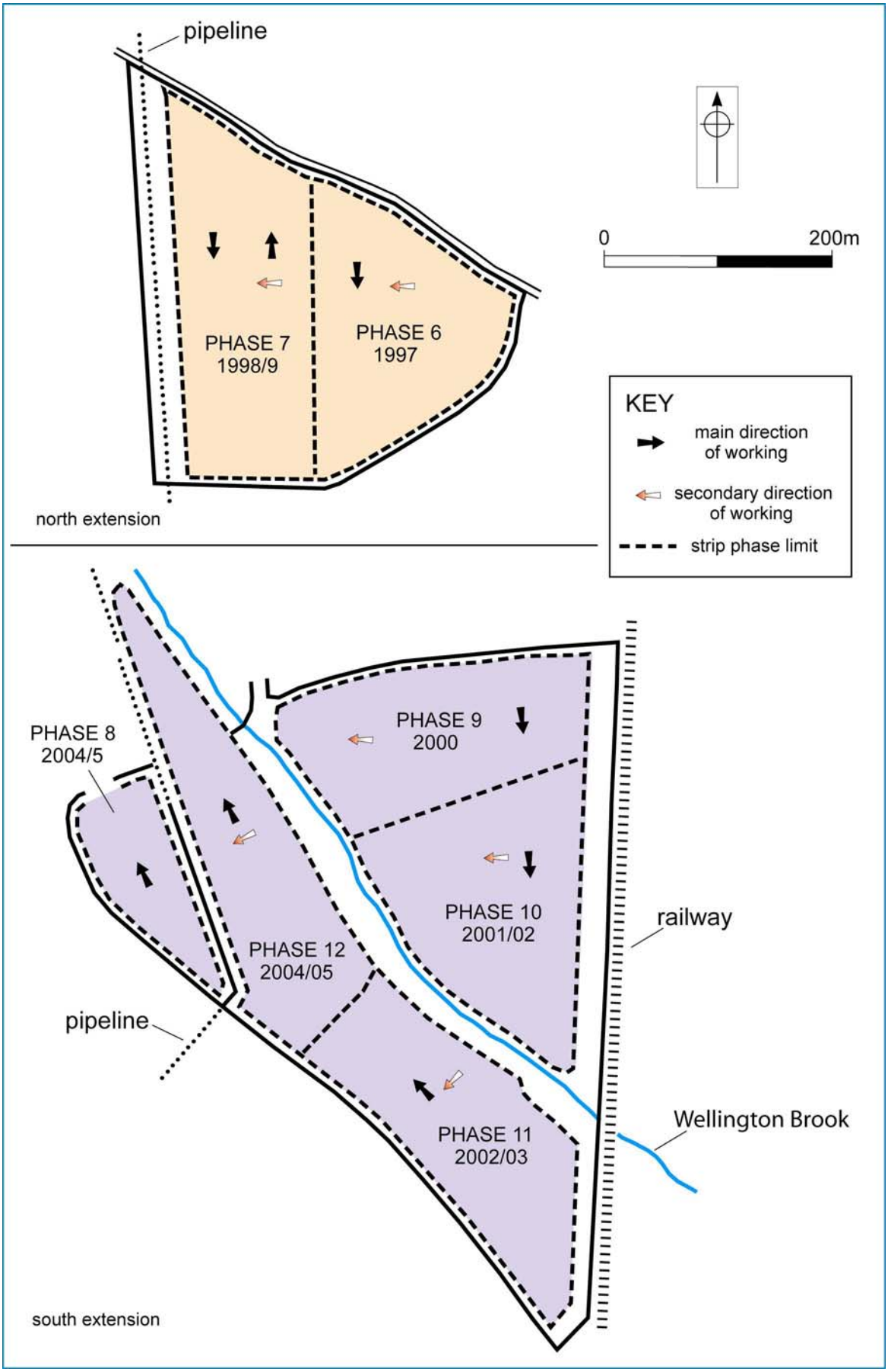


Figure 26: Moreton Camp – evaluation trenches and areas of archaeological potential

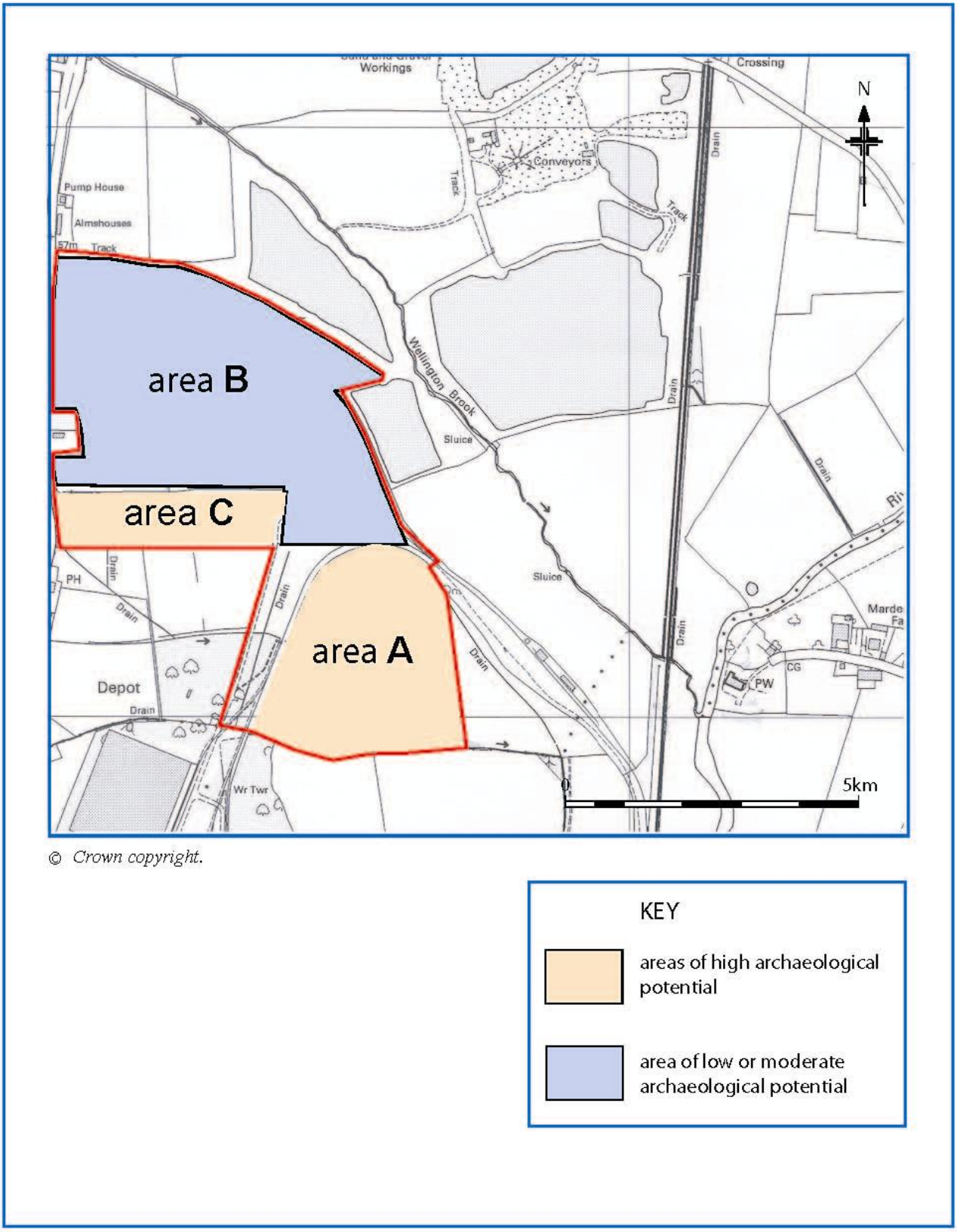


Figure 27: Palaeochannels

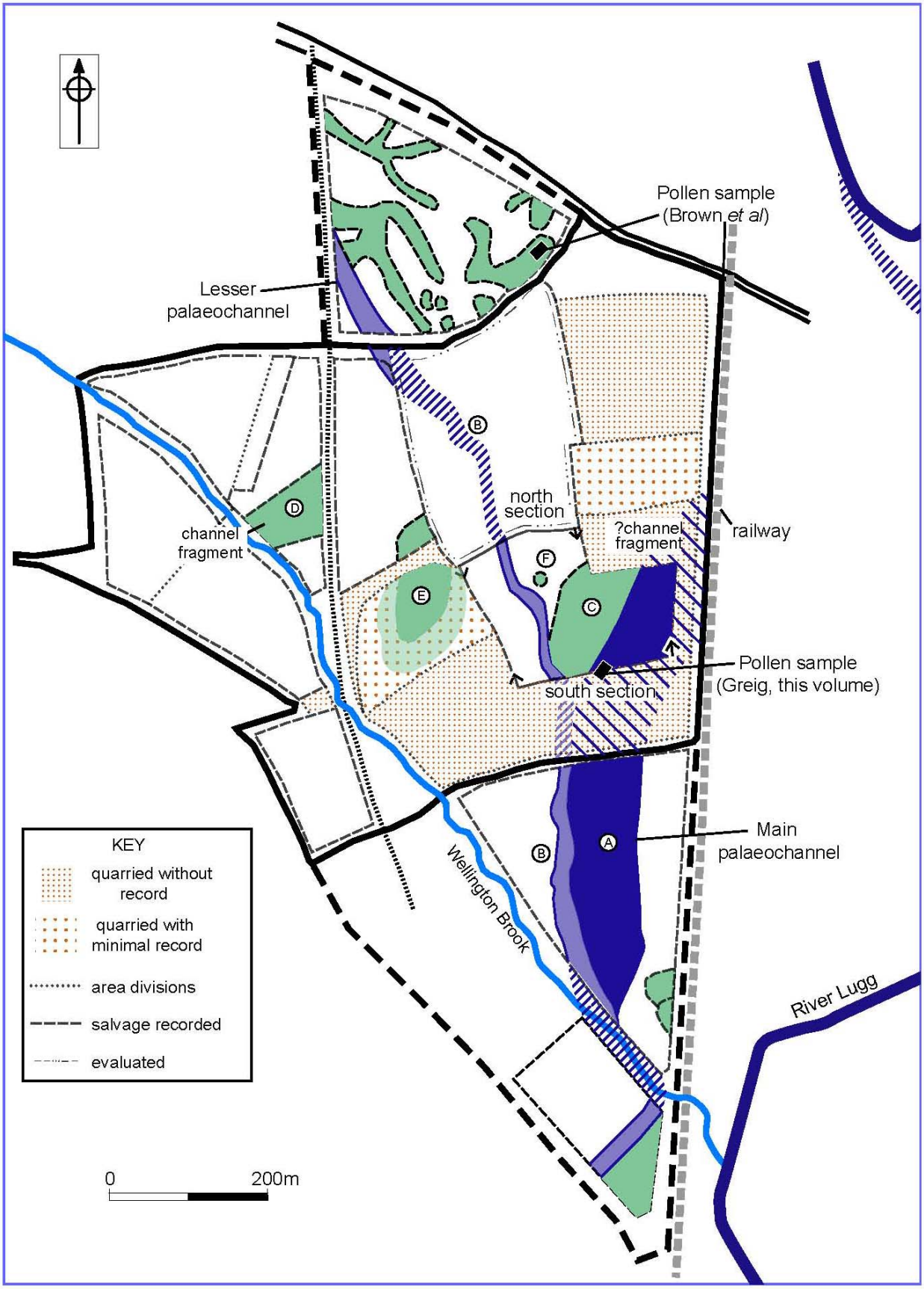
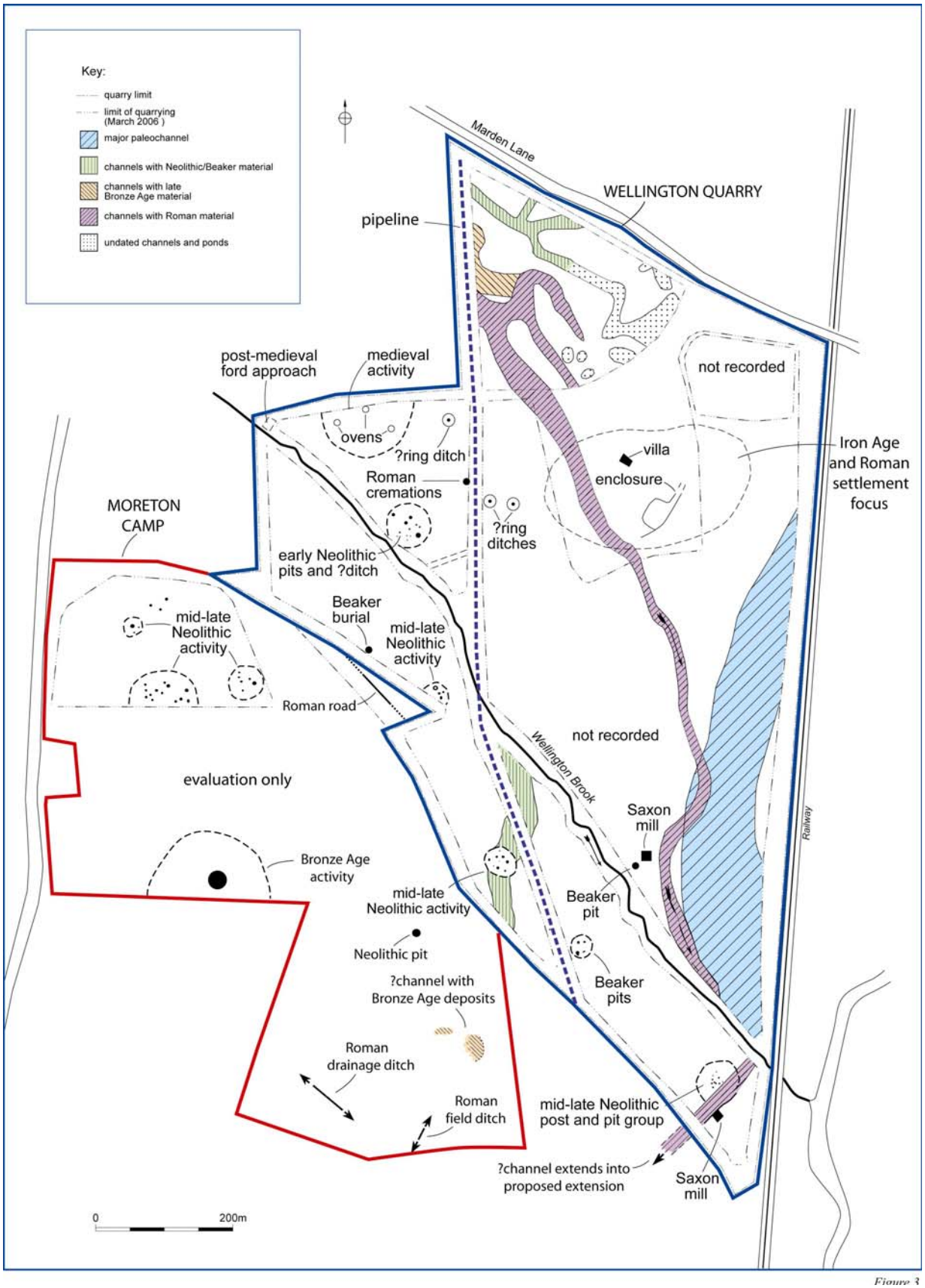


Figure 28: Summary of results – all periods



4.2 Summary of the Wider Archaeology of the Lower Lugg Valley

Introduction

4.2.1 *Purpose and constraints*

This section of the report sets out, on a period by period basis, a summary of all known archaeological information for the Lower Lugg Valley. It should be noted that the data presented in this section specifically excludes material which has been recorded and investigated under the auspices of the Worcestershire Historic Environment and Archaeology Service (WHEAS) and its predecessor organisation (principally from the recording and excavations at Wellington Quarry). This latter body of information is separately summarised in **Section 4.1** of this document.

The separation of the WHEAS data from the rest of the Lugg Valley archaeological evidence does perhaps carry with it the risk that the account of the wider resource is seen simply as a secondary adjunct to the sometimes spectacular recent 'finds' from Wellington. The work at Wellington is undoubtedly of key importance. For one thing it has begun to fill in what had appeared to be large blanks in the chronological and spatial coverage of the local archaeological record of the Lugg Valley (cf. SMR data summary below). For another it has demonstrated the high potential of buried alluvial archaeology in the area. And finally it has emphasised the need for a fully integrated 'geo-environmental' approach to the investigation of the Lower Lugg historic environment resource (one of the fundamental starting points for this ALSF funded project). However it is important also to emphasise from the outset that Wellington - and the other sites investigated by WHEAS linked to Development Control mitigation - represent but one element of a complex local archaeological sequence of which they may not be more widely representative. They may not necessarily therefore directly inform the probability of similar archaeological remains surviving elsewhere in the project area.

In developing the wider resource assessment exercise, it is therefore crucial to take full account of the 'background' archaeological material. For one thing, this wider pool of information is the principal reference point chronologically for those periods which have, from Medieval times onwards, most obviously shaped the visible historic landscape of the Lower Lugg (as mapped in the aerial photographic analysis and transcription exercise set out in **Section 4.3**). Moreover, however imperfectly, this background 'pool' forms the principal key to an informed understanding of the full archaeological resource of the Lower Lugg. The process of 'summarising' this data is therefore also necessarily one, from the start, of interpretation. The material needs to be 'read' in its context, not just abstractly presented as if free of meaning or analytical purpose. So, although the summary that follows stands before the 'critical analysis' part of this document, it should be implicitly understood that it too is the result of a critical process of data search, sifting and analysis of significance.

4.2.2 *Sources*

A range of sources of information have been consulted in researching this summary.

The Herefordshire Sites and Monuments Record (SMR). This integral element of the county archaeological service is the principal repository of historic environment information

for Herefordshire (and therefore the Lower Lugg Valley). The SMR holds a wide range of relevant data ranging from the results of archaeological excavation and evaluation, to statutory listings of historic sites and buildings, artefact finds, field and place-names etc. The basic SMR resource is a computerised database which can be searched via a range of search parameters (SMR number, period, site type, place-name, Parish, grid reference etc.). Additional information relating to SMR entries is held in supporting paper files which are housed by Herefordshire Council. It is also possible to consult the SMR computerised data files remotely at www.smr.herefordshire.gov.uk.

For the purposes of the present research exercise, the 696 SMR entries relating to the Lower Lugg project area (**Section 7.3**) have been interrogated. The results are shown in terms of period/spatial distributions in figs 1 to 5. It should immediately be noted that there is a very marked bias in the SMR record to the later historic periods. There are just 28 entries for the whole of prehistory (4 Palaeolithic, 0 Mesolithic, 5 Neolithic, 1 Bronze Age and 3 Iron Age and 15 undefined prehistoric), and only a further 25 for the Roman (20) and Early Medieval (5) periods combined. The Medieval (109), Post-Medieval (376), Modern (16) and those of Unknown Date (142, mainly later periods) therefore represent 94% of the SMR entries for the Lower Lugg valley.

At one level, this chronological distribution of records is, of course, neither surprisingly or markedly exceptional to the Lugg Valley. The pattern of SMR records is inevitably skewed to more recent and easily visible and recognised components of the historic environment, with, for example, 38% of the 376 Post Medieval records relating to surviving buildings. It is also important to stress that SMR dating ascriptions cannot necessarily be taken at face value. In the present state of SMR data editing, many records are likely to be misattributed (or imprecisely placed in the Unknown Date category), and this situation may well tend to favour the later periods (Seddon and Dingwall forthcoming). For the purpose of this summary and analysis, undated records have been critically assessed according to their most likely period association.

Nevertheless, the low absolute totals of records for all periods from the Early Medieval period back in time does give a striking (if also coarse) indication of the extremely poor current knowledge of long periods of human activity in an area whose agriculturally fertile, resource rich and strategically significant character would - even without the supportive evidence of the Wellington site - imply the likelihood of a significant focus of human activity from the earliest times.

To ensure, against this background, that the best use is made of the SMR material (especially that relating to the earlier periods), supporting evidence from which the computerised SMR record is derived has also been reviewed and critically assessed.

Survey of archaeological excavation and evaluation work. Some significant non WHEAS archaeological excavation and evaluation work has been undertaken in the project area. Perhaps most notable in this respect was Kathleen Kenyon's work at Sutton Walls Iron Age hillfort between 1948 and 1951 (Kenyon 1954) which provides the principal source of information not only for this important and now partially destroyed site, but for the Iron Age sequence of the area more generally.

Recent work by Herefordshire Archaeology has also made an important contribution to the investigation of the Medieval and Early Medieval periods in particular, with investigation of the settlement complex at Sutton St Michael/Freen's Court (Ray and Hoverd 1999), and the

suggested Early Medieval cemetery at Ash Grove, Bodenham (Hoverd 2000). In addition, a 2006 Herefordshire Archaeology investigation at Hillcroft Field, Bodenham (Dorling 2007) revealed an Early Neolithic enclosure which provides the first substantive stratified evidence beyond Wellington of Neolithic activity in the Lower Lugg.

Other evaluation and survey work has contributed significant insights into the wider archaeological sequence. This includes geophysical survey (Barker 1993) and trial excavation (Stone 1993) on the Lugg Meadow 'Lammas' marker stones, walkover survey on the line of the proposed Hereford bypass (Dinn and Hughes 1990), and salvage recording at the Lugg Bridge quarry site (Vyce, Wood and Williams 1999).

Survey of wider Literature. A wide range of general literature sources have been reviewed. This includes relevant wider 20th century archaeological literature and syntheses, the Woolhope Club Transactions (1852-present), and antiquarian literature referring to the topography and history of the Lower Lugg area.

Map evidence. The mid 19th century tithe maps for the Lugg valley Parishes have been reviewed for features and fieldnames of potential historic interest, and OS maps from the First Edition onwards visually analysed and cross compared.

Historic Landscape Characterisation The results of Herefordshire Archaeology's EH funded Historic Landscape Characterisation work have also been considered (Ray and White forthcoming).

Period Review

4.2.3 *Palaeolithic (Figure 29)*

There is only one find of certain Palaeolithic cultural material in the Lower Lugg Valley. A Lower Palaeolithic bifacial hand-axe of Acheulian type was discovered at a depth of approximately 0.8 metres in a garden in Tupsley in 1977 (SMR 2367). The axe measures 19.5 x 9.5 x 5.8 centimetres, and is said to be of 'poor quality grey stone' (Hereford Museum accession description); presumably it is flint with grey surface patination. The assumption must be that this hand-axe derives from a re-deposited context (probably fourth river terrace gravels), although it is worth noting that it survives in crisp and unworn condition (as demonstrated by the cast held in Hereford Museum). In any event, the Tupsley hand-axe does unequivocally demonstrate the potential to recover Palaeolithic cultural material from the Lower Lugg area.

A more tentative Upper Palaeolithic stylistic attribution has been given to two large flint blades (SMR No 38817) discovered as 'casual finds' in 2004 north of Lugwardine. One had a red brown colour which could imply post depositional colour change associated with an iron stained (gravel?) context (note in SMR from Lawrence Barfield dated 28th February 2004), though no detailed find-spot information is recorded. It should be emphasised, however, that the Palaeolithic identification is only conjectural, and a Neolithic date is equally probable (and perhaps more likely) for these tool types.

The scarcity of tangible Palaeolithic material culture sits in evident contrast to a complex sequence of palaeo-environmental data relating to the development of the Lower Lugg Valley during the Pleistocene. This information is separately reviewed in this report (**Section 3.1**), but

it is worth mentioning here recorded fluvio-glacial exposures such as those associated with the Risbury formation of the Middle Pleistocene at Norton Court (SMR 32814), Upper Lyde (SMR 32819), Frankland's Gate (SMR 32815), and Adzor Bank (SMR 32818). These deposits display varied lacustrine, glacial compression and riverine outwash features and attest not only to the interleaved glacial and peri-glacial conditions which characterised significant blocks of the Pleistocene in the evolving Lower Lugg Valley area (Richards 1999, **Section 3.1**), but also concisely illustrate the kind of varied (and often inhospitable) environments which obtained there during prolonged periods of potential Palaeolithic occupation. Even though interglacial episodes are likely to have connected with significant seasonal human activity in a potentially rich riparian environment, re-working of deposits by subsequent fluvio-glacial activity has almost certainly substantially disrupted the archaeological record of such ephemeral settlement.

If these combined processes might seem to suggest low potential for survival of stratified Palaeolithic archaeology in the Lower Lugg, then the recovery in the 19th century of Woolly Rhinoceros and Horse fossils from a quarry at Bartestree (Symonds 1867, Dawkins 1869), and a Woolly Rhinoceros molar from near Dinmore station (Symonds 1861), indicates the potential for significant re-deposited environmental data within the Pleistocene Lugg gravels. The point is emphasised by the more recent recovery from the Lugg Bridge quarry of well preserved faunal material which probably derived from Flandrian peat layers (Vyce, Wood and Williams 1999 and see Mesolithic discussion Section 4.2.4 and **Section 3.2**). Similar survivals – perhaps including human cultural material – are certainly conceivable in analogous late glacial Devensian contexts where what appears to be a sequence of river activity and braiding can be projected to have left a comparable legacy of intact primary deposits associated with former river channels and lakes/ponds.

4.2.4 *Mesolithic (Figure 29)*

No Mesolithic material culture has been recorded from the Lower Lugg (excepting the small collection of flintwork from the Wellington excavations, see **Section 4.1**). Despite this lack of absolute evidence of wider Mesolithic occupation, the Lugg Bridge quarry has provided a partial glimpse of the broader environmental context of the period. Importantly, this illustrates that the Wellington 'story' is only one part of a more complex early Holocene landscape in the Lower Lugg, with a range of niches and resources which might have been seasonally exploited and selectively combined by Mesolithic peoples.

Salvage recording at Lugg Bridge following overburden stripping was undertaken in 1999 by Archaeological Investigations Limited (Vyce, Wood and Williams 1999, see also **Section 4.1** for complimentary WHEAS work at Lugg Bridge). Although the scope of the work was limited, and faunal material was not observed in situ, the secondary recovery of preserved bone included a horse left radius and ulna, an auroch scapula, and a red deer antler. These bones all came from different parts of the quarry, apparently deriving from separate contexts, and therefore incidentally emphasise the widespread (though presumably localised and context specific) survival of such evidence across a large area. The horse and auroch bones displayed what appeared to be organic staining, and the auroch scapula additionally showed surface abrasion consistent with exposure to running water, implying re-deposition in its eventual burial site by fluvial action. In the cases of the auroch and horse at least, the bones most likely derived from peat contexts whose anaerobic conditions would also explain their survival and relatively good preservation. The formation process of these peat horizons is not clear, but they seem to be linked to the constricted character of the valley floor at Lugg Bridge causing water

to pond and leading to the associated accumulation of up to 1.5 metres of deeply buried organic debris.

The Lugg Bridge bones may or may not be exactly contemporary, but they can be most likely assigned a broadly early Holocene date. If it is tentatively assumed that these three species coexisted in the same time frame in the Lower Lugg, then a wooded or partially wooded environment is implied, where horses - which are more commonly linked to the open and cooler conditions of late glacial Tundra environments - were nevertheless still present. So while these particular bone samples produced no evidence of human action (such as butchery marks), they do speak of an abundant game resource associated with an environmentally varied riparian hinterland of a kind which must have been attractive to Mesolithic populations. Moreover, although these bones may well have been re-deposited by fluvial action, their preservation in secure palaeo-environmental contexts underpins the case for the survival of similarly fragile contemporary archaeological materials in comparable deposits elsewhere in the Lower Lugg valley bottom zone.

4.2.5 *Neolithic (Figure 29)*

Until recently, the only evidence for Neolithic activity in the Lower Lugg beyond the Wellington Quarry area was provided by flint scatters, three stone axes, and two standing stones of possible (but questionable) Neolithic date.

The principal finds of prehistoric flintwork in the Lower Lugg were made in the course of fieldwalking during the Hereford bypass survey in 1990 (Dinn and Hughes 1990). The proposed A49 bypass route was to have followed a course along the eastern edge of the gravel terrace on which Hereford is located. Isolated flintwork finds were widespread, although mostly at a 'background' level of less than five flints per field (SMR 8611, 8612, 8614, 8615, 9100, 9143, 9446). Much of this material was not sufficiently diagnostic to allow specific period attribution, although almost certainly some is of Neolithic date. This Neolithic component was confirmed by a denser concentration of fifty flints found in a field near Hampton Bishop (SMR 6500) which included evident Neolithic material such as a re-worked polished axe fragment (of possible Wiltshire origin). A small but comparable scatter has also been noted on a north facing slope overlooking the river at Litmarsh, Bodenham (SMR 26944), and although the material was less distinctive in period terms, a Neolithic date is also likely in this case. While such evidence of prehistoric activity is not surprising on the gravel terraces of a major river valley, it is nevertheless important in unequivocally demonstrating the widespread use of the Lower Lugg landscape from the Neolithic onwards.

Of the three complete axes, a late Neolithic polished stone example probably of Group 6/Lake District origin was found at a depth of approximately 0.8 metres in a clay marl deposit at Dinmore Fruit Farm, Wellington in 1960 (SMR 6552, Norwood 1961). A flint axe of Early to Mid Neolithic date was a surface find at Wellington Wood in 2004 (SMR 31009), and can be closely compared to another flint Neolithic axe which was recovered in the 1940s from a dumped gravel heap at Moreton-on-Lugg (SMR 8429). Although it has been suggested that the gravel in which the Moreton-on-Lugg axe was found had come from the quarry within Sutton Walls hillfort, it could very well have been excavated from the adjacent Moreton Camp (then under construction), and this would mean that all three axes actually derive from a small geographical area. This concentration apparently demonstrates the presence of a Neolithic community in the Wellington area able to attract such high status objects, and could also hint at deliberate deposition of such items in this limited vicinity. Although none of the axes are

associated with known contexts, their good condition could also support the case for deliberate burial rather than casual loss. An intriguing additional possibility is that the two precisely similar flint axes were actually originally imported to the Lower Lugg in the same trade consignment (Ray 2007).

The standing stones are at best uncertain as regards their Neolithic associations. That at 'The Bank', Withington (SMR 1270) is 1.6 metres high (now leaning to the north) and stands (apparently in situ) in a garden boundary hedge adjacent to a road junction. The context in particular makes an identification as a Medieval or later boundary marker or milestone probably more likely than a prehistoric provenance, though an early date – or later re-use and/or re-location of an earlier standing stone – is still a possibility.

The same broad analysis is most likely true of the more celebrated Wergin's Stone in Sutton Parish (SMR 929, Royal Commission on Historical Monuments 1932). This in fact consists of two stones, with the 1.5 metre upright resting in a socket in the roughly pentagonal base stone. The current arrangement is probably of fairly modern date, and the stones are certainly recorded as being moved (by the Devil, according to popular accounts!) in the 1640s, before being returned to their original position (Watkins 1927b). Before this disturbance, Camden's late 16th century account (Gough 1789) records that one stone was then upright with the other lying across (on top?) of it, and his opinion was that the stones thus represented the remains of a 'Cromlech'. Despite - now as then - the romantic attraction of this idea that the Wergin's Stone is the remnant of a Neolithic chambered tomb, other early commentators such as Duncomb (1812) more prosaically state that the (Medieval?) origin of the setting was as a land/water height marker associated with the management of the former Wergin's Meadow common. Given the locational context on the Lugg flood plain, and the recorded presence of stone markers on other Lower Lugg meadows, this does seem a strong argument. It would certainly need to be explained how a Neolithic feature in this situation still somehow survives above ground after five or more millennia of surrounding alluvial deposition.

A 2006 archaeological field evaluation by Herefordshire Archaeology of an enclosure at Hill Croft Field, Bodenham (Dorling 2007) has recently provided a more grounded glimpse of local Neolithic activity. The oval enclosure encircles the western summit of a hill to the south of Bodenham, with the ground falling away sharply on the north to the river flood plain. The site is therefore prominently located to overlook (and perhaps to be visible from) the loop of the river Lugg east of Dinmore Hill. The enclosure, as partially defined by air photography and subsequent geophysics, is 180 metres across at its maximum diameter and consists of a single continuous ditch (not visible on the eastern edge of the hill where the natural scarp may mask its presence), with one apparent entrance to the north.

Although trenches in the interior of the enclosure and at the base of the southern slope of the hilltop failed to yield significant archaeology, a 10 by 5 metre trench over the suspected entrance both confirmed the existence of opposed ditch terminals at this point (with a 4.5 metre wide causeway between), and produced important contextual and dating evidence. The ditch at the excavated western terminal was 3.3 metres wide and 0.85 metres deep, and splayed out slightly as it approached the terminal. The primary fill in the base of the ditch consisted of a red/brown silty clay containing plain round bottomed bowl sherds in the Early Neolithic tradition, struck flint, animal and human bone and numerous snail shells; there appeared to be no stratigraphic separation in this mixed deposit between these different elements. Above this primary layer was a horizon of compact silts and clays. This was interpreted as re-deposited natural (probably derived from the ditch) representing deliberate burying/sealing of the basal

deposit. This was itself overlain by a layer of silt with charcoal flecks, with this sealed by a narrow and more dense charcoal layer. A mixed upper fill deposit apparently represents gradual silting of the ditch following the abandonment of the enclosure.

Radiocarbon determinations from the basal deposit (4 samples) and the upper charcoal band (2 samples) have confirmed the broad dating suggested by the pottery associations, though they may also hint at the complexities of the activities with which the site was associated. By combined statistical interrogation of the samples, a construction/primary deposit date of 3640-3520 cal BC (84% probability) or 3430-3380 cal BC (11% probability) can be inferred. The two samples from the upper charcoal layer were closely contiguous at 3500-3120 cal BC (95% probability) and 3490-3110 cal BC (95% probability), and would tend to indicate a period of perhaps 200 years between the initial construction/use and this final (?) act of deposition/burning which apparently marks the end of the use of the monument. What is perhaps more interesting, however, is that the four radiocarbon samples from the basal deposit were not themselves statistically consistent; the two bone samples appear older than the charcoal samples (though the two charcoal samples also show a statistical variance). It may therefore be possible to suggest that deliberately preserved old bone (and other?) material was placed in the Hill Croft Field enclosure ditch terminal. The detailed analysis of the implications of this observation is beyond the scope of this summary, but such an intriguing pattern does imply the symbolic juxtaposition in the Lugg Valley Neolithic not just of abstracted qualities of past and present, but also of the separate places in the valley and its environs where different life/ritual activities - such as the storage and preparation of conserved bone remains - were carried out.

The primary importance of the Hill Croft Field enclosure is as the first Herefordshire example of a Neolithic monument which (in terms of date and pattern of depositional activity) may be broadly regarded as being within the wider 'Causewayed Enclosure' tradition. In the present specific context of assessing the archaeology of the Lower Lugg, it is also a site which offers evidence of the complexity of the Neolithic use of the valley. The implication is not necessarily that there are other closely similar enclosures to be discovered in the immediate area – though this could be so. It is that a range of Neolithic 'sites' – or perhaps it might be better to think of 'landscapes of deposition' – are likely to be present in the Lower Lugg which may not necessarily be straightforward to predict just in terms of the observed character of what we already know about. In this sense the Hill Croft Field enclosure exemplifies the difficulty in that it was itself a completely unexpected Neolithic discovery of quite different character to the dispersed pits found under deep alluvium at nearby Wellington (see **Section 4.1**) which represent the only other stratified Neolithic archaeology from the area (although see Ray 2001a for a prediction that such sites would be found).

4.2.6 *Bronze Age (Figure 29)*

Tangible evidence of the Bronze Age beyond Wellington Quarry (**Section 4.1**) is slight in the Lower Lugg. One flint scatter (SMR 8465) found at Lower Bullingham during the 1990 Hereford bypass survey was of diagnostic Bronze Age character (Dinn and Hughes 1990). It included 100 flakes, 14 flake lumps, 4 blades, 4 small round scrapers, and two possible further scrapers. Trial trenching in the area did not reveal evidence of associated features. Nevertheless, the wider distribution of flintwork found during the bypass survey (see 4.2.4 above) must in part indicate Bronze Age as well as Neolithic settlement patterns, and moreover implies that similar levels of activity would be observed throughout the valley were similar survey to be undertaken in other areas.

In addition to flint finds, air photography on the alluvium free gravel terrace areas has revealed probable Early Bronze Age ring ditches, with one concentration forming a well defined group at Hampton Bishop (SMR 226). The air photo evidence is reviewed in detail in **Section 4.3**, but it should be added here that there is as yet no hard excavation evidence to confirm identification of Bronze Age features postulated from cropmarks.

In essence, even though the evidence is limited and non-specific, it is enough (in combination with the Wellington Quarry material, **Section 4.1**) to strongly imply the probability of extensive Bronze Age settlement activity in the Lower Lugg. Such activity would, of course, be expected in this kind of river valley context.

4.2.7 *Iron Age (Figure 29)*

Recognised finds of diagnostic Iron Age character in the Lower Lugg are as scarce as those for the prehistoric period generally. Only one artefact find – a Late Iron Age coin from Bartestree Parish – has been recorded (SMR 6528). The presence of this coin – a stater bearing the name of Corio, ruler of the Dobunni tribe in the late first century BC – is nevertheless suggestive evidence of the political and commercial context of the Lower Lugg in the immediate pre-Roman period. The territory of the Dobunni seems to have been centred around the Severn Estuary (Cunliffe 2005), and it was formerly thought on the basis of numismatic evidence that Corio ruled the southern part of the territory at the same period as a rival/joint ruler called Bodvoc was overlord of the northern Dobunni (Allen 1960). However, the more balanced distribution of recent coin finds for both rulers seems instead to suggest that both men held sway over the whole tribal area, with Corio's reign probably immediately preceding that of Bodvoc (Van Arsdell 1994). Whether or not the Lower Lugg (or Herefordshire as a whole) in fact fell within (or north of) the Dobunnic territory remains a matter of debate, but in any scenario the Bartestree stater does indicate the sophistication of local trading and exchange activity which by this time evidently linked the area and its resources into wider regional economic patterns.

The hillfort at Sutton Walls (SMR 912) is the only unequivocally recognised Iron Age settlement site in the Lower Lugg area, and there is a long history of archaeological finds within the hillfort (Royal Commission on Historical Monuments 1932, Walters 1908, Jack 1917). The interior was partially destroyed by gravel extraction in the mid 20th century, although a degree of archaeological salvage was achieved both by collection of artefacts found during quarrying in the late 1930s and early 1940s (Marshall 1943) and more significantly by the systematic excavations undertaken by Kathleen Kenyon between 1948 and 1951 in advance of extraction (Kenyon 1954). The hill itself is capped by Pleistocene gravel deposits of the fourth Lower Lugg river terrace left upstanding by combined eustatic recovery and subsequent river erosion; the summit is 30 metres above the current flood plain. As such, the east–west aligned hill occupies a naturally prominent strategic site which effectively appears to 'block' this part of the Lugg Valley. The hillfort rampart, consisting of a single bank and ditch modified from the natural fall of slope, encloses the 28.842 acre summit plateau area.

Kenyon's excavations were conducted at the western end of the hillfort principally with the aim of recording areas which had so far escaped the advance of the quarry in that area. The work was done over four seasons, totalling about sixteen weeks on site in total. The main 'Area 1' focus explored the northern side of the hillfort interior which then still existed between the quarry edge and the northern rampart (additionally including partial trenches over the rampart

itself). Small exploratory trenches were also placed close to the southern rampart; these were targeted either side of the modern quarry entrance to explore pockets of undisturbed ground left by previous quarrying (Areas 2 and 3). In addition, a sequence of trenches (Area 4) were opened over and adjacent to the original western entrance of the hillfort (although the ramparts and entrance earthworks themselves were not threatened by the quarrying work, and still substantially survive today). Kenyon's team also, as far as possible, recorded sections of archaeological interest which happened to be revealed in the active quarry face at the time of their yearly visits, and continued to collect finds turned up by quarrying in areas which were not archaeologically explored.

Kenyon's method of archaeological excavation was very much of the mid 20th century period, with a heavy emphasis on sectional recording via matrices of 10 foot (3 metre) square box trenches divided by baulks. Although significant areas (notably Area 1) were examined by this method, the potential weakness of the approach is the failure to recognise more complex (and exiguous) spatial patterns which become obscured by the network of balks and uncertain visual association of adjacent stratigraphic layers, perhaps especially where features are not additionally clarified by marked patterns of diagnostic artefact deposition That said, it is clear from the excavation report and accompanying photographs that Kenyon deserves her reputation as a thorough and meticulous excavator. There seems no particular reason to question the veracity of her observations and main interpretations, or to suggest that significant elements of the sequence may have been missed in the areas she examined. It must, of course, remain possible (indeed likely) that Sutton Walls saw earlier and later occupation than the Iron Age/Romano-British phases identified by Kenyon in the 2% sample of the hill-top she excavated.

The ground in Area 1 sloped from the crest of the hill to the rampart, and the evidence recorded here by Kenyon was associated with a series of scoops/shallow pits cut into the gravel, one of which (Pit 1) was completely excavated, one partially so (Pit 2), while a similar feature to the west in Area 4 (Pit 3) was cut by an evaluation trench. The bases of these pits were marked by an iron pan deposit which was not noted elsewhere on the site. Kenyon interpreted the origin of these features as borrow pits for rampart material, with subsequent occupation activity then exploiting the shelter value of these depressions as preferred settlement locations; she argued that it was this occupational re-use and its impact on the local soil chemistry that influenced the iron pan formation over the natural gravel in only these pit areas. In the fully investigated Pit 1, up to four phases of Iron Age occupation were identified from stratigraphic evidence (plus further continued occupation of the same character into the Roman period – see Roman review section below). These phases were interpreted as representing repeated episodes of infilling/levelling and re-building on the same site. While post and stake holes were identified linked to these different stratigraphic units, no definite/unequivocal evidence of distinct structures was obtained. However, a well defined sandstone hearth survived from the presumed Period 3 structure. All phases were associated with Iron Age pottery types (predominantly black burnished flat-based wares), with the Roman forms additionally appearing in phases 3 and 4 interpreted as representing the impact of acculturation in the 50 or more years before the conquest.

The investigation of the ramparts in Areas 1, 2 and 4 (the latter in tandem with the wider exploration of the western entrance works) seemed to produce a complementary picture to the evidence from the interior. In Areas 1 and 2, bone and Iron Age pottery sealed beneath the rampart was found to be stratigraphically associated with artificial (?) hollows in the gravel substrate. This appeared to attest to a pre-rampart occupation phase, and a large post hole in

one of the hollows was interpreted as suggesting the possible existence of a pre-rampart palisade (although no other comparable post holes were found to corroborate this possibility). Distinct stratigraphic horizons in Area 2 were interpreted as turf layers interleaved with and alternately sealing this pre-rampart occupation material. This turf formation seemed to indicate that this phase had been of considerable duration (and perhaps activity had not been continuous, at least in this part of the site), though no evidence of pre-Iron Age occupation was uncovered.

The rampart itself presented two apparent phases, with its fabric showing a classic 'reverse' stratigraphic sequence consistent with the use of excavated material from the ditch to form the bulk of the bank structure. In the suggested first phase, a series of post holes and an associated drystone wall revealed in Areas 1 and 2 seem to demarcate a frontal revetment. However, Kenyon's view (not fully explained in the report) was that this was not the outer face of the rampart. Instead, she suggested the outer face must lay beyond the area of her excavation, and be associated with a second (postulated) revetment. If this argument is correct, then the identified revetment either represents an additional (earlier?) phase to the structure, or an internal structural reinforcement intended to prevent bank subsidence. What does seem clear is that this first form of the rampart was subsequently altered by the secondary addition of a capping of further alternating layers of clay and gravel, presumably to raise the height of the bank. This modification was associated with Late Iron Age ('Belgic' in Kenyon's parlance) pottery, and linked by Kenyon to improvement of the defences in the century before the Roman conquest.

What seemed to be an additional phase in the history of the defences was revealed by an investigation of the ditch system adjacent to the western entrance (Area 4). The entrance itself was shown to be 66 feet (22 metres) wide between the flanking revetments. The associated ditches were of V shaped profile, infilled with a basal silt deposit overlain by larger stones. These fills were plausibly enough interpreted as deriving from decay of the Phase 1 rampart. A new ditch had been cut into these basal fills. It comprised a broad and shallow flat bottomed feature, quite different in character to the Phase 1 ditch. It was associated by Kenyon with rapid refortification of the site in the face of the Roman advance. This ditch refurbishment seems only to have been undertaken adjacent to the entrance.

The view that this improvement was a 'panic' measure before a pending crisis/attack was very much reinforced by the discovery of twenty-four male skeletons lying in the base of the re-cut ditch. Some had been decapitated, others showed evidence of violent injury, and the haphazard position of the bodies was consistent with their being carelessly dumped in the ditch. Kenyon plausibly enough interpreted this deposit as dumped war dead/executed prisoners, and on the grounds that the entrance defences appeared to have been deliberately slighted following the disposal of these bodies, she argued that the Roman conquest scenario (rather than conflict between rival Iron Age groups) was the most likely context. While this analysis remains reasonable, it is not completely clear why Kenyon saw the entrance ditch re-cut and the wider raising of the ramparts as separate phases. Although her excavations failed to identify a certain stratigraphic association between the two events, it does seem that both could be part of one integrated re-fortification programme.

In general terms, the Iron Age sequence from Sutton Walls, attesting as it does to a continuous and complex pattern of settlement at a major site from at least the Middle Iron Age onwards, is a key piece of evidence for the later prehistory of the Lower Lugg more widely. Although there is currently very little evidence of Iron Age settlement in the immediate hinterland of Sutton

Walls, the fact that the hillfort is there indicates that a well occupied hinterland should also exist, but the evidence for it has simply not yet been recognised. The lack of absolute dating from Kenyon's excavations, and the apparent failure to distinguish any clear chronological stylistic patterns in the generically 'Iron Age' pottery sequence from the site, does mean that precise re-interpretation of the sequence alongside modern Iron Age analytical frameworks is not immediately straightforward, and would probably need re-working of the primary archive to achieve. Nevertheless, the Sutton Walls evidence is still a major local 'marker' for the period, and importantly it might be possible to see in this site the Iron Age emergence of a political and administrative unit which is then re-invented through shifting Roman, Early Medieval and Medieval estate structures to fossilise the same basic zone of local control and landscape organisation up to recent times.

4.2.8 *Roman (Figure 31)*

Excepting the estate complex at Wellington (see **Section 4.1**), the settlement at St Donat's (see **Section 4.1**) and the Romano-British settlement phases at Sutton Walls (see below), no properly excavated archaeological material from this period has been recovered from the Lower Lugg. However the 20 recorded Roman finds for the area in the SMR nevertheless imply, as might be expected, a significant level of ongoing activity throughout the Roman period. The geographical and strategic context of the Lower Lugg at this time is emphasised not only by the possible evidence for a direct Roman assault on Sutton Walls (see above) during the initial Roman advance (perhaps in the mid 70s AD in this area), but also in the longer term by the presence of the major Roman roads running east from Kenchester to Stretton Grandison (SMR 5559, crosses the Lower Lugg valley at Lugg Bridge), and north from Kenchester to Leintwardine (part of Watling Street west) which fringes the western edge of the Lower Lugg area.

For much of the Roman period, the Lower Lugg may effectively be considered part of the commercial and agricultural hinterland of the town at Magnis/Kenchester (situated 3 miles west of Hereford). From excavation and ceramic evidence (Jack and Hayter 1916, Jack and Hayter 1926) it seems Kenchester became established as a significant centre in the 2nd century (possibly initially developing from a military fort), and remained in continuous (and apparently prosperous) occupation at least up to the end of centralised Roman governance in the early 5th century (Wilmott 1980, Ray 2002). That sustained local importance is emphasised not only by the substantial stone buildings and associated mosaics known from Kenchester, but also by major investment in the building of a bastioned town wall as late as the mid 4th century. In the Lower Lugg area itself, coin finds such as a 2nd century Sestertius of Hadrian from Withington (SMR 6515, Martin 1951), a late 3rd century billon (base metal) antoninianus of Diocletian from Mordiford (SMR 6493, Norwood 1960), a 3rd century Roman silver coin from Sutton Court (SMR 6547, Pritchard 1938), and an early 4th century coin of Licinius from Withington (SMR 24959) can collectively be taken to evidence the ongoing pattern of everyday commercial activity and exchange within the relatively stable socio-political context which seems to have obtained in this part of Herefordshire for much of the Roman period.

The discovery in 2004 of a Late Roman military 'spatha' or slashing cavalry sword embedded in the river bank just to the west (and downstream) of Bodenham (now in Hereford Museum) perhaps provides additional insight into evolved patterns of Roman activity in the Lower Lugg. The spatha can be compared in date and significance with a bronze belt-fastener which was also a recent chance find from Kenchester (also now in Hereford Museum). Both items belong to a 4th century context, and are examples of the kind of equipment owned by the military-

civilian elite of that period. As such, these objects relate to a Late Roman administrative framework associated with decentralised 'multiple province' political organisation. Their owners derived authority from control of an army which combined military and administrative functions, and which was based in - and drew many of its personnel from - key points along the communications network, including walled towns such as Kenchester. The location of the Bodenham find may also be significant in that it could indicate the presence of a river crossing on a Late Roman routeway between Hereford/Marden and Leominster (where there is also plausible evidence for a Roman road/river crossing, see Ray 2002).

It must be generally suggestive that where systematic field walking has been undertaken in the Lower Lugg area – most notably in 1990 by Hereford and Worcestershire Archaeology Service along the line of the then proposed eastern Hereford bypass route - a significant 'background scatter' of Roman pottery has been recovered (Dinn and Hughes 1990). The majority of the bypass sherds were of small and abraded character, and the relatively low quantity of material recovered from each transect (SMR 8621-1 sherd, 9102 – 14 sherds, 9445 – 1 sherd, 9132 – 4 sherds, 9134 – 3 sherds, 9136 – 5 sherds, 9138 – 19 sherds, 9140 – 5 sherds, 9144 - 60 sherds, 9149 – 2 sherds) and the lack of significant clustering of finds was taken to imply that specific sites were not represented. Even the 60 sherds from Pype and Lyde (SMR 9144) were, in fact, dispersed over an area of 1.6 hectares, and the most likely explanation for the presence of such material is the spreading of domestic refuse over the fields as manure. Nevertheless, the significant implication is one of intensive use of the agricultural landscape through the Roman period, with the domestic sites from which the scattered pottery waste originally came presumably located nearby.

Indeed, it does seem possible that some apparently 'casual' Roman pottery finds from the Lower Lugg do more directly derive from disturbance of stratified contexts associated with such settlement sites. Examples include an assemblage of 3rd century pottery from Hill Crest, Marden (SMR 6543), 2nd and 3rd century pottery discovered during house building work at New Inn, Marden in 1951 (SMR 6545, Cohen 1951), and 2nd century pottery found in the 1930s at The Lawns, Withington (SMR 6506, Watkins 1927a). According to subsequent small scale investigation in 1955 by members of the Woolhope Field Club (Webster 1955), the Lawns assemblage was associated with a made up cobbled surface. Roman pottery (not specifically dated) found in the 19th century at Wellington (SMR 6897, Archaeological Survey of Hereford 1896) is said to have been associated with an oven, and although no certain find site is recorded for this material, it is tempting to speculate that there might be a link with the Roman estate complex recently discovered within the Wellington quarry site (see **Section 4.1**). Interestingly, nearby fieldwalking by Sam Meadows at Green Farm, Wellington (Tim Hoverd pers. comm.) has also produced an extensive Romano-British pottery assemblage from an area where a linear crop mark complex has been recorded by air photography (see **Section 4.3**).

Perhaps the best defined of these likely occupation sites is that at Sheepcote, Lugwardine (SMR 5320, 7007). A field which occupies the end of a flat-topped gravel ridge overlooking the Lugg Meadows has been revealed by aerial photography to contain a complex of linear cropmarks (see **Section 4.3**). Field-walking in the area in the 1980s by members of the Woolhope Club and a local WEA class produced a range of Roman finds. Pottery included Severn Valley wares, black burnished ware and Samian types as well as brick, roof tiles (tegulae) and possible hypocaust flue fragments. Other material such as burnt daub, and part of a quern stone (imported from the Paris basin) strongly support the impression of a significant Roman settlement. The most obvious interpretation would be as a villa or estate complex perhaps similar to that now known at Wellington, although the character of the

Roman coarse wares from the site may been compared to material associated with 1st century military sites elsewhere in the Marches (descriptive note in SMR file); in reality it must be likely that several phases of activity are present, and the site may, of course, also include pre and post Roman components.

If the assumption is that a site such as Sheepcote is in some way of explicitly 'Romanised' character, then the continuing sequence of occupation at Sutton Walls through the Roman period (Kenyon 1954) perhaps more accurately conveys typical 'Romano-British' settlement activity in the Lower Lugg (and elsewhere). Although the site defences appear to go out of use at the time of the Roman conquest – at any rate there is no evidence they were maintained into the Roman period – settlement in the interior (see especially Kenyon's Area 1 phases 5, 6 and 7) appears to go on essentially as before, and in the same areas as had been in use in the pre-Roman period. It is worth noting that such a pattern is paralleled at nearby Credenhill, where late 1st century stone fronted buildings replaced timber structures near to the east gate of the hillfort (Stanford 1971).

Roman period activity at Sutton Walls is most obviously defined in terms of a range of diagnostic artefact types. Local and imported pottery ranged from Samian (true and imitation) through to wares in the Severn Valley tradition, and other coarse ware bowls, mugs, high-necked jars and mortaria also of local West Midlands origin. Associated finds such as turned shale vessels, imported quern stones, a range of metalware including iron artefacts such as sickles, and a diagnostic sequence of Roman bronze brooch types, all combine with the pottery to speak of stable and continuous domestic activity from the 1st to at least the later 4th century (although it is worth noting that the 4th century pottery was mostly found in un-stratified contexts either from plough soil above the excavated areas or from material salvaged from quarry disturbed areas). In addition, the presence of objects such as a metal working crucible, an anvil (Tylecote 1961) and an antler weaving comb also demonstrate, as one might expect, a range of production activities at the site, and imply that Sutton Walls continued to prosper and have a significant local commercial role for much of the Roman period.

The principal structural evidence for this Romano-British occupation is represented by Phase 6 of Pit 1 in Area 1. Here, a floor of rough stone slabs defined a sub-rectangular two cell building which either consisted of a single room and courtyard, or alternatively two covered rooms. The two units of the structure were divided by a sill stone with associated sockets evidently marking the site of a connecting doorway. On the floor of the building were the crushed remains of several large pots, and two infant burials found just beyond the structure seemed also be spatially and stratigraphically associated with it. The pottery evidence dated this structure to the 3rd century, and it directly overlies the supposed earlier Roman and Iron Age buildings in Pit 1, so demonstrating clear continuity of domestic occupation at this location. The novel structural form of this building does, however, emphasise the distinctively Romano-British character of the settlement by this period.

The final phase of Roman period use of Sutton Walls appeared to consist of a series of seven crouched burials which overlay the 3rd century building in Area 1. Although the grave fills were associated with (residual?) Roman pottery, there was no clear dating evidence for these burials; indeed, they may have been cut into the base of the black plough soil which overlay the hilltop and sealed the occupation layers. If this is so, then they either belong very late in the Roman sequence after a period of abandonment of the site, or just possibly they may date from the Early Medieval period (although the crouched position would seem to fit best with the earlier context). Kenyon postulated that other unrecorded burials discovered elsewhere in the

site during quarrying may have been part of the same late burial phase, although this cannot be certainly substantiated.

As with the earlier Iron Age sequence at the site, the Sutton Walls Roman evidence is important because it indicates something of what must exist elsewhere in the locality. Whether or not those missing sites would be of similar character – or whether Sutton Walls is in some way 'special' and perhaps retained some of the 'central place' function it had during the Iron Age – remains to be seen, but whatever its local role, it is clearly just one element of a broader settlement system. Moreover, it does provide a useful counter to the more obviously 'Roman' settlement patterns at a planted town such as Kenchester, and demonstrates that for the Lower Lugg in particular a high degree of continuity between Iron Age and Roman settlement patterns can generally be expected, even if Roman or Roman influenced consumer goods increasingly provided the basic fabric of daily life.

4.2.9 *Early Medieval (Figure 31)*

As throughout the Welsh border region, the level of recorded data relating to the Early Medieval period in the Lower Lugg is scant, with just 10 entries in the SMR (including probable Early Medieval entries in the undated category). Domesday references to places such as Amberley (SMR 24193), Bowley (24345) and Broadfield (SMR 24354) give a sense of the crystallisation of nucleated settlements in the landscape by the pre-conquest period. However, the relationship to earlier patterns of activity, and the detailed nature of the transition from the Romano-British to Anglo-Saxon human landscape remains obscure, essentially because we cannot clearly 'see' the elements of either of these intersecting phases.

Isolated artefact finds offer some interesting hints of the continuing significance of the area. An early 6th century Byzantine coin of Justinus 1st found in Holmer in 1957 (SMR 6511, Martin 1957) is suggestive in that it perhaps implies the local existence of continuing currency based exchange systems, or at any rate a scenario where such a coin still had tangible value. This find might also be taken to mean that the wider Romanised Mediterranean trading zone had a continuing impact even in the Lower Lugg at least a century after the end of formal Roman rule, though, of course, the presence of such a coin almost certainly does not mean that any kind of direct contact then existed between the early British kingdoms and the surviving eastern Roman Empire. By contrast, a Saxon spear head from Lugg Bridge (SMR 36610) is evidently associated with the later extension of Anglo-Saxon political control across the area, and perhaps also with a consciously different kind of linkage between ownership of precious artefacts and status.

Beyond such isolated finds, the Early Medieval settlement pattern in the Lower Lugg is elusive. The traditional historical association with the Sutton area as a Mercian palace site has long suggested one promising 'target' to go beyond this impasse. According to Medieval chroniclers, it was at his palace at Sutton that Offa of Mercia had his rival monarch Aethelbert of East Anglia murdered in 794 AD (Bannister 1917). Most observers have linked this event to Sutton Walls hillfort and the perfectly plausible idea that this site may have been re-occupied in the Early Medieval period, although Kenyon (1954) found no evidence to this effect in her Sutton Walls excavations. Nevertheless, the idea of a possible early royal link to the Sutton area is further strengthened by the evident importance of the manor of Sutton with Marden in the Norman period. The manor passed through the hands of St Guthlac's in Hereford, and remained under the ownership of major Lords well into the Medieval period (Coningsby 1813, Shepherd 1979). This high status involvement in Sutton with Marden may well reflect its

previous royal significance, and indeed suggests effective continuance by proxy of that royal interest long after the time of Offa and the later Saxon monarchs (cf page 1 of the Hereford Domesday, Thorn and Thorn 1983).

In 1990, aerial survey of the site of the Medieval manor at Freen's Court (south of Sutton Walls) seemed to offer important evidence to support the Early Medieval palace connection. Two sets of distinctive parch-marks were observed which closely resembled 'classic' Anglo-Saxon halls of aisled and 'multi-celled' form (SMR 10414), perhaps suggesting a valley bottom location for the Mercian royal site. Archaeological excavations in 1999 (Herefordshire Archaeology and Time Team) and 2000 (Herefordshire Archaeology) in fact revealed a more complicated story (Ray and Hoverd 1999, and Keith Ray pers. comm.). The two buildings turned out to be of non-domestic function and significantly later in date than the time of Offa, although their large size and high status associations still make them of considerable interest in trying to understand Late Saxon/Early Norman settlement patterns in the Sutton area.

The aisled structure was shown by radiocarbon dating to have burnt down in the last quarter of the 12th century. At the time of its destruction, it contained large pottery vessels and quantities of harvested but unthreshed grain. Roofed with stone, this building was evidently an important structure, and it might best be described as a 'Great Barn'. The adjacent multi-celled building produced less certain evidence of function and date, though it too is an unusual and apparently high status stone built (or at least stone founded) linear structure. One interpretation of it might be as a warehouse fronting onto a channel of the River Lugg (although this context and association is not proven). What is clear is that these two buildings together confirm the existence of a major administrative complex at Freen's Court in the Norman period. Indeed, since no evidence for their date of construction was found, they could quite possibly have been built as early as the 10th/early 11th century, and originally have formed a late phase of the supposed Saxon royal site.

The Herefordshire Archaeology investigations (including an additional season in 2002) also explored two further areas in the Sutton/Freen's Court vicinity. A ploughed out rectilinear enclosure at Downfield Knoll north of Freen's Court (SMR 30514) can probably be interpreted as an earlier Medieval stock corral. It was overlain by ridge and furrow, but itself overlay a linear feature running on a North-South alignment towards Freen's Court. This feature produced a sherd of 11th century pottery, and comprised a foundation slot for a double palisade. This palisade apparently formed a prominent Late Saxon landscape division, or one element of a stockade.

Areas adjoining Sutton St Michael Churchyard were also evaluated. In the field to the west of the church, Deserted Medieval Village (DMV) earthworks (SMR 1026) were conclusively shown to be of 11th to 14th century date, and therefore seem to be a good chronological ‘fit’ with the part Norman fabric of St Michael’s. However, a ring ditch beneath the DMV produced two sherds of probable Anglo-Saxon pottery (identified by Alan Vince as dating to the 7th/8th century). This feature might plausibly be interpreted as an Anglo-Saxon burial mound, although the pit within it contained no surviving burial or other recognizable deposit (Tim Hoverd pers. comm.). If it is a Saxon burial mound, then it must be associated with a pagan context, and therefore would most likely date to the 600-650 AD period. Local information suggests other ‘rings’ have sometimes been noted in this field associated with differential vegetation growth, and while these accounts can hardly be regarded as hard evidence of similar ring ditches, the existence of an early Mercian barrow cemetery hereabouts is an intriguing possibility, and would give an interesting context to the later development of the area.

To the east of the church, investigation focused on the large rectilinear Downfield East enclosure (Keith Ray pers.comm.). This feature was known from a combination of earthwork and air photo evidence, and appeared to include a ploughed out northern boundary beyond the modern Sutton St Nicholas Road, and southern and eastern edges still traceable as earthworks in Downfield East field. A trench across the southern boundary revealed at least three phases of activity. An initial palisade slot had been subsequently re-cut to facilitate replacement/repair of the palisade. In the third phase, the alignment was re-used as an open ditch. A dog skeleton inserted in a second phase palisade post hole gave an 11th century radiocarbon date for that rebuilding event. By contrast, what was supposed to be the eastern boundary produced a 16th century date for a pig bone in the base of the single phase ditch. It therefore seems probable that the original enclosure extended to the east of this significantly later and unrelated feature (and, indeed, such a continuation of the southern enclosure boundary does seem to be confirmed by air photography). Excavation within the enclosure produced no occupation traces implying a non-domestic function. Interestingly, geophysics in the surrounding field identified a further boundary diagonally joining the South West corner of the main enclosure, and this would seem to indicate that the Downfield East enclosure was part of a wider bounded landscape.

Integrated interpretation of the fragmentary evidence from these different sites is difficult. However, the suggestion from two sites (Downfield Knoll and Downfield East) of 11th century (and probably earlier) palisades forming part of a wider boundary system is intriguing, especially when added to the existence of the broadly contemporary storage buildings/barns at Freen's Court and the possible early Mercian barrow cemetery. It is certainly tempting to connect this complex of features to the 'missing' Anglo-Saxon royal site. One interpretation in this light might be to see the palisaded boundaries as defining muster areas for military levies in advance of campaigns by Offa and his successors into the Welsh border area; large barns and grain storage facilities would also make sense in association with such activity. Indeed, it would also be very reasonable to see re-use of the adjacent Sutton Walls hillfort in this military context.

Overall, it must be said that Offa's ‘palace’ remains elusive in the sense of the ‘Great Hall’ buildings known archaeologically at sites like Yeavering (Northumberland) and Cheddar (Somerset). However, it is now reasonable to argue that the Sutton area has revealed traces of a different kind of Saxon royal complex. The extent and dating of that complex is by no means fully demonstrated, but it certainly remains possible that more diagnostic high status domestic buildings of the Saxon period will be discovered in the area. For example, a range of earthwork features exist on the spur of land above the Lugg on which the now isolated Marden church stands (see **Section 4.1**). Interestingly, a rare Early Medieval ecclesiastical hand bell was found in 1848 in a pond near the church (Ray 2001b), and the area is an obvious prime strategic location for high status settlement activity. Salvage recording in 2005 of earthworks north of the church (during their destruction for the erection of agricultural sheds at Marden Farm) unfortunately failed to produce dating evidence (Archaeological Investigations Limited 2005). However, a well defined boundary ditch was identified on the northern edge of the spur. Such a feature would be unusual in a Medieval context, and does add to the strong circumstantial sense in which Marden is another zone of potential Early Medieval research interest.

It must, of course, be generally reasonable to suggest that the evolved Medieval settlement pattern we see today in the Lower Lugg has its direct origins in the Early Medieval period, and that some of the modern villages with their Anglo-Saxon names first emerge at that time.

Unfortunately, nowhere in the Lower Lugg is it yet possible to archaeologically substantiate such connection in terms of clear continuity of domestic occupation from the Anglo-Saxon period. The one source of further 'hard' evidence which can be brought to bear on this problem is provided by limited observation and recording of possible Early Medieval cemeteries in the area.

The most certain example is that at Ashgrove Quarry, Marden (SMR 6544). Finds of human remains had variously been noted during mid 20th century quarrying of this hill top gravel deposit (Watkins 1930, and anonymous 1943 letter in SMR 6544 file), and in 1950 Kathleen Kenyon visited the site and suggested that the disposition of the bones she saw poking out 'all round the quarry face, just below the topsoil' (letter quoted in Hoverd 2000) were reminiscent of an Anglo-Saxon cemetery she had excavated at Leicester, and perhaps represented an early churchyard. It was left to the amateur initiative of two local boys (W.M. Dent and H.A.W. Blundstone) to carry out further investigation, and they duly uncovered a number of in-situ graves containing extended inhumations without grave goods (Dent and Blundstone 1951).

Unfortunately, when the site was re-investigated in 1999 (Hoverd 2000) and 2005 by Herefordshire Archaeology, it transpired that, although quarrying had ceased in the 1950s, the upper soil horizons of the surrounding hill-top had been bulldozed at some time after 1951, and no intact archaeological deposits remained. However, the skeletons recovered by Dent and Blundstone were still available for further study, and despite poor collagen preservation, a radiocarbon date of 340AD-540AD at 95.4% probability was obtained from one sample (Oxford AMS date OxA-10832, 2001). Although it subsequently transpired that a laboratory error meant this date might be between 1-200 years too old, an Early Medieval date for Ashgrove remains clear, with a British (rather than Anglo-Saxon) context probable.

Other possibly comparable finds of human remains in the Lower Lugg area are recorded even more sketchily. Skeletons were discovered during 20th century quarrying of the nearby hill top at Frankland's Gate, Sutton Parish (SMR 31109), while 19th century drainage works west of Arundel Farm, Pipe and Lyde Parish apparently turned up human bones in an area which had been known as 'skull field' in the 18th century (SMR 34274). In 2004 part of a human skull was discovered in a heap of gravel at Moreton-on-Lugg being used by Herefordshire Council for road repairs (SMR 31652). The bone was subsequently radiocarbon dated to the 8th/9th century, and was probably re-deposited (with the gravel) from nearby Adzor Bank, perhaps hinting at the presence of another cemetery at this location. It may also be relevant in this connection to mention the late burial phase at Sutton Walls (see above, Roman section). Although Kenyon (1954) understandably suggested a late Roman date for the crouched inhumations she found, other burials destroyed during quarrying may or may not have been of the same form.

In fact, it must be said that the uncertain character generally of this additional pool of burial data does preclude absolute identification of Early Medieval cemeteries in all (or any) of these cases, but the proven presence of the Ashgrove site nevertheless encourages the suggestion. Such identification, if accepted, would point to widespread settlement activity in the Lower Lugg throughout the Early Medieval period, as well as significant future archaeological potential to investigate (and perhaps chronologically delineate) that activity.

4.2.10 *Medieval (Figure 32)*

The 109 SMR entries for the Medieval period cover a range of categories including Deserted

Medieval Villages (DMVs), moated sites, field, meadow and water management systems, and ecclesiastical, secular and mill buildings/sites. This is a significant body of data potentially allowing a rather more sophisticated and locally differentiated description and understanding of the Lower Lugg than is possible on present evidence for any of the preceding periods.

Although Hereford itself is outside the project study area, the development of this commercially, strategically and ecclesiastically important town at the southern end of the Lower Lugg valley is clearly a crucial influence on what happens in the valley area itself in Medieval times. The town recognisably begins as a planned Mid-Saxon Burh (Thomas and Boucher 2002), and was evidently already a well established centre by the beginning of the Medieval period, with an ongoing strategic and military significance associated with the emergence of the Marcher Lordships and the story of English and Welsh interaction and conflict in the central Marches. Within this evolved context, Hereford was equally important as a secular and Diocesan administrative centre, and the quality of its surviving late medieval buildings (Thomas and Boucher 2002) still speak of the commercial prosperity which was closely interleaved with these other roles. The Lower Lugg was not just part of the hinterland of Hereford, it was the major northern access corridor to it, and an important source of food and other resources (such as building aggregates or clay for pottery, bricks and tiles?) to sustain the daily life, consumer demands, and fabric of the city. That reflected importance may well be represented in the degree to which the significance of the conjectured Mercian royal holdings in the Sutton/Marden area in the Early Medieval period seem to carry through into the high value manorial holdings more firmly documented in the same vicinity in the Medieval context (e.g. Thorn and Thorn 1983).

The dynamic pattern of Medieval settlement in the Lower Lugg is implicit in much of its recorded character. The considerable number of Deserted Medieval Village (DMVs)/Shrunken Medieval Village sites (SMVs) include examples at the Rough, Bartestree (SMR 2502), Glebe Farm, Bodenham (SMR 2451), Whitechurch, Bodenham (SMR 6565), Holmer (SMR 7016/25365), Marden (SMR 11146), Lower Lyde Court (SMR 4046), Lyde Arundel (SMR 6305/9060), Preston Wynne (SMR 6532/10953), Sutton St Michael (SMR 1026), Thinghill (SMR 6531/7006), and Eau Withington (SMR 24820). Several of these sites are also associated with surviving churches as, for example at Bartestree (SMR 15273), Marden (SMR 6900) and Sutton St Michael (SMR 6902), and indeed with high status manorial secular buildings (or sites thereof) such as Freen's Court (SMR 314), Thinghill House (SMR 31615), Wisteston Court (SMR 6549) and Shelwick Manor (SMR 5881).

The overall process of growth and abandonment of these settlement complexes evidently reflects major economic change which must also have connected with fluctuating levels of population, agricultural production and the effective value of Manorial land holdings. It is easy to see why traditional explanations of the national DMV phenomenon have focused on the uncontrolled external impact of economically and socially traumatic episodes such as the Black Death, rapid local climate change or internal/external warfare and conflict (e.g. Beresford and Hurst 1971). Nevertheless, the differential survival of higher status settlement elements/buildings which is observed in the Lower Lugg (and, of course, many other places) could also be taken to mean that, from the point of view of those high status interests, more structured and 'positive' re-planning of the settlement context was also involved. That may also be emphasised in the Lower Lugg by the presence of later (?) high status moated sites away from the nucleated settlements. Examples include Old Court Farm, Lugwardine (SMR 926) and Church House Farm, Moreton (SMR 6551), though these sites are not precisely dated beyond their supposed relationship to national trends. A larger high status land unit such as the

oval shaped deer park fossilised by later land boundaries and field names at the Vern, Bodenham (SMR 31127) is also of uncertain date, but it again speaks of the local Medieval capacity for high level imposition of entirely new settlement patterns.

Only the 1999 - 2002 Herefordshire Archaeology investigations in the Sutton St Michael area give any detailed local definition to these settlement development and change debates (Ray and Hoverd 1999, Keith Ray pers.comm.). The Sutton St Michael DMV was apparently founded as a new occupation site in the late 11th/early 12th century, and was abandoned in the 14th century, although St Michael's Church remained in use thereafter. At nearby Freen's Court, the Late Saxon/Early Norman aisled barn burnt down in the late 12th century (see Section 4.2.9 above), and was then replaced by a series of smaller stone successor buildings on the same site, indicating that the complex remained in use in a modified form. In the later 14th century, contemporary with the abandonment of Sutton St Michael village, the focus of Freen's Court moved to a new moated complex to the north which included the Manor house which survived into the 20th century. The building of the moated site is also associated with a wider re-planning of the surrounding landscape to create fish ponds and 'water gardens'. In addition, the development includes (by the 15th century) a new barn on the site of the earlier barn ranges. In the absence of comparative excavation evidence from other parts of the Lower Lugg, it is not possible to comment on how representative the sequence in the Sutton St Michael area is of the locality as a whole, but the degree to which the 14th century marked a major reorganisation of local settlement patterns does seem clear in this case.

Many of the present day villages do, of course, retain visible aspects of their Medieval fabric, most clearly in terms of churches (e.g. St Andrew's Church, Hampton Bishop SMR 6836, Amberley Church, Marden SMR 6899, St Andrew's Church, Moreton SMR 8524, St Peter's Church Pipe and Lyde SMR 6887, Holy Trinity Church Preston Wynne SMR 8258, St Nicholas' Church, Sutton SMR 6901), and comparative analysis of the building sequences and thus relative investment being made in these structures may be one way to start to identify the fluctuating Medieval fortunes of settlements in the Lower Lugg. Systematic analysis of village plans and associated vernacular buildings also has the potential to provide useful information. It is clear that many surviving smaller buildings such (e.g. Ivy Cottage, Sutton, SMR 6548) do have Late Medieval origins. Recent Herefordshire Archaeology survey of Bodenham village as part of a European Leader + funded project (Dorling 2007) has helped to emphasise this analytical potential, and reveal a more sophisticated understanding of the particular growth sequence of one settlement.

Perhaps the most impressive group of Medieval archaeological features surviving in the Lower Lugg are those associated with field systems and agricultural activity. Large areas of relict arable ridge and furrow earthworks have been noted (see also **Section 4.3**) including Court Farm, Hampton Bishop (SMR 7010), The Shets, Hampton Bishop (SMR 10646), Shelwick Green, Holmer (SMR 8531/9450/30268), Sheepcote, Lugwardine (SMR 2420/31944), Fiddlers End, Lugwardine (SMR 41543), Marden (SMR 30473/38463), Moreton Bridge, Marden (SMR 31889), Lower Lyde, Pipe and Lyde (SMR 4047), vicinity of Wellington (SMR 6003/9558). The character of these earthworks, often of relatively slight proportion compared to 'classic' ridge and furrow elsewhere in the Midlands, may suggest either particular patterns of local arable agriculture producing this particular less pronounced form of earthwork, or perhaps earlier abandonment. This would mean that these earthworks are more truly 'Medieval' with less later elaboration and enhancement through accumulated re-use in the Post Medieval period than the better known examples from the 'champion' regions of Central England (Hall 1998). In either scenario, they are an important indicator of particular local land management practice,

and also reveal an agricultural landscape which must have spread beyond the surviving islands of such features. Indeed, the abrupt and obviously truncated boundaries to some of these earthwork groups very clearly make that point (see **Section 4.3**).

The areas of ridge and furrow also often connect and intersect with other kinds of earthworks expressly linked to water management. Some such features evidently connect with localised land drainage of arable areas, and in several cases with the specialised creation and maintenance of groups of fishponds associated with the Manorial complexes at Fenne Manor, Bodenham (SMR 11909), Amberley Court, Bodenham (SMR 11911), Lower Lyde Court, Pipe and Lyde (SMR 4044) and Freens Court, Sutton (SMR 10162). In other circumstances, valley bottom/flood plain systems of water channelling are deliberately aimed at facilitating specialised intensification of agricultural production. This is most clearly illustrated at Shelwick (SMR 30268), where a sophisticated raised water meadow overlays and interrupts an earlier pattern of ridge and furrow (see **Section 4.3**). The precise dating of this meadow is unclear beyond the relative stratigraphic sequence, but such a feature clearly embodies an explicit episode of Mid to Late Medieval improvement of the agricultural landscape. It may be that the needs and ready markets of nearby Hereford were a significant influence in this respect on the particular character of development in the Lower Lugg.

These relict Medieval agricultural features must also be set alongside the remarkable and nationally important survival of one component of active 'Medieval' agricultural practice in the Lower Lugg in the form of the Hampton (SMR 23263) and Lugwardine (SMR 9216) 'Lammas' meadows (Brian 1994, 1999, 2000, Brian and Thompson 2002), now sustained in the traditional way by the Herefordshire Nature Trust (Brian and Thompson 2002). The Lammas management system involves controlled watering of floodplain meadows in the early part of the year to facilitate maximum grass growth. The hay is then allowed to grow untouched until Lammas (August 12th). After cutting of the hay crop as quickly as possible after Lammas, common grazing is permitted until Candlemas (February 2nd) when the meadow is shut to stock and the sequence begins again.

It is historically known that a series of common meadows of this type (e.g. Upper Lugg meadow, Wergin's meadow etc.) once extended over most of the Lower Lugg flood plain (Brian 2000), and their former sites are still fossilised at one remove by the recognisably late patterns of enclosure in many of the valley bottom areas. More explicit archaeological evidence of common meadows includes water channel earthworks, and also in the surviving Hampton and Lugwardine cases, the marker stones used to delineate ownership of each allocated strip of hay. The surviving stones are evidently Post-Medieval, but geophysics and limited archaeological excavation (Barker 1993, Stone 1993) have tested the potential for survival of earlier buried stones. The results were inconclusive, but it is a historically well grounded assumption that the Lammas/common meadows were a key part of the integrated Medieval Lower Lugg agricultural system, though the exact origin and development of this pattern of land-use remains to be demonstrated (both locally and nationally).

The common meadow areas evidently also had other ancillary management uses. One interesting detail was the presence as late as the 19th century of a number of ancient trees within the former meadows, several of which were recorded in the 1860s and 70s by the Woolhope Field Club. Examples include a once locally famous pair of oaks called 'Adam and Eve' which stood near the ancient boundary of Wergin’s Meadow close to what is now Moreton-on-Lugg railway station (Woolhope Club 1872). Adam fell prey to a storm in the mid 1830s, but Eve enjoyed an unexpected new lease of life with the arrival of the railway in the

1850s. Adapted with a sloping roof and a brick built hearth/chimney (and, one suspects, a self-conscious dose of Victorian whimsy!), it variously served for the next 20 years as the station master's house, station office, and latterly the lamp storage room. As its re-use implies, Eve had a very broad and stocky hollow trunk some 26 feet in circumference, and is said to have once provided shelter for 21 fully grown sheep. Its form clearly demonstrates an origin as a regularly harvested pollard which must, from its size, have been of Medieval date. Such evidence indicates that timber/fuel production within a wood pasture type system was also a locally significant part of Medieval common meadow management in the Lower Lugg.

The Lower Lugg and its tributaries were, of course, important not just as a means of watering adjoining agricultural land, but also as a source of power for mills, and for the direct food resource they provided via fishing activity. Some mill sites, such as those at Back Brook, Court Farm, Hampton Bishop (SMR 5497) and that north of Lugg Bridge, Holmer have been identified (SMR 5497) through river bank erosion exposing their remains, though no such sites have been further examined archaeologically. The majority of claimed Medieval mill locations are in fact purely linked to historical documentation (such as the recorded name of 'King's Mill Meadow' at Moreton on the 1721 Coningsby Estate map) and/or assumed backward projection of known Post-Medieval structures (Brian 1996). Examples include Lugg and Scut mill, Bodenham (SMR 38557), Holmer Mill (SMR 5879), Lugg mill, Lugwardine (SMR 12047), Mordiford Mill (SMR 8953), Wellington Mill (SMR 9311) and Friers Mill, Wellington (SMR 23301).

Without clear chronological delineation of these sites, or indeed certain evidence that all of them did exist in the Medieval period, it is hard to put any particular analytical emphasis on what must have been an important component of Medieval activity on the Lugg. Perhaps the 'known' mills simply represent a necessary component of the Medieval farming production system in the Lower Lugg, but it could also be that the particular context of the Lower Lugg and its proximity to Hereford placed special emphasis and financial value on local milling. Curiously, evidence of organised fishing processes are equally elusive. Some of the weir structures which certainly existed at the end of the 17th century (Brian 1996) may have Medieval origins in this connection, but explicit Medieval fishing features have not yet been identified.

It must be the case that other kinds of production and manufacture were also ongoing through the Lower Lugg Medieval landscape. The visible remains of quarrying are mostly presumed to be Post Medieval, but it is surely likely that in many places there is an earlier component to this activity which has not yet been positively recognised archaeologically. The so called 'Kings Cellar' hollow within Sutton Walls hillfort (now destroyed) was a probable quarry old enough to already have a quasi-historical association by the time its existence was first recorded by the Ordnance Survey in the 19th century, and it could conceivably have had a Late Medieval (or earlier?) context. Likewise, the numerous small water-bodies dotted all over the Lower Lugg basin are generally classified en-masse as Post Medieval field ponds for stock watering (especially where they are off the flood plain), but it could very well be that some at least originate in localised aggregate and clay extraction from the Medieval period onwards.

The fact that local clay resources were extensively utilised for local brick and tile manufacture in the Post Medieval period is well documented (principally from historic map evidence). However, the probability - with the consumer centre of Hereford near at hand - that such activity began in the Medieval period has not been explored archaeologically or historically, though it has been suggested with respect to earthworks associated with a later brick kiln site at

Burghope, Wellington (SMR 11151). It may be worth noting that the sites of manufacture of some locally produced Medieval pottery forms from Hereford have not been identified (e.g. the Hereford 'A' wares, Thomas and Boucher 2002), and the nearby clay reserves of the Lower Lugg perhaps offer one of the more obvious potential locations for these missing potteries.

Firmer evidence of Medieval fabric does survive with respect to local administrative boundaries and transport links, even if such remains are again inevitably closely bound up with continuing Post-Medieval usage. Supposed Medieval boundary banks linked to Parish and township boundaries are recorded at Bartestree (SMR 21346), Sutton Lakes, Marden (SMR 42841), Checkley Field, Mordiford (SMR 21359) and Wellington Woods (SMR 41530), though it would be hard to certainly prove the Medieval credentials of such features. A number of hollow ways and roads (e.g. Old Road, Ashridge Hill, Bodenham, SMR 43212, and the old road to Freen's Court, SMR 31891) have explicitly been assigned a Medieval context, but of course many other current roads and tracks (whether still in use or now surviving as lesser Rights of Way), very likely have similar Medieval origins. This must also be true of established bridging points over the Lugg, and the western arches of the bridge at Mordiford (SMR 915) are said to be of mid 14th century date.

Less obvious is the use of the river itself for Medieval transport. Despite the limits to navigation which the natural character of the river and the addition of human infrastructure such as weirs imposed, the Lower Lugg must have been used in Medieval times for movement of goods and produce. However, the absence of the archaeological evidence of this (e.g. landing points and wharfs?) again emphasises a significant gap in current understanding of the Medieval context of the area.

Overall, there is clearly a rich Medieval archaeological resource in the Lower Lugg. However, it is worth emphasising that much of this existing record comprises broad based description and recognition of generically 'Medieval' features rather than the specific investigation of such evidence. Except for the information incidentally recovered at Freen's Court and environs by Herefordshire Archaeology between 1999 and 2002, there is currently no detailed excavation and contextual information to complement and explicate the outline record of generalised site categories (note the dearth of references in this section to supporting literature beyond the basic SMR record). Without such definition, the danger is that the specific story of Medieval landscape development in the Lower Lugg is too easily and uncritically subsumed under the archetypal appearance of a 'typical' midlands river valley Medieval sequence. The presence and particular local form of features such as the Lammas meadows both emphasise the possible error of this assumption, and indicates the potential to develop distinctive analytical narratives founded on the Lower Lugg Medieval evidence itself.

It is also clear that the localised survival of some aspects of the Medieval evidence - such as field systems and water management features - has much to do with the differential impact of later natural and human landscape change. The visible islands of information therefore point not just to the former existence of similar evidence elsewhere, but maybe to the archaeological potential to recover some of those lost landscapes from, for example, subsequently alluviated environments in adjacent areas.

4.2.11 *Post Medieval (Figure 33)*

It is scarcely surprising that the Post Medieval period is, judged solely in terms of the 376 SMR entries, the best recorded phase of the Lower Lugg archaeological sequence. There is, of

course, a significant survival of building stock from the last few centuries (132 listed in the SMR), but perhaps more important in assessing the distinctive evolution of the Lower Lugg human landscape over that time are patterns of evolving transport infrastructure, increasing extraction of the mineral resources of the Lower Lugg, and changing agricultural practice most obviously associated with the emergence of an increasingly enclosed landscape.

That said, as with the Lower Lugg landscape in the Medieval period, it is evident that the recent fortunes of Hereford city have exerted an important influence on the area. With the decline of the Marcher Lordships, and indeed the active suppression by Henry 8th of the economically important fulling industry in Hereford (Thomas and Boucher 2002), the town entered a period of stagnation and economic decline which is still effectively evidenced today in the almost complete survival of the Medieval town plan, and the fact that the main commercial centre (late 20th and early 21st century out-of-town retail complexes aside) remains within its Medieval boundaries. Without the stimulus of growth in Hereford, the adjacent Lower Lugg Post Medieval landscape was also restricted in terms of new development and shows a marked degree of continuity from Medieval patterns (which trend is perhaps most obvious in the nationally rare survival of elements of the Lammas meadow system, Brian and Thompson 2002).

The pattern of the villages perhaps also emphasises this story. The considerable numbers of surviving 17th, 18th and 19th century buildings (see **Section 7.3**) speak not so much of large scale re-construction as consolidation of existing settlement plans via piecemeal renewal of housing stock which very often involved refurbishment and 'updating' of earlier buildings rather than their complete replacement. In some cases new buildings of the period reflect specialist functions such as the smithy at Pipe and Lyde (SMR 18615), the 17th century Moon Inn Public House at Mordiford or the 17th century dovecote at Old Sutton (SMR 6489), though again it is evidently replacement of buildings to support existing commercial activities that is involved.

The association of some existing settlements with SMV earthworks (as, for example, at Lower Lyde) emphasises relative decline from the Medieval period, although the precise chronology of this process has not been investigated. It could be that such shrinkage was ongoing into the 18th and 19th centuries as is suggested, for example, by the considerable number of Post-Medieval buildings in the SMR known now only known through map and documentary evidence (e.g. cottages at Moreton-on-Lugg SMR 8968). Some of these relate to the 19th and 20th century disappearance of Post Medieval ‘squatter’ type smallholdings on former common land (e.g. in the vicinity of Venn’s Green). However, at the other end of the socio-economic scale, a general lack of Post Medieval investment in Lower Lugg settlements is also written in the fabric of churches. Little re-building is apparent before the later 19th century, when the Victorian fashion for 'restoration' inevitably resulted in significant alterations in some cases (e.g. Marden SMR 6900) and completely new churches in others (e.g. St James', Bartestree SMR 8234).

This situation is reflected to a considerable extent in the pattern of high status landholdings and structures. Revamped Medieval buildings often remained in use at the manorial level, though by the 18th and 19th centuries several had declined in status to be occupied as tenanted farm houses, and an example such as Freen's Court was subject to the ultimate endpoint of that process with its demolition in the mid 20th century. Nevertheless, the continuing Post-Medieval importance and transformation of some earlier estates is demonstrated by a sequence such as that at Sufton Court, Mordiford where the Medieval manor house is first rebuilt in the 17th

century (SMR 8948), and then replaced again by an up to date 18th century country house (SMR 8949) complete with re-planning of the surrounding area to create an associated landscape park (SMR 8950). A similar 18th century reconstruction of grand house and surrounding landscape also occurs at Hagley Court, Lugwardine (SMR 15296).

Some of the processes of income generation which perhaps permitted this kind of re-development even in the relative economic backwater of the Lower Lugg are demonstrated in the patterns of the local Post Medieval agricultural landscape. The transition to a largely enclosed landscape had occurred by the time those field boundaries were recorded in detail on the Tithe maps of the mid 19th century, and analysis through the Herefordshire Landscape Characterisation exercise (Ray and White forthcoming) has evidenced a progressive process of enclosure which, as illustrated by the fossilisation of earlier open field strips in some places, evidently began in the Late Medieval period. An important stimulus to this may have been the importance of the Medieval wool trade in Herefordshire (and to Hereford itself), and although this declined in the Post-Medieval period (Thomas and Boucher 2002), its legacy seems to have remained in the Lower Lugg in the early abandonment of traditional arable field systems. This scenario is possibly also illustrated in the particular character of local ridge and furrow earthworks which do not look as if they have been subject to continued Post-Medieval use.

The landscape of enclosure also has a corollary in significant numbers of dispersed farmsteads, with those of 18th and 19th century date typically comprising brick built houses of double-pile type plan with associated ranges of farm buildings tailored to a range of 'mixed farming' functions. Examples include Lower Bartestree Farm (SMR 25973), Woodbine Farm, Hampton Bishop (SMR 25324), Holmer House Farm, Holmer (SMR 9435), and Ash Grove Farm, Marden (SMR 31614). Those at Lower Bartestree and Woodbine also incorporate earlier barns in the wider farm complex indicating that in these cases farm renewal and partial modernisation was as much involved as complete reconstruction, and (echoing the pattern in the nucleated settlements) this is perhaps the typical scenario in the Lower Lugg.

Some components of Post Medieval re-planning of the farming landscape do reflect more specialised patterns of intensification. A number of hop-kilns (e.g. Moreton-on-Lugg SMR 25362, Brook House Farm, Moreton-on-Lugg SMR 25362, Eau-Withington SMR 25360), a cider mill recorded at Sutton (SMR 18985), and Vineyards such as that recorded at Pipe and Lyde (18613) all attest to the growth of the brewing industry, and the creation of specialist infrastructure and patterns of land management in the Lower Lugg linked to that. These examples are all 19th century, and the earlier development of this industry has not been actively researched locally or explored archaeologically. The assumption would be that (in line with Herefordshire as a whole) the improvement of 18th and 19th century transport networks (see below) generated capacity for export of brewing products to distant markets and therefore permitted the effective industrialisation of what had previously been a more localised and small scale component of agricultural activity.

Perhaps much the same pattern is relevant to the development of clay based production industries in the Lower Lugg. Brick and tile kilns and associated buildings and clay pits are known or recorded at Brick Kiln Piece, Marden (SMR 32448), Brick Lump Orchard, Marden (SMR 32355), Brick Close, Marden (SMR 32356), Chancehill Wood, Wellington (SMR 18901), Lower Lyde (SMR 31562), Eau Withington (SMR 18897) and Godwin Tile Works, Lugwardine (SMR 11862). Like the Hop Kilns, these brick making businesses seem to represent specialised 19th century intensification of a cottage industry whose earlier genesis remains to be archaeologically recognised. The markets in this case were presumably relatively

local, and 19th century renewal of building stock in Hereford, and especially the creation of new areas of terraced-housing there in the Victorian period, was doubtless an influence on such production, which seems to then decline in the early 20th century. Other specialised kinds of Post Medieval production in the Lower Lugg perhaps also hinge on the particular commercial circumstances of the Hereford hinterland. An example may be a number of recorded tanneries, with examples including those at Withington Marsh (SMR 18877) and Wootton, Wellington (SMR 18903). As well as the presence of Hereford as a consumer and commercial dispersal centre for such goods, a local emphasis on cattle based pastoral agriculture was presumably also important in stimulating this particular industry.

It is the Post Medieval period which witnesses the first demonstrable extraction of the extensive sand and gravel reserves of the Lower Lugg, and the earlier pattern of activity is well evidenced by field names on the mid 19th century Tithe maps (23 sites, **Section 7.1,** Quarry Table 1), as well as the pattern of gravel pits recorded on the OS First Edition (26 sites, **Section 7.1,** Quarry Table 2); many of these sites still survive as archaeological features. The initial pattern was apparently one of dispersed and small-scale extraction focussing on the more easily accessible deposits provided by the outer (and geologically earlier) river palaeo-terraces where the gravel is free of any alluvial capping (see **Section 2.3**). Many of the quarries seem to be little more than single episode borrow pits presumably linked to immediately local construction projects (e.g Norton Court, Sutton SMR 2080, or Ingravel Pit, Pipe and Lyde SMR 25478). However, some sites such as Frankland's Gate, Sutton (SMR 41211) and Ashgrove, Bodenham (SMR 41203), and a group of quarries in the vicinity of Upper Lyde (SMR 40005, SMR 54780, SMR 23183, SMR 23185) were evidently worked over an extended period, with progressive exploitation of linear hilltop outcrops of the mineral, and in some of these cases extraction continued into the mid 20th century (see **Section 2.3**)

It is noticeable that the larger zones of established gravel working are planned into the 19th century enclosed landscape. They often occupy field margin or corner locations seemingly demonstrating positive awareness of this resource in the way the enclosure boundaries were originally placed. This could imply a pre 19th century origin for established quarrying patterns, although it is reasonable to assume that it is not until the 19th century that the scale of activity increases in line with increased regional aggregate demand (new housing stock in Hereford?) and better transport connections. Specific local construction projects such as the construction of the Shrewsbury–Hereford Railway in the late 1840s presumably generated specific periods of boom for local quarry operators.

The Lower Lugg river itself evidently remained an important component of the commercial life of the area, and this is most obviously illustrated by historically documented 17th and 18th century efforts to improve the river for navigation as far upstream as Leominster. A survey to this end undertaken in 1697(Brian 1996, Stockinger 1996) not only provides an indication of the proposed works – principally installation of locks to overcome obstacles such as weirs – but also incidentally provides an important indication of the mills and other infrastructure such as bridges which then existed. Much of that pattern of river-associated development can still be traced, including many of the same mills believed to have existed in the Medieval period (see above), although those which survive only exist in much altered 18th and 19th century incarnations, and none have been investigated archaeologically. The same is true of the 18th century improvements for navigation. Fragmentary riverside masonry and brickwork structures noted near Moreton Bridge, Freen's Court and Shelwick (Brian 1996) could be associated with the former locks, and there is evidently the potential for further survey to offer additional insight into such features.

Despite such improvement of the River Lugg, its value for navigation was finally eclipsed by the progressive development of entirely new 18th and 19th century transport networks in the area. A turnpike road north from Hereford was built under under a 1730 Act of Parliament and apparently ran through the Lower Lugg Valley via Bodenham, although little original infrastructure seems to survive today (SMR 34209, 34204). The long delayed Ledbury to Hereford section of the Hereford and Gloucester canal (first planned in the late 18th century) was built between 1839 and 1845, and traversed the southern end of the Lower Lugg valley (Bick 2003). The commercially troubled venture was eventually leased by the Great Western Railway in 1881 who promptly converted the Gloucester section into a railway, while the isolated Hereford end thereafter saw gradual abandonment, decay and progressive destruction. Remains in the Lower Lugg include Withington bridge (SMR 30747), Withington Lock House (SMR 30746), Sutton bridge and culvert (SMR 30751 and 30752), and Holmer over-bridge (SMR 22165). There has been no systematic archaeological survey of these structures which are, somewhat ironically, now threatened by modern restoration proposals.

The primacy of the canal as the principal local artery for bulk transport was very short-lived. The Shrewsbury and Hereford Railway opened in 1853, while the Lower Lugg was also crossed by the Hereford to Worcester Railway in 1861, with the two lines joining at Shelwick junction (Oppitz 1990, Simpson 1997). These railways remain in active use today, with the resultant survival of much of the original engineering and building infrastructure. Moreton-on-Lugg station (SMR 30837 and 30838), for example, is a well preserved late 19th century rural station complex with station building, signal box and good's shed (although passenger trains have not actually stopped at Moreton since the 1950s).

The story of the Post Medieval development of the Lower Lugg is, overall, a complex one. There is a vast and varied archaeological resource associated with this period, though (as with the medieval period) there has been little or no systematic archaeological investigation of this potential. The danger is obviously that an assumption is made that this material is relatively unimportant archaeologically because of the wealth of available historical information available for the last few hundred years. In fact, it is clear that many aspects of the Post Medieval story of the Lower Lugg – such as the development of the river over that time or the evolution of settlements – will only be effectively revealed through more systematic investigation of the archaeological resource.

4.2.12 *Modern (Figure 34)*

The transport initiatives of the 19th century to some extent anticipate the profound patterns of change and re-development in the Lower Lugg in the 20th century, and particularly in the post World War 2 period. The development of road based transport systems in association with the rise of the internal combustion engine has led to significant improvement and reconstruction of the Post Medieval infrastructure of lanes and roads, most notably with the upgrading of the main north south valley route as the A49 Trunk Road.

This much improved access has also stimulated significant housing estate developments in the last 50 years in villages such as Sutton, which have effectively become dormitory settlements for nearby Hereford. Another impact of increased development in the valley has been decreased tolerance of 'natural' river flooding patterns, and pro-active construction of flood defences to protect both land and property in the Lower Lugg (e.g. Hampton Bishop, SMR 30267), and at one remove in Hereford; flood defence banks either side of the Lugg are now

one of the distinctive earthwork features of the area. At the other extreme of water management, a number of 20th century covered reservoirs have been created (Highfield House, Holmer SMR 34551, Hill Barn, Pipe and Lyde SMR SMR 34554) to supply the increased water demands of Modern populations.

The principal 20th century industrial development in the Lower Lugg – the large scale exploitation of the valley bottom gravel resources – is separately discussed and analysed elsewhere in this assessment (**Section 2**). Another major impact on the valley was the creation in the mid 20th century of the Moreton-on-Lugg military base, serving both as a military depot and a World War 2 German Prisoner of War Camp (SMR 27089, 35863). The camp had an immediate impact on local population demographics and economic circumstances, and to some extent that effect continues even after its closure and demolition with the re-invention of some of the former area as a late 20th century 'out of town' industrial estate.

In truth, it is only recently that the 20th century fabric of the Lugg Valley has been considered an explicit component of the archaeological resource. The limited character of the review above reflects the manifestation of that attitude in the very restricted recognition of modern features in established archaeological recording databases such as the SMR (only 16 entries), or indeed in analytical and historical treatments of the evolution of the 20th century Herefordshire landscape. Nevertheless, it is increasingly recognised that archaeological study of the remains of sites such as 20th century military installations can offer significant insights over and above written and oral records. The archaeology of the 20th century Lower Lugg has an important potential role both in active research, and in preserving and celebrating a sense of place for local communities faced by ever increasing cycles of 21st century change.

Figure 29: Distribution of Lower Lugg Valley prehistoric SMR entries by period

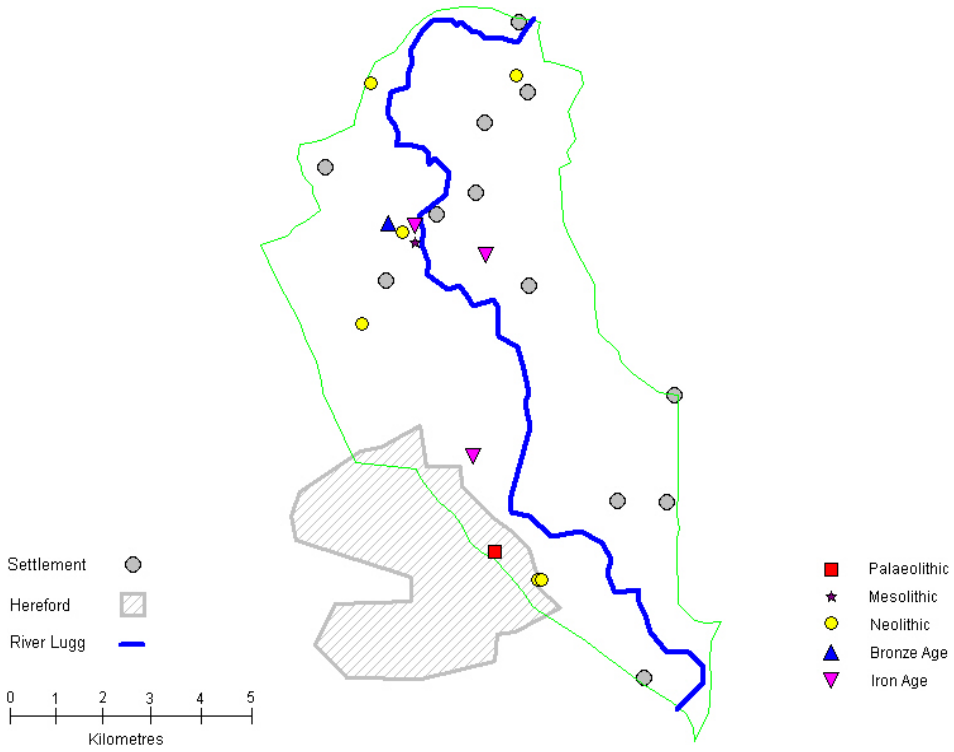


Figure 30: Distribution of Lower Lugg Valley undefined prehistoric SMR entries

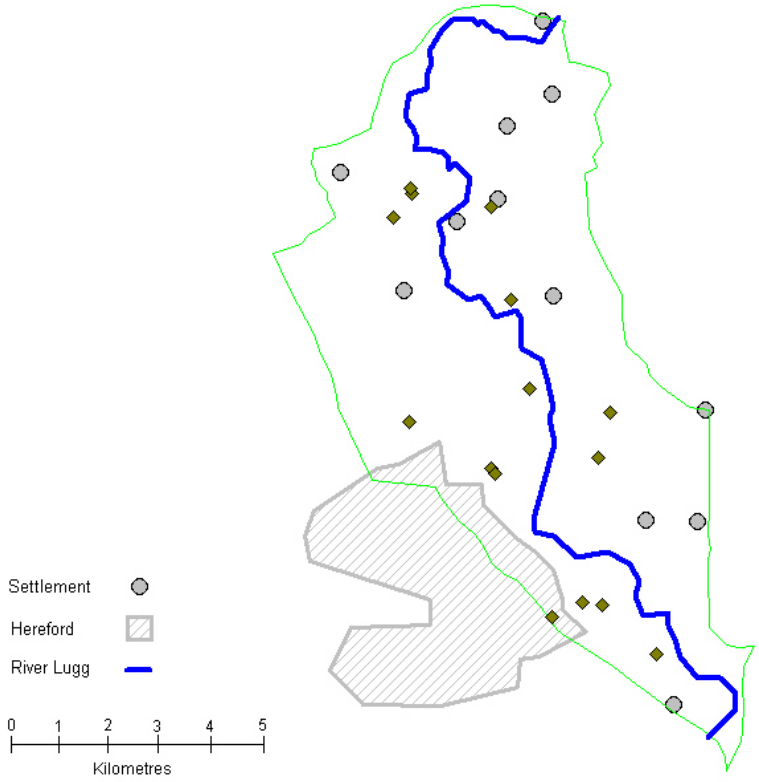


Figure 31: Distribution of Lower Lugg Valley Roman and Early Medieval SMR entries

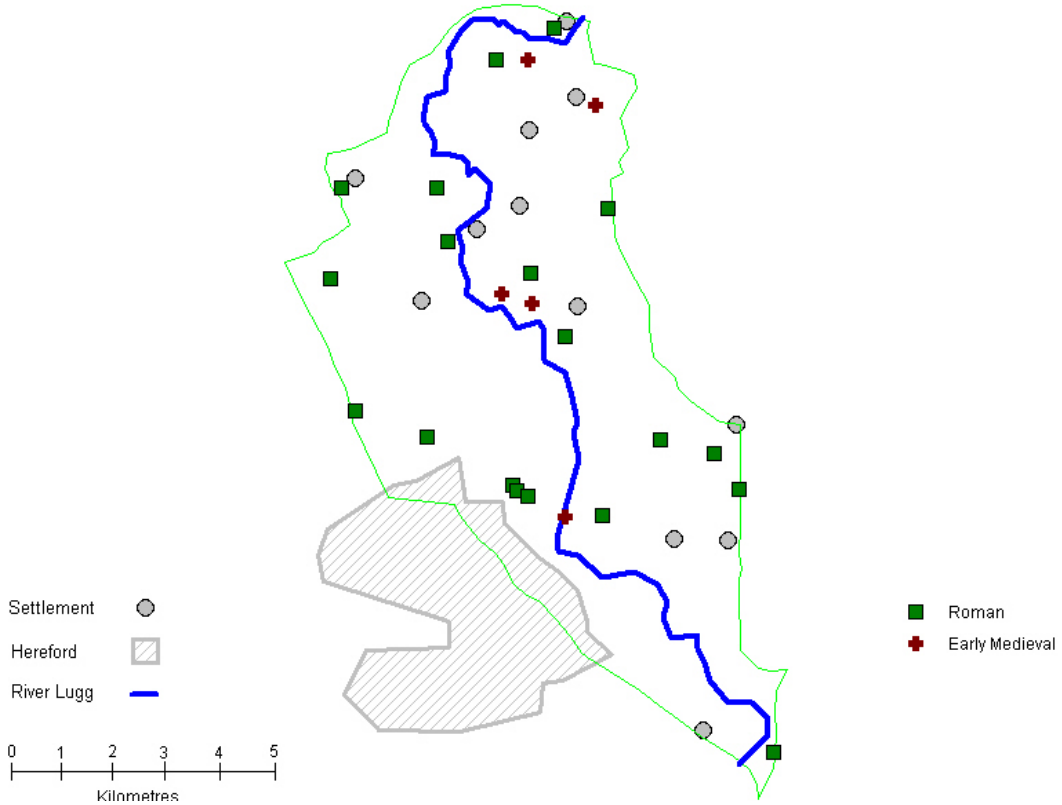


Figure 32: Distribution of Lower Lugg Valley Medieval SMR entries

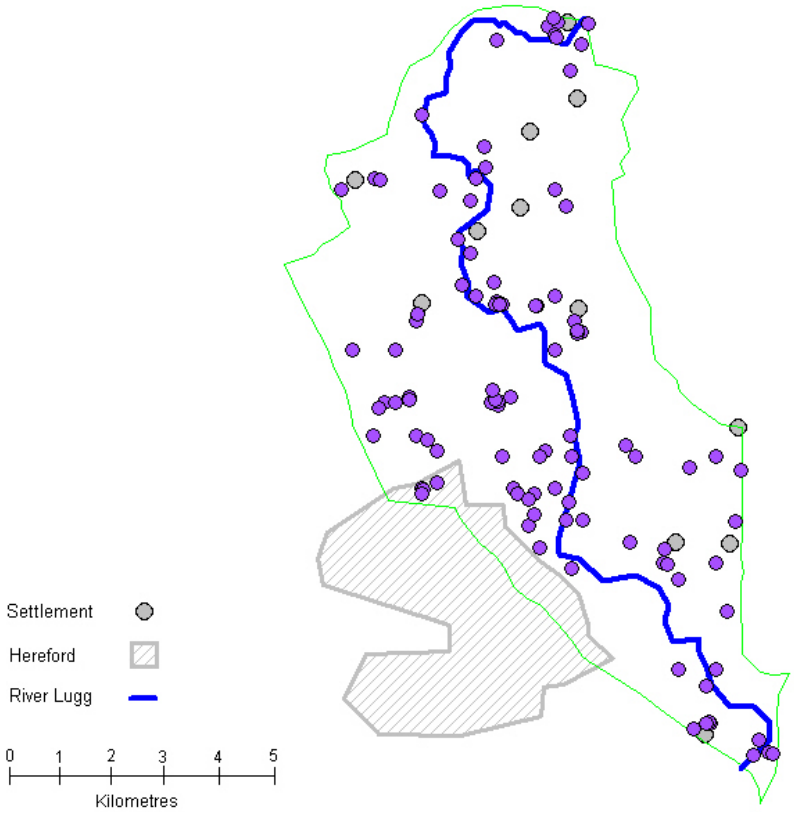


Figure 33: Distribution of Lower Lugg Valley Post Medieval and Modern SMR entries

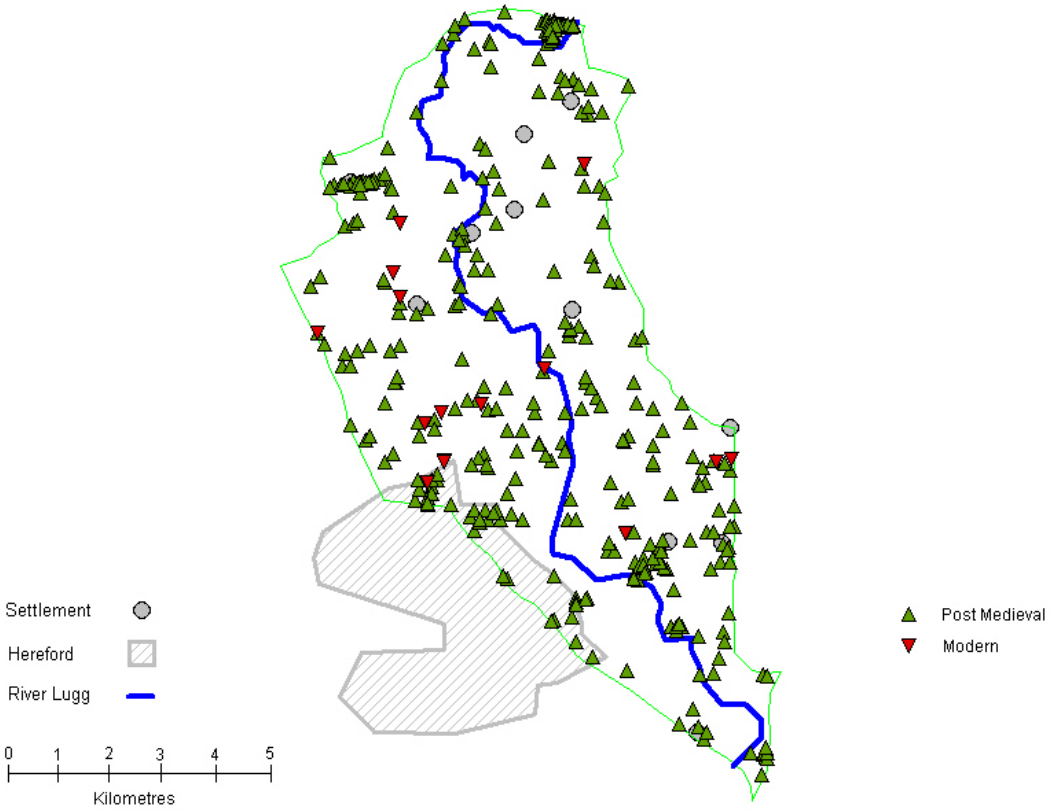
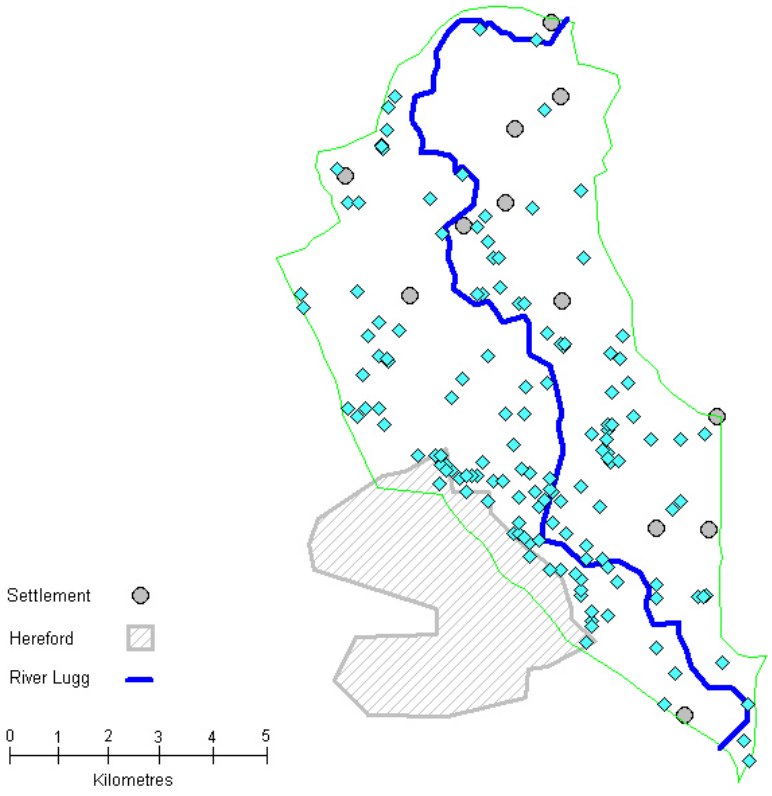


Figure 34: Distribution of Lower Lugg Valley undated SMR entries



Section 4.3 Air Photo Mapping and Interpretation

Introduction

4.3.1 *Objective*

The API component of the Lower Lugg Archaeology and Aggregates Resource Assessment comprises archaeological interpretation of selected vertical and oblique aerial photographs in addition to interpretation of geomorphological or pedological features where visible.

4.3.2 *Scope*

API data have been mapped to an Ordnance Survey (OS) Landline digital map base (surveyed at 1:2500 scale) supplied by the client on license for the project, after rectification of chosen aerial photographs. The API component is delivered as a multi layered digital map (DXF R12 from AutoCad) and database (MS Access) suitable for import to MapInfo GIS, and this report (MS Word) which details the project background and methodology, and summarises the results.

The object of this interpretation is to provide information on the location and nature of any archaeological features or areas of archaeological potential visible on existing aerial photographs. All mapping has been completed in compliance with standards and conventions employed by the English Heritage National Mapping Programme (NMP).

The interpretations were made with reference to the Herefordshire Sites and Monuments Record, 1st Edition OS mapping and a comprehensive range of aerial photographic sources as detailed below.

It is important to note that aerial photographs usually only show part of the horizontal and vertical extent of buried features. Their capacity to reveal features as crop marks, soil marks or earthworks depends upon a number of environmental and agricultural factors prevalent at the time of photographic survey. The appearance of marks in crops over buried features is also governed by a complex interaction of landuse, soil type, weather and other environmental factors.

API data thus acts as a starting point for ground-based or documentary investigations, which may further reveal the date and nature of the deposits which are initially identified from the air.

4.3.3 *Environment and the potential for aerial recognition of archaeological features in the Lower Lugg*

The physical characteristics and landuse of the Lower Lugg valley are summarised in **Section 1.2** of this report, the geomorphological background in **Section 2.1**, while the known archaeological resource is described in **Sections 4.1** and **4.2**. This range of information establishes the context for the aerial survey and mapping work, and demonstrates the potential for significant recovery of archaeological information from air photography in the Lower Lugg.

The potential for observation of sites as crop marks on aerial photographs, of which a moderate number are already recorded, is good, especially over the river terraces above the immediate floodplain, which are laid to crop and improved pasture.

In addition, vertical aerial photographs, particularly those dating to the 1940s, show a range of earthwork remains, particularly dating to the Medieval, Post Medieval and Modern periods and provide a good archive from which to record archaeological and some palaeoenvironmental features.

The study area is thus considered an ideal environment in which to apply aerial survey and air photo interpretation to the systematic recording of buried or eroded features, and the recording of features seen as earthworks, usually in pasture.

4.3.4 *Soil conditions in the Lower Lugg (see also **Section 3.1** for a more detailed review)*

The valley floor is heavily alluviated with soil of the Hollington and Lugwardine associations (classifications 811c and 561d) as defined by the Soil Survey of England and Wales, (SSEW, 1983). This alluvium comprises deep stoneless reddish fine silty clay, which is variably affected by retained ground water, and occurs over flat land with attendant risk of flooding. The valley was observed under flood water during the 1940s and variably in the 1950s on aerial photographs. Alluvium effectively ‘blankets’ earlier archaeological landscapes and its extent in parts of this valley has encroached upon medieval features. Former river beds and channels (palaeo-channels) are often visible as slight ‘cut’ features within the alluvium.

To the west and east of the river, the flanking terraces are overlain by well drained fine silty soils over shale and sandstone of the Bromyard soil association (classification 571b) with areas of deep well drained coarse loamy soils of the Escrick 1 association (571p) on the west. These fertile soils are conducive to the formation of crop marks under correct environmental circumstances.

Areas of river terrace drift (gravel) give rise to well drained fine loamy soils of the Newnham association (541w) at Wellington, Lugwardine and to the south of Sutton St Nicholas. Parts of these areas have been quarried since the 1960s. The soils here are most conducive to the formation of crop marks in times of slight drought over buried features, due to the free draining nature of the substrate.

Soils over sandstone and gravel substrates are light and easy to work and were thus attractive to early settlers, particularly in the rich natural environments offered by river valleys.

Areas of seasonally waterlogged loamy over clayey soils overlie reddish mudstone and till at Pipe and Lyde and Moreton-on-Lugg.

The role of aerial photographic interpretation

4.3.5 *Introduction*

Air photo interpretation provides an overview of landscape history and changes in landuse. It provides informed guidance for subsequent desk and ground-based investigations and complements cartographic and documentary research.

Information gained from aerial photographs cannot easily be detected by other means. The interpretation of contemporary and archival aerial photographs is thus an important component of multi-disciplinary archaeological investigation.

Interpretation of aerial photographs allows the accurate mapping of archaeological sites or natural features recorded as crop, grass or vegetation marks (caused by the differential growth of plants over buried features); soil marks (caused by differences in soil colour over ploughed buried features) and shadows cast by upstanding earthworks and features seen in relief.

4.3.6 *Limitations of the data*

Aerial photographic evidence is limited by seasonal, agricultural, meteorological and environmental factors which affect the extent to which either buried or upstanding archaeological features can be detected. It is thus advantageous to examine a range of photos taken under a variety of environmental conditions in order to build up a comprehensive interpretation of the archaeological landscape. The visibility of archaeological features may differ from year to year, and be obscured by differential depths of soil or differing types of vegetation. Individual photographs often record only a small percentage of the actual extent of buried or upstanding features.

In the Lower Lugg case, the range of aerial photographs available for interpretation was very comprehensive, both seasonally and chronologically.

4.3.7 *Types and sources of aerial photographs*

Two types of aerial photograph are used for archaeological interpretation. Vertical aerial photographs are taken for general-purpose survey using a camera mounted inside a modified aircraft. The aircraft is flown on a pre-planned set of overlapping flight-lines which cover the survey area completely. The camera points straight towards the ground. The vertical viewpoint provides aerial photographic coverage from a fixed scale and constant 180° angles at the centre of each frame. The overlap between the areas covered by each consecutive frame is usually 60%. This overlap between frames enables the photo interpreter to study each pair of vertical photos under a stereoscope.

The stereoscope combines the two images to allow the interpreter to see one three-dimensional image of the ground surface. Vertical aerial photographs carry inherent distortions introduced by variations in perspective and ground height, but are essentially ‘map-like’ in appearance. They are generally taken for non-archaeological, civil and military purposes and form the basic data from which most modern maps are compiled. Vertical aerial photographs are a very useful source of archaeological data, particularly in areas where features survive as earthworks. They also constitute historical ‘documents’.

Oblique aerial photographs are taken using a hand held camera by an aerial archaeologist to portray features which have been identified during specialist survey. These photos are extremely useful, but contain inherent perspective distortions, which must be accounted for in rectification and mapping procedures.

Sources of data for the Lower Lugg study

4.3.8 *National Library of Air Photographs (NLAP)*

Address: National Monuments Record (NMR) Centre, RCHME, Kemble Drive, Swindon, Wiltshire. Coversearch number 87727.

Two hundred and sixty two records, comprising over 300 specialist oblique aerial photos, 89 records comprising over 100 military oblique photos and 30 vertical aerial photographic sorties containing 612 individual prints are held in this collection which cover the study area and its immediate environs. They provided a primary source of data for the assessment and were taken between 1946 and 1988. The NMR contains the majority of photos taken by Chris Musson during sorties which were funded by English Heritage (EH) regional flying initiative. These photos were an extremely useful source of data, and Chris Musson provided further unaccessioned photos and information regarding the valley to this survey.

4.3.9 *Unit for Landscape Modelling, formerly Cambridge University Collection of Aerial Photographs (CUCAP)*

Address: Tennis Court Road, Cambridge.

Over 250 oblique and 400 Vertical aerial photographs are held by this collection which cover the study area and its environs.

4.3.10 *Herefordshire County Council SMR*

A comprehensive collection of vertical and oblique aerial photographs is held in the Herefordshire Sites and Monuments Record (SMR). Most of these are duplicated in the NMR, but photos taken in 2005 and 2006 by Chris Musson were seen at the SMR.

Interpretation and mapping methodology

4.3.11 *Introduction*

All aerial photographs were initially examined, then graded for their archaeological and environmental usefulness. Chosen photos were then closely examined, under 1.5x and 4x magnification, and interpreted with the aid of a mirror stereoscope where appropriate. This greatly facilitated interpretation of extant or vestigially extant features such as medieval settlement, ridge and furrow and water meadows, and was used in detail over the 1940s vertical aerial surveys to determine the extent and nature of water management systems in the valley and their possible relationship to the earlier ridge and furrow.

4.3.12 *Rectification methodology*

Selected air photos were ortho-rectified and scaled using AirPhoto 3.21 rectification software, which achieves a comparable transcription process to AERIAL rectification software. All control point mismatch values as stated by AirPhoto averaged less than 2.0m, which lies within the accuracy tolerance of OS base mapping at 1:2500 scale, unless otherwise stated in the data base if insufficient control information was present on the photographs. A minimum of 5 control points were used for each photo, with an average of 10 for larger areas on vertical photographs. No digital terrain modelling (DTM) was required in this area.

4.3.13 *Mapping methodology*

Aerial photographic data were re-interpreted as geo-referenced images on screen under high resolution, and the interpretations drawn as separate layers to an OS Landline digital map base provided by the client specifically for this project. Geo-referenced digital 1st Edition OS maps were used to clarify interpretations and to reconstruct the field patterns which were present at the time of photography in the many cases where historic air photos were used. These older maps are very accurate, and assisted in distinguishing the patterns of former boundaries and drainage channels which show as crop marks in the same way as earlier ditched sites and Medieval land use.

Palaeochannels which showed as marks in grass (mainly), crop, or as depressed features in the alluvium were recorded to a separate layer.

The mapping was produced using AutoCad Map 2004 in dwg format, and exported for the GIS MapInfo as dxf 12 format. AutoCad was preferred as a drawing tool for the accurate representation of the morphology of small archaeological features over the more limited capacity of MapInfo to produce accurate drawings with comparative ease. It is acknowledged that this preference is likely to be personal to individual operators.

National Mapping programme (EH NMP) drawing conventions were used as appropriate throughout the mapping, and all interpretations of new and additional sites were recorded to an Access database for accession to the Herefordshire SMR GIS and the project GIS.

4.3.14 *Layer identification and drawing conventions*

The following layers were used to contain and separate the data for import to the GIS:

Layer name	**Map symbol**	**Comment**
Bank		Stipple used over wider banks
Ditch		Solid fill over wider ditches
Modern-boundaries		Post enclosure boundaries, now removed
Non-archaeol		Rarely used – features which may be mistakenly identified as archaeological
Palaeochannels		Former streams or river channels
Possible-archaeol		Features which may be archaeological, but interpretation is inconclusive
Quarry		Visible area of former small-scale quarrying
RF-NMP		Second layer to use NMP convention for RF – choice may be made between the 2 RF layers

Ridge-furrow	_____	Detailed depiction of ridge and furrow
Site-numbers	AP 01	Numbers assigned by the AP project
Site polygons		Closed polygons to define visible area of each site
Study area		Sinuous line defining the entire Study Area
Water management	_____	Post-Medieval and modern water meadows and drains

Conventions and layers may be changed according to the requirements of the GIS representation and analysis.

4.3.15 *LiDAR Data*

It was not possible to undertake interpretation of LIDAR data at this stage due to its present limited extent.

Results

4.3.16 *Results - general observations*

The study area within the Lower Lugg Valley is a cohesive block of land which is defined by geographical features. It presents an opportunity to the air photo interpreter to work with a varied and rich natural environment which has been photographed from the air since the RAF undertook sorties for military purposes in the 1940s.

In addition to good vertical aerial photographic coverage, the valley has been surveyed systematically by aerial archaeologists JK St Joseph, David Wilson and Chris Musson over the past half century. There is thus a collection of oblique aerial photos taken by archaeologists to work with in complement to the verticals which show aspects of the natural, Medieval, Post Medieval and Modern landscapes over the entire area.

Oblique aerial photographs were interpreted first, and their archaeological data transcribed to the map as indicated above. SMR data were then imported to the base map from MapInfo as a series of points with attached attributes, and checked against the preliminary interpretations to determine which sites were known and recorded on the SMR, and which were newly recorded, and to allow follow up to any queries generated by discrepancies between the SMR and AP data.

Vertical aerial photographs were then sorted and interpreted and their relevant data added to the project mapping.

The results of this process demonstrated the history of specialist archaeological aerial reconnaissance in the Lugg Valley, and the cumulative nature of recording crop marked sites. It also demonstrated the value of vertical aerial photographs in recording large areas of Medieval fields and Post Medieval re-use and remodelling of this landscape for large-scale

management of water within the river valley with the development of pastoral farming techniques.

Fifty four individual areas were recorded which contained cohesive archaeological sites or larger blocks of Medieval fields or Post Medieval water meadows. The Interpretation-mapping units are defined where possible by the modern land divisions for ease of recording and recognition. They are each bounded by a closed polygon which is drawn to a single layer on the base map.

It is not possible to accurately date all sites seen on air photos by their appearance and morphology alone, unless this is entirely obvious such as the appearance of Ridge and Furrow, or that of some Roman military sites. It is also not possible to accurately predict the vertical or horizontal stratigraphy or area of a particular site, particularly if seen as marks in crop over one field or area only.

4.3.17 *Results - extent of the crop marked sites*

The AP evidence within the Lower Lugg Valley strongly suggests that the sites which are seen as marks in crop present a series of environmental 'windows of opportunity' which show particular features. In most areas, these do not show as a contiguous landscape as in some other river valleys such as that of the Trent.

Site AP 6 provides a typical example of this 'island effect' where a core area of crop marked features obviously continues beyond the visible extent of the site.

This site lies at NGR SO 497451, to the west of Moreton on Lugg. The soil here is conducive to the formation of crop marks over buried features, but I would argue strongly for the continuation of the buried features beyond their visible extent.

Figure 37 clearly shows that the linear ditches seem to end abruptly, and logically must 'go somewhere' rather than hang in space as they appear to do. The areas around and between these sites must therefore be considered as areas of archaeological potential, as it is impossible to put any hard edge on the extent of the buried features.

Figure 37 also depicts Site AP 21, a group of probable round barrows and settlement enclosures, which lies immediately south of the river at Hampton Bishop. These features are obviously truncated by the river and the alluvial soil, which indicates a change in the course of the river, which has encroached upon this area since the site was built and used.

Taking a wider view of the river valley reveals that all the crop marked sites show on such 'islands' and therefore their distribution reflects the ability of the environment to reveal buried features, rather than the actual extent of those features, which remains unknown.

It is also obvious that the crop marks are revealing features which date to different chronological periods over the same site.

In areas of the Lower Lugg Valley, examination of photos taken in the 1940s and those taken since the 1970s reveals the loss of some sites either due to erosion, agriculture or quarrying. A detailed study and quantification of this process and the effects of aggregate extraction, agriculture and natural processes upon the archaeological resource would be useful. This could

be achieved by an overview survey of land use types in the 1940s and more recent times (since 1970) and a comparison of extant sites in earlier times to those visible on more modern photographs. This will not extend, of course, to crop marked sites unless they have been completely removed by quarrying, as their visibility is controlled by external factors. However, the attrition of the Medieval and Post Medieval landscape may be assessed by a study of the condition of earthworks and their visible extent.

The areas which showed archaeological features as crop marks lie over sand or gravel soils. These areas were attractive to early settlers, are well drained and thus show marks in crops easily, and are now subject to continuous modern arable farming. They are also areas which may be potentially subject to future aggregate extraction (see **Section 2**).

4.3.18 *Results - archaeological features by period*

Prehistoric. Prehistoric landscapes within the Lower Lugg Valley are represented in the aerial photographic record solely by sites which are now eroded and visible only as marks in crops. In the absence of hard dating evidence derived from excavation, it is not possible to date these sites from the aerial record, but rather to suggest dates and types on the grounds of their appearance and morphology which may be tested by field investigation as necessary. Examples of these sites are illustrated by Figures 35 and 36.

Sites which are likely to date to the prehistoric periods are visible mainly on the sand and gravel subsoils on the west and south sides of the Study Area, and one section of curvilinear interrupted ditch seen near Bodenham, which may date to the Neolithic period (AP54).

Ring ditches, which may be the remains of eroded Bronze Age burial mounds are visible in the vicinity of Wellington (Figure 36) at sites AP2 (SMR 7054) and AP3 (SMR 6019) as part of a complex of obviously multi period features which show as crop marks. Site AP2 comprises what may be a Barrow cemetery.

A ring ditch is also visible at site AP6, (Figure 36, SMR 22872) alongside three smaller circular enclosures which form part of a complex pf rectilinear enclosures and tracks on the same site.

Crop marks immediately south of the river at Hampton Bishop, (Figure 36, AP21, SMR 226) show a complex of rectilinear enclosures and ditches which are either under or overlain by at least five, possibly six, ring ditches which are likely to date to the Bronze Age. Curvilinear enclosures are also visible as part of complexes of enclosures and tracks at AP 23, 24, 25, and as s single ring ditch at site 27. The SMR records a circular crop mark at The Horseshoe, Sutton (AP34, SMR 30270), but this feature is sub-circular, and is not likely to be the remains of a Round Barrow.

Romano-British. The western and southern parts of the area are likely to have been settled and farmed extensively in the Iron Age and Romano-British periods. Investigations in the vicinity of Wellington indicate a substantial Roman presence in the area, and the Hillfort at Sutton Walls indicates major settlement and landuse in the Iron Age.

Again, crop marked sites on the sand and gravel areas from Wellington through to Lugwardine, indicate probable settlement and landuse in these periods (Figures 36 and 37). It is likely that these features are more extensive than the aerial record reveals, and the archaeological

potential for discovery of further remains of farmsteads, tracks and possibly funerary sites is high in the areas which may be used for future aggregate extraction.

The eastern terraces of the river valley do not show such concentrations of cropmarked features as those on the west (which comprise gravels in addition to the sandstones), but one site which shows undated enclosures and ditches was recorded at Pikestye, Marden (AP44 SMR 8526). The area between Bodenham and Sutton St Nicholas on the east side of the valley obviously carries potential for archaeological discovery, but the distribution of known crop marked sites presently favours the west and south east areas of the river valley, with a notable 'blank' area between Sutton and Bodenham.

It is notable also that the crop marked features are visible in greater concentration on areas which lie over gravels, as mapped by the Soil Survey of England and Wales in 1983. This mapping may at present be at too coarse a scale to provide a definite link between soil type and early settlement, and the extent of the actual archaeological landscape, as opposed to that revealed selectively by the crop marks.

Reasons for this apparent dearth of evidence in the east of the study area may be addressed by a combination of further investigation of the soils and agricultural regime, and by ground based archaeological techniques. It may also prove valuable to re-examine the vertical aerial photographs, particularly those taken recently, to determine any environmental differences between areas over sandstone and those over gravel.

Early Medieval. There is no direct evidence in the aerial record for sites which date to the Early Medieval period. This is not uncommon, and lack of aerial photographic evidence alone cannot be used to infer a lack of general potential for discovery of sites or finds from these periods.

Medieval. The Medieval landscape in the Lower Lugg Valley comprised a very well developed pastoral environment with settlement and extensive systems of open fields evidenced by the remains of ridge and furrow ploughing and associated headlands, examples of which are illustrated by Figure 5.

Aerial photos taken in the 1940s reveal extensive areas of medieval fields close to the river throughout the study area (Figure 39). The field systems in the valley lie on, or abut, the present day extent of the alluvium, which may have extended since the medieval period.

Further fragmentary evidence for the continuation of Medieval ploughing is seen further away from the river. It is obvious that modern ploughing has eroded substantial areas of ridge and furrow, as much is now visible as marks in crop, and often overlay sites which were settled in earlier times.

Areas of known Medieval settlement (Figure 39) occur throughout the area, with some possible preference for the west and central areas of the valley. The appearance of features on aerial photos ranges from the very well preserved and scheduled upstanding remains of the manorial complex and associated fishponds, drains etc at Freen's Court to more fragmentary remains of possible house platforms and hollow ways.

Typical areas of shrunken Medieval settlement are evident on the ground and from the air at Marden, in conjunction with well preserved Medieval field systems (AP38, SMR 8532).

Further examples show as smaller 'islands' of eroded earthworks at Pipe Medieval manor (AP9, SMR 25792) and Lower Lyde Court (AP14, SMR 34556). The distribution of traces of settlement around manors and at more major centres such as Marden indicates a thriving agricultural environment in the Medieval period, through into the Post Medieval period when much of the Medieval ridge and furrow was re-used and incorporated to large areas of structured water meadows on the valley floor.

Post Medieval. Post Medieval agriculture saw the enclosure of the land from the 17th century, and the development of systems of water meadows and drainage which made full use of the potential of the river valley to yield rich early pasture.

Large areas of Medieval ridge and furrow around Shelwick (AP31) were modified in the Post Medieval period with additional drains and feeder channels to re-use these areas as water meadow (Figure 40).

Extensive evidence for Post Medieval and modern drainage is visible on aerial photographs throughout the valley on alluvial and adjacent areas. There is potential for further dating of these systems through interpretation of vertical aerial photos and early mapping. At this first stage they have been identified and mapped.

Modern. Modern features identified during this survey are largely discreet areas of small scale quarrying which are now inactive, and some evidence for changes in field boundaries since enclosure of the land to facilitate modern agricultural land use. Modern flood defence banks have also been recorded as part of the evolving landscape, along the floodplain edge, particularly at Shelwick and Marden.

Conclusions

4.3.19 *Output of the air photo mapping*

This survey has revealed extensive archaeological landscapes which date from the prehistoric to post medieval periods. It thus identifies a large body of 'raw data' which has been accessioned to the project GIS, concorded with the SMR and briefly described in morphological or functional terms.

Figure 35: Distribution of air photo sites in the Lower Lugg Valley

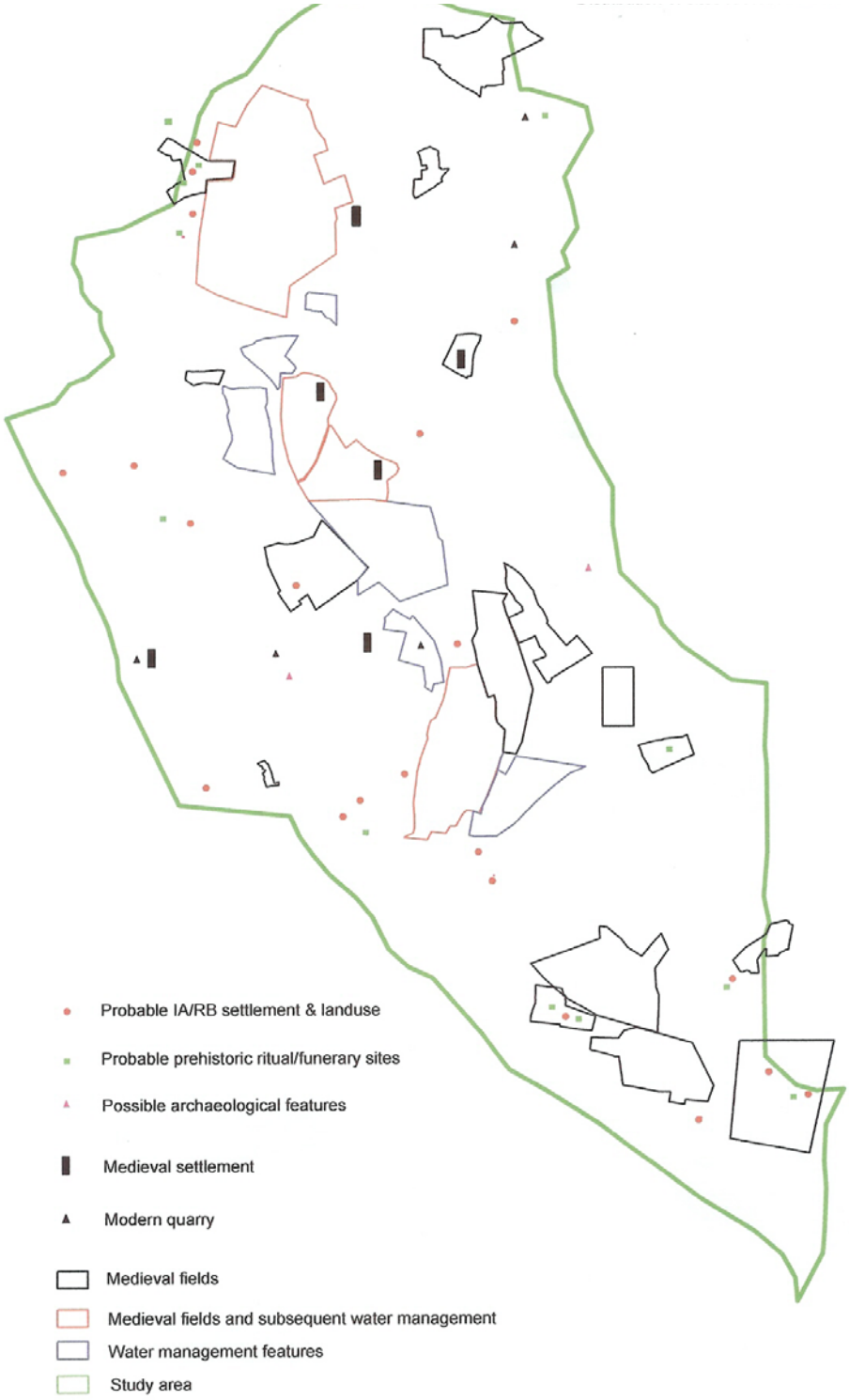
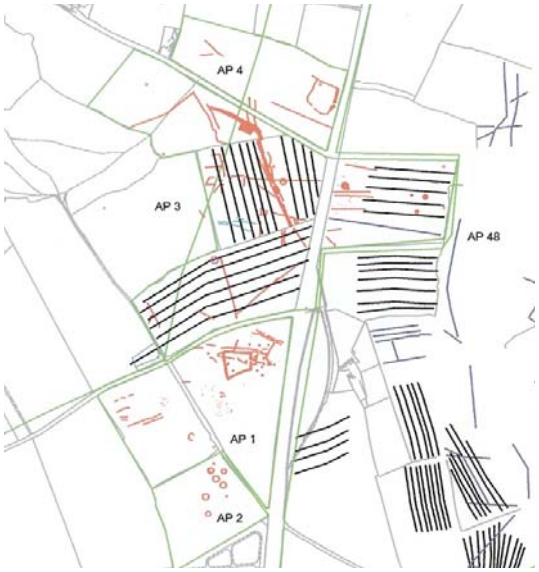
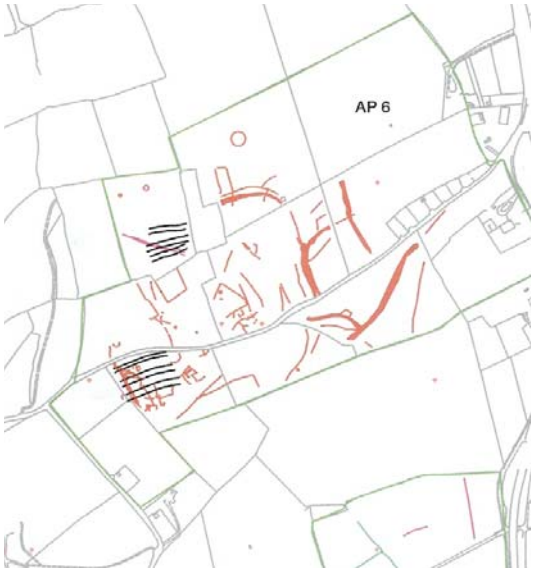


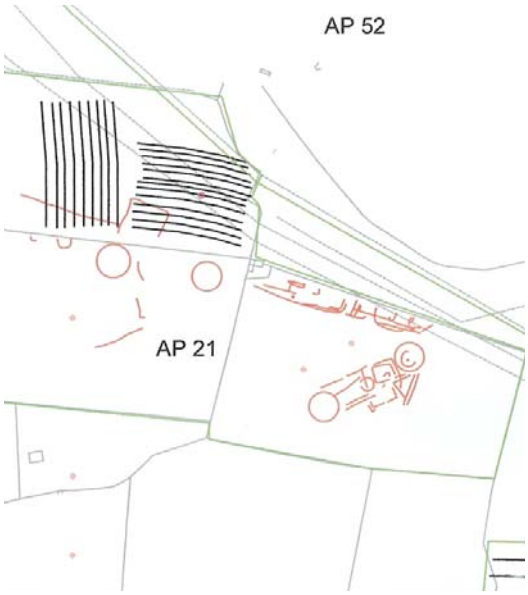
Figure 36: Examples of possible prehistoric or IA/RB sites which show as crop marks. Scaled variably to illustration only.



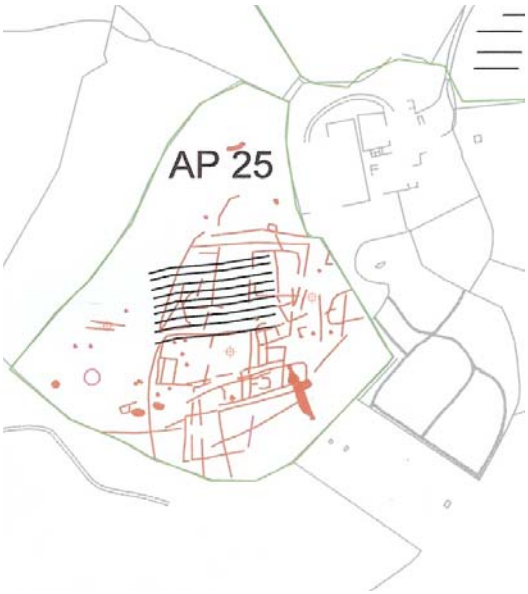
Enclosures, tracks, pits and ring ditches north of Wellington. AP1-4, NGR SO 500 490.



Enclosures and dirches to the west of Moreton-on-Lugg on sand substrate. AP 6, NGR SO 497 453.



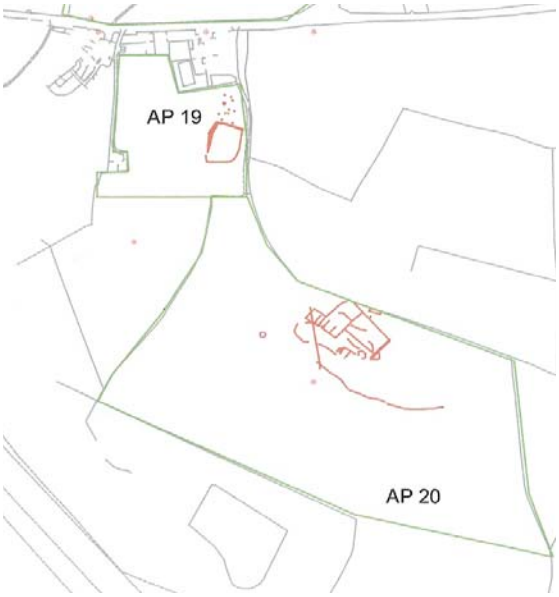
AP 21. Enclosure and ring ditches E of Tupsley, on gravel substrate. NGR, SO 453 397.



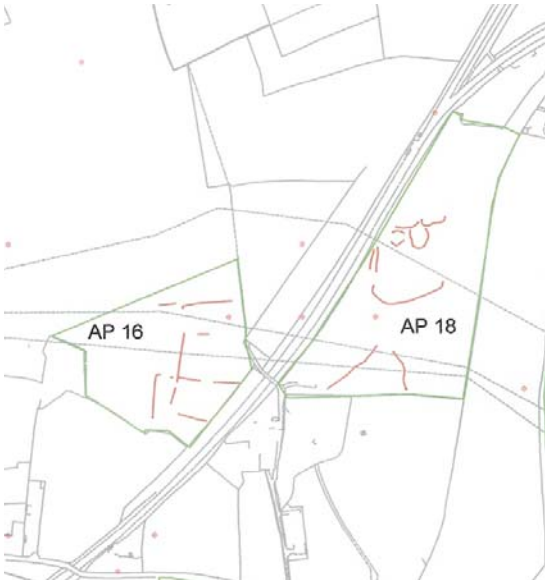
Enclosures indicative of complex settlement and possible ring ditch at Tidnor Wood on gravel substrate. AP 25, NGR SO 561 400.

Figure 37: Examples of possible prehistoric or IA/RB sites which show as crop marks. Scaled variably to illustration only.

AP 05. enclosures and ditches S of Brookhouse Farm. NGR SO 494459



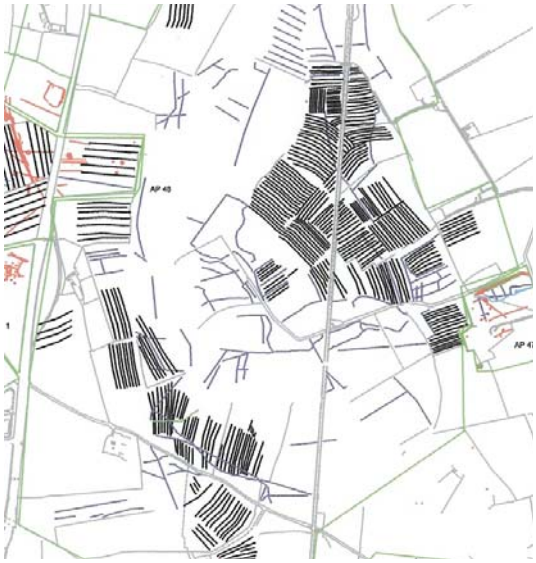
AP 19 and 20. Enclosures and ditches W of Lugwardine on gravel substrate. NGR SO 535 413.



Possible enclosures and ditches S of Burcott, Holmer, on sand substrate. AP 16 and 18, NGR SO 523 423.

Possible enclosure and tracks at Pikestye, Marden, on sand substrate to the E of the River Lugg. and undated quarries. AP 44 and 45, NGR SO 538 479.

Figure 38: Examples of Medieval fields. Scaled variably to illustration only.



AP 48. Medieval fields N of Wellington Crossing. Shown in relation to possible prehistoric features and Post Medieval Water management. NGR SO 510 491.

AP 38 Medieval fields and Manor at Freen's Court S of Marden and modern flood defence banks. NGR SO 519 459.

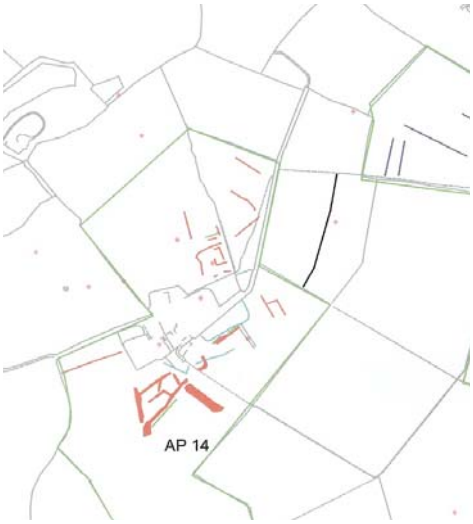
Medieval fields and ditched features near Prior's Frome Medieval Settlement. AP 24, NGR SO 567 388.

AP 31. Medieval fields and modern flood defence banks at Shelwick. NGR SO 529 423.

Figure 39: Examples of Medieval settlements. Scaled variably to illustration only.

AP 38. Shrunken Medieval Village at Marden. NGR SO 514 470.

Hollow way, settlement features and undated quarries at Pipe Medieval Manor. AP 9, NGR SO 500 440.



AP 14. Deserted Medieval Settlement N of Lyde Court. NGR SO 518 440.

Figure 40: Examples of Medieval water management features. Scaled variably to illustration only.

AP 41. Water meadows W of Marden. NGR SO 507 466.

AP 36. Drains, water management and palaeochannels S of Freen's Court. NGR SO 518 440.

AP 31. Re-use of Medieval fields as water meadows at Green Farm , Shelwick. NGR SO 532 432.

4.4 Critical Review of Combined Archaeological Data

Introduction

4.4.1 *Objective and methodology*

The purpose of this section of the report is to draw together the collated archaeological data within a critical assessment of the meaning and significance of that data. It also seeks to explore potential future areas of archaeological interest, discovery and analysis in the Lower Lugg.

Fundamental to the analytical approach adopted in this section is the basic fact arising from the data collation process (**Sections 4.1, 4.2, 4.3**) that the current understanding of the archaeology of the Lower Lugg is somewhat limited. It is, for instance, heavily biased to a small number of excavated sites (principally that at Wellington Quarry), with extremely low and poor quality recovery of archaeological data for all of the rest of the Lower Lugg area. As has been noted in **Section 4.2**, the SMR has just 28 entries for the whole of prehistory, and only 25 for the Roman and Early Medieval periods combined. Even the remaining 501 Medieval, Post Medieval and Modern entries are typically of a general nature, and are unsupported by detailed excavation evidence and further analytical synthesis. Such a situation is, of course, typical of most areas within an archaeologically under-explored county such as Herefordshire.

Interrogation of SMR source material and the wider literature review and searches undertaken within the data collation part of this project has not significantly added to this data resource. Indeed, it is worth noting that, due largely to the sub-alluvial character of much of the archaeology of the area, nor has this scenario significantly altered even with the more intensive primary survey which has been undertaken throughout the Lugg as part of Herefordshire Archaeology's 2006 Leader + Lugg Valley Project (excepting the case of the Hill Croft Field Neolithic enclosure, see **Section 4.2**). On the plus side, the air photo mapping (**Section 4.3**) has been an important contribution to the Lower Lugg dataset, and is extremely useful in providing information of consistent quality for the wider geographical area. Nevertheless, that material is still geographically limited, biased to the later periods, and of uncertain interpretative value in terms of the mapping evidence alone.

As a result of this basic problem of quality and coverage of information, it has not been judged appropriate or meaningful to undertake the critical analysis of collated data in terms of quantitative and statistical extrapolations, and presentation of 'hard' conclusions and predictions. Instead, the approach taken here is necessarily discursive and qualitative, with the objective of maximising the understanding and value of the limited data available through a 'soft' analytical process.

The basic starting point is that, notwithstanding the dearth of existing archaeological evidence, national and regional comparison of the Lower Lugg with similar river valley settings elsewhere establishes the strong likelihood of dense and complex patterns of past human settlement in the area. The known archaeological sequence from Wellington in particular (as well as the excavations at Sutton Walls and in the Sutton St Michael area) confirms that this assumption is well grounded.

The task of the critical analysis is to assess the significance of what is so far known, to examine the contention that it is correct to suppose that similar remains of past activity also exist in other parts of the Lower Lugg, and to offer a judgement on what the wider archaeological

resource might comprise. Implicitly, the process also involves attempting to define the distinctiveness of the Lower Lugg sequence in regional and national terms, and establishing a framework for future research initiatives. Inevitably there is a high degree of judgement embedded in all parts of this assessment, and significant unevenness in its application to different periods.

4.4.2 *Analytical structure*

The analysis of each period is structured around 5 sections:

Integrating different data sources. This section draws together the data from the different archaeological collation sources (WHEAS excavations **Section 4.1**, the wider archaeological data collation **Section 4.2**, and the air photo mapping and analysis **Section 4.3**) and presents a concise overall summary of the archaeology of the Lower Lugg. This also involves critical evaluation of the degree of bias in the evidence associated with the high degree of reliance on data from particular excavated geographical areas (such as Wellington) in forming this integrated view.

Wider archaeological context. This section summarises comparative information from wider regional and national archaeological contexts. This review is intended to help inform 'missing' aspects of the current Lower Lugg resource, and also provides a basis for defining the particular regional and national value of the known Lower Lugg archaeology.

A key source in assembling the wider archaeological review has been the period and thematic collation work undertaken as part of the English Heritage sponsored 'Archaeological Research Framework for the West Midlands' process (Myers 2001, Buteux and Lang 2001, Ray 2007, Garwood 2001, Barfield 2001, Halstead 2001, Barber 2001, Wigley 2001a, Wigley 2001b, Hurst 2001, Dalwood 2001, White 2001, Ray 2002, White 2002, Guest 2002, Ferris 2002, Evans 2002, Baker 2002, Hooke 2002, Vince 2002, Hines 2002, Dalwood 2002b, Baker 2003, Dalwood 2003, Hunt 2003, Hurst 2003, Hoverd 2003, Stamper 2003a, Stamper 2003b, Dinn 2003, Atkin 2003a, Atkin 2003b). As well as providing up to date synthesis and review of local archaeological sequences, this body of literature underpins projected archaeological research programmes in the West Midlands, and therefore provides the basic thematic reference point for developing investigation of specific geographical contexts such as the Lower Lugg.

Significance. Against the local, regional and national archaeological frameworks set out above, this section offers an assessment of the significance of the known archaeological resource of the Lower Lugg. Significance here is an expression both of the value of known sites in understanding the Lower Lugg sequence in particular, and of the wider significance of the archaeology of the Lower Lugg in the context of regional and national archaeological information.

Constraints/absences. This section details the constraints which act on realising fuller understanding of the Lower Lugg archaeological resource, and in particular points up apparent lacunae in the current Lower Lugg evidence (as revealed by comparison with the broader regional and national archaeological sequences).

Potential. This section offers a prediction of the nature of the Lower Lugg archaeological resource beyond existing knowledge. This covers both the potential for future discovery of evidence of a similar character to that already known, and the possibility for identifying

categories of archaeological material hitherto unrecorded in the Lower Lugg. Associated research issues and approaches are also indicated where appropriate.

The section is organised under two sub-headings**. Potential in the valley bottom/main aggregate extraction areas** concerns the valley bottom zone where future aggregate extraction is likely to be focussed and the threat to the archaeological resource is greatest (**Section 2**). **Potential in the wider Lower Lugg landscape** assesses the areas beyond the valley floor which include further sand and grave reserves, but where the threat of future aggregate extraction is less likely in the foreseeable future. It should be stressed, of course, that the potential archaeological resource in these zones is nevertheless under progressive destructive pressure from processes such as agricultural activity and building development.

Period Review

4.4.3 *Palaeolithic*

Integrating different data sources

The Lower Palaeolithic hand-axe from Tupsley is the only demonstrable item of Palaeolithic material culture to have been found in the Lower Lugg (**Section 4.2**). Although it is not possible on the basis of a single find to make further explicit observations on the character of the Palaeolithic archaeology of the area, the Tupsley hand-axe is nevertheless important simply because it does demonstrate the possibility of recovering Palaeolithic evidence from the Lower Lugg.

It is also important to stress that significant palaeo-environmental data does exist for the period of potential Palaeolithic occupation of the area. This consists of a late glacial pollen sequence derived from a Devensian palaeochannel at Wellington Quarry (dated 14400 to 11700 cal BC, **Section 4.1**), and a number of geological exposures (associated with gravel quarries) illustrating the structure and formation of the river valley palaeo-terraces and of fragmentary older drift deposits which can perhaps be linked to the Anglian glaciation (**Section 3.1**). The recovery of Woolly Rhinoceros and Horse fossils from the fourth Lugg river terrace in the 19th century also gives a significant glimpse of pre-Devensian environmental conditions (**Section 4.2**).

It is apparent that the potential Early to Middle Pleistocene period of Lower Palaeolithic occupation in the Lower Lugg is associated with long periods when prevailing glacial conditions would have rendered human occupation unlikely or impossible, though even in cold periods the post-Anglian Lower Lugg probably always remained south of the actual ice limit, though certainly sometimes subject to severe peri-glacial conditions. Consequently, although it seems to have been assumed that glacial episodes would have removed any primary stratified deposits associated with human occupation before the Upper Palaeolithic, it is worth noting that in-situ fluvio-glacial deposits do also exist in the Lower Lugg contemporary with both the Lower and Middle Palaeolithic periods (**Section 3.1**).

From the late glacial maximum of about 22,000 years ago, the process of climatic amelioration is associated in the Lower Lugg with the action of a dynamic pattern of braided water courses resulting in the deposition of the deep and undulating valley bottom gravel beds which are now the principal focus of aggregate extraction (**Section 3.1**). This Devensian drainage system ultimately evolves towards a single main river channel, with the incision of the river to form the modern flood plain (perhaps occuring during the Younger Dryas). The pollen data from the

Devensian Wellington palaeochannel fragment illustrates development of scrub, heathland and open grassland, indicating (in that immediate vicinity at least) an environment potentially ideal for exploitation by Later Upper Palaeolithic hunters (**Section 4.1**). Moreover, the preservation of such environmental data would seem to indicate the possibility elsewhere of associated survival of cultural material in similar contexts.

Wider archaeological context

Human occupation in Britain tangibly begins about 500,000 years ago, apparently initially associated with *Homo heidlebergensis* and, from about 130,000 until 30,000 years ago with *Homo neanderthalensis* (generally assumed to be a *heidlebergensis* descendant specifically displaying evolutionary adaptation to the cold conditions of the northern hemisphere). This vast period of Lower and Middle Palaeolithic settlement dovetails with the ebb and flow of glacial and inter-glacial episodes, and is principally recognisable via stone tools of Clactonian and Acheulian type and, from about 250,000 years ago, by the emergence of the distinctive Levallois technology (Gamble 1999).

Although recovery of Lower and Middle Paelaeolithic material from an area such as the West Midlands has traditionally been limited and evidently linked to the localised work of particular collectors (e.g. see distributions in Roe 1968), increased rates of recognition and recording associated with quarrying of Pleistocene sand and gravel deposits in the last 20 years (Wymer 1999) has started to show a wider find distribution (five Lower/Middle Palaeolithic artefacts are now known in Herefordshire for example), and crucially has revealed sites with significant contextual information. The most important of these is at Waverley Wood Farm, Warwickshire, where four handaxes were discovered in association with animal bones including a straight-tusked elephant in a deposit which pre-dated the Anglian glaciation (Shotton and Wymer 1989). The handaxes can therefore be securely dated to about 500,000 years old, and represent one of the earliest finds of demonstrable human activity in Britain comparable to the southern sites at Boxgrove (West Sussex) and High Lodge (Suffolk).

Developing understanding of local sequences of Pleistocene geological deposits and associated geomorphological processes has been crucial both to effective recent prospecting for Palaeolithic sites, and proper analysis of new finds. The find context of Palaeolithic handaxes from the Wolverley area of Warwickshire/Leicestershire can be linked to re-deposition by glacial outwash processes (Saville 1988), and the study of palaeo-drainage patterns is providing key information in setting the activity of early human populations in their original environmental context. Both the Wolveley and Waverley finds can now be associated with the relict pre-Anglian Bytham River system (Bateman and Rose 1994) which flowed for over 300 km across the Midlands between Worcestershire and Suffolk. A probable Bytham tributary, the Mathon River has now been identified in eastern Herefordshire underlying the modern Cradley Brook Valley, and probably continued upstream into Northern Herefordshire and Shropshire (Richards 1999). These drainage systems were dammed and destroyed by the subsequent Anglian glaciation, and the evolution of more recent systems is marked by complex sequences of palaeo-terraces associated with the formative phases of the modern river valleys. The inter-relation of these features has proved important in dating Palaeolithic finds, with particular work to this effect with respect to the five terraces of the Avon, and the seven of the Severn (Maddy et al 1991, Maddy et al 1995, Rose 1994).

The arrival of fully modern humans in Britain is not yet certainly dated, though the presence of dated leaf point assemblages such as that at Pin Hole Cave, Derbyshire suggest colonisation by early Homo Sapiens between 30 and 40,000 years ago (Gamble 1999). Interestingly in the

local Herefordshire context, the now mostly lost lithic finds from King Arthur's Cave, Herefordshire included a leaf point, and this could suggest an early Upper Palaeolithic component to the activity there (Symonds 1871, Taylor 1927). A number of cave sites in the west of Britain such as Paviland and Kent's Cavern have also produced contemporary Aurignacian flint forms (Myers 2001, Buteux and Lang 2001), and though such sites are lacking in the West Midlands, the location of Herefordshire nevertheless makes that distribution immediately relevant to the present discussion.

Although the traditional evidence for Early Upper Palaeolithic settlement has been largely derived from cave sites, it is perhaps also important to note that the potential for tracing open-air sites of this period has also been demonstrated by modern discoveries. The best and most relevant example is the hyena den deposit associated with a leaf point found in advance of aggregate extraction at Glaston, Rutland in 2001 (Thomas and Jacobi 2001). The location on a rise between the Welland and Chater rivers presumably offered an equally advantageous hunting view point for hyenas and humans alike, and it seems significant that other probably contemporary flint working debris was also found in the vicinity.

It seems certain that, with the onset of the late glacial maximum about 25000 years ago, human occupation ceased in Britain for perhaps 10,000 years or more. Re-colonisation is associated with tool assemblages of the Cresswellian type which are usually dated to between 13000 and 12000 years ago, although cut-marked horse and red deer bones from Cheddar Gorge with radiocarbon dates of between 12500 and 13500 years ago may imply that the process of colonisation in fact began somewhat earlier than that (Gamble and Lawson 1996). It is again interesting with respect to the present study that the only certain Creswellian assemblage from the West Midlands derived from King Arthur's Cave, Herefordshire. In fact, King Arthur's Cave is probably best considered as part of a group of west of Britain cave sites north and south of the Severn estuary which also includes the Creswellian associated occupation phases at Gough's Cave and Sun Hole (Myers 2001). Collectively, this body of evidence offers an important regional insight into late Upper Palaeolithic settlement, and emphasises the potential for new finds of this kind in surrounding localities.

The final phase of the Devensian glaciation was marked from about 11000 years ago by a last 1000 year long 'cold snap' associated with the Loch Lomond Interstadial, and this deterioration was almost certainly sufficiently severe in its effects to again cause abandonment of Britian by human groups (Gamble 1999). The first phase of re-colonisation after this event is associated in Southern Britain with distinctive triangular section long blades which are usually considered to represent the latest form of Upper Palaeolithic (as distinct from Mesolithic) flint industry. However, no such finds have been made in the west or in the Midlands (Myers 2001), and it may be that this cultural tradition never penetrated that far. For an area such as Herefordshire, the story of human re-occupation after the Loch Lomond Interstadial effectively commences with diagnostic Mesolithic flint types.

Significance

General geological context of the Lower Lugg with respect to sand and gravel deposits overlapping with Palaeolithic timescale. The Pleistocene geological sequence of the Lower Lugg presents sand and gravel which chronologically overlap the Lower, Middle and Upper Palaeolithic periods. Because these deposits lay just beyond the maximum southern extent of the Devensian glaciation, they survive in the Lower Lugg where they have been lost in more northerly parts of the Lugg valley. Moreover, the fluvio-glacial sand and gravel deposits of the Lower Lugg can be generally compared to precisely the kinds of contexts which have recently

yielded significant Palaeolithic finds in other places where no such finds had previously been recorded.

Devensian importance of the Lugg Valley. Prior to the last glaciation the Lugg was probably joined upstream by the Teme and Onny, potentially linking the terraces to a much larger river system than the present Lugg, and perhaps indeed making the proto-Lugg the major river of the region joined by the proto-Upper Wye as a tributary at Hereford (Brandon 1989). This would have also have made the Lugg and its resources a key linear focus for human settlement and exploitation, and the river margins represented by the terraces an optimal location for exactly the kind of activity recently identified in situ at Glaston in Rutland. A prominent feature such as Sutton Walls (part of the fourth terrace) is in this sense as likely a place for occupation before the last glaciation as it was in the Iron Age.

Regional geographical linkage to known Palaeolithic sequences. The Lower Lugg is regionally associated with a geographical zone where developed Palaeolithic activity and cultural sequences are known. This is generally true with respect to other nearby river valleys such as the Severn, but also specifically relevant to Later Palaeolithic sequences in particular and the distributional incidence of sites (including King Arthur's Cave, Herefordshire) with Creswellian tool traditions.

Constraints/absences

Lack of Palaeolithic material from the Lower Lugg. Only one certainly Palaeolithic find has so far been made from the Lower Lugg. In mitigation of that apparent fact, it should nevertheless be emphasised that the recent large quarrying activity in the valley bottom has been associated with geologically recent gravel beds which could only have, at best, very late Palaeolithic associations (and even then the gravel itself has generally been regarded as 'natural' of no archaeological interest). Where quarrying has occurred into the older river terraces which might be thought to offer better potential for Palaeolithic archaeology, it was in a 19th and early 20 century context where there was even less chance of that archaeology being recognised or recorded. 19th recovery of fossil animal bone from a gravel pit at Lugwardine nevertheless demonstrates that some observation and collection did take place (Symonds 1867).

Lack of detailed understanding and dating of the gravel terrace systems of the Lower Lugg. There is no precise dating in the Lower Lugg for the pre-Devensian drift and the river terrace deposits with which Palaeolithic material might be associated (in principle covering the whole Lower/Middle/Upper Palaeolithic time range). The 'older drift' deposits are usually conjecturally linked the Anglian glacial episode (around 470,000 to 420,00 years ago).The oldest (4th) river terrace of the Lower Lugg is generally considered to be only a little younger than the older drift, while the youngest river terrace perhaps has a Late Devensian context (Brandon 1989, Maddy 1999).

Constraints on potential for archaeological recovery. In archaeological terms, there is a significant distinction to be drawn between potential for secondary recovery of cultural material from re-deposited contexts (which is, of course, what all the fluvio-glacial deposits of the Lower Lugg are), and the primary recovery of in situ-archaeology associated with ancient landforms which have been sealed by later deposition. In addition, a significant proportion of possible archaeological materials in both situations are likely to be deeply buried within sand and gravel deposits, making prospection effectively impractical prior to exposure by quarrying. It should also be noted that understanding of the subsurface character of the Lower Lugg sand

and gravel deposits remains at best localised and incomplete (as derived from the study of available quarry exposures), and this again makes detailed predictive modelling of possible horizons of higher potential archaeological interest effectively impossible.

In essence, a key issue is that the archaeology of Palaeolithic period is in most circumstances within the 'natural' beyond what has been the traditional limit of archaeological recording/watching brief activity in advance of local quarrying activity. In that sense, the apparent absence of Palaeolithic archaeology in the area is inevitable (although it may still be real).

Potential in the valley bottom/main potential aggregate extraction area

Later Palaeolithic re-deposited environmental and cultural sequences associated with palaeochannels. The late Devensian Wellington palaeochannel has directly illustrated the potential for discovery of redeposited environmental (and cultural?) data from slightly earlier but comparable contexts associated with braided river systems which straddled the Pleistocene/Holocene boundary. It is certainly possible that the rapidly evolving river system may have sometimes sealed fragments of fossilised former land-surface, and the detailed morphology of the gravels could therefore reveal localised lenses of significant Late Palaeolithic archaeological interest within the so called 'natural'. Such preservation is entirely unproven at the present time, but as with the Palaeolithic archaeology of the area generally, nor has there been any particular attempt to prospect for such features.

Sealed Later Palaeolithic occupation surfaces associated with the first terrace. It is possible that the newer drift deposits which make up the valley bottom sand and gravel resource of the Lower Lugg (resulting from outwash from the last glaciation) may partly conceal and overlay elements of the first terrace, effectively providing a possible sealed pre-glacial ancient land surface within the gravel with considerable archaeological potential. Moreover, those newer drift deposits may in any case contain re-deposited archaeological and environmental materials.

Potential in the wider Lower Lugg landscape

Recovery of Lower Palaeolithic material from the older drift deposits. The older drift deposits are generally considered to be the earliest fluvio-glacial deposits (broadly of Lower Palaeolithic date in human occupation terms) of the Lower Lugg (**Section 3.1**, Brandon 1989). These deposits are associated with fragmentary terrace systems linked to glacial out wash systems from the pre-Devensian glaciation. The principal remnants in the Lower Lugg are the sand and gravel deposits of the Sutton Hill/Franklands Gate area and the Portway-Burghill area (the quarries with active permissions at Portway/St Donat's and Upper Lyde would both be exploiting this latter resource). The deposits themselves would have been laid down in the period when the extreme cold conditions of the Anglian would have made human occupation impossible, but the possibility that they contain redeposited pre-Anglian evironmental and human cultural artefacts cannot be discounted and has not so far been investigated.

These deposits also show in detail a range of complex structural features associated with the particular patterns of channels and drainage which created them, and they also seem to overlay and fill pre-existing geomorphological features such as small valleys; indeed it is these features which acted in part to trap and sort the sand and gravel deposits which can be locally up to 20 metres deep (Brandon 1989). These local formation processes are not understood in detail, but the possibility that pre-Anglian landforms exist beneath the older drift could be of potential

interest in archaeological and palaeo-environmental terms. The geomorphological association of what is now the Lower Lugg area with the recently recognised pre-Anglian Mathon river a little to the east is not known, but a notional context of the Lower Lugg zone within the catchment of the Mathon River could also be suggestive in terms of the probability of patterns of human activity and usage within the hinterland of a major river system.

Recovery of Lower, Middle and Upper Palaeolithic material from the river palaeo-terraces. Surface collection of Palaeolithic tools from Wolveley in Warwickshire (Saville 1988) emphasises the potential for similar recovery of Palaeolithic artefacts from the surfaces of the Lower Lugg river terraces, and this possibility seems to be confirmed by the Tupsley axe find.

Sub-surface exploration of the older terraces (probably in any case most relevant to discovery of re-deposited earlier cultural material) is less likely to be a viable option in the immediate future because it does not seem likely that fresh quarrying activity will occur in these areas (see **Section 2**). Nevertheless, it is worth noting that the potential for recovery of redeposited environmental data from these deposits is emphasised by the historical discovery of fossilised animal bones from the fourth terrace quarry at Bartestree. It is also worth adding that the possibility that the 3rd terrace could be associated with the Hoxnian interglacial (**Section 3.1**) is especially significant in a regional context where few deposits of Hoxnian age have been identified (Myers 2001).

4.4.4 *Mesolithic*

Integrating different data sources

Finds of demonstrable Mesolithic flintwork in the Lower Lugg have exclusively come from the Wellington quarry site (**Section 4.1**). They comprise bladelet and bladelet cores from the original 1985 application area, a microlith blade from the 1989 Northern extension, and a recently discovered microlith point from the adjoining Moreton Camp site. Despite the fact that this assemblage amounts to just a few dispersed flints, it is nevertheless important in providing both hard evidence of Mesolithic activity in the Lower Lugg, and in demonstrating the potential to recover and recognise Mesolithic material where more intensive and professional archaeological survey is undertaken.

The limited finds of Mesolithic flintwork can be combined with the contemporary environmental evidence from both the Wellington (**Section 4.1**) and Lugg Bridge (**Section 4.2**) quarries. At Wellington, the collected environmental evidence indicates a valley bottom area comprising a braided river system with shifting gravel islands and, away from the active channels, patterns of oxbow lakes and marshy former river 'cut-offs'. A palaoechannel dated to the later Mesolithic (5900-5500 cal BC) produced a pollen sample indicating alder carr in peat conditions with haxel and oak in the valley bottom. Further afield, lime, oak and elm woodland would appear to be predominant, though that woodland may have been interspersed with larger open spaces which could even in some degree represent human clearance and management. The supposed Holocene (Flandrian?) faunal remains from Lugg Bridge do not have a secure context, and may or may not be contemporary either with each other or with the Wellington palaeochannel. However, the mix of species (horse, auroch and red deer) would also collectively fit with a wooded or partially wooded environment, and may suggest (unsurprisingly) a fairly uniform environmental context throughout the Holocene Lower Lugg.

It is clear then that the Holocene Lower Lugg offered a range of riparian, woodland and more open environments potentially providing an inviting mosaic of seasonal resources for Mesolithic populations. There is no hard evidence of the detailed patterns of that activity, still less of the extent that explicit management of resources may or may not have been involved, but at the very least systematic hunting and gathering activity must have been a part of daily local life in the Lower Lugg through-out the 5000 years or more of the Mesolithic period.

Wider archaeological context

Despite the fact that finds of Mesolithic material have been fairly plentiful compared to the Palaeolithic, national distributions may as much reflect the accidental result of archaeological collection strategies as the actual extent of former Mesolithic activity (Myers 2001). Nevertheless, it has been possible to define both some degree of regional patterning in tool types and settlement patterns, and indeed to demonstrate a significant chronological shift towards a more complex microlith technology after about 8650 years ago (Myers 1989) apparently associated with the use of more sophisticated composite tools. The traditional interpretation of microlith technology has been to emphasise patterns of more specialised hunting and gathering within an essentially wooded early Holocene environment, though the evidence for regional differences in material culture (and, perhaps, emergence of different cultural traditions?) demonstrates that processes other than simple environmental determinism may also be involved.

A relative dearth of finds in the Midlands has always made it difficult to fit the area into this broader framework. Some cave sites in the vicinity of Symonds Yat, Herefordshire have yielded Mesolithic material (Barton et al 1997), and these perhaps can be compared regionally to better investigated rock shelters elsewhere such as that at Wetton Mill in North Staffordshire (Kelly 1976). Clearly these sites are only one part of a more complex settlement pattern with targeted (and seasonal) use of a range of different landscape niches, though defining precise contexts elsewhere is sometimes less easy archaeologically. For example, although significant quantities of material have been recovered by surface collection in areas such as the South Shropshire hills, much of this material is not fully published, or systematically recorded (Myers 2001). More detailed field walking surveys in North-East Warwickshire have yielded significant flint concentrations whose density and range of tool types represented could perhaps indicate sustained settlement (overwintering?) episodes. Such sites, and the significant Mesolithic assemblage at Sandwell Priory, West Bromwich (Hodder 1991) recovered from a low ridge close to a spring, could begin to give a real indication of preferred settlement locations, with a (perhaps predictable) emphasis on elevated, well drained sites close to water. One particular benefit of such situations may have been low undergrowth in the immediate area allowing better visibility for hunting purposes.

Detailed archaeological investigation of a limited number of flint scatter sites has revealed significant potential to recover more detailed contextual and stratigraphic evidence. The ‘type’ example in the West Midlands is Bourne Pool, Aldridge where excavation over a site on a sand and gravel spur overlooking the Bourne Brook recovered over 1000 stratified microliths in association with stake holes and gullies which probably represented semi-permanent structures (Saville 1972). This pattern of discovery has been replicated at Kisses Barn, Warwickshire (Palmer 1992), and recently in advance of pipeline construction in North Worcestershire (Robin Jackson pers. comm.). In the latter case an assemblage of 1400 flints was directly associated with a series of post-holes, gullies and a pit.

The clear implication is that there is a significant potential for Mesolithic archaeology in the West Midlands region beyond broad analysis of lithics, and as models of site type, context and chronological/cultural development become defined, so increased secondary analysis of local Mesolithic sequences in a national context will become possible (Myers 2001)

Significance

Proven presence of Mesolithic activity. Recovery of microliths from Wellington confirms the (seasonal?) use of the valley bottom area by Mesolithic populations, although the recovered flintwork would seem be representative of isolated losses rather than sustained occupation or re-use of defined 'settlement' areas.

Resource rich Mesolithic environmental context. The environmental evidence from Wellington and Lugg Bridge reveals the rich landscape of the Lower Lugg during the Holocene, with the presence of interleaved riverine, woodland and open grassland habitats. Such a mosaic would have evidently provided a range of game, vegetable and riparian subsistence resources, and can scarcely have been ignored by Mesolithic peoples. Of course, it should also be stressed that this picture of the Lugg landscape is itself a generalisation from limited source evidence, and the detailed context of the environment must have been subject to considerable alteration through the period. It is possible that the local resources (such as patterns of woodland cover) may have been subject to direct human management/modification by the later Mesolithic.

Constraints/absences

Very limited recovery of Mesolithic evidence. No Mesolithic finds have so far been made beyond Wellington quarry, and no distinct clusters or scatters of material have been recognised or investigated in the Lower Lugg. It should, of course, be noted that there been very little fieldwalking, so this pattern is likely to be a 'false' absence.

Lack of chronological definition and demonstrable association with regional patterns. The few finds available do not allow any statement of precise chronology of Mesolithic activity in the area, or of the relationship of the Lower Lugg to wider debates concerning regional patterning and patterns of cultural/lithic change in the Later Mesolithic.

Lack of definition of patterns of Mesolithic activity within the Lower Lugg. It is not yet possible to define any sense of the specialised use of different parts of the Lower Lugg landscape by Mesolithic peoples, though the assumption is that the few microliths from the alluvium represent isolated and occasional incidents of hunting and gathering activity.

Potential in valley bottom/principal aggregate extraction areas

Further discovery and investigation of palaeochannel environmental sequences. The palaeoenvironmental material recovered from the Wellington palaeochannel emphasises the potential to continue to exploit such evidence to build up more detailed understanding of the nature and change through time of the Mesolithic environment of the Lower Lugg. A key component of this potential is obviously the linkage in geo-archaeological terms with shifting patterns of river development in the valley bottom area, and the ways in which Mesolithic populations interacted with such change. One specific aspect of potential palaeoenvironmental enquiry may be to look for decline in woodland cover which could be linked with deliberate human interference to produce clearings and improved environments for specific hunting and

gathering regimes. For such detailed observation to be a realistic objective, high resolution pollen analysis combined with multiple radiocarbon dates will be necessary.

Additional recovery of artefact/ 'settlement' evidence from the Holocene alluvium. Although the Wellington site suggests there is limited potential for concentrated artefact recovery from the valley bottom area, this cannot be assumed to be a general pattern for the valley bottom area as a whole. Obviously, the detailed and varied pattern of the valley bottom/river margin area may well have created environments elsewhere where more sustained settlement episodes are possible. The anastomising character of the Holocene river potentially created features such as small lakes which may well have attracted specialised Mesolithic use and more sustained kinds of settlement activity exploiting such particular micro-environments. It is possible that elements of the Lugg Bridge environmental deposit were associated with a pool/lake context, and future opportunities to investigate the archaeological associations of such features offer significant potential for recovery of Mesolithic archaeology.

Potential in the wider Lower Lugg landscape

Identifying longer term occupation sites on the river terraces. The landscape of the outer river terraces of the Lower Lugg, providing free draining elevated spur and ridge locations overlooking the valley bottom, can be correlated very closely in a regional geographical context with the sorts of environmental zones which have produced significant scatters of Mesolithic flintwork in areas such as Warwickshire and South Shropshire. Because these areas are also free of later alluvium, the potential for recovery of Mesolithic material would seem high (despite the current dearth of material). It is reasonable to suggest that Bourne Pool and Sandwell Priory type sites could well exist in the Lower Lugg, with the potential for recovery of comparable stratified Mesolithic archaeology. As a caveat to that observation, it should also be noted that these river terrace areas have been subject to significant past agricultural and aggregate quarrying activity, so the survival of extant stratigraphy (even if flint scatters can be identified via intensive fieldwalking) remains to be proven.

Defining local sequences of specialised landscape occupation and Mesolithic cultural development. Clearly, there is no basis on which to even begin analysis at the present time of the detailed 'working' and dynamics through time of Mesolithic occupation and exploitation of the Lower Lugg. However, if and when more data becomes available, there is an evident future potential to build more specific understanding of the ways in which the area was 'used' by Mesolithic populations.

The advantage of the Lower Lugg for this kind of developed analysis is that it is a small yet geographically coherent unit (as defined by the boundaries of the river valley). Within its area, intensive archaeological survey would be possible, supporting palaeo-environmental evidence can be accessed, and the 'right' kinds of contexts seem (at least in principle) to exist for recovery of Mesolithic archaeological material.

4.4.5 *Neolithic and Early Bronze Age*

Integrating different data sources

Although the detailed evidence from Wellington (**Section 4.1**) has provided the principal recent touchstone for the Neolithic and Early Bronze Age in the Lower Lugg, it is now becoming possible to set that data within a broader local context, and demonstrate a range of spheres of activity across the landscape at this period.

For the Early Neolithic, the 2006 excavation at Hill Croft Field, Bodenham (**Section 4.2**) provides an interesting chronological correlation with the pit group at Wellington; both contexts produced similar round bottomed pottery and comparable early to mid 4th millennium radiocarbon dates. Clearly the nature of the activity at the two sites – one deposition in dispersed valley bottom pits, the other in the terminals of a hill top enclosure reminiscent of the wider Causewayed Camp tradition – is quite different, but it is reasonable to suggest they are differently contributing to the same overall pattern of activity, and they may be explicitly linked in that way. There is an evident research and interpretative challenge both to begin to understand these interrelationships and to track the wider range of local activities to which these discrete sites belong.

The sequence at Wellington continues into the Middle and Later Neolithic as represented by scatters of pits, hearths and postholes, a Middle Neolithic pit circle, and a beaker burial. Scatters of lithic material in the vicinity including stone axe fragments can probably also be broadly dated to this phase and confirm the impression of significant activity in this area throughout the period. Although there are notable omissions from the sequence - most obviously the absence so far of a Grooved Ware component - ongoing occupation certainly continues into the Bronze Age. Environmental evidence from palaeochannel channel deposits at Wellington dovetails neatly with the cultural material, in particular illustrating patterns of woodland disturbance dated from the early Neolithic onwards which could be linked to human intervention/clearance. Recovery of charcoal from the same contexts perhaps shows the use of fire as part of the clearance process, and by the Bronze Age the pollen record indicates a more open and cleared landscape with evidence for extensive areas of cereals and grassland in the broader landscape.

Beyond the excavated areas, the very limited recovery of additional Neolithic/and Early Bronze Age material does not much help with phrasing the broader story to which Wellington and Hill Croft Field must belong (**Section 4.2**). The Wergin's and Withington Bank standing stones cannot be substantiated as Neolithic features, although the three Neolithic flint/polished axes from the vicinity do perhaps offer tangible evidence both of woodland clearance processes and deliberate deposition of significant objects. The close similarity of the two flint axes in particular may also hint at trading processes, and reflect the special significance of the Wellington area.

At a broader level, the detailed air photo mapping (**Section 4.3**) has helped to reveal potential fragments of other earlier prehistoric landscapes, albeit principally associated with geographically limited alluvium free areas in the west and south of the study area where the sand and gravel subsoils present the best crop mark results. A large trapezoidal enclosure near Green Farm, Wellington (AP3), whose shape might superficially be taken to suggest an early prehistoric origin, is associated with a wider complex of rectilinear cropmarks in the vicinity. Immediately to the south, a group of seven ring ditches can be interpreted as a Bronze Age barrow cemetery, and may be part of the same linear complex as the excavated beaker burial from Wellington. An apparently similar ring ditch group at Hampton Bishop (AP 21, SMR 226), comprising maybe 5 or 6 such features, and isolated examples at Moreton (AP 6) and Tidnor Wood (AP 25) again associated with broader patterns of linear boundaries, also illustrates the wider potential in the Lower Lugg for monument groupings of this kind (although the preservation of such features is not known).

Wider archaeological context - national patterns and chronology

The Neolithic is associated with the first adoption of agriculture, and with the associated emergence of distinctive artefacts, cultural traditions and patterns of deposition (Thomas 1999, Whittle 1996). The Early Neolithic (Early to Mid 4th millennium BC) is linked to the first tangible onset of cereal cultivation, and with distinctive monumental traditions such as Long Barrows and Causwayed/Interrupted Ditch enclosures. Stone and flint tools include leaf shaped arrowheads, end scrapers a range of blade and flake forms, and polished and flaked axe types, while Early Neolithic pottery consists of plain, round based bowls and cups.

The Middle Neolithic (mid 4th to early 3rd millennium BC) is marked by continuation and elaboration of earlier monument types such as Causewayed Camps, as well as construction in some areas of large and complex chambered tombs and completely new categories of structure such as Cursus monuments, and stone and timber circles. Earlier lithic traditions continue, while more decorated Peterborough Ware types displace the earlier plain pottery forms.

The Late Neolithic (Early 3rd to Later 3rd Millennium) is traditionally defined by the emergence of new versions of the Peterborough Ware pottery tradition in the form of the Mortlake and Fengate types, and by the emergence of the flat-bottomed Grooved Ware tradition. Lithic technology also becomes more complex, with a wider range of specialised tool forms such as knives and borers typically larger than earlier Neolithic types. Sophisticated and labour intensive forms such as axes, adzes and leaf points are often found a long way from their source areas and consciously deposited in monumental and burial contexts. While the earlier monument traditions continue, they also undergo significant transformation; Long Barrow and Chambered Tomb types show enlargement and elaboration and sometimes (apparently) deliberate blocking and abandonment. Newer forms of monumental expression such as Round Barrows and Henge monuments become important and are grafted onto existing complexes of monumental activity, while the first palisaded enclosures also appear.

The final Neolithic and the transition to the early Bronze Age (late 3rd to early 2nd Millenium) is most obviously defined by the earliest copper and bronze artefacts such as flat axes, and the emergence of the Beaker pottery tradition, initially in complex relationship to the continuing use of Grooved Ware (Parker Pearson 1999). Beakers are linked especially with high status individual burial in Round Barrows, but they are also found across a range of contexts, and continue into the early 2nd Millennium as new pottery types such as Food Vessels and Collared Urn emerge (again often associated with burial). Evolved early 2nd Millennium metalware types also include flanged axes and tanged daggers, and distinctive flint tool types such as thumbnail scrapers and barbed and tanged arrowheads are also typical of the period.

The Late Neolithic/Bronze Age transition is associated with key shifts in cultural practice. The earlier monument traditions are ultimately abandoned, though key monumental landscapes may in some sense have remained 'special places' to be respected by Later Bronze Age settlement patterns.

Wider archaeological context - regional patterns

If this national summary sets the scene for interrogating local Neolithic and Early Bronze Age sequences, the downside is that it may actually say very little about what might be expected in a particular region or locality, and this is perhaps especially true in an area such as the West Midlands (Ray 2007). It is probably still the case that the generalised perception and description of the Neolithic is slewed by reference to areas (such as Wessex or East Yorkshire)

where the landscape of monuments is most visible, and where the greatest degree of archaeological research effort has been made. In fact it increasingly looks as if it is not so much an issue of looking for similar 'missing' elements in other places, as realising that there were marked regional differences in the patterns of Neolithic settlement (Thomas 1999).

This perception is also serving to transform interpretative perspectives, and to focus on the sense in which there be many different 'Neolithics' to understand (Ray 2007). For example, some parts of Britain (such as Ireland, Scotland and more recently Derbyshire, Kent and Northumberland) have produced evidence of substantial Neolithic houses, while these remain apparently absent in other zones even where monument building traditions are well developed (Thomas 1996). Perhaps this is a real difference, reflecting alternative approaches to landscape and subsistence (transhumance and animal pasturing versus arable agriculture?) even in a wider cultural milieu where other aspects of artefact tradition, belief and representation are held in common.

There is a sense in which much of the West Midlands zone does appear marginal to established traditions. In terms of Early-Middle Neolithic monuments, Cotswold-Severn tombs found in south-west Herefordshire and Warwickshire fringe the main distribution of these sites (Ray 2007), while known examples of Causewayed Camps on the Staffordshire Trent (Riley 1987), the Avon (Hughes and Crawford 1995) and to the west in the Walton basin, Powys (where a new site was recognised in 2006, Chris Musson pers. comm) are geographically limited in their occurrence (although the association with river valley terraces and the continuing discovery of such sites could yet imply a wider distribution). Other categories of Early Neolithic monuments such as Long Barrows appear to be scarce in the region, although a truncated pair of ditches known from air photographs at Wasperton in Warwickshire have been mooted as a Long Barrow type structure (Hughes and Crawford 1995).

Similar absences are reflected in wider earlier Neolithic settlement evidence. The plain bowl pottery from the Lower Lugg (see above) has its best local parallel in the Walton material (Gibson 1999) and the unpublished assemblage from Beckford in South Worcestershire, while Ebbsfleet ware is only known from a single enclosure at Wasperton (Hughes and Crawford 1995). Diagnostic Early Neolithic flint scatters are somewhat more commonplace, with a notable clusters in the Golden Valley in Herefordshire and around Clun in Shropshire (Ray 2007). The best evidence for actual settlement sites currently comes form a range of hilltop enclosures which include Dorstone and Dinedor in Herefordshire, and other suspected examples such as the Roveries near Bishop's Castle in Shropshire (Ray 2007).

Later Neolithic evidence is perhaps more plentiful, but not necessarily easier to connect to an overall regional narrative. Major monument concentrations in the Welsh borders in areas such as the Severn Valley south of Welshpool (Gibson 1994) and the Walton Basin (Gibson 1999) - with the latter particularly equalling those in other regions in terms of shear scale and investment in structures such as the massive Hindwell timber enclosure - are not directly matched in the West Midlands counties themselves, though the Late Neolithic/Early Bronze Age complex on Stapeley Hill, Shropshire is a significant group (Watson 2002). Nevertheless, at a smaller scale local concentrations of monuments in river terrace locations have been identified particularly in association with the Warwickshire Avon at sites such as Barford, Charlecote and Church Lawford (Loveday 1989, Hughes and Crawford 1995). Another similar complex at Fladbury, Worcestershire appears to include a small cursus monument, a 'hengiform' structure and a possible palisaded enclosure (Jackson 2007). Elsewhere in the West Midlands a number of apparently isolated 'hengiform' monuments have been identified from aerial photographs, with the site at the Bredon's Norton, Worcestershire producing a

Grooved Ware assemblage (Jackson 2007). In addition, the potential for classic 'Henges' was recently emphasised by a Herefordshire Archaeology excavation of a site at Stapleton in the Upper Lugg Valley (Dorling 2007). Excepting the Stapeley Hill group, stone circles appear to be uncommon in the region, although the Queen's Stone, an apparent monolith at Huntsham, Herefordshire, is considered a remnant of a larger stone circle, and has produced an associated Neolithic stone tool assemblage including a Type 6 (Langdale) axe fragment (Watkins 1926).

Middle and Later Neolithic pottery assemblages are only marginally more common than those of the earlier Neolithic. In Worcestershire (see Jackson and Dalwood 2007), for example, isolated Peterborough Ware sherds have been recovered from three sites in the Carrant Valley, four sites have produced fragmentary sherds of Grooved Ware, although Beakers are better represented from both funerary contexts (Bredon Hill and Hill and Moor Quarry) and domestic sites (Huntsman's Quarry and Longmore Hill Farm). Elsewhere, a significant Grooved Ware assemblage was recovered from Upper Ninepence, Powys (Gibson 1999), while structured Grooved Ware deposition in pits was noted at Wasperton on the Warwickshire Avon (Hughes and Crawford 1995). Beaker pottery has also been recovered from a range of non-funerary contexts including, in the case of Herefordshire, sites at Aymestery, Staunton-on-Arrow (White 2003) and below Dinedor Camp (Robin Jackson pers. comm.)

The emergence of the Round Barrow tradition in the later Neolithic/Early Bronze Age offers a diagnostic category of site which has aided recognition, especially from aerial photographs on river valley gravels. As a result some 900 such sites are now known (Garwood 2001) including concentrations of well preserved groups in South West Shropshire, Warwickshire, central Worcestershire and South West Herefordshire. Air photo evidence has revealed comparable ring ditch complexes in areas such as the Upper Severn, the Upper Teme, and the Staffordshire Trent (Watson 1991, Webster and Hobley 1964). Some of these groups clearly intersect with earlier areas of identified Neolithic activity and monument building, and this supports the impression that their incidence reveals real patterns of variation and density of Neolithic/Bronze Age settlement, rather than just accident of discovery. Archaeological excavation has also demonstrated that Round Barrows in the West Midlands/Welsh border area are a complex group, with patterns of artefact association, structural form and chronological development embodying the full range of variations known from other parts of the country (e.g. see Hughes and Woodward 1995). The barrows have collectively been the principal sites for recovery of Early Bronze Age pottery types including Beakers from the earlier period, and Collared Urns, Biconical Urns and Accessory Vessels from later contexts (e.g. see Grinsell 1993).

Tracking other aspects of Early Bronze Age settlement in the West Midlands zone has proved rather more difficult; the only certainly proven early Bronze Age domestic structures on the English side of the Welsh borders have been defined by radiocarbon dates on a group of three settlements overlooking the river Bollin in Cheshire (Garner 2001), while a Middle Bronze Age roundhouse at Glanfeinion, Powys has been conjectured to have an Early Bronze Age origin (Britnell et al 1997). This dearth of evidence is, in fact, symptomatic of broader national patterns, although the possibility remains that the complexes of enclosures and linear features which typically accompany Round Barrow groups on the gravel river terraces in the West Midlands and elsewhere include some early settlement components.

Ultimately then, the variety of Neolithic and Bronze Age local sequences in the West Midlands seems to underpin the argument for locally specific interpretations which can make some sense of that detail. Ray (2007) has argued for a positive spin on this local distinctiveness, revealing a West Midlands Neolithic which, in its emphasis on, for example pit groups and ditched

enclosures rather than 'classic' monuments, offers a novel and revealing counterpoint to 'orthodox' Neolithic sequences elsewhere.

Significance

Regional significance of the Wellington Early Neolithic pits. The Early Neolithic pits at Wellington are a currently rare group of features of regional importance, demonstrating what may be a particular component of Neolithic activity associated with the valley bottom/river side context. It is possible that such pits are commonplace in Midland river valley areas, although problems of archaeological detection outside of large area excavation make them difficult to identify. In a sense that possibility emphasises the potential significance of the Wellington group, precisely because they may be a fundamental part of Neolithic depositional practice in the West Midlands zone, not something 'unusual'. The sub-alluvial preservation of the Wellington pits also offers a rare opportunity for palaeoenvironmental analysis of sealed assemblages to help elucidate their precise nature and context of use.

Regional significance of the Early Neolithic site at Hill Croft Field, Bodenham. Hill Croft Field is the only 'Causewayed Camp' period enclosure so far identified in Herefordshire, and also the first concrete indication of the possible presence of a wider Neolithic 'monumental' landscape in the Lugg Valley area. This does not necessarily mean that other similar sites should be expected (though that is now a much stronger possibility), but it does indicate complicated and varied use of different parts of the Lugg Valley from the Early Neolithic onwards. A key importance of Hill Croft Field is that it provides a complementary context for the Wellington pits, with the clear possibility that activities at such different types of site are nonetheless closely connected. In these terms the Lower Lugg begins to emerge not so much as a 'marginal' area with limited Neolithic activity (compared, for example, to the monumental landscape of the Walton basin), but as a particular landscape of deposition with its own distinctive character, and with specialised patterns of activity throughout the river valley zone. In this sense, the Lower Lugg also fits wider regional Neolithic narratives which emphasise the distinctive character of local sequences.

Significance of the Mid to Later Neolithic features from Wellington. Although the precise functional character of the range of features of Mid to Later Neolithic date (pits, pit circle, hearths and postholes) has not been defined, they provide regionally important evidence of sustained activity in this period in the valley bottom zone. Features such as the pit circle again seem to suggest specialised use of the river side areas, and moreover confirm that 'monuments' do exist in the locality, albeit of a different kind and scale to Neolithic monumental landscapes in some other parts of Britain. Finds of three stone axes from the Lower Lugg (very probably again representing deliberate deposition) perhaps also help to emphasise the variety of Neolithic activity in the Lower Lugg area, and maybe the significance of the Wellington area in particular.

Significance of the Late Neolithic/Bronze Age barrow cemeteries. The three or four clusters of ring ditches now identified on the gravel terraces from air photography, combined with the beaker burial from Wellington, form a good illustration both of the similarity of the Lugg sequence in this respect to patterns which have been recognised more widely in river valleys through the Welsh border zone, and of the importance of the Lower Lugg in terms of high status settlement patterns in the Early Bronze Age. It is perhaps important to note that the ring ditch clusters do look 'real' (not just accidents of discovery) although it is certainly probable that other such sites exist in adjacent areas - for instance those under permanent pasture or buried under alluvium (as indicated by the Wellington beaker burial). The preference for the

gravel terraces and the distinct groupings of barrows are consistent with distributions of such features elsewhere, and could represent the expression of territorial/'chiefdom' affiliations, and control of the 'best' areas. What is clearly implied is that the Lower Lugg was a locally important settlement zone in the Early Bronze Age.

Constraints/absences

Low recovery of Neolithic lithic material. Outside of the three axe finds, and recovery of flintwork from the Wellington excavated area, only three scatters of Neolithic/Bronze Age lithic material have been noted in the Lower Lugg. This contrasts sharply with patterns of discovery in some other areas in the West Midlands region, and it does seem strongly likely that this is an issue of survey and discovery rather than a 'true' absence. This is emphasised by the fact that two of the three observed scatters were identified during 1990 survey of the proposed Hereford bypass, one of the few instances of systematic fieldwalking in the Lower Lugg.

Absence of a Grooved Ware component to Neolithic assemblages. Grooved Ware has not so far been identified in the Lower Lugg, although similar pit contexts to Wellington have produced Grooved Ware regionally. It remains to be seen if this is accident of discovery (which seems likely) or a real absence connected to the particular nature of local Neolithic sequences (which is also possible). Indeed, the fact that such material is present locally has very recently been demonstrated by identification of Grooved Ware pottery among an assemblage from a Late Neolithic settlement site to the north of Dinedor Hill (Robin Jackson pers. comm.).

Apparent absence of Neolithic monuments. On the face of it, the best known categories of Neolithic/Early Bronze Age monuments (e.g. Causewayed Camps, Longbarrows/Chambered Tombs, Henge and Hengiform monuments) have not so far been identified in the Lower Lugg despite the fact that the river valley location looks like the 'right' sort of location, and despite the presence of such sites elsewhere in the vicinity (notably the Walton Basin, Powys, while a Henge was recently identified elsewhere on the Herefordshire Lugg at Stapleton, see Dorling 2007). What this observation really means in terms of the Lower Lugg is another matter. Sites such as the Hill Croft Field enclosure and the Wellington pit circle clearly do fit within a 'monumental' landscape, albeit of somewhat different kind to more 'iconic' sequences in other parts of Britain. Of course, it may be that it is those other sequences which are the exceptional and idiosyncratic ones. In that sense, the known monuments of the Lower Lugg may be highly significant in a regional context where sites such as Hill Croft Field may be much more representative of ‘typical’ Neolithic activity than, for example, 'classic' Causewayed Camps. The influence of the nearby focus of Neolithic/Early Bronze Age monumental activity in the Walton Basin may also be relevant to patterns in the Lower Lugg, though as Wellington and Hill Croft Field (and the Stapleton Henge) again clearly demonstrate, the presence of the Walton monuments does not mean that related sites are absent in adjacent areas.

Absence of Neolithic and Early Bronze Age 'domestic' settlement features. Such a pattern is, of course, reflected in many prehistoric sequences of this period, and in part reflects modern categorisations which are ill fitted to the description of patterns of Neolithic deposition where there may have been no clear separation of 'living' and 'ritual' activity. Nevertheless, features such as houses and subsistence infrastructure are entirely lacking in the Lower Lugg (although note that nearby Late Neolithic settlement features/possible houses have recently been identified north of Dinedor Hill on a terrace above the Wye, Robin Jackson pers. comm), and there is no defined sense of how people occupied the local landscape at the level of habitation and subsistence. That absence continues into the Early Bronze Age despite the presence of the

barrow cemeteries which seem to occupy the prime settlement/agricultural areas on the gravel terraces.

Overall absence of wider Neolithic/Early Bronze Age finds/excavation coverage. In essence, the current picture of the Neolithic/Early Bronze Age in the Lower Lugg is very geographically restricted, with the main area of excavated evidence that from Wellington (now supplemented by the Hill Croft Field sample investigation). In the absence of broader coverage/landscape survey, it remains very difficult to establish whether the known evidence is 'typical', and how it relates to and integrates with the use of the landscape as a whole.

Potential in the valley bottom area/main aggregate extraction areas

Recovery (linked to area excavation) of further Neolithic and Bronze Age occupation features associated with the valley bottom area. On the basis of previous discovery, the prime target areas are associated with former gravel islands within the Holocene braided river system, and areas of former floodplain margin landscape which have been sealed by later alluviation. Additional Early Neolithic pit groups may be anticipated, and the presence or absence of such features will help to assess the character and typicality of the finds of this kind already made. The scatters of Middle Neolithic and Late Neolithic/Bronze Age activity at Wellington also makes further recovery of structures such as pits and hearths likely, and it is perfectly possible that more coherent structures could also be recognised among such complexes. In all cases, detailed scientific analysis to exploit the preservation offered by sealed alluvial contexts will be important. Analysis should include facets such as lithic microwear and pottery residue analysis as well as closely defined sets of radiocarbon dates to give tight chronological resolution of sealed stratigraphic contexts.

Further detailed analysis of palaeochannel sequences. There is evident potential to give better resolution of Neolithic and Bronze Age environmental sequences in this respect. It cannot be assumed that settlement either in the valley floor area, or in surrounding landscape niches was uniform throughout the period. Building greater awareness of spatial differences in environmental management may be one of the key means of identifying detailed local patterns of differential landscape use and integrated subsistence strategies. Further evidence of use of domesticated plants and animals would provide important markers in this respect.

Discovery of settlement/artefact types not previously known in the Lower Lugg. There is no reason to suppose that the whole Lower Lugg Valley bottom area is an analogue of the Wellington vicinity, especially if the still little known valley bottom Holocene environment in fact offered a more complex range of niches (including standing water bodies) than have so far been discovered. It remains possible that future discovery, even in the valley bottom area, could include more explicit 'domestic' settlement features, or indeed 'missing' monuments of the Late Neolithic and Early Bronze Age. Perhaps one of the key artefact absences at Wellington is that of Grooved Ware. Local recovery of Grooved Ware contexts is clearly possible (as now demonstrated by the Dinedor Hill Late Neolithic site, Robin Jackson pers. comm.), and would add a significant dimension to the local Later Neolithic sequence.

Potential in the wider landscape

Late Neolithic cropmark features. Some air photo features, most notably including the Green Farm trapezoidal enclosure, could conceivably have Later Neolithic/Early Bronze Age associations. This remains to be demonstrated, but further investigation might also help to clarify the potential in the Lower Lugg for a wider 'monumental' landscape of this period.

Identification of other Neolithic monuments. If a wider monumental landscape exists - and the general lower reach river valley context appears 'right', especially alongside the recent discovery of the Hill Croft Field Causewayed Camp related enclosure - then these are most likely (on analogy) to be in the terrace landscapes fringing the immediate flood plain area. Future potential to find such sites remains clear, though there can be no necessary assumption that they 'must' be there, especially within the particular context of Neolithic expression which the Lower Lugg may represent.

Early Bronze Age monumental landscapes. Investigation of known areas of Early Bronze Age cropmark features (ring ditches) has clear potential to give better understanding of the preservation, chronology, associations and extent of these features.

Wider evidence of Neolithic and Later Bronze Age settlement activity. There is clear potential (and necessity) to build better understanding of the overall spread of Neolithic and Early Bronze age activity in the Lower Lugg. Fieldwalking of ploughed areas would be one obvious mechanism to increase recovery of lithic assemblages and scatters in particular, to get more meaningful distribution data on patterns of activity (chronological and differential character in particular niches), and perhaps to identify additional 'site' components.

4.4.6 *Middle/Later Bronze Age and Iron Age*

Integrating different data sources

The two principal excavated areas where later prehistoric activity has been explored (Wellington and Sutton Walls) appear to be associated with quite different contexts of landscape use, possibly representing a significant degree of distinction between ritual and domestic spheres of activity. At Wellington/Moreton, the activity appears to be 'non-domestic' in character. (**Section 4.1**) A recently excavated water hole feature associated with a post setting has produced a Middle Bronze Age radiocarbon date and can perhaps be interpreted as part of a 'burnt mound' type complex, though the burnt mound itself (if ever present) was missing, or lay beyond the excavated area. In the Later Bronze Age, pottery (datable to the 8th and 9th centuries BC) and animal and human bone scattered in the palaeochannels may suggest practices such as excarnation. This 'ritual' use continues into the Iron Age, with two skulls deposited in the old river channel, two possible horse burials (although neither of these are certainly of Iron Age date), and further scatters of pottery, bone and artefacts.

By contrast, at Sutton Walls (**Section 4.2**) the sequence does appear to be more expressly linked to patterns of everyday life and subsistence. There are difficulties in defining the Sutton sequence in modern chronological terms (there are no radiocarbon dates for the site, and the pottery sequence has not been subject to modern analysis) but here the earliest phase of occupation apparently begins in the Early Iron Age, with subsequent elaboration of the defences occurring through the Middle and Later Iron Age (the final phase apparently prior to Roman assault if Kenyon's interpretation of the 'war dead' deposit is accepted). Dense occupation of the interior appears to be continuous through the Iron Age, with progressive cycles of round-house re-building at preferred sheltered locations. Artefact assemblages associated with the living areas seem to confirm their essentially domestic character, and there is evidence for production and manufacturing activity, including iron working. It may, of course, not be coincidental that Sutton Walls overlooks the areas of apparently ritual deposition near the river at Wellington, or that there are few Iron Age burials (excepting the late 'war dead' deposit) from Sutton Walls itself.

In terms of wider later prehistoric settlement patterns in the Lower Lugg, the evidence is to some extent inferred rather than known in detail. At Wellington (**Section 4.1**), pollen sequences suggest an essentially cleared landscape with relatively little woodland remaining and an emphasis on meadow land and arable cultivation in the wider landscape. Areas of the original 1980s quarry area on the margins of the floodplain are known to have contained significant patterns of linear and other features which were not explored archaeologically but could represent elements of domestic settlement and field systems deriving from later prehistory. The complex of linear features revealed by recent excavation work at Moreton Camp may be part of the same landscape (though only the base of the ditches survived, and dating evidence was again elusive).

The air photo mapping (**Section 4.3**) is also potentially revealing with respect to the wider organisation of the later prehistoric landscape. The zones of rectilinear enclosures and linear boundaries at Wellington, Moreton, Lugwardine, Tupsley, Holmer and Marden very possibly relate to this period, although precise dating within a range from the Later Bronze Age to the Early Medieval is difficult on the visual evidence alone. Nevertheless, the implication is that the farmed landscape of the Later Bronze Age/Iron Age does survive or partially survive in the Lower Lugg, and may indeed be best preserved in some of the areas we can't see it (such as under the alluvium) as those we can (on the free draining and heavily ploughed gravel soils).

Isolated Iron Age finds such as a Dobunnic stater hint at the assimilation of the Lower Lugg into wider political spheres at least by the Middle/Late Iron Age, but there is a yet little detailed or certain understanding of these relationships, or of the tribal and ethnic affiliations of Iron Age communities of the area.

Wider archaeological context - national patterns and chronology

The period after 1600 BC is marked by significant changes in the way land organisation, settlement structures and patterns of status and identity are represented in the archaeological record (Champion 1999, Parker Pearson 1993). Key aspects of these changes, which become more developed into the Later Bronze Age and into the Iron Age, include new regional pottery and metalworking traditions and the emergence of permanent defended centres which apparently serve local 'central place' functions. A wider settlement/domestic landscape also becomes 'visible', with patterns of dwellings and surroundings fields anticipating the kinds of rural settlement patterns we are still familiar with today.

From the Middle Bronze Age (1600-1200 BC) onwards cremation was apparently the norm (Parker Pearson 1993). To begin with cremation is still associated with barrow/cairn/ring ditch monument types (often with apparent re-use of such features for burial over long periods), though by about 1400 BC the new practice of burial in simple urns in flat unmarked cemeteries had become established, a shift which some have linked to the emergence of new social structures associated with a Chiefdom based system. Cemeteries are spatially separate from (but close to) settlements. Where they have been identified, Middle Bronze Age houses are relatively substantial structures often organised into nucleated groupings perhaps associated with extended family/kin groups, and linked in subsistence terms to surrounding agricultural enclosures and fields (Champion 1999). One form of Middle Bronze Age settlement feature whose precise context and purpose is unclear is the burnt mound, typically consisting of a water hole feature associated with post settings, charcoal and mounds of burnt stone (Barfield and Hodder 1987).

The Later Bronze Age sees a further elaboration of these trends, with continuing emphasis on division of the landscape by boundaries which include field banks, larger banks and ditches which may had an expressly territorial function, and more enigmatic 'monuments' such as pit alignments (Bruck 2001). The Later Bronze Age also sees a wide elaboration of bronze metalwork types. The evolving sequence of palstave and socketed axes, a wide range of weapon types including swords and armour, and other forms such as cauldrons and buckets probably linked to large scale preparation of food and feasting, all seem to explicitly connect to displaying and exercising individual/group status and power (Champion 1999). Metalwork is relatively rare on settlement sites, but is commonly found in association with hoards. A particular theme is the deliberate deposition of objects in watery places marginal to the settled landscape, and it may be that conspicuous consumption of wealth in this ritualised way was one mechanism of displaying power and authority (Parker Pearson 1993).

There is considerable overlap between Later Bronze Age and Early Iron Age activity, though the commencement of the Iron Age is traditionally dated to around 800 BC, with the adoption of iron technology itself a gradual process which is not really associated with a marked shift in social and economic structures until the later first millenium BC (Haselgrove 1999, Cunliffe 2005, Haselgrove and Moore 2006). It is developments in decorated pottery types, more than evolution of metal technology, which underpin the established chronological division for southern Britain into the Early Iron Age (c. 800-300 BC), Middle Iron Age (c. 300-100 BC) and Late Iron Age (c.100-Roman Conquest) sequence.

One of the key settlement types of the Iron Age is the hillfort, although it is now clear that some such sites begin in a Late Bronze Age context. The peak of hillfort building appears to be the mid first millennium, with the Later Iron Age characterised by the elaboration of larger sites which (in the south east of England at least) perhaps served as central place 'Oppida' for emergent regional territorial/tribal groupings (Cunliffe 2005). In reality, it is evident that hillforts are, even in any one locality, a functionally and chronologically diverse group of sites whose interrelationships are unclear. While some clearly had significant food storage, manufacturing and trade coordination/redistribution functions, others may have 'worked' in quite different ways in their particular regional and local settings (Haselgrove and Moore 2006).

The broader settled landscape remains in use through the Iron Age, with specific enclosure forms suggesting that both pastoral and arable agriculture were important. Earlier palisaded enclosures tend to be replaced by later bank and ditch compounds. Dispersed farmsteads consisting of roundhouses and other ancillary structures (such as 'four posters' and grain storage pits) are the principal rural settlement type (Wigley 2001b).

Earlier traditions of formal burial appear to disappear in the Iron Age, and human remains are sometimes found in association with storage pits and settlement entrances or boundaries implying either 'casual' disposal, or a closer integration of the treatment of the dead with ongoing 'domestic' practice (Hill 1995). The tradition of 'ritual' deposition (including disposal of human remains) in marginal locations such as lakes, bogs and rivers continues from the Later Bronze Age, and by the later Iron Age some more formalised 'shrines' can be recognised (Cunliffe 2005).

Patterns of manufacturing, trade and exchange are well represented in Iron Age sequences (e.g. Morris 1994), with continuity from centres of specialised production (such as salt works in Cheshire) which had become established in the Later Bronze Age. Again as with the Bronze Age, there is clearly a dimension of continental contact to some trading activity, and that is also

represented in artefact styles (Cunliffe 2005). Distinctive Late Iron Age pottery forms consisting of decorated jars, bowls and 'saucepan pots' (replacing earlier situlate jars and furrowed bowls) do seem to represent a particular phase of continental acculturation, and the effects of the 1st Century BC Roman expansion in Gaul may have had a specific transformative effect on Southern British Iron Age tribal patterns and cultural affiliations in the immediate pre-Roman period (Haselgrove and Moore 2006).

Wider archaeological context - regional patterns

Inevitably, there is considerable variation in the way these general patterns translate in different regional contexts. In the West Midlands/Welsh borders, it is no particular surprise that the geographical fault-line between the English lowlands and the Welsh uplands is marked by a dense concentration of hillforts, or that the gravel terraces of the Midland river valleys have produced extensive air photo evidence of later prehistoric settled landscapes which probably does represent a real focus of settlement in these areas (Wigley 2001b). Less clear is the distinctiveness of local patterns at a cultural level, and to what extent there is a distinctive expression of Later Bronze Age and Iron Age traditions and developments in the West Midlands zone.

Generally speaking, the evidence for the Middle to Late Bronze Age remains poor, and indeed this is true for much of lowland England away from the South East, in part reflecting the fact that the friable nature of the pottery of the period makes detection of Later Bronze Age sites difficult by methods such as fieldwalking (Dalwood 2001). In a county such as Herefordshire, no domestic settlements have so far been identified, though elsewhere multi-period prehistoric sites in particular are starting to reveal that the Later Bronze age components are there to be discovered. At Huntsman's quarry, Worcestershire (Jackson and Napthan 1998) groups of Later Bronze Age roundhouses were associated with waterlogged pits, a trackway and a field system. There was evidence of bronze metalworking from the site, and the associated pollen sequence revealed an emphasis on cereal cultivation. A prehistoric settlement complex at Sharpstones Hill, Shropshire produced Late Bronze Age elements associated with field boundaries (Barker et al 1991), while a recently excavated enclosure at Wyre Piddle, Worcestershire has been dated to the Middle Bronze Age (Dalwood 2002a). The Wyre Piddle complex also included an (undated) burnt mound, and another burnt mound has also recently been identified close to a palaeochannel at Clifton Quarry, Worcestershire (Robin Jackson pers. comm.). The suggestion must be that many identified areas of later prehistoric settlement activity - notably cropmark complexes on the river valley terraces - include a significant Middle/Late Bronze Age component, even if that is not associated with the immediately visible features.

Patterns of territoriality and larger scale landscape planning are also beginning to be recognised in the Later Bronze Age context of the West Midlands. At the individual site level, several hillforts including the Wrekin, Shropshire and the Breiddin, Powys (close to the Shropshire border) have produced Late Bronze Age pottery and features, suggesting the hillfort tradition first begins at this time (Wigley 2001b). Other landscape features including the cross ridge dyke at Devil's Mouth on the Long Mynd, Shropshire (Dinn et al 1996), the 'Shire Ditch' on the Malvern ridge, Herefordshire/Worcestershire border (Jackson and Dalwood 2007), and pit alignments in Shropshire (Wigley 2001a), can also now be dated to the Middle/Later Bronze Age, and also seem to speak of large scale territorial demarcation which might be consistent with greater emphasis on more explicit expressions of local and regional power and control.

Centrally controlled organisation of the Later Bronze Age landscape is perhaps also implied by evidence for large scale field systems which may date from this period. In Herefordshire, patterns of long sinuous field boundaries noted in the North East and North West of the county and in the central Wye appear to represent the relic preservation of ancient planned landscapes whose axial form supports a possible Later Bronze Age origin (Ray and White forthcoming).

Later Bronze Age funerary sites are, like settlements, uncommon across the region. Excavations of earlier Bronze Age barrows have sometimes revealed secondary cremation interments of Later Bronze Age date as at Midsummers Hill, Herefordshire or Aston Mill, Worcestershire (Dalwood 2001). A Deverell-Rimbury type cremation urn cemetery at Mathon in the east of Herefordshire was noted during early 20th century sand and gravel quarrying (White 2001), while a more recently discovered site of possibly similar character at Wyre Piddle, Worcestershire only survived in fragmentary and much disturbed condition (Dalwood 2002a). An unusual ring ditch of Middle Bronze Age date at Perdiswell, Worcester has been interpreted as a palisaded enclosure with an east facing entrance (Griffin et al 2002); its function is not clear, but funerary activity may have been part of the use of this a-typical monument. It is perhaps important to note that the date and character of this feature only emerged through excavation of a 'typical' Early Bronze Age ring ditch, emphasising again the problems of Middle and Later Bronze Age site recognition.

The West Midlands counties have produced a range of Later Bronze Age metalwork finds. In Herefordshire, 19th century agricultural improvement and drainage of areas such as Byton Moor near Buckton, Walford near Ross and Willox Bridge at Allensmoor were all associated with significant discoveries of Bronze Age metalwork (Stanford 1991), while more recently hoards of later Bronze Age axes were found in the 1980s at Madley and Much Marcle, and in 2006 at Tretire (Peter Reavill pers.comm.). Comparable finds from other counties seem to show similar concentrations, and include large amounts of metalwork (now lost) from the River Isbourne at Sedgeberrow, Worcestershire (Hurst 2000), and the Broadward hoard from Shropshire, discovered during 19th century drainage of a field close to the Herefordshire border (Burgess et al 1972). The animal bone also discovered at Broadward hints at the complexity of the activity such deposition sometimes involved, though hoards in the West Midlands (as elsewhere) probably represent many different circumstances of metalwork disposal.

The understanding of the later prehistoric settlement sequence of the Welsh border counties has inevitably been dominated by the hillforts, although detailed understanding of these sites remains unclear. In Herefordshire, for example, excavation at sites including Croft Ambrey (Stanford 1974), Wapley Hill and Mere Hill, Aymestrey has evidenced initial construction of the defences in the 8th and 7th centuries BC (White 2001), with a slightly later example such as Ivington Camp (Dalwood et al 1997) illustrating sophisticated rampart construction using internal timber strengthening. Both Croft Ambrey and Ivington show elaboration and extension of the defences in the Middle Iron Age, though there are clear differences in individual site sequences. Activity at Croft Ambrey peaks in the Middle Iron Age (at least as judged by the artefact sequence) and declines thereafter, while a site such as Sutton Walls continues into the 1st century AD (and then into the Romano-British period). In some cases it may be possible to see in the later landscape fossilised remnants of the Iron Age territorial areas which were associated with hillforts. Banks and boundaries around Wall Hills hillfort at Thornbury in the Upper Frome valley, Herefordshire appear to define a coherent two to three kilometre zone around the hillfort (although the origin of these boundaries in the Iron Age is not independently proven, see White forthcoming).

Wider awareness of settlement patterns is demonstrating that hillforts are perhaps less distinctive than they first appear, with closely similar enclosed sites now identified across the landscape. Smaller single and multiple ditched enclosures are common in the valley bottom areas of the Upper Severn, and some of these might, except for their context, very well be classified as mini 'hillforts' (Wigley 2001b). Excavated examples including Hay Farm, Shropshire, Bromfield, Shropshire (Wigley 2001a) and Arddleen, Powys (Ian Grant pers. comm.) typically reveal patterns of round-houses and 'Four Posters' within the enclosures suggesting occupation by small communities/extended family groups. The character of the field systems which have sometimes been identified around such enclosures is consistent with mixed farming activity (Wigley 2001b).

Increasing detail is now available on other kinds of 'open' Iron Age settlement sites, especially associated with the densely occupied gravel terraces bounding the lower reaches of the main river valleys. Excavation of a cropmark complex at Wasperton, Worcestershire revealed a complex sequence of Iron Age rectilinear enclosures apparently focussed around an earlier boundary ditch which may be of Later Bronze Age date (Crawford 1981, 1982, 1983, 1984). The complexity of such patterns and the degree of change and reconstruction of settlement structures through the Iron Age was also emphasised at Beckford in Southern Worcestershire (Britnell 1975, Willis 1978). Here enclosures were associated with round houses, cobbled surfaces and storage features again apparently constructed over an earlier boundary feature. The site was completely reorganised in the Late Iron Age, and produced a rich range of later prehistoric finds. Other similar Severn Valley sites include Holt (Hunt et al 1986), where Iron Age settlement appears to have respected Bronze Age features, and Wyre Piddle, where a cluster of roundhouses was located close to a stream (Dalwood 2002a). Within Herefordshire at both Huntsham near Goodrich and at the Ridgeway, Cradley enclosed Middle Iron Age/Late Iron Age farmsteads were superseded by open settlement (Taylor 2000, Hoverd 2001).

Regional perspectives on Iron Age 'ritual' actvity remain poorly developed. The continued practice of hoard deposition is best illustrated by the recent discovery in South Worcestershire of a large hoard of Iron Age gold and silver coins, which also included a gold torc off-cut (Hurst 2000). Interestingly, following archaeological investigation of the find-spot, it transpired that the discovery probably represented two separate hoards, and that there was an extensive (and previously unknown) Iron Age settlement site nearby. Such a pattern illustrates the many different circumstances in which later prehistoric hoards may occur, and this example may or may not have a 'ritual' component. The identification of non 'domestic' spheres of cultural behaviour generally remains problematic in the West Midlands region, with absence of burials a particular issue despite the density of settlement activity (Wigley 2001b).

A degree of manufacturing specialisation is a continuing theme through the Iron Age (e.g. see Hurst 2001), with regional production of commodities such as salt (from Droitwich), iron and pottery (e.g. Malvern wares). It has been suggested that the distribution of such items within local areas may be one way of defining territorial and tribal groupings; for example, the distribution of spit shaped iron currency bars has been identified with the territorial zone of the Dobunni (Hurst 2002). That broader issue of territorial boundaries, ethnicity and cultural identity remains little explored, even in the Late Iron Age where the tribal names are known. Herefordshire emphasises the problem, sitting as it does on the apparent boundary of major groupings such as the Dobunni, Silures and Cornovii, but with no evidence of how particular local areas fitted at a given time into such regional political structures (White 2001). The matter is complicated by uncertainty as the degree to which the post-conquest tribal picture is more a creation of Roman administrative classifications than a straightforward representation of earlier Iron Age patterns (Millet 1990).

Significance

Middle Bronze Age activity at Wellington. The burnt mound feature from Wellington is a regionally important discovery for the West Midlands zone, and significant in that it establishes at least one touchstone for Middle Bronze Age activity in the Lower Lugg. Although the precise use of such a feature remains a matter of conjecture, it does look as if it indicates a degree of continuity from the patterns of activity in the Lugg river side context in the later Neolithic/Early Bronze Age, and emphasises the general significance of this landscape niche for prehistoric populations in the locality.

'Ritual' deposition in the River Lugg. The evidence from Wellington for deposition in the Lugg palaeochannels of human bone and other material in the Later Bronze Age and Iron Age is a regionally important example of later prehistoric 'ritual' practice. Such behaviour clearly fits with wider patterns observed across the Welsh border zone and beyond, and perhaps suggests that the Wellington part of the Lugg had a special significance in these terms, with the river and its margins a demarcated 'ritual' zone.

Sutton Walls hillfort. Sutton Walls provides a regionally important Iron Age domestic occupation sequence, and remains one of relatively few hillforts in Herefordshire/the Welsh borders which has been subject to significant excavation of both the defences and the interior. Understanding of the site today is hampered by absence of modern study of the artefact/pottery assemblage, and it is unclear to what extent Kenyon's dating can be straightforwardly translated in modern analytical terms. Nevertheless, to the extent that the site straddles the Early to Late Iron Age periods, and sees a very late phase of upgrade of the defences, it emerges as a hillfort which retained its importance over a long period of time, and may have served as a major central place in the locality. The site also offers evidence of manufacturing activity, and rare examples of Iron Age burial, principally in the form of the late 'war dead' deposit. In essence, the presence of this site anchors the Iron Age sequence of the Lower Lugg, and demonstrates the probable importance of the locality as a whole in the Iron Age.

Wider later prehistoric settlement patterns. The air photo evidence for an extensive range of enclosure and linear features on the river terraces almost certainly embodies many later prehistoric settlement elements, although precise interpretative differentiation of these is difficult from the visual evidence alone. It is likely that this landscape extends into adjacent areas where alluviation, soil conditions and land use now mask the evidence, as is probably suggested by (undated) linear features noted away from the river channels at Wellington and Moreton. Although such landscapes have now been recognised in many river valley areas, the association in the Lower Lugg with Sutton Walls in particular makes this an important example where a major hillfort, the settlement pattern of its territorial hinterland, and ritual practices in marginal areas, can be all be observed and interrelated.

Constraints/absences

Absence of diagnostic Bronze Age artefacts (especially metalwork). Surprisingly perhaps, no Bronze Age metalwork has so far been recovered from the Lower Lugg. This contrasts with significant finds of such material in the Welsh border zone generally, though it is evident that many of those discoveries were associated with hoards in marginal contexts. Nevertheless, the fact that, for example, three Neolithic axes have been recovered from the locality does throw into focus the lack of comparable Bronze Age discoveries. It is interesting too that the later

prehistoric 'ritual' deposits from the Wellington palaeochannels have not (so far) yielded metal finds, though the situation and other associations look 'right' for such discovery.

Absence of later Bronze Age settlement features. No certain Middle or Later Bronze Age settlement elements have been identified in the Lower Lugg, although it is clearly possible that these are represented within some of the observed cropmark features. Nevertheless, more potentially diagnostic structures - such as the Later Bronze Age pit alignment type boundaries which have been recorded in the Severn Valley - have not so far been recognised in the Lower Lugg (although it is worth noting that possible pit alignment features have been identified from air photographs at Leintwardine in the Teme valley, Keith Ray pers. comm.).

Absence of later prehistoric burial evidence. Excepting the material from Sutton Walls and the partial human remains from the Wellington 'ritual' palaeochannel deposits, no evidence of human burial has been noted from the later prehistoric Lower Lugg. This is perhaps a reflection of wider tradition for the Iron Age phases (where burial is rare nationally) but more of a clear 'absence' for the Middle to Later Bronze Age in particular, when cremation cemeteries might be expected (although few have been identified regionally). To some extent this 'lack' does accompany the dearth of contemporary settlement evidence, since there is typically a close spatial association between Bronze Age settlement and cemetery sites. The lack of excavation of presumed Early Bronze Age barrows also means that there have been no opportunities to recover Middle/Later Bronze Age secondary burials from such contexts.

Limited evidence of Later Prehistoric production and trade. There was some evidence for iron working at Sutton Walls. However, while the later phases of the Sutton Walls pottery sequence showed the continental influence that is typical in late Iron Age southern British contexts, explicit evidence for production and trading activity is effectively absent in the Lower Lugg. This is partly an inevitable consequence of the dearth of later prehistoric artefact finds (excepting the Sutton Walls material), with some categories such as later Bronze Age pottery and Bronze Age metalwork (see above) entirely absent. Nevertheless, in an area with significant natural resources such as workable clays, the fact that local use of those materials has not been identified in Later Prehistory underscores the poor knowledge of local economic processes.

Absence of evidence of use of the river for transport and other purposes. Notwithstanding the fact that parts of the river zone may have had an explicitly ritual dimension, the possibility that the river was extensively used for local transport is also likely, and Late/Bronze Age boats have been discovered elsewhere in Britain in palaeochannel contexts (though not in the West Midlands area). Nonetheless, so far there is no evidence (either direct or implied by riverside structures) for the later prehistoric use of the Lower Lugg in this way.

Absence of understanding of Late Iron Age ethnic and cultural affiliations. It is not yet possible to put the late Iron Age sequence in the context of historically known tribal groupings in the area. The discovery of a Dobunnic Stater from the Lower Lugg might seem to suggest a linkage with Dobunni territory, but this cannot be affirmed on the basis of a single coin.

Limited environmental knowledge from Wellington palaeochannel evidence. Understanding of the later prehistoric environment is limited on current evidence (partly because the river zone at Wellington appears to be deliberately separated from the 'normal' landscape), and pollen sequences which might underpin the understanding of later prehistoric agricultural patterns in the Lower Lugg are lacking.

Potential in the valley bottom/likely future aggregate extraction areas

Later prehistoric ritual deposition in watery contexts. Further recovery of ritual deposits associated with palaeochannel and other former water body/marsh features. The ritual deposition area so far observed may or not be localised to the Wellington vicinity, but it does seem reasonable that similar later prehistoric ritual activity elsewhere in the immediate vicinity of the Lugg is possible. An obvious missing element so far is disposal of Bronze Age metalwork either in hoard type deposits or more dispersed groupings linked to 'shrine' locations. In any event, close environmental and radiocarbon analysis of sealed deposits will be important in furthering investigation of deposition of this kind and the changing chronological patterns of such behaviour.

Later prehistoric use of the river. Discovery of structures linked to use of the river must be considered a possibility in the sealed palaeochannel contexts of the Lugg alluvial zone. Features such as trackways and platforms associated with river edge areas have been recovered from comparable waterlogged contexts elsewhere in Britain. Structures such as post alignments are also known from such environments, and these may connect as much with the ritual deposition aspects of river use (see above), as more 'functional' day to day activities. In terms of the use of the river for day to day transport, discovery of boats is certainly a further possibility. It should be noted that, of course, all these kinds of finds are rare, and would be exceptional in the West Midlands area.

Later prehistoric landscapes on the river margins. Subsequently alluviated areas away from the course of the later prehistoric river channels evidently offer significant opportunity for recovery of buried human landscapes including linear boundaries, field systems, settlement enclosures/houses and associated burial sites. One issue here is that some of those features may themselves be cut into alluvium, so there may be difficulties in recovering the upper parts of such features within current evaluation/excavation methodologies (see **Section 4.5**).

Extend understanding of environmental change and management. There is clear potential for ongoing analysis of environmental data associated with palaeochannels to underpin more detailed understanding of wider later prehistoric environmental sequences in the Lower Lugg river zone.

Potential in the wider landscape

Survey and investigation of the later prehistoric crop mark areas. Zones of cropmarks on the terraces which are likely to be associated with later prehistoric landscapes offer a clear opportunity for fieldwalking and targeted evaluation to assess the nature, chronology and preservation of features. Fieldwalking may also be a method to assess the later prehistoric potential of the Lower Lugg area generally, to identify variations in density of settlement activity and to generate a greater artefact resource for the period.

Re-analysis of the Sutton Walls artefact sequences. Modern assessment of this existing resource of Iron Age artefacts from Sutton Walls material may help to refine understanding of the development of local later prehistoric material culture traditions, clarify relationships to regional and national sequences, and offer insights into the context of the Lower Lugg in terms of exchange, production and (possibly) tribal associations.

4.4.7 *Roman*

Integrating different data sources

Much of the story of the Roman period in the Lower Lugg appears to be one of developed and stable settlement patterns in a local context where the influence of the town at Kenchester was a key reference point (**Section 4.2**). Widespread Roman pottery scatters, with some concentrations of non abraded material which apparently derive from specific settlement contexts, suggest a well developed local settlement system. The known existence of major roads in the vicinity (e.g. Kenchester to Stretton Grandison), combined with lesser local tracks (e.g. that leading to the Wellington 'villa') also serve to emphasise established patterns of settlement infrastructure.

Three excavated sites help to give some detail and chronological delineation to these general patterns. At Wellington (**Section 4.1**), a significant local Romano-British settlement associated with a planned surrounding agricultural landscape (and active drainage of the marshy river margins) seems to begin in the 2nd century. By the 4th century it included explicitly 'Roman' stone buildings, high status pottery and artefacts, and a probable road link to Watling Street West at Portway. Whether or not this complex can be meaningfully described as a villa remains to be seen, but it does seem to represent a significant local estate centre perhaps covering up to four hectares, and presumably serving as an important focus for local landscape management and organisation.

Only a short distance to the east of Wellington, occupation continues throughout the Roman period at Sutton Walls (**Section 4.2**) where Romanised rectilinear buildings are in use by the 3rd century. Local and imported pottery types, as well as Roman style metalwork and dress fittings, are the main constituents of the Sutton Walls Romano-British artefact sequence. West of Wellington at St Donats (**Section 4.2**), a quite different kind of Roman period settlement site is represented by 'D' shaped enclosure with contemporary ditches probably representing a field system. Dating here suggests use throughout the Roman period from the 1st to the 4th century. Perhaps these different sites in the Wellington area reflect complementary exploitation of different landscape niches, although their precise interrelationship remains unclear, as do the relative patterns of status and ownership with which such differences might be linked. What is apparent is that even in a restricted geographical area, there is considerable complexity and variety to the local settlement pattern.

Such a situation may well be represented elsewhere in the Lower Lugg by some of the complexes of features revealed by air-photo mapping (**Section 4.3**). It is not easy to differentiate Roman period elements from those of later prehistory, but the linear crop mark complexes in the vicinity of Wellington, Moreton, Holmer and Lugwardine probably all represent landscapes still in use in Roman times. The Lugwardine group particularly (including the Sheepcote site) has been revealed by field-walking to include high status artefacts, hypocaust fragments, roof tile and imported quern stone, and may well be a similar complex to Wellington (**Section 4.2**). If this interpretation is correct, the presence of at least two such settlements begins to speak of the local significance of the Lower Lugg area, although it is important to emphasise that there is little chronological control on the relative ebb and flow of these patterns of activity through-out the Roman period.

Wider archaeological context

Perhaps two themes characterise recent Roman studies, and in a sense both mark a departure from traditional perspectives of a homogenised Roman province enjoying relative stability for nearly 400 years.

The first, which archaeological discovery has significantly helped to inform, is the simple observation that Roman Britain in the early 5th century was (along with the Empire as a whole) very different to Roman Britain in the later 1st, and that there are many patterns of change, shifting associations of material culture, and relative characteristics of economic and social activity between those dates (Millet 1990, Dark 1994).

The second is perhaps a more fundamental reassessment of older views, with the realisation that the extent of visible 'Romanisation' may actually have been slight in many regions, with a high degree of continuity and evolution from previous Iron Age landscapes and settlement patterns (Millet 1990). Perhaps the best example of this has derived from the work of the Wroxeter (Shropshire) hinterland survey, demonstrating that the fourth largest town in Roman Britain exercised remarkably limited influence on explicit patterns of life and artefact usage even in closely contiguous geographical areas (Gaffney and White 2003). What seems to be emerging, especially in the west of Britain, is a significant dislocation between the Roman landscapes of government, military control and regional power and economic activity (military fortifications and infrastructure, public buildings in town, the homes and estates of the principal Romanised elites), and the broader landscapes which embodied the continuing lives of most 'Romano-British' people, especially in areas distant from the main urban and military centres (Millet 1990).

Of course, the paradox of such perspectives is that because we most obviously 'see' the 'classic' Roman elements, standard descriptions of areas such as the West Midlands provide relatively little insight into the 'less Roman' aspects. In Herefordshire, archaeological investigations and interpretative narratives have dealt to some extent with the patterns of major roads, forts and towns, but far less with the intervening landscapes these particular categories of structure once related to (Ray 2002). In fact, even for these limited areas of enquiry many questions remain. A key concentration of military activity seems to be represented by the complex of fortifications in the Leintwardine vicinity, but it remains difficult to connect the detail of this group (and other known and conjectured fort and marching camp locations in Herefordshhire) with a convincing understanding of how Roman advance and consolidation played out in the area in the later 1st/early 2nd century (e.g. see Webster 1981).

Likewise, Kenchester itself is poorly understood (Wilmot 1980). The principal excavations there in the early 20th century (Jack and Hayter 1916, 1926) demonstrated the existence of high status public, private and commercial buildings in the town apparently associated with a peak of prosperity in the later 3rd century, while the town was expensively fortified in the mid 4th century. But the more complex patterns which must be associated chronologically and spatially with the stone structures are not known, and it remains possible that other elements of the settlement are still to be discovered.

In Herefordshire and elsewhere, some sense of rural settlement patterns is emerging. Kenchester appears to be the focus of a group of high status farms all within a 2 km radius of the town, most notably including the high status villa at Bishopstone, and a multi-phase site east of Magna Castra farm with stone buildings, wall paintings and imported stone columns (Wilmott 1980, Ray 2002). Clearly these are exceptional sites, but they are exceptional sites

which must presume a broader agricultural and production hinterland on which their wealth was based. Some of that hinterland can now perhaps be traced, with evidence for both continuing occupation of hillfort sites (see Ray 2002 for summary) such as Credenhill, Herefordshire Beacon and Risbury Camp (and, of course, Sutton Walls in the Lower Lugg), as well as increasing discovery of 'villas' and farmsteads such as those at Lord's Wood, Whitchurch (Taylor 2000), Foxhall (Walters 1987) and Weston-under-Penyard (Jackson 2000a). Recent work in the Arrow valley has investigated similar enclosures which appear to have been occupied in the early Roman period, and show continuity of occupation from the preceding Iron Age phase (White 2003), while the Cardiff University Project at Lyonshall (Guest 2003) has involved the investigation of neighbouring farmstead enclosures which may have had contrasting roles (or occupants).

In some places more specialised settlements seems to have evolved, including the complex associated with iron working activity at Bromsach (Ray 2002), although other components of explicitly industrial production such as pottery manufacture are so far lacking in the county. Other kinds of specialised activity noted in Herefordshire include the probable Roman period shrine within Croft Ambrey hillfort (Stanford 1974), which may be one of a complex of such sites in that locality (Ray and Hoverd 2003).

The known sequences of adjoining counties such as Shropshire and Worcestershire inevitably overlap with that of Herefordshire, but also help to articulate some additional detail. In Worcestershire, extensive evidence for settlement and landscape organisation is now available (Jackson and Dalwood 2007), with apparent distinctions in the nature of Roman period settlement across the county beginning to emerge. In the Severn Valley the emphasis appears to be on field-systems and associated settlements, while the Avon Valley seems more characterised by ditched enclosures apparently without obvious field systems (Lockett 2001). Meanwhile, some larger settlements such as Droitwich seem to crystallise around specialist industrial functions, in this case salt manufacture. In Shropshire, Wroxeter has proved an obvious focus for research leading to increasing sophistication of understanding of the growth of the town and the area around (White and Barker 1998, White and Gaffney 2003). As in Worcestershire, identification of sites associated with the gravel terraces of the Severn Valley has also been significant, and has led to increasing awareness of developed agricultural and settlement landscapes through the Iron Age and Roman period.

In many ways the picture we have of Romano-British landscapes are still fairly generalised; the lack of significant chronological definition remains an issue, and understanding of regional variation and degrees of site specialisation are still poorly developed. Moreover issues which were surely important at the time - such as ethnicity, continuity of earlier tribal traditions and associations, and degrees of integration into the currency based economy of Roman Britain – remain difficult to assess from the patchy archaeological data which is available (Ray 2002). Interesting though continuing research into military networks or the development of the major Roman towns may be, it is perhaps these kinds of 'secondary' research components which will ultimately make the greater impact in formulating the understanding of an area such as Herefordshire in the Romano-British period (Ray 2002).

Significance

Regional importance of Sutton Walls Sutton Walls remains one of the key regional sequences for demonstrating evolving patterns of Roman influences in the Late Iron Age, processes of conflict and conquest associated with the late fortification phase and the 'war dead' deposit, and continuing patterns of Romano British settlement within the hillfort until

late into the Roman period. The site may well exemplify the complexity of local processes of Romanisation (cf Wroxeter hinterland) in so far as an Iron Age central place appears to continue in relatively unaltered use (and influence?) through the Roman period.

Distinctive local settlement patterns. Some aspects of Lower Lugg Roman material patterning begin to look both suggestive and potentially important in terms of the wider significance of the Lower Lugg. The close geographical interrelationship of sites of seemingly different character at St Donats (Romano-British farmstead?), Wellington (higher status estate centre?) and Sutton Walls (significant long term settlement site and central place?) suggests a distinctive local integration of different site functions whose understanding may be important to the understanding of wider Romano-British sequences. Perhaps there is a distinctive settlement pattern in the Lower Lugg which can start to parallel the locally specific kinds of patterns which are now beginning to be recognised in other Midlands river valleys

Association of settlement with the river terraces. The incidence on the river terraces fringing the flood plain of both air photo evidence for Romano-British activity and known higher status sites such as Wellington and Sheepcote, is perhaps not just an accident of differential survival/recognition, but a real pattern representing an explicit preference for those locations. This apparent linkage very much parallels the situation in adjoining counties such as Worcestershire and Shropshire, and may be of wider significance especially with respect to the preferred landscape context of higher status sites.

Local significance of the Lower Lugg. The position of the Lower Lugg, lying between key military and civilian centres such as Kenchester, Stretton Grandison, and Leintwardine (and south of the settlement by the Lugg at Blackwardine east of Leominster), emphasises the potential local and regional importance of the valley as a production hinterland for the local economy. As well as being fringed by one major Roman road and crossed by another, a local connecting road (at Wellington/St Donats) shows that other such links must exist, and that the Lower Lugg was very much an integrated element of the local settlement complex.

The impact of environmental change on settlement patterns. One factor which may be locally important in the development of Roman period settlement and prosperity in the Lower Lugg is environmental change. The Lower Lugg alluvium sequence (as already evidenced at Wellington) offers a regionally important opportunity to explore this issue in direct relationship to observed regimes of landscape planning and settlement.

<u>Constraints/absences</u>

Absence of proper chronological definition outside of principal observed settlement patterns. The apparent local complexities of settlement pattern may be as much about chronological change as the detailed complexity of local settlement at any one time. On the basis of current knowledge, it is difficult to resolve this distinction.

Absence of detailed evidence of local settlements. Excepting Sutton Walls, knowledge of Roman settlements in the Lower Lugg derives from limited archaeological evaluation/observation with very little accompanying knowledge of site character and development. Even at Sutton Walls, artefact sequences have not been subject to modern evaluation and analysis.

Absence of evidence for operation of local agricultural systems and land management. The Wellington environmental sequence and associated Roman period land boundaries suggest

active drainage and reclamation of rich alluvial areas in the Lower Lugg, and this may explain the relative prosperity of a site such as Wellington. However, detailed understanding of the fabric and operation of such land management systems is so far lacking.

Absence of Roman period burial evidence. Excepting possible very late Roman period burials at Sutton Walls, no Roman period cemeteries or burials have yet been found in the Lower Lugg despite the evidence for dense settlement of the area.

Absence of military sites in the Lower Lugg. The lack of Roman military sites in the Lower Lugg (an apparently strategically significant river valley area) is curious, not least against the apparent evidence for a significant military operation at Sutton Walls (?) during the initial Roman advance. It is interesting to note that the comparable nearby 'basin' landscape of the Walton Basin (Powys) has, by contrast, a complicated sequence of 1st century marching camps as well as a later fort. Perhaps the regional presence of the conjectured early fort at Kenchester explains the absence of such sites in the Lower Lugg.

Absence of evidence for local industry. Despite the assumption that local sites had at least small scale manufacturing functions, we know little of this detail. One obvious absence compared to regional sequences is evidence for local pottery manufacture in an area apparently forming part of the prosperous hinterland of a significant town for much of the Roman period, and which also has major clay reserves.

Absence of evidence for working of the aggregate resource in the Roman period. With military roads in the vicinity, as well as a town with high status buildings, defences, a planned street grid and nearby 'villa' sites, local working of the extensive sand and aggregate deposits seems likely to have occurred in the Roman period. No evidence of such extraction has yet been identified in the Lower Lugg, although it is interesting to note that road side quarries have been identified in association with Watling Street West near Shobdon/Kingsland (Ray 2002).

Absence of evidence for use of the river. There is no evidence of Roman period use of the river for transport (wharfs?) or exploitation of its resources (organised fishing activity?). Roman crossing and bridging points also remain to be identified, though the presence of a settlement such as Wellington with linking roads to it may well imply the local existence of such a feature or features in the immediate vicinity.

<u>Potential in the valley bottom/potential aggregate extraction areas</u>

Discovery and analysis of Wellington estate water management systems. In the immediate southward extension of the Wellington/Moreton, there is good potential for recovery of alluvially buried landscapes and water drainage features linked to the Wellington estate complex, with the opportunity to examine the evolution of those systems through time.

Discovery and analysis of wider patterns of agricultural management. In the valley bottom more generally, there is a good opportunity to retrieve evidence of field, pastoral and drainage systems across the alluviated areas. There is also potential for evidence of active management of the river channels/flood plain (e.g fishing infrastructure, bank revetment to protect preferred agricultural/settlement areas, flood control banks?).

Further recording of Roman period environmental sequences. There is evident potential to build up more complex and complete sequences of Roman period environmental data via the study of palaeochannels.

Discovery and analysis of military sites. The potential for discovery of military sites in the Lower Lugg is probably especially relevant to the earlier phases of the Roman occupation. If, for example, Roman marching camps were to be found in the area, it is in the immediate vicinity of the river in key strategic locations (established crossing points?) that they might be expected. It is possible that later burial under alluvium could have entirely masked (as well as significantly preserved) such relatively exiguous sites, although it should be said that most riverside Roman military sites occupy terrace locations off the river floodplain itself. It is also worth adding that one possible fort site in the Lower Lugg north of Marden has been speculatively claimed on the basis of later place name evidence (Richardson 1996).

Discovery and analysis of river transport infrastructure. River infrastructure (including wharfs and boats) must once been commonplace in the period, and the alluvial context of the Lower Lugg offers evident potential for preservation of such features. Discovery is most likely in spatial association with other features such as roads and settlements.

Discovery and analysis of additional settlements of Wellington type. The Wellington 'villa' may not be the only site of its kind in the valley bottom area. Although there is some reason to argue that Wellington is preferentially associated with the particular context of the Lugg/Wellington brook confluence, it may nevertheless be that other similar locations existed in the vicinity. The proximity to Kenchester may be important in predicting a considerable density of such sites in the generally rich agricultural situation offered by the Lugg flood plain.

Potential in the wider landscape

Further examination of the St Donat's site. In association with the permitted (though currently inactive quarry) at St Donat's, further examine the environs of the settlement noted in previous archaeological evaluation (the enclosure itself is outside the permitted quarrying area. There is obvious potential to increase understanding of the character, associations and chronological delineation of this particular area of Roman period settlement activity, including the relationship between the settlement and its agricultural landscape.

Additional survey of cropmark areas. On the river terraces in general, there is clear potential to explore known crop mark features including likely Roman period occupation, and to target sites where concentrations of Romano-British artefact material are known. Broader intensive survey through field walking may help to evaluate the proposition that the preferential association of settlement with the gravels is a 'real' pattern. Such work may also aid identification of different categories of site and begin to reveal their chronological, spatial and functional interrelationships.

Discovery and analysis of Roman period industrial sites. One potential here is the recognition of clay industries connected to local pottery/tile manufacture. Such sites are likely to be connected both to surface outcrops of the mineral (4th terrace especially), and linkages with wider settlement and transport systems. They may well be associated (if they exist) with areas of later quarrying activity.

Discovery and analysis of local transport infrastructure. The identification of the road at St Donat's/Wellington has emphasised the potential for further discovery of Roman period transport links in the Lower Lugg area.

4.4.8 *Early Medieval*

Integrating different data sources

The Early Medieval settlement pattern of the Lower Lugg is elusive in terms even of a comparable level of visibility to that of the Roman period. The air photo evidence has not revealed obviously Early Medieval features (although that could be a consequence of classification which tends to assume that so called later prehistoric/Roman type features do not continue into the Early Medieval period). Nevertheless, pollen data from Wellington supports the maintenance of ongoing pastoral and arable agricultural systems, although reclaimed areas close to the Lugg were probably abandoned in the post Roman period (**Section 4.1**). More widely, the burial data from Ashgrove (and at least two potential similar sites) proves the presence of significant Early Medieval activity in the area, in the case of the Ashgrove site mostly likely associated with a pre-Anglo Saxon British community (**Section 4.2**). Other evidence, such as the spearhead from Lugg Bridge and a possible early Anglo-Saxon burial/ring ditch recently excavated at Sutton St Michael, also gives some context to the process of Anglo-Saxon settlement of the area. Nevertheless, it remains impossible to make any explicit correlation between the modern landscape of Anglo-Saxon placenames and archaeological recognition of actual Anglo-Saxon settlement elements.

The area with the most obvious potential for tracking patterns of Early Medieval activity is that in the vicinity of Sutton and Marden (**Section 4.2**), where historical evidence supports the presence of a Royal estate in this vicinity perhaps dating back to at least the 8th century. The most direct archaeological indication of this is provided by the presence of two Saxon mills at Wellington which produced 7th/8th century dendrochronological dates. While it is very plausible to suggest these mills are part of the contemporary Royal estate probably centred to the east, efforts by Herefordshire Archaeology to trace other elements of this complex remain tantalising incomplete. The large barns at Freen's Court which are known to have existed in the 12th century could have late Saxon origins within the Royal estate, perhaps serving a storage function close to a wharf on the Lugg. Nearby traces of boundary features and palisade slots revealed at Downfield and Downfield East may relate to an extensive series of enclosures going back into the Saxon period, and one conjectural interpretation of these might be as some sort of military muster area associated with Offa and his successors.

Much of this 'story' hangs on complex archaeological interpretation of limited evidence, but it remains plausible that the area of Marden, Sutton and a re-used Sutton Walls did have a particular administrative and royal significance in the later Early Medieval period. It is perhaps important to reflect that the presence of such a high status and specialised centre may also have significantly skewed patterns of surrounding 'normal' settlement.

Wider archaeological context

The traditional designation of the Early Medieval period as the 'Dark Ages' in part reflects the scarcity of historical sources for the period, but the term is similarly apt with respect to the availability of archaeological data. In contrast, for example, to the relatively plentiful groups of diagnostic artefacts and pottery types (both local and imported) available for much of the Roman period, there is a marked dearth of such evidence especially for the earlier part of the Early Medieval time frame (Vince 2002). There may also be problems of artefact recognition even where they are found (and a tendency to classify fragmentary Early Medieval coarse wares, for example, into Roman or late prehistoric contexts where they seem to 'better' fit). The consequence is that 'casual' finds of Early Medieval material are uncommon (leading to very

incomplete overall pictures of artefact and 'site' distribution), and it may be possible to 'miss' Early Medieval phases of sites even under modern excavation conditions; while structures or stratigraphy may be recorded, they may not be chronologically defined within the Early Medieval period. For this reason, one recommendation coming out of recent research assessment debates is for much more use (where possible) of stratigraphically tied groups of radiocarbon dates to provide the missing chronological dimensions which may begin to reveal 'lost' Early Medieval contexts (Hines 2002).

What is apparent is that whether or not the evidence is easy to see, the patterns of national and regional change through the period were profound. The effects of these changes - most obviously in terms of languages in Britain, core ideas of national and regional cultural identity, and the naming and basic organisation of the settled landscape - still tangibly persist today (Hills 1999). Other key themes include the development of the Church (e.g. see Malpas et al 2001, Bassett 1989), patterns of landholding (Hooke 1989) and regional and local government and administration (Hooke 1985), the impact of climate and environmental change (Dark 2000), and the nature of networks of trade and production (e.g see Bryant and Dalwood 2004). The last in particular also emphasises the ongoing issues of Britain's relationship to Mediterranean Europe, and the embedded significance that the symbolic shadow of Roman rule continued to have for British Anglo-Saxon monarchs (Hills 1999).

In broad historical terms, the process which created these patterns can be divided into four broad phases. The sequence of transition from late Roman Britain - and degrees of continuity associated with this - remains uncertain (Dark 1994). Even some of the best attested instances of continuance of Romanised patterns into the later 5th and 6th centuries - such as the post Roman sequence at Wroxeter, Shropshire (White and Barker 1998) - ultimately relate to complex archaeological interpretations which may or may not survive further investigation and analysis. The impact of Anglo-Saxon colonisation and settlement can be to some extent better tracked archaeologically through diagnostic artefact types (especially associated with cemeteries) and settlement associated building forms such as 'Grunbenhauser' (Welch 1992). However, major issues remain as to quite what adoption of these material culture traditions really means, and how broader patterns of Anglo-Saxon settlement connect at the macro political level with the emergence of broader political entities and distinct regional kingdoms (Campbell et al 1982). For an area such as Herefordshire, for example, the relationship to the shifting territories of emergent regional political (and demographic?) groupings such as the Anglo Saxon Magonsaete, Hwicce (Hooke 1985), and Wreocensaete together with British kingdoms such as Ergyng, remains complex and uncertain both in spatial terms and with respect to impact on local settlement and ethnic patterns (Bassett 2000).

The crystallisation and competition of larger political entities in the mid Early Medieval period (with the emergence of Mercia in the Midlands) can be described in broad historical terms (Campbell et al 1982) and has produced archaeology to support these narratives (such as, in the West Midlands, Mercian royal sites at Tamworth and Northampton, Welch 1992). Finally, the period of the Viking Invasions and the associated emergence of Wessex as the leading Anglo-Saxon power (see Cambpell et al 1982 for a summary) bequeathed core structures of government and administration which underpin the Medieval period (including the emergence of England as a political unit). It may also be that key aspects of land organisation and subsistence activity (such as the adoption of ridge and furrow cultivation) also begin in the late Early Medieval landscape (Hooke 1998).

Local archaeological sequences in the Welsh border area touch on many of these debates and uncertainties. As noted above, the major Roman town at Wroxeter in Shropshire has produced

evidence for significant continuing occupation in the later 5th and 6th century, with the suggested construction of a large Roman style building on the site of the former baths basilica. It has been variously argued that this re-building may be associated with a British Bishopric and/or the crystallisation of a significant post-Roman British kingdom still successfully operating an essentially Romanised administration from a power base at Wroxeter (White and Barker 1998). Perhaps partly reflecting the influence and control of such sub-Roman political entities, 'classic' pagan Anglo-Saxon cemetery groups become less common in the west, with examples including the sites at Beckford in Worcestershire (Evison and Hill 1996), and nearby cemeteries in the Avon valley which are linked to the discovery of 'Grubenhauser' type settlements at sites such as Ryall Quarry (Jackson and Dalwood 2007). Elsewhere the early Anglo-Saxon presence has been recognised in terms of high status buildings, with a pair of Anglo-Saxon halls at Atcham, Shropshire (interestingly only a short distance from Wroxeter) identified by air photography and now confirmed by archaeological evaluation (Watson and Musson 1993).

The evidence for the early emergence of Christian chuches and ecclesiastical sites remains scanty, but two important excavations in Powys at Capel Maelog and Pennant Melangell have revealed sequences with possible prehistoric origins where initial patterns of burial and enclosure were only finally elaborated with the addition of the churches (Arnold and Davies 2001). This might be a pattern more broadly relevant across the Marches, especially with respect to British ecclesiastical foundations. The development of significant towns such as Worcester and Hereford (Baker 2002), both of which have produced tangible archaeological evidence of mid-Saxon planning and fortification, evidently also had a significant ecclesiastical dimension, with the Bishoprics in these places perhaps initially associated with the areas of the kingdoms of the Hwicce and the Magonsaete respectively (Hooke 1985).

One category of Early Medieval landscape monument which seems to be particularly important in the Welsh borders are territorial (?) boundaries consisting of linear banks and ditches. Typically these are relatively short structures up to 3 km in length, and one such example which crosses the Arrow Valley in Herefordshire is the Rowe ditch. Following recent excavation by Herefordshire Archaeology of a Romano-British farmstead overlain by the dyke (White 2003), this can now be dated to the 6th or 7th century, and perhaps reflects a response by a local (British?) community to a territorial and/or military threat from the west. Interestingly, as well as cutting through the former farmstead (which had probably already disappeared by the time the dyke was built) the Rowe Ditch also massively disrupts the established pattern of axial field boundaries, and is a very clear imposition on the existing landscape.

The scale of a structure such as Rowe ditch is far surpassed by Offa's Dyke, which by association with the Mercian monarch whose name it bears, can be dated to the later 8th century (Fox 1955). With 80 miles of bank and ditch discontinuously following an overall course close to the modern England-Wales border of some 130 miles, the dyke is not only one of the most significant surviving Anglo-Saxon monuments anywhere, but important evidence of the power and regional policy of Offa himself. Although debates continue regarding its original extent and purpose (e.g. see Hill and Worthington 2003 for one explanation), it must in part have been intended to help achieve political stability in an area of complicated Anglo-Saxon and British relationships. What indeed may be particularly relevant to the present analysis is that the dyke is absent across much of Herefordshire, and it may be that this 'gap' implies both the extent of existing Mercian power in the area by the later 8th century, and the significance of Hereford and environs to Offa in realising the wider aim of regional pacification in the Mercian interest (Ray and Hoverd 1999).

The reigns of Offa and his immediate successors marked the national zenith of West Midlands based power structures, and through the later 9th and 10th centuries the locality fell variously within Viking and Wessex/English zones of control (Campbell et al 1982). The archaeological evidence for processes of Viking incursion are slight, although the river valley corridors must have been an obvious focus, and to the west into Wales it is likely that, for example, the high status princely settlement at Llangorse Crannog was destroyed by the Vikings in the later 9th century (Arnold and Davies 2001). Interestingly, the linguistic evidence for Viking influence in North Herefordshire is considerable, and the multiplicity of north-west English dialect words in medieval manuscripts referencing the Ludlow area is one example of this (John Hines pers. comm.). The continuing growth of important defended regional centres such as Hereford under the later Anglo-Saxon English kings essentially represents a consolidation of the burh system in the Welsh borders (Thomas and Boucher 2002), and is as much a statement of English political commitment against the Welsh as against potential Viking incursion.

There is still remarkably little regional evidence for the wider later Saxon landscape of rural settlement (Hooke 1998, 2002), even though this is generally supposed to underlie and structure later Medieval patterns. Where earlier Anglo-Saxon settlements have been identified (such as at Ryall Quarry, Worcestershire, Alexander et al forthcoming) they have been subject to investigation precisely because they were subsequently abandoned and *did not* become part of the later settlement pattern. The evolution of distinctive agricultural patterns such as ridge and furrow are one part of this problem. The recovery, for example, of buried ridge and furrow beneath the early Norman motte at Hen Domen (Powys) seems to unequivocally suggest that ridge and furrow must have been practiced in the Welsh borders from the Late Saxon period, but no certain evidence of when and why this came about has yet been found (Arnold and Davies 2001). What is clear is that such a new approach to land management must have been a significant development, which also (at least in its Medieval guise) connected to very significant social and economic patterns (Hooke 1988).

Significance

Importance of the Sutton/Marden area. The collected evidence from the Wellington, Marden and Sutton areas helps to substantiate the historical reasons for regarding this locality as a Mercian royal complex in the Mid-Saxon period. This is most tangible in the case of the two Saxon mills recovered at Wellington, which can be convincingly associated with this royal estate. Evidence for other facets of the complex, including the idea of the Sutton St Michael area as a military muster area, remain conjectural, but the data from Freen's Court, Downfield, Downfield East and Marden Farm do cumulatively support such narratives. As such, the area is of regional and national significance, potentially giving insight into the crystallisation of Mercian power structures and the operation of an Early Medieval state. Combined with the presence of nearby Offa's Dyke, and the emergence of Hereford at about the same time, this is an important area for the archaeological exploration of such crucial Early Medieval themes

Particular nature of local settlement patterns. The probable presence of the Mid-Saxon royal estate/'palace' may also have a significant impact on the character of surrounding settlement patterns. In this sense (and that of the proximity to Hereford), the character of Mid Saxon settlement in the Lower Lugg may be atypical and specific to this locality (although it would be hard to say what atypical might mean, since there is so little 'typical' evidence regionally to match it against!).

Relationship to earlier settlement patterns. The interface in the Lower Lugg between this Mid-Saxon evidence, and that relating to earlier post Roman patterns of settlement in the area

is also potentially regionally significant. The burial site at Ashgrove is most likely associated with a pre-Anglo-Saxon British community. How this earlier settlement sequence was transformed into that of the Mid to Late Saxon period may offer important insights into the process of evolving Anglo-Saxon/British relationships more widely.

Ridge and furrow cultivation origins. The sequence of agricultural landscapes buried within the alluvium could be of considerable importance in decoding issues such as the emergence of the practice of ridge and furrow cultivation in the area. Although field systems are notoriously difficult to interrogate (and date) archaeologically, the chance to link medieval and early medieval patterns of this kind in the particular defined stratigraphic circumstances of the Lower Lugg alluvium would be of national significance.

Constraints/absences

Lack of any evidence of the form and nature of Early Medieval settlement at any time in the period. The presence of 'classic' Saxon settlements regionally (e.g Ryall) certainly suggests they could be present in the Lower Lugg; perhaps the Medieval settlement pattern might offer locational clues for the later part of the early medieval period, while in earlier times a hilltop burial place such as Ashgrove must have its settlement near at hand, presumably more adjacent to the valley floor. It could, in fact, be that this lack of settlement features is something of a 'false absence' reflecting failure to recognise the Early Medieval components of the recorded crop mark complexes on the gravel terraces. If these were the preferred locations in the Roman period, the very same locations (and features) almost certainly have an Early Medieval dimension.

Absence of diagnostic artefact sequences. This is, of course, very much an issue for analysis of the Early Medieval period more widely, but will continue to make the task of Early Medieval identification difficult in the Lower Lugg in particular.

Absence of 'classic' Anglo-Saxon pagan cemeteries. This is one category of site that might be expected to have been identified through chance discovery (cf patterns regions to the east and south, and the discovery of other burial sites in the Lower Lugg) if it was present. It seems most likely the absence is 'real' reflecting the British Christian tradition in the area in the earlier part of the period, with the Saxon 'arrival' post dating the adoption by the Saxon peoples of Christianity.

Lack of any local evidence for development of ecclesiastical foundations in the Lower Lugg. Kenyon conjectured on superficial field observation that the Ashgrove burials might be linked to a church, but there is no actual evidence of this, and the patterns at Pennant Melangell and Capel Maelog to the west (Powys) suggest such burial grounds typically (in the British tradition) precede the construction of churches. The opportunity to test that contention in the Lower Lugg would be interesting, though, of course, active church sites are seldom easily available for such research.

Absence of evidence of the use of the river and its resources. As with most periods in the Lower Lugg, there is little hard evidence of river use (given their location on the very edge of the floodplain, the identified late Saxon (?) barn/administrative structures at Freen's Court have been conjectured as waterfront warehouses for the Royal Estate). Despite the absence of information, the river corridor must have been a major feature of life and commercial activity through the period.

Potential in the valley bottom/main potential aggregate extraction areas

Recovery of agricultural landscapes associated with the Early Medieval period. Although the environmental evidence from Wellington indicates abandonment of the river edge agricultural areas in the Early Medieval period, the incidence of (Medieval?) ridge and furrow in the upper horizons of the alluvium nevertheless emphasises the potential for recovery of this kind of evidence. With close dating of associated environmental deposits, the possibility to demonstrate early origin for such practices is a real one.

Recovery of river management related features. The discovery of the Wellington mills has most obviously emphasised this possibility. Although these were specifically associated with the Wellington brook, it is certainly possible that other similar structures of Early-Medieval date could exist elsewhere in the valley floodplain area, along with more general evidence of water management and drainage. From this standpoint, it is also potentially significant that the more southerly of the two mill sites was associated with significant bank-side management sections, and also with what is probably best identified as the remains of a fish trap.

Recovery of palaeoenvironmental evidence. Intensive investigation of alluvially sealed environmental deposits is a key tool to date and reveal sequences of landscape and vegetation change associated with the Early-Medieval period.

Potential in the wider landscape

Further evidence of the Saxon and later royal complex in the Sutton/Marden area. In the Sutton/Marden locality, there is considerable scope to undertake further survey and investigation to identify additional components of the Saxon 'palace' complex. Earthworks destroyed in 2005 at Court Farm, Marden almost certainly represented the tofts of a medieval village, but a substantial gravel bank located at the same site could represent the northern side of a Mid/Late Saxon 'precinct' in just the area described in the 17th century as the 'site of Offa's house' (Keith Ray pers. comm.).

Investigation of crop mark sites to reveal a potential Early-Medieval component to such activity. It does seem likely on (slight) present evidence that the principal Early Medieval settlements are likely to be away from the river valley floodplain itself and associated with the terraces (as with the Medieval and later pattern). It is possible that some of this activity is being seen but not recognised in the existing air-photo evidence (this may be especially true for the early part of the period with direct continuity from Roman patterns).

Using Medieval settlements to identify Early Medieval settlement areas. It may be possible to 'backtrack' from existing settlement locations to test the contention that these may, at least in part, derive from Early-Medieval predecessor sites. Where the opportunity presents itself, investigation of the environs of known medieval church sites might also be part of that process. Equally, the sites of some Medieval chapels (such as that at Wisterton, north of Marden) could potentially mark the locations of earlier ecclesiastical activity.

4.4.9 *Medieval*

Integrating different data sources

The Medieval landscape of the Lower Lugg still determines the underlying fabric of the visible landscape of today, and many Medieval or Medieval derived features can be seen in the

vicinity (**Section 4.2**). The most obvious legacy is the settlements themselves. The complex relationship of the surviving settlements to Deserted Medieval Village and Shrunken Medieval Village earthworks, to former manorial complexes and to patterns of ridge and furrow and other agriculture related features, all emphasise the dynamic processes which were active through the Medieval period. However, in the Lower Lugg as elsewhere, the fact that the Medieval period is more visible in the archaeological record does not actually result in better understanding of questions such as the origin of the observed settlement patterns, or of the evolution of settlements within the Medieval period.

8.1.2 The air photography mapping now available offers an important resource in terms of focussing some of these analytical issues (**Section 4.3**). The detailed form of the extensive complexes of ridge and furrow at Wellington, Marden, Prior's Frome, Shelwick and elsewhere give significant potential insight into the processes of landscape planning within which they originated, but also offer the chance to define patterns of change and reconstruction of such systems through time. That analysis remains to be undertaken, but superficial study of the new mapping immediately reveals patterns such as modification of ridge and furrow to create raised water meadows at Shelwick, and the complex interrelationship of ridge and furrow and water drainage systems in the area between Marden Village and Freen's Court. In addition, the association of field systems with former settlements is illustrated in areas such as Marden and Upper Lyde, and these different components of the record can begin to be set within a broader narratives of agricultural growth, decline, local depopulation and consolidation of new economic and social structures against such transformations. In the Lower Lugg, a key process seems to be increasing emphasis on pastoral systems (most obviously in the form of the common meadows on the floodplain) and enclosure in the later Medieval period, with this early abandonment of open-field arable systems effectively fossilising a significant component of the Medieval landscape in a relatively undeveloped form.

So far there is little detailed excavation evidence to explain why such change occurred. Alluvially buried ridge and furrow was recorded at Wellington along with two ovens and other crop processing features (**Section 4.1**). These collectively attest to extensive arable cultivation in the area in the 13th/14th century. The abandonment of arable cultivation here seems to be associated with climate change and a period of increased river inundation. Whether or not such 'external' reasons were always the prime cause of such shifts, it is interesting that the 14th century abandonment of the excavated Sutton St Michael settlement (**Section 4.2**) is contemporary with the alluviation at Wellington (**Section 3.1**) and also dovetails with the reconstruction and re-planning of the Freen's Court site in the later 14th century (**Section 4.2**). All this seems to clearly link the Lower Lugg to the major traumas (Black Death, climate change etc?) which the 14th century wrought on Medieval populations across Britain.

There are a number of wider themes here which may prove to be important to understanding the Medieval Lower Lugg. The context of the Lower Lugg within the hinterland of Hereford has to be significant, and it would clearly be misleading to attempt to understand local patterns outside of that frame of reference. Similarly, and especially in the earlier Medieval period, the continuing high status importance of the royal estate complex in the Marden area (which by this time is in the hands of powerful landowners such as St Guthlac's in Hereford), may make the Lower Lugg as a whole a far from 'typical' Medieval river valley.

<u>Wider archaeological context</u>

It would be difficult task to offer a detailed review (even on a limited regional basis) of the full range of Medieval archaeology in the post war period. The potential archaeological resource is

vast, and indeed many Medieval patterns still structure the human landscape today (Williamson 2003). Moreover, especially in the urban areas, the development of improved archaeological provisions within the planning process has provided a significant new resource of archaeological data leading to much increased understanding of the growth of towns such as (in the West Midlands) Hereford, Worcester, Gloucester and many others (Baker 2003).

It is probably true that the investigation of Medieval rural landscapes has lagged behind the urban areas (notwithstanding high levels of late 20th century destruction of features such as ridge and furrow, and significant losses and alteration of many other relic Medieval structures/buildings in the same period). Despite work ranging from the classic research investigations of the 1960s and 1970s (e.g Wharram Percy, East Yorkshire, Ministry of Works/English Heritage programmes of investigation on monastic and ecclesiatical sites, or large scale excavation of castles such as Hen Domen, Powys) through to more recent programmes of Parish focused excavation and survey (e,g. The West Heslerton Project or the Shapwick Project) many aspects of research into rural Medieval settlement remain to be addressed today, especially in specific regional and local contexts (Hurst 2003, Gerrard 2003, Stamper 1994). Another issue which still hampers more complete synthesis of Medieval sequences regionally and nationally is the fundamental failure to adequately integrate historical and archaeological data strands (Hunt 2003).

The known Medieval archaeology of rural Herefordshire emphasises not just the shortcomings of current understanding (Hoverd 2003), but the difficulty of phrasing the particular expectations or predictions which might therefore be made about a limited geographical area such as the Lower Lugg. To start with, recent survey makes it clear that there has generally been massive under-recognition in Herefordshire of medieval sites (Hoverd 2003). Significant numbers of new DMVs are still being recorded, major sites such as the earthworks of the significant planned town at Lyonshall have only recently been recognised, and even new castle sites are also being discovered. Few church sites have been investigated archaeologically (Shoesmith's work at Llanwarne and Craswall forming the exception, see summary in Hoverd 2003), and some ecclesiastical sites known from documentary evidence are yet to be located (Malpas et al 2001). Other higher status building complexes have been subject to detailed survey (notably Wigmore Castle, Longtown Castle and Richard's Castle), but limited understanding remains of the many 'lesser' Motte and Bailey and moated sites (Hoverd 2003). What Herefordshire does perhaps reveal in overall terms is the importance of change in the 14th century, creating radically different settlement patterns after 1400 to those which were current in 1350. The principal effect of that is a transition from a 'classic' central England pattern of settlement focused on arable agriculture to a more dispersed pattern connected with a greater emphasis on pastoral agricultural systems (Roberts and Wrathmell 2000).

The Medieval archaeology of surrounding counties such as Worcestershire and Shropshire is not necessarily significantly more developed, but does help to establish the character of the broader regional context. In Worcestershire detailed excavation has tended to focus on urban contexts and particular high status sites such as Bordesley Abbey (Astill 1993), although attempts have also been made to synthesise a better overall understanding of settlement patterns. One current focus of debate is the idea that the county can be divided into contrasting zones of settlement showing distinct characteristics, with a focus on dispersed hamlets in the West, a more wooded zone in the North East where settlement shows greater nucleation, and a 'classic' Medieval settlement pattern of nucleated villages with open fields in the Cotswold area (Roberts and Wrathmell 2002). Like Herefordshire, Worcestershire has yielded archaeological support for the major changes of the 14th century almost certainly associated with significant population decline in both rural and urban contexts (Bond 1982, Dalwood 2003). Other aspects

of Medieval Worcestershire - such as the small number of castles reflecting a high level of land ownership by the church - are clearly specific to that county (Dyer 1980), but do point to the sorts of locally distinct variations relevant to the detailed interpretation of sequences elsewhere.

Church ownership has also emerged as a significant theme in Shropshire. Investigation and survey of major ecclesiastical sites (e.g. at Shrewsbury and Haughmond abbeys, where complex development sequences are now known) has been combined with emergent understanding of the granges and monastic farms associated with such sites (Stamper 2003a). Castles such as Whittington and Clun have also seen important new work beginning to reveal the evolved landscapes around the fortifications, with, for example, a late Medieval formal garden now recognised adjoining Clun (Watson and Musson 1993). Yet the obvious weakness in Shropshire is (like Herefordshire) the dearth of knowledge of broader rural landscapes and settlement sequences. While it is clear from the Post Medieval picture that there is a marked diversity of settlement patterns in Shropshire associated with the distinctive and quite different geographical areas of the county, it is hard as yet to track the origin of those differences in Medieval terms (Stamper 2003a).

Although it would be difficult to extract coherent regional models of medieval activity from this varied evidence, a number of research themes have recently been emphasised by Hunt (2003). These include: landscape boundaries, ethnicity, demographic change, processes of commercialisation, the relationship of towns and hinterlands, the role of estates, Church landscapes and society, transport and trading networks, the importance and representation of hierarchy and status, the industrial and agricultural economies and the emergence of the gentry. This is a complex and intersecting list, but much of it provides an agenda as relevant to area as small as the Lower Lugg as to the Midlands region as a whole.

Significance

The context of the Lower Lugg as the hinterland of the major commercial, Diocesan, administrative and strategic centre at Hereford. The detailed character of the Medieval Lower Lugg has not yet been described or researched. However, the sense in which that sequence potentially embodies the influence of a major Medieval town on its hinterland area gives the Lower Lugg particular local and regional significance as an exemplar of this aspect of Medieval landscape development.

The development of ridge and furrow and water meadow agricultural systems. One of the most visible components of the archaeology of the Lower Lugg are the earthworks associated with Medieval agricultural systems. It may be that elements of the surviving ridge and furrow preserve relatively 'untouched' Medieval agricultural landscapes which (because of early conversion to enclosed pasture) have not been subject to later Post Medieval alteration. Similarly, the link between the Medieval water meadows and the nationally important extant elements of the Lammas system make the Lower Lugg an area of particular significance. The surviving Lammas meadows give a unique context for connecting archaeological remains elsewhere in the valley to the emergence, development and retention of such systems.

The evolution of estates and land ownership. The Lower Lugg potentially offers a significant archaeological sequence associated with narratives of estate management and change in the Medieval period. One particular focus for this is the continuing importance of the Sutton/Marden area in the Medieval period, with continuation of high status ownership (linked to St Guthlac's in Hereford) of the Early Medieval royal estate complex in the area. The scale and potential specialised function of the buildings in use at Freen's Court in the

11th/12th century has already hinted at the 'abnormal' patterns of development this particular circumstance may have created. It may that in these terms (allied to the influence of Hereford) the Lower Lugg offers an unusual and distinctive Medieval rural sequence. This not only makes it significant as a specific example of the interaction of status, estates and land ownership in the Medieval landscape, but it also gives added importance to the wider Medieval archaeology of the area.

The development of nucleated settlement and patterns of settlement change through the Medieval period. The settlement archaeology of the Lower Lugg does not superficially seem markedly atypical in a Midlands context. The local pattern of DMVs, SMVs, and moated sites very much corresponds with regional and national sequences. However, the relative stagnation of Hereford and its hinterland in the Post-Medieval period has led to unusually good survival of earlier settlement configurations in particular (as represented by both earthworks/buried archaeology and extant settlement areas). This makes the Lower Lugg a particularly good area for examining how Medieval settlement emerged, and how changes (such as the external impacts of the 14th century) affected established patterns.

Constraints/absences

Absence of detailed excavation evidence and analysis of Medieval sequences. The current view of the Medieval Lower Lugg is based on observation of general site patterns which have not been subject to any detailed investigation or analysis. The lack of archaeological research is also matched by similarly limited historical research, with no integrated synthesis available.

Uneven distribution of observed evidence. The survival and recognition of earthworks and cropmarks associated with features such as ridge and furrow is evidently influenced by a combination of later land management practices, underlying geology and association with areas of later alluviation. The current distribution may therefore be only partly representative of the original extent of such features, and further analysis is necessary to counterbalance such biases.

Lack of evidence for Medieval use of the river. There is no current evidence at all of the use of the Lugg river as a transport corridor in the Medieval period (although one possible interpretation of the 'multi-celled building' at Freen's Court is as a waterside 'warehouse' for agricultural produce). It must be assumed that the Lugg river was an important transport corridor linking Hereford to the Lower Lugg hinterland area.

Lack of evidence of fishing and other economic exploitation of the Lugg. No material remains have so far been recovered linked to Medieval fishing activity along the Lugg. This contrasts regionally with significant evidence of purpose built Medieval fishing features on rivers such as the Wye and the Severn.

No medieval fortifications are known from the Lower Lugg. This fact is surprising in view both of the high incidence of such sites in the Marches as a whole, and the strategic context of the Lower Lugg as the principal northern approach to Hereford. It may be that this absence is a result of the particular character of Medieval activity in the Lower Lugg in terms of the proximity to Hereford and the presence of the high status estate complex focussed on Marden/Sutton.

Absence of evidence (excepting milling) of Medieval industrial activity in the Lower Lugg. Given the known significance of aggregate quarrying in the later Medieval period, and the proximity of Hereford, Medieval quarrying seems likely, though it is not recorded

archaeologically. One particular category of site so far absent are pottery kilns. The availability of local clay resources, and the presence of a Post Medieval brick and tile industry in the area, point to this as a marked anomaly.

Potential in the valley bottom/main potential aggregate extraction areas

Recovery of Medieval water meadow/management systems. There is obvious potential on the flood plain for identification and investigation of the origins, development and operation of Medieval water meadow systems, and the beginnings of the Lammas meadows in particular.

Investigation of the development and Medieval operation of ridge and furrow and associated arable agricultural features. The possibility of recovering evidence of ridge and furrow agriculture buried and stratified by later alluviation may offer the important potential to explore the local origins of ridge and furrow agriculture and its relationship to earlier systems of agricultural land organisation.

Identification and exploration of Medieval mill sites. There is an obvious opportunity in the river zone to reveal and archaeologically investigate Medieval mill sites, and assess their origins and development through time.

Identification and exploration of infrastructure associated with river transport and navigation. There is evident potential in riverside locations to identify Medieval river management features such as wharfs and bank revetments. Recovery (from former river channels/alluviated river margins) of associated artefacts such as boats is also a possibility.

Identification and investigation of other river related features such as bridging and fording points. There discovery of features such as former bridges and fords associated with transport infrastructure in the vicinity of the Medieval river is an evident possibility in the alluvial zone.

Potential in the wider landscape

Investigation of Medieval settlement origins. The wide potential for investigation of Medieval settlement evidence in the wider Lower area includes recording and analysis of standing buildings (notably including ecclesiastical buildings) and archaeological investigation of earthwork and cropmark Medieval features. The objective here must to be build more detailed models of settlement development, site interaction and the relationship of the Lower Lugg to broader regional sequences.

Spatial analysis of evidence of wider Medieval agricultural and land-use patterns. The Lower Lugg offers extensive evidence (primarily linked to earthworks/air photography) for Medieval agricultural land-use, with particular densities of such features on the river terraces adjoining the valley bottom area. There is a clear need to develop more detailed analysis of these sequences, and to isolate phases of chronological and functional development.

Identification and investigation of Medieval industrial sites including aggregate quarrying and clay industries. The probability that quarry features in the Lower Lugg have Medieval origins has not been explored archaeologically, and the area provides a distinctive opportunity to investigate this component of Medieval landscape development.

4.4.10 *Post Medieval/Modern*

Integrating different data sources

As with the Medieval period, the visibility of the Post Medieval landscape and the high rates of survival of features including buildings, settlements, field patterns, quarry remains, industrial buildings and transport infrastructure, has not led to significant archaeological enquiry into this wide resource of evidence.

If the early part of the period seems to be associated with relative stagnation partly reflecting the decline of Hereford, then by the 18th and 19th centuries the Lower Lugg is clearly influenced by wider currents of economic and social change, and particularly by the impact of industrialisation (**Section 4.2**). Such trends are represented in improvement of transport infrastructure and (in the early 19th century) the creation of canal and rail networks. By the later 19th century, increased quarrying (especially linked to the local clay manufacturing industry) is also apparent, and another significant change is the development of the brewing industry, with associated re-planning of significant areas of the rural landscape. There is also (from the 18th century onwards) a corollary to such patterns in the re-building of some major houses and the creation of associated landscape parks, the corresponding reconstruction of the building stock of many settlements, and the reconfiguration of an agricultural landscape where dispersed farmsteads linked to enclosed land become typical.

Despite the fact that such change may appear simply a non specific adjunct to wider regional and national patterns, the Lower Lugg does have its own characteristics, and the detailed air photo mapping now available again helps to distinguish some of these (**Section 4.3**). Most obvious and important in this respect are the flood plain water meadow systems, with examples including the well preserved channel grid west of Marden, and similar evidence of the former Wergin's meadow in the vicinity of Moreton. Further analysis of such data offers the potential to begin to analyse the chronological growth of these systems and perhaps to investigate the particular sense in which the Lower Lugg sequence represents not just a local expression of a wider phenomenon, but a particular pattern of local development.

Wider archaeological context

Patterns of Post Medieval landscape development reflect processes of fundamental social and economic change which very clearly have a national emphasis (Newman 2001). Themes include processes of industrialisation, the large scale growth of urban centres (with associated shifts in rural development patterns), shifts in social structure and patterns of wealth (such as the development of the 'middle class'), radical change in political and institutional structures, and profound technological change with massive effects on, among other things, communication and transport infrastructure (Whyte 1999).

Analysis and understanding of this complex and intersecting web of change has traditionally derived from document based historical narratives, though it has been increasingly recognised in the post war period that archaeological data have much to contribute to the debate, and indeed have the potential to give insights which explicitly contradict the written record (Newman 2001). This is true both in terms of specific research into detailed site development sequences associated, for example, with the development of new industrial technologies (Trinder 1982), but also more widely by offering access to the way particular patterns of local and regional change actually embody presumed national trends. In a sense an area such as Herefordshire - which appears to be an economically marginal 'backwater' for much of the Post Medieval period - reveals that potential precisely by offering a well preserved Post Medieval

rural landscape which is as typical as it is nominally removed from the principal zones of 'new' Early Modern and Modern development (Boucher 2003).

One fundamental process affecting rural landscapes regionally and nationally is that of enclosure, and the West Midland counties are all subject to progressive Post Medieval re-organisation of land in this way (e.g. see Jackson and Dalwood 2007). Enclosure is clearly associated with wider economic change, growth of urban centres and population increase all leading to a need for intensification of food production, but it would be wrong to suppose that, at a local level, there is an explicit cause and effect relationship in these terms defining why enclosure happens (Stamper 2003b). Although the traditional historical story has focussed on enforced 'top down' Parliamentary enclosure in the later 18th and 19th centuries, it is now well understood that this was often just the final formalisation of a shift that had often begun for more local economic reasons as far back as the Medieval period (Rackham 1986). Across counties such as Shropshire, Herefordshire and Worcestershire, patterns of enclosure which fossilise earlier ridge and furrow, or involve irregular field shapes in areas of former common land, very clearly underscore the longevity of this process (Stamper 2003b). In the Hereford area in particular, it is historically evident that one early stimulus to enclosure was the importance of the fulling industry (Boucher 2003), which encouraged conversion of land from arable to pastoral use, and resulted in the early creation of enclosed landscapes for stock management.

The general trend to enclosure also sits alongside the Post Medieval emergence and consolidation of other kinds of intensive landuse. In the Midland river valleys, creation of sophisticated water meadow systems is one important trend, with the potential to increase hay production as much as four fold by the use of this technique (Rackham 1986). Research is demonstrating that such systems were more widespread across the Midlands than has traditionally been supposed, with six previously unrecognised raised bed type meadows recently identified on the Avon and Severn floodplains in Worcestershire (Atkin 2003b).

Increased agricultural production is also represented by 17th, 18th and 19th century expansion of cultivation in marginal/upland landscapes. Sometimes this happened as a specific component of other kinds of economic development (such as the 19th century development of squatter type smallholdings on the Stiperstones in Shropshire linked to population growth associated with mining activity, Watson and Watson 1993), but sometimes it was a part of more centrally planned agricultural expansion into former upland/common areas. Some of this activity does seem to have a specific historical context, and periods of pressure on national food production associated with the Napoleonic wars in the late 18th/early 19th century, and the 1st and 2nd World wars in the 20th century all led to attempts to increase cultivation area in the West Midlands (e.g. see Palliser 1976). However, it is also clear that pro-active development of income generation on the large estates which dominated landholding in the Welsh border area was also a significant factor informing such development through-out the 18th and 19th centuries in particular (Milln 2003).

This general reconfiguring of agricultural landscapes inevitably had a significant impact on patterns of rural domestic settlement. One process which enclosure encouraged was the creation of dispersed farmsteads, and the knock on effect of this (linked also to wider demographic change) was sometimes abandonment and partial shrinkage of some of the Medieval nucleated settlements. Because there are few excavated Deserted Medieval Village/Shrunken Medieval Village sequences for the West Midlands region, it could well be that some such sites are actually the result of Post Medieval abandonment, and that case can sometimes be underpinned by map regression analysis (Stamper 2003b). It is also the case that some specific Post Medieval settlement categories such as 'squatter' settlements were also very

sensitive to cycles of economic change (Roberts and Wrathmell 2002), and sometimes disappeared almost as rapidly as they had first appeared (and were also pro-actively removed by government campaigns to improve health and living conditions in the 20th century).

The Post Medieval development of estates is an important theme in the West Midlands counties, and one which was the direct agency for the emergence of many of the patterns which have already been discussed (Milln 2003). The Dissolution of the Monasteries in the mid 16th century had a fundamental social and economic impact on a county like Worcestershire where extensive former Medieval ecclesiastical landholdings became the core of large new secular estates. Indeed, in some cases, the monastic houses themselves (e.g. at Beckford Hall in Worcestershire) were directly converted to form the 'great houses' at the centre of the new estates (Atkin 2003b). Through the 17th, 18th and 19th centuries, the display of gentry/estate wealth via wholesale programmes of great house rebuilding and fashionable creation of associated landscape parks and gardens, also had fundamental effects on the appearance and economic context of rural landscapes (Bettey 1993). As well as resulting in increasing separation of high status settlement from wider rural settlement activity, the process of landscape park building sometimes directly involved the re-location of existing villages and the conversion of arable land to parkland/wood pasture so as to create suitably 'picturesque' vistas (Lockett 1997).

Post Medieval development of major West Midlands urban and industrial areas like Ironbridge, Birmingham and the Black Country and Stoke-on-Trent is beyond the scope of a comparative summary relevant to an area such as the Lower Lugg, but the theme of industrialisation still had inevitable indirect and direct impacts on the rural West Midlands. Issues such as rural depopulation have been mentioned, but specific forms of direct industrial development such as the emergence of the hop growing and brewing industry in Herefordshire and Worcestershire in the 19th century (Boucher 2003) was significant in local economic, landscape organisation, and social terms (though these effects have not been specifically studied). Mineral extraction also seems to grow in scale in the 19th century, and the expansion of towns such as Hereford and Worcester at this time is obviously a direct influence on local aggregate and clay extraction in particular (Thomas and Boucher 2002).

An important related theme is that of transport improvements. Traditional means of bulk transport on rivers such as the Severn and the Wye in particular were the focus of various improvement schemes to improve navigation and facilitate increased and less season dependent use by larger boats (Morris, R, 1994). By the later 18th and early 19th centuries, the creation of turnpike roads closely followed by canal and then railway systems, fundamentally transformed regional transport infrastructure and capacity (Trinder 1982), and directly facilitated economic growth and industrial development in what had previously been relatively isolated areas (such as Herefordshire). The growth of the Herefordshire brewing industry, for example, is almost certainly a direct reflection of the capacity to use rail transport to export the product to West Midlands urban markets.

The 20th century (especially since the Second World War) in the West Midlands has seen further amplification in the West Midlands counties of the 19th century processes of industrial development, transport infrastructure creation (primarily associated with the motor car) and large scale building development in both urban centres and rural settlements. In addition, rural landscapes have also been increasingly transformed by later 20th century agricultural intensification. Significant changes have included mechanisation of farming activity, abandonment of earlier agricultural buildings and their replacement with larger structures, re-conversion of pasture to arable, and large scale removal of field boundaries to create bigger land management units (Rackham 1986).

The impact of the two world wars and the world political situation in the later 20th century also resulted in the creation of significant military complexes in the West Midlands rural counties. Features recently recorded by the Defence of Britain project in Worcestershire (Atkin 2003b) include anti tank defences, pillboxes, gun emplacements, observation posts, and airfield and military camp buildings and infrastructure, as well as a Cold War nuclear bunker at Powick.

Significance

Ongoing development of the Lower Lugg water meadow systems. The survival of the Lugg Meadows as an active 'Lammas' meadow, and the archaeological evidence throughout the Lower Lugg flood plain area of former meadows of this type, offers a nationally and regionally significant sequence relating to the evolution of Post Medieval agricultural intensification in flood plain environments. Although remains of similar meadows are now being recognised in other Midlands river valleys, the Lower Lugg remains one of the best exemplars of this form of management, and is unique in the partial survival of a Medieval/Post Medieval meadow to the present day.

Evolution of the Lower Lugg as a Post Medieval transport corridor. The Lower Lugg valley has long had significance as an important North-South transport route within the wider Marches area. That is well emphasised by the Post Medieval transport infrastructure which includes river, road and rail links in the same corridor. Much archaeological evidence associated with the development of these features survives, and as such the Lower Lugg offers a locally and regionally significant demonstration of the impact of Post Medieval transport developments on change and economic growth in rural landscapes

Development of quarrying in the Lower Lugg. The Lower Lugg contains an important sequence of Post Medieval quarrying remains principally associated with the development of sand and gravel extraction, but also including clay pits and associated manufacturing infrastructure. This resource offers an important regional insight into the Post Medieval development of quarrying in the West Midlands area. In the local context, the quarry remains also provide significant evidence of the association between such development and the wider economic regeneration of Hereford and environs in the 19th and 20th centuries.

Integrated Post Medieval settlement and agricultural landscape. The Lower Lugg area retains well preserved Post Medieval settlement patterns which include settlements, buildings, and a largely intact agricultural landscape with significant survival of Post Medieval boundaries and hedgerows. Although this pattern can be compared to many other localities within Herefordshire and more widely, the particular context of the Lower Lugg adjacent to Hereford gives the Lower Lugg an added significance, and means that the valley offers a regionally important insight into processes of rural settlement change.

Constraints/absences

General lack of detailed definition of archaeological evidence. As with the Medieval period, there is a wealth of potential archaeological information relating to the Post Medieval Lower Lugg. However, very little exploration of that material (or archaeological investigation of Post Medieval features) has taken place. As a result, the understanding of the Post Medieval archaeology of the area is generalised, and hard to interrogate beyond generic categories. Many areas of potential interest such as transport (including the use of the river), the Post Medieval development of milling, and Post Medieval development of settlement/building infrastructure, are all entirely unsupported by detailed archaeological study.

Lack of information about quarrying. One specific deficit in the evidence is that, despite the evident archaeological resource relating to quarrying, there is little available historical information concerning that activity, and there has been no detailed archaeological investigation of quarrying features.

The need to closely integrate archaeological and historical source material. Although the Lower Lugg has been subject to some historical research into Post Medieval patterns of settlement development (such as Brian's work on water meadows and river navigation), there is an important to need to cross correlate these documentary approaches with rigorous archaeological survey and investigation

Potential in the valley bottom/likely main aggregate extraction areas

Investigation of Post Medieval water meadow/management systems. There is an evident opportunity to **d**evelop understanding of the Post Medieval phases of water meadow use and development, and the phasing of the abandonment and enclosure of the meadows.

Identification and exploration of Post Medieval mill sites. In tandem with Medieval features, there is good potential to survey Post Medieval mill sites, and to archaeologically delineate the Post Medieval phases of activity at known mills.

Investigation and exploration of infrastructure associated with river transport and navigation. There is a good opportunity to identify Post Medieval river management features such as infrastructure associated with 17th and 18th century improvements to navigation, and to clarify the extent to which the proposed schemes known from documentary evidence were actually enacted. As with earlier periods, recovery from waterlogged contexts of barges and boats associated with Post Medieval navigation may also be a possibility.

Potential in the wider landscape

Investigation of Post Medieval quarries. There is an evident opportunity to undertake archaeological survey and investigation of Post Medieval quarry sites, and to establish better understanding of patterns of quarrying operation and the chronological sequence of the industry.

Investigation of Post Medieval clay extraction and manufacturing sites Investigation and survey of known 19th century brickwork sites will help clarify the origins, development and character of this component of local industry.

Investigation of specific Post Medieval settlement features such as squatter settlements and landscape parks. There is an evident opportunity in the Lower Lugg to develop survey and investigation of specific components of the Post Medieval landscape such as squatter settlement and landscape parks (both of which are well represented in the Lower Lugg), and to accordingly build new understanding of the local relationship of the area to the wider regional and national patterns associated with these features.

Investigation of surviving Post Medieval buildings and settlements. There is clear potential locally to develop survey of the Post Medieval components of extant settlements and other building complexes such as farms and large houses, and to undertake detailed fabric recording of buildings as part of this process.

4.5 Demonstration Lugg Valley GIS Spatial Analysis

4.5.1 *Methods of GIS Data Analysis*

This section of the report outlines methods that could be used to analyse spatial relationships between 'landscape' and 'cultural' variables incorporated within the Lower Lugg GIS. Because the Lower Lugg dataset is currently extremely limited in terms of the number and the quality of the archaeological records (see **Section 4.2**), this demonstration is principally based on a consideration of the larger archaeological dataset available for the whole of the Herefordshire part of the Lugg Valley.

Examples are provided where spatial relationships between variables in baseline, landscape and cultural layers of the GIS are investigated with respect to the wider Lugg Valley area

4.5.2 *Preliminary Observations*

Before undertaking any detailed analyses, GIS can be used to make preliminary observations about the spatial distribution of variables such as archaeological sites. Preliminary observations can also be made concerning the spatial relationships between multiple variables by simultaneously viewing the relevant datasets in the GIS. Although qualitative in nature, preliminary observations made in this way can allow spatial trends and relationships to be identified that are not immediately evident from the examination of tabulated data.

The GIS is particularly useful for displaying the spatial distribution of specific attributes within a dataset. For example, the archaeological SMR layer can be viewed as a single entity but the dataset can also be classified by archaeological 'period' or 'form', with different symbols being used to visually represent the different categories. Where the SMR dataset is concerned, this simple method allows preliminary observations to be made concerning spatial relationships between archaeological records from, for example, the Iron Age and Bronze Age. Simple frequency plots can then be produced (using a spreadsheet programme such as Excel) to evaluate spatial records dating from different archaeological periods (see the examples provided in Section 4.5.7).

4.5.3 *Point Density Analysis*

Density analysis can be used to investigate, in a quantitative manner, the spatial distribution of point data such as that found within the Herefordshire SMR. The density analysis method takes a measured quantity of point data and distributes it across the landscape to produce a continuous surface. The density values produced are based on the number of points measured in a given location, or search area. In the first instance, a circular search area is defined (by assigning a value for the radius of the search area) and the density value is then calculated from the total number of data points that occur within the search area. The analytical method employed here uses a simple density calculation, where points falling within a given search area (in this case, within a 1 km radius) were summed and then divided by the size of the search area to give a density value (density value = number of points / πr^2). Density analysis can be carried out on point datasets within the Lower Lugg GIS and can be executed in both the ArcMap version (using Spatial Analyst) and the MapInfo version (using Vertical Mapper) of the GIS.

The point density analysis method is particularly useful for interrogating the Herefordshire SMR and it can be refined, for example, to examine the distribution of sites by archaeological

period. In Section 4.5.8 an application of the point density analysis method is demonstrated by investigating the spatial distribution of archaeological sites and records by the period assigned to them in the SMR.

4.5.4 *Predictive Modelling and Probability Mapping Analysis*

GIS can be used to undertake sophisticated analyses for predictive site location modelling. This capability is particularly useful for investigating the relationship between archaeological sites (or cultural variables) and a wide range of environmental factors (or landscape variables). The method of site location modelling outlined here predicts the probability of finding archaeological sites on the basis of the relationships between known archaeological sites and a variety of environmental factors. The main principle behind the predictive modelling of archaeological sites is that human activity in the landscape conforms to a pattern so that sites tend to recur in favourable environmental settings. If patterns exist then statistical relationships can be established and this information can be used to predict where archaeological sites may be located. A probability map can then be produced showing where archaeological sites are most likely to be found. This type of analysis has been used elsewhere to aid planning and development decisions in areas with a potentially rich archaeological resource. Most notably, this approach has been employed in the valley of the River Arroux in Burgundy, France, where it was found that areas with a higher probability of archaeological sites being present frequently coincided with areas threatened by gravel mining activities (Madry, 2002).

Where the Lugg Valley is concerned, the predictive modelling and probability mapping method was investigated in a preliminary manner by analysing Post Medieval archaeological sites and their relationship with environmental variables, including elevation, slope gradient and geology. The use of this method, and the results that were derived, are described in more detail in Section 4.5.9. It should be noted, however, that the effectiveness of this method is heavily dependant on the quality of the known archaeological record and the environmental (or landscape) data sources. This method of predictive modelling and probability mapping can be undertaken in both the ArcMap and MapInfo, but other statistical programmes such as Excel or SPSS are also required.

4.5.5 *Application of the GIS Data Analysis Methods*

In the following examples of the application of GIS analytical methods, archaeological data from the Sites and Monuments Record (SMR) layer (Filtered SMR) have been used along with elevation and slope gradient data from the NextMap Digital Elevation Model (DEM) layer, and geological data from the British Geological Survey (BGS) layer (BGS Superficial Geology). To increase the likelihood of finding meaningful relationships between archaeological and environmental variables, the datasets examined incorporate data pertaining to the entire valley of the Herefordshire Lugg. This means that an area larger than the Lower Lugg study reach has been examined in these preliminary analyses but the methodological approaches employed are the same as those that would need to be applied to the Lower Lugg GIS.

4.5.6 *Data Preparation*

The filtered Herefordshire SMR data layer was used for the preliminary application of the proposed analytical methods (Figure 41). The SMR dataset contains a considerable number of inconsistencies in spelling and capitalisation that prevented effective use of database queries. These inconsistencies were eliminated in the data preparation stage in order to get meaningful results when interrogating the dataset. To demonstrate the potential of the proposed analytical

methods, the 'period' attribute in the SMR was selected for interrogation against a number of environmental variables. Conventional archaeological period divisions, as outlined in the Herefordshire County Council SMR database, were used in these preliminary analyses (Table 1).

The environmental variables used in the preliminary analyses were elevation and slope gradient, derived from the NextMap DEM data layer, and geological data, derived from BGS map layers. To allow spatial relationships to be analysed effectively, raster grids were created to display elevation, slope gradient and geological data.

Table 1: Chronology of archaeological periods (Herefordshire Council, 2006). Periods in bold were used for the spatial analysis reported in Section 4.5.9

Period Name	Dates
Prehistoric	**100,000 BC – AD 43**
Palaeolithic	100,000 BC – 10,000 BC
Mesolithic	10,000 BC – 4,000 BC
Neolithic	4,000 BC – 2,000 BC
Bronze Age	2,000 BC – 800 BC
Iron Age	800 BC – AD 43
Roman	**AD 43 – AD 410**
Anglo-Saxon/Early Medieval	**AD 410 – AD 1066**
Medieval	**AD 1066 – AD 1540**
Post Medieval	**AD 1540 – AD 1900**
Modern	**AD 1900 – Present**

4.5.7 *Results from Preliminary Observations*

A number of observations can be made about the spatial distribution of archaeological sites and the spatial relationships between archaeological sites and environmental variables (elevation, slope and geology) simply by viewing the relevant datasets in the Lugg Valley GIS. Greater detail concerning data distribution and relationships can be obtained by changing the way the datasets are viewed, for example, by classifying the archaeological sites by period.

A large proportion (29%) of the archaeological records in the SMR is undated. The two dominant periods for which archaeological evidence have been recorded are Post Medieval (40%) and Medieval (18%). Roman and Saxon sites are less numerous in the SMR but are widely distributed across the middle and lower reaches of the river valley, with a notable cluster of sites occurring at Stoke Prior. Iron Age and Bronze Age sites are sparsely distributed throughout the Lugg Valley and the same is true for Prehistoric sites, although there are a substantial number of flint finds along Hindwell Brook in the upper reaches of the Herefordshire Lugg at Combe Moor.

Simple frequency plots of known archaeological sites, classified by period, against calculated values of elevation and slope have been produced and are shown in Figure 42. The relationship between archaeology and elevation (Figure 2A) shows that the vast majority of recorded archaeological sites are found below an elevation of 150 m OD. Only 288 sites, or 19% of the records within the SMR, are found at elevations above 150 m OD and these are dominated by Post Medieval archaeology. When known archaeological sites were compared with slope gradients it was found that 92% of sites were located on ground where the gradient was less than 15 degrees and 33% of sites occurred on slopes with a gradient of less than 2 degrees

(Figure 42B). Archaeological records found on steeply sloping ground (>15 degrees) mainly dated from the Post Medieval period.

Preliminary spatial analyses were also undertaken to investigate relationships between known archaeological sites and the geology of the Lugg Valley. Of the 1499 records in the filtered SMR layer, 43.1% were located on superficial deposits and 56.9% were located on ground that is classed as bedrock. When the archaeological records were classified by period, however, it became apparent that sites dating from the Prehistoric period, the Roman and Saxon period, and the Medieval period are more commonly found on, or within, superficial deposits (Table 2). Examining these data in greater detail shows that 17.7% of the archaeological records occur on glacial deposits, 2.9% occur on periglacial deposits and 22.5% occur on riverine alluvium (Table 3). Looking more specifically at superficial geology (Figure 42C), it is evident that Post Medieval and Medieval sites are most commonly located on valley floor alluvium whilst a larger proportion of records from the Roman and Saxon period and the Prehistoric period are found on older glacial deposits.

Table 2: Distribution of archaeological sites over bedrock and superficial geology.

Period	Bedrock (%)	Superficial (%)
Modern	1.4	0.5
Post Medieval	29.5	14.1
Medieval	8.1	12.2
Roman & Saxon	1.4	2.8
Prehistoric	2.4	2.8
Undated	14.1	10.7
Total	56.9	43.1

Table 3: Distribution of archaeological sites over different geological surfaces.

Period	Bedrock (%)	Glacial (%)	Periglacial (%)	Alluvium (%)
Modern	1.4	0.2	0.1	0.2
Post Medieval	29.5	4.9	1.6	7.6
Medieval	8.1	4.6	0.8	6.8
Roman and Saxon	1.4	2.1	0.2	0.5
Prehistoric	2.4	1.7	0.1	1.0
Undated	14.1	4.2	0.1	6.4
Total	56.9	17.7	2.9	22.5

4.5.8 *Results from Point Density Analysis*

Point density analysis was used to investigate the spatial distribution of archaeological sites and records by period. A 1 km radius was used to define the search area employed in the analysis and density values were calculated by dividing the number of sites found within a search area by the size of the search area (πr^2). The archaeological records were consolidated into five time periods for the point density analysis; these are highlighted in bold in Table 1 and, in a further piece of consolidation, the records from the Early Medieval and Medieval periods were also merged.

Known Prehistoric sites are rarely found within close proximity of each other in the Lugg Valley (Figure 43A). Higher densities of Prehistoric sites were identified at the upper end of

the Herefordshire Lugg near Combe Moor, in the tributary valley of the River Arrow to the south of Leominster and a minor increase in density was identified in the Lower Lugg study area at Wellington Quarry. Known archaeological records from the Roman and Saxon period are also sparsely distributed throughout the Herefordshire Lugg (Figure 43B) but there is a distinct concentration of Roman sites in the vicinity of Stoke Prior and a less pronounced density increase in the tributary valley of the River Arrow. The absence of archaeological sites dating to the Prehistoric, Roman and Saxon periods is clearly evident between Mortimer's Cross and Leominster and in the lowermost reaches of the Lower Lugg study area downstream of Lugwardine.

The larger number of Medieval records in the Herefordshire SMR means that spatial patterns are more easily discerned for archaeological sites dating from this period (Figure 43C). By far the highest density of Medieval sites is located around Leominster where the density value is more than twice that found elsewhere. In the Lower Lugg study area, more modest increases in Medieval density values can be seen around Bodenham, Freens Court and Shelwick Green. The record from the Post Medieval period contains the greatest number of sites and, as a consequence, the highest point density values (Figure 43D). The majority of Post Medieval activity is recorded in the upper reaches of the Lugg Valley, above Mortimer's Cross. Elevated Post Medieval density values are also seen in the town of Leominster and, in the Lower Lugg study area, on the southern edge of Dinmore Hill at Queen's Wood. Spatial analysis of the small number of Modern archaeological sites (Figure 43E) revealed low density values throughout the Lugg Valley with little overlap between search areas.

4.5.9 *Results from Predictive Modelling and Probability Mapping Analysis*

Predictive modelling and probability mapping methods can be used to predict the probability of finding archaeological sites on the basis of the relationships between known archaeological sites and environmental factors such as elevation, slope and geology. For this preliminary investigation, this sophisticated method of analysis was undertaken using only Post Medieval archaeological records as this was the largest period grouping in the Herefordshire SMR. The predictive modelling calculations are based on the probability curves produced for Post Medieval sites occurring at different elevations, on different slope gradients and on different types of geology. The pre-prepared raster grids (with 10 x 10 m pixel sizes) for elevation, slope and geology were used as base layers in the model. Each pixel in the raster layers was allocated a probability value calculated from frequency distribution graphs (which are explained in more detail for each environmental variable below). The three raster grid layers were then overlaid and, across the whole of the Lugg Valley, the probabilities for the overlying pixels were multiplied. A new raster grid layer (the probability map) was then produced showing the probability of Post Medieval sites occurring in each pixel based on the combined probability of the individual environmental variables (elevation, slope and geology).

Probability calculation for elevation. The frequency of Post Medieval sites occurring at different elevations does not conform to a normal or logarithmic distribution (Figure 44A). There are three peaks in the data at 80, 130 and 280 m AOD. A large proportion of sites occur in the area adjacent to the floodplain (40 – 170 m AOD) and, above this, the number of sites generally decreases with increasing elevation.

Three normal distribution curves were drawn to fit the frequency distribution for the elevation of Post Medieval sites (Figure 44B). The mean (μ) and standard deviation (σ) values for each curve were then substituted into the normal distribution equation to derive probability equations for each section of the graph.

Normal Distribution Curve 1: $\mu = 84$ and $\sigma = 22$
Normal Distribution Curve 2: $\mu = 132$ and $\sigma = 45$
Normal Distribution Curve 3: $\mu = 265$ and $\sigma = 28$

Boundaries were set where each curve crossed in order to accurately predict probabilities by utilising the correct normal curve for probability calculations.

Normal Distribution Curve 1: < 100
Normal Distribution Curve 2: 100 - 229
Normal Distribution Curve 3: > 230

Using these three calculations, probability could then be calculated for the entire elevation data range when applied to the raster image of the whole Lugg Valley area.

Probability calculation for slope gradient. Figure 45A shows the frequency with which Post Medieval sites occur on different slope gradients. Few Post Medieval sites occur on flat ground but the largest number of sites occurs on slopes with low gradients. The frequency with which sites occur then decreases as slope gradient increases. Approximately 60% of all sites from this period occur on slopes with gradients less than 8 degrees. A logarithmic curve was fitted to the frequency distribution of slope gradients at, and above, 2 degrees and its probability equation was derived. The probability of sites occurring on flat ground surfaces (< 2 degrees) was derived from the frequency distribution as 0.37.

Probability calculation for geology. The probability of Post Medieval sites occurring on different geological surfaces was obtained from the proportions calculated and presented in Table 3. The probability values for Post Medieval sites located on alluvial, periglacial, glacial and bedrock surfaces are shown in Table 4.

Table 4: Probability of Post Medieval sites occurring on different geological surfaces.

Period	Bedrock	Glacial	Periglacial	Alluvium
Post Medieval	29.4	4.9	1.6	7.6

Production of the probability map. The overall probability of Post Medieval sites occurring at any point in the Lugg Valley area was calculated using the probabilities derived from the three frequency distribution curves. This allowed the influence of variations in elevation, slope gradient and geology to be incorporated in the final model. Figure 46 shows the model output: a probability map indicating the potential for Post Medieval sites being found across the landscape of the Lugg Valley. The output is heavily dependent on the quality of the Herefordshire SMR, however, as the model assumes that data from the SMR are representative of the entire (known and unknown) Post Medieval archaeology of the Lugg Valley.

The most notable feature of the map produced from the predictive model is the higher probability of Post Medieval archaeology found at lower elevations in the Lugg Valley (Figure 46). Probability values are generally highest in valley floor environments although they are lower in the Lower Lugg study area than they are in the valley floor reach between Mortimer's Cross and Leominster. It is also evident from the model output that probability values are lower where slope gradients are higher. In the valley floor alluvial basins, probability values appear to be driven principally by the underlying superficial geology whereas on the higher ground, in the upper reaches of the Herefordshire Lugg and in the vicinity of Dinmore Hill, elevation and slope gradient appear to be more dominant factors. There is also a high

probability of Post Medieval archaeology being found on the margins of the valley floor, at the base of the valley slopes.

Figure 47 presents a close-up view of a small portion of the probability map of the Lugg Valley floor immediately downstream of Bodenham. The darker colours indicate areas where there is a low probability of finding Post Medieval archaeology whilst the light colours represent areas where there is a higher probability of finding archaeological sites that date from the Post Medieval period.

4.5.10 *Conclusions*

The spatial analysis methods outlined and demonstrated in this report illustrate the potential of the Lower Lugg GIS as a valuable research and planning tool. A variety of methods have been presented, illustrating the range (from simple to sophisticated) of analyses that can be undertaken using the GIS. In particular, the predictive modelling and probability mapping analysis is viewed as a method that has considerable potential for aiding the management of the archaeological resource in the Lower Lugg study area. The spatial analytical methods presented in this report are by no means exhaustive and other methods such as cluster analysis could be applied to interrogate the data layers in the GIS.

Once again though, it should be stressed that the value of the output from these spatial analyses depends entirely on the quality of the data sources being interrogated. This is particularly pertinent where the Herefordshire SMR is concerned; as a source of data it has huge potential but, at present, the nature of the record means that it has to be used with caution in any spatial analysis. Notwithstanding these difficulties, the Lower Lugg Valley GIS Database, in its present form, constitutes a powerful tool for analysing the landscape and cultural resource of the Lugg Valley and it also serves as a valuable device that can be used to aid planning and development decisions in the Lower Lugg study area.

Acknowledgements. Alison Szajdzicka is thanked for her assistance in the development and application of the spatial analytical methods outlined in this report.

Figure 41: Spatial distribution of archaeological sites recorded in the Herefordshire SMR.

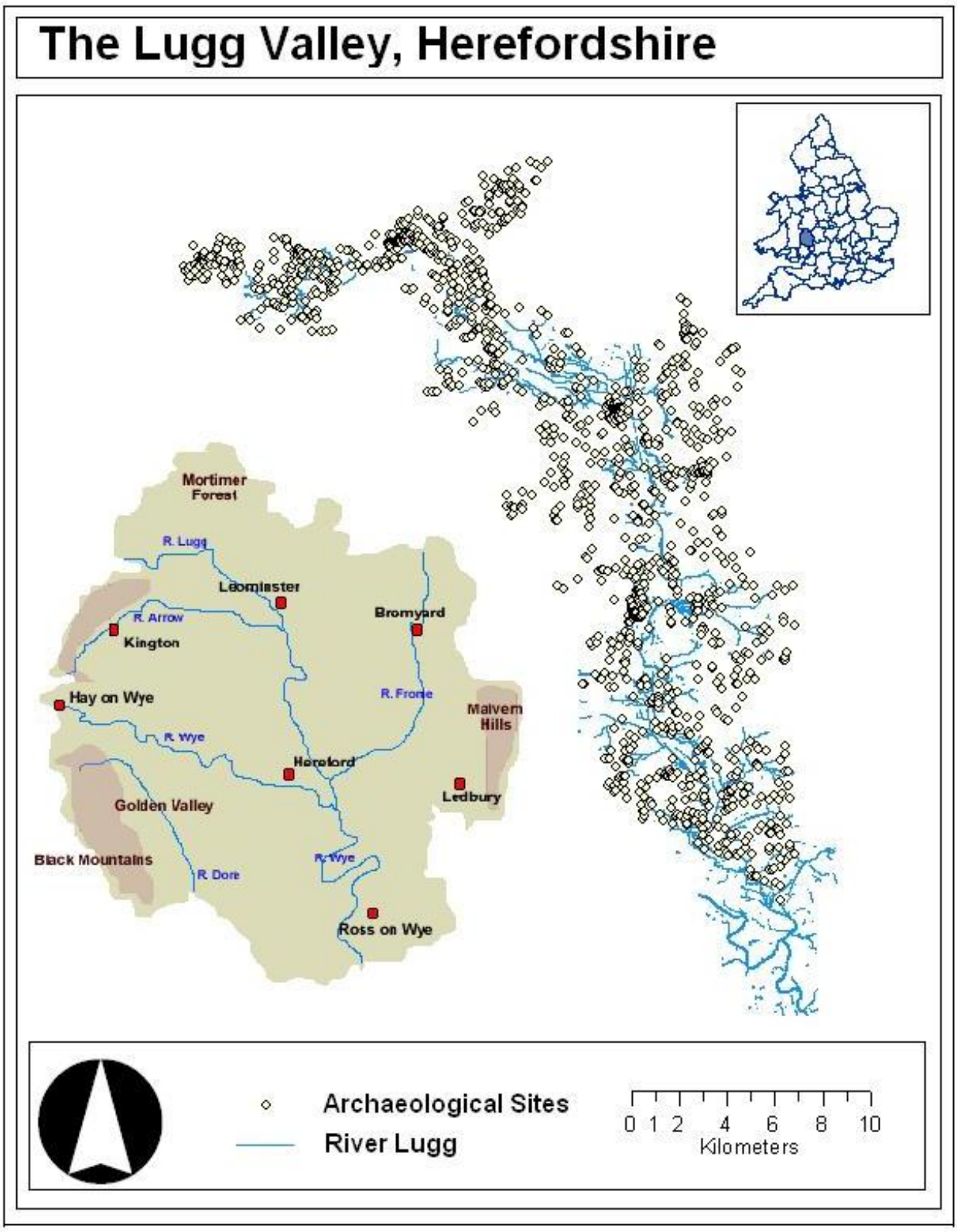


Figure 42: Spatial relationships between archaeological sites and (A) elevation, (B) slope, (C) superficial geology.

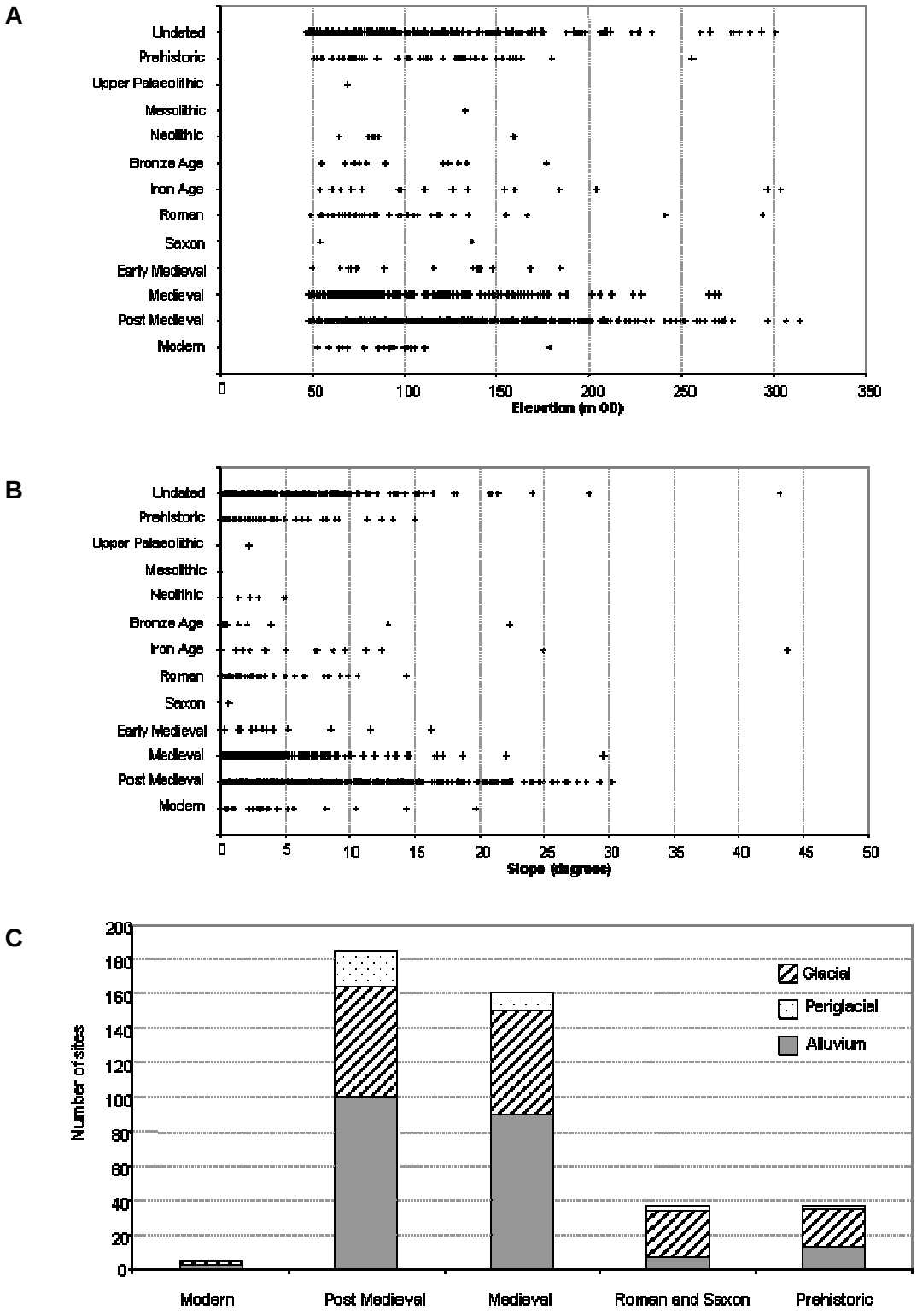


Figure 43: Point density values for different archaeological periods in the Lugg Valley.

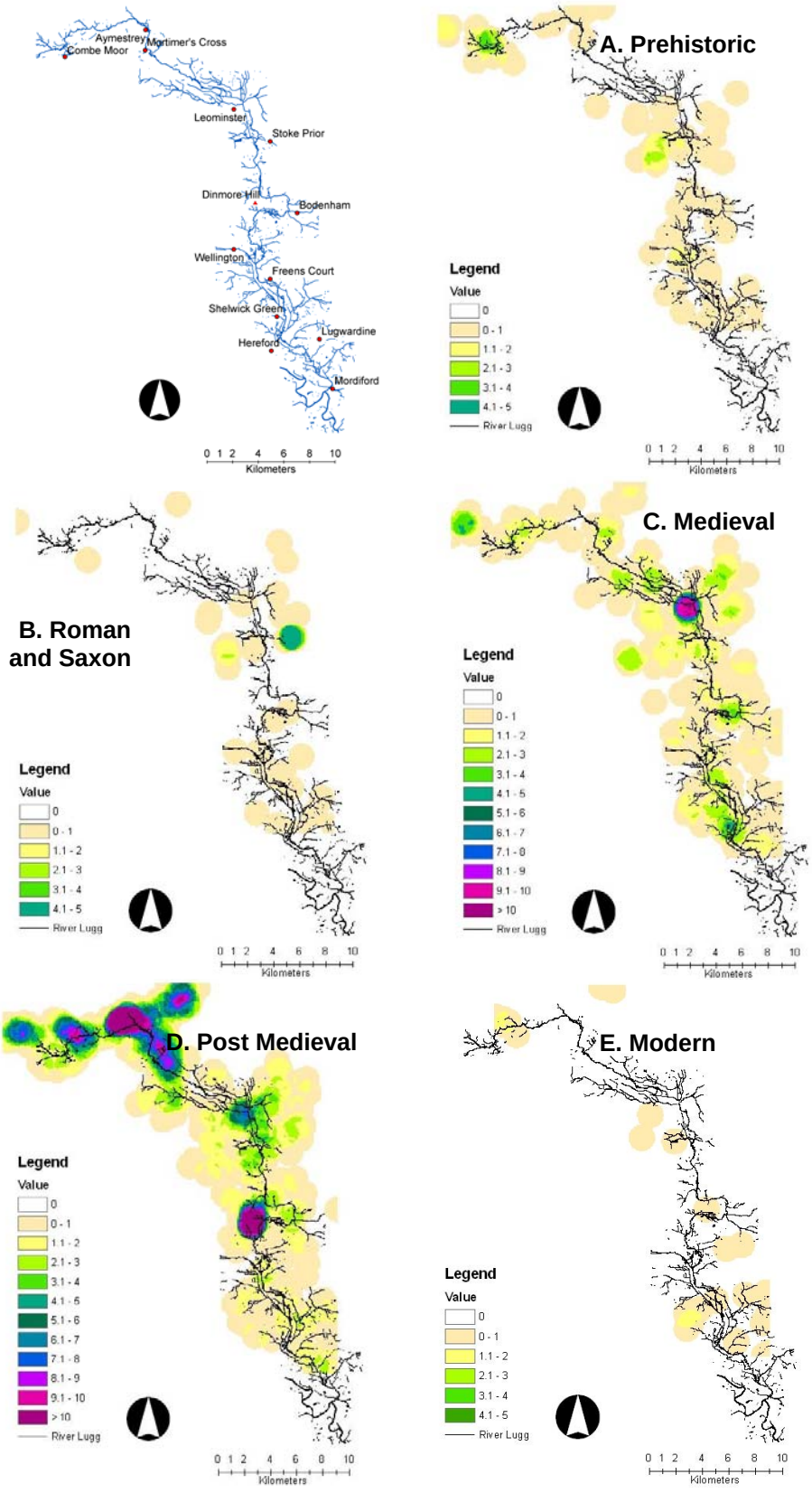
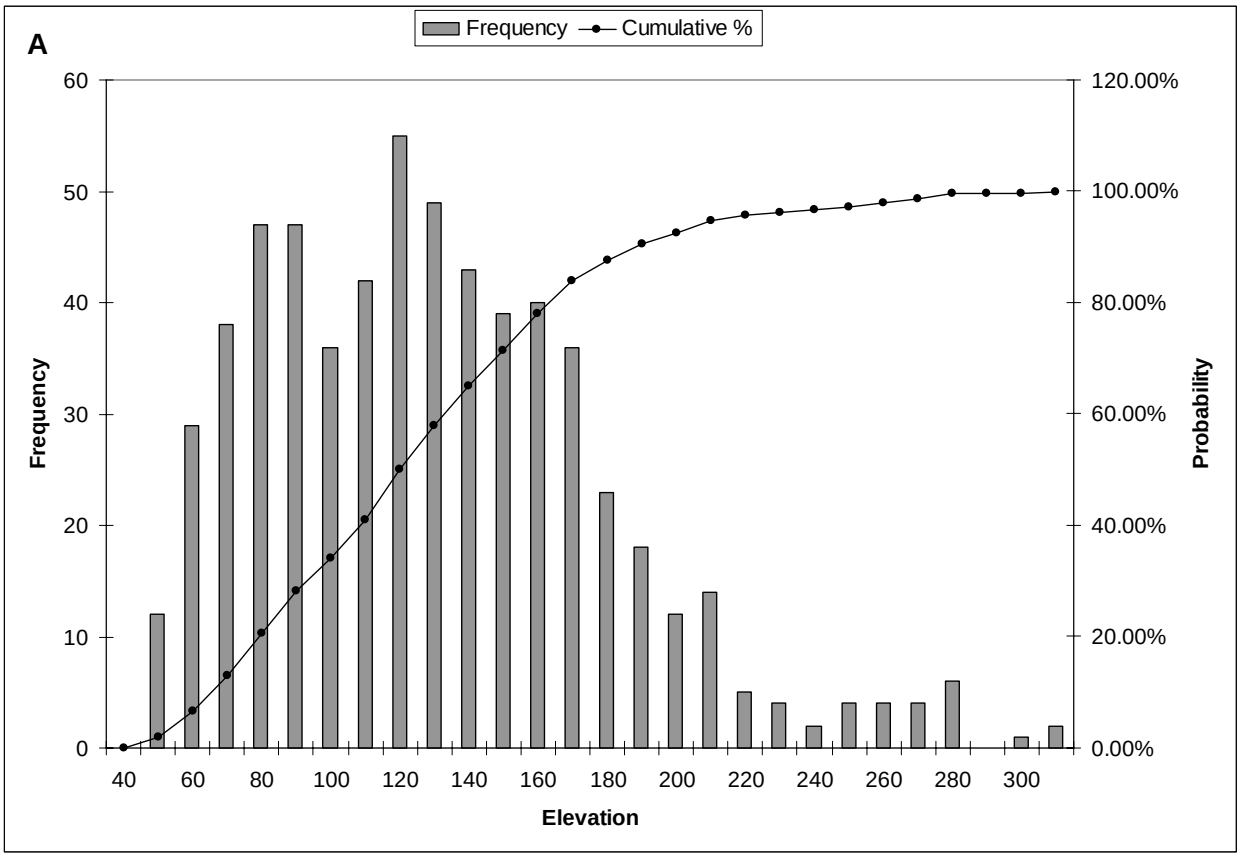


Figure 44: Frequency distribution of Post Medieval sites plotted against (A) elevation, and (B) the normal distribution curves fitted to the Post Medieval data.



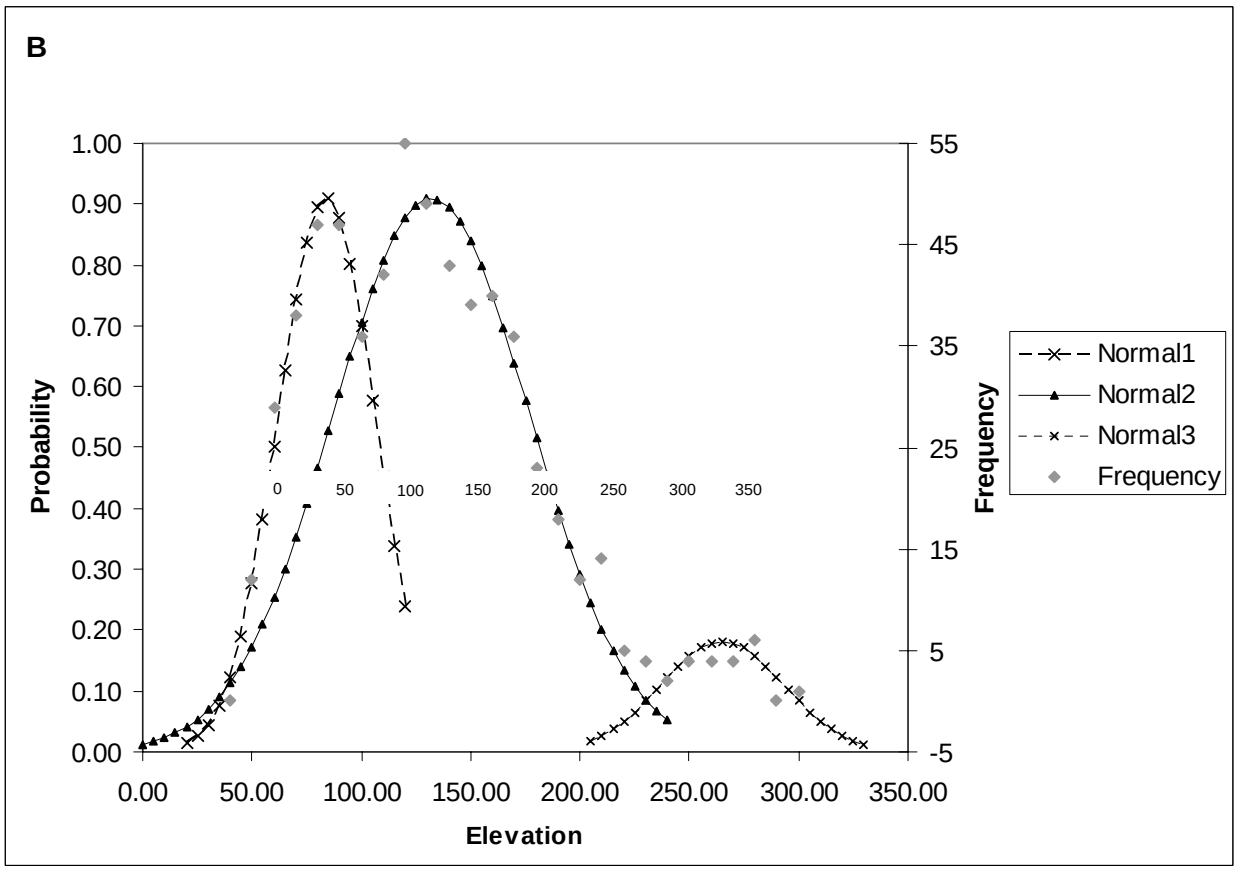
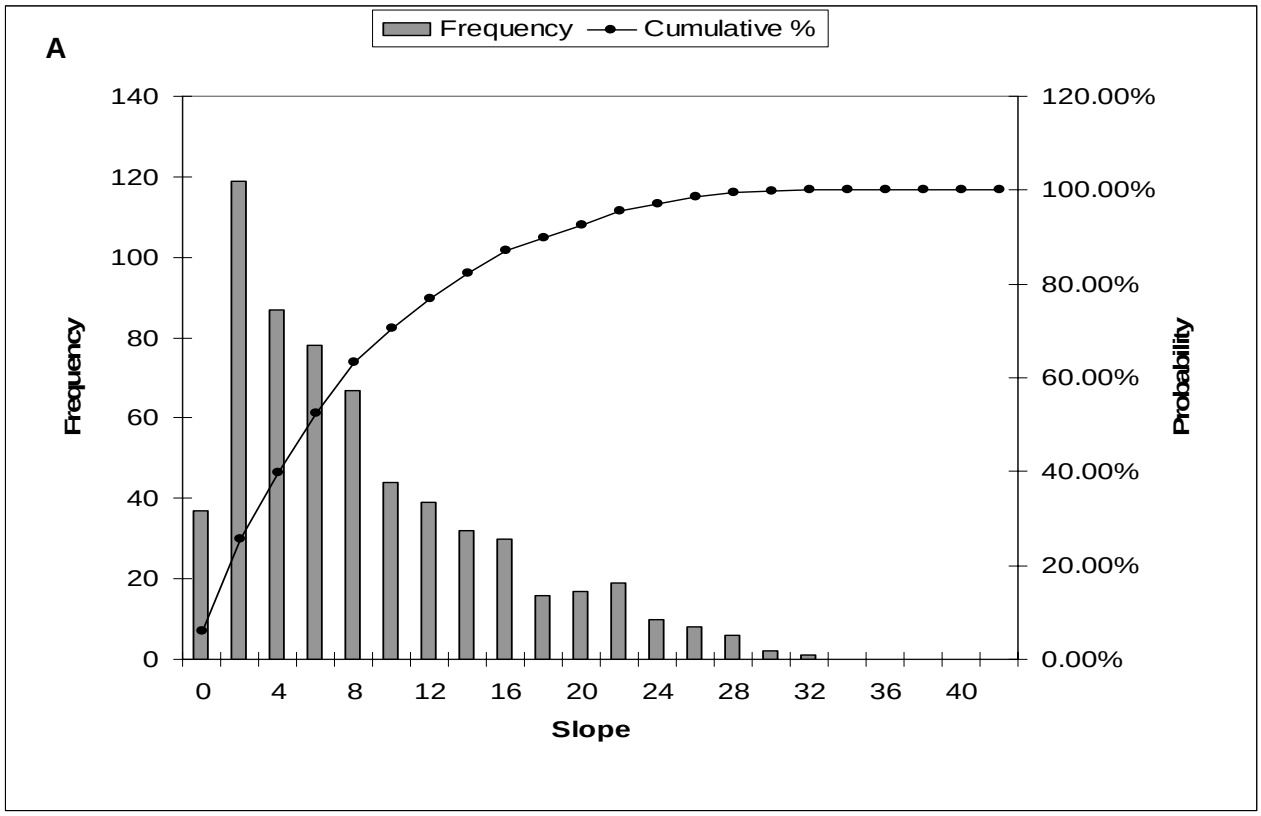


Figure 45: Frequency distribution of Post Medieval sites plotted against (A) slope, and (B) the logarithmic curve fitted to the Post Medieval data.



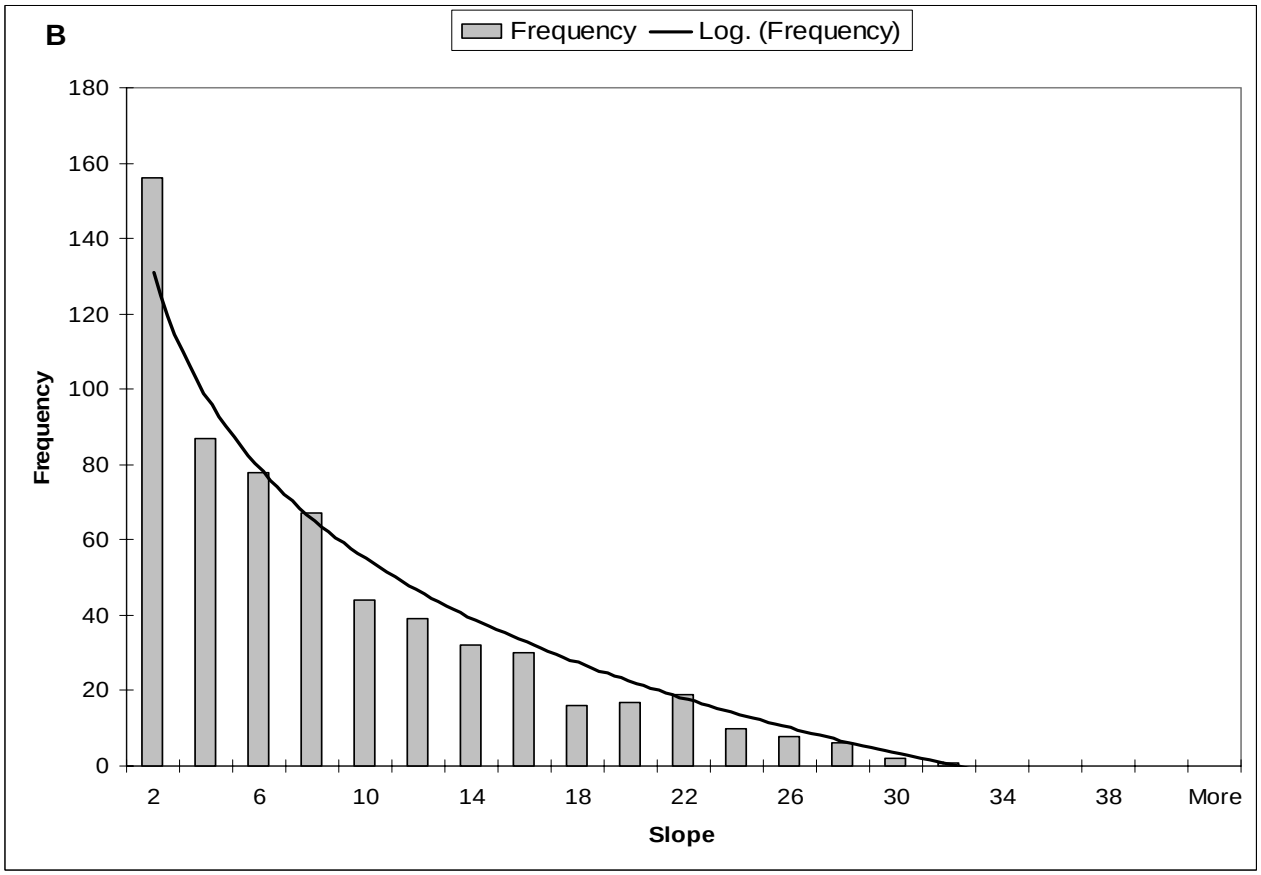


Figure 46: Map indicating the probability of Post Medieval archaeological sites being located across the Lugg Valley.

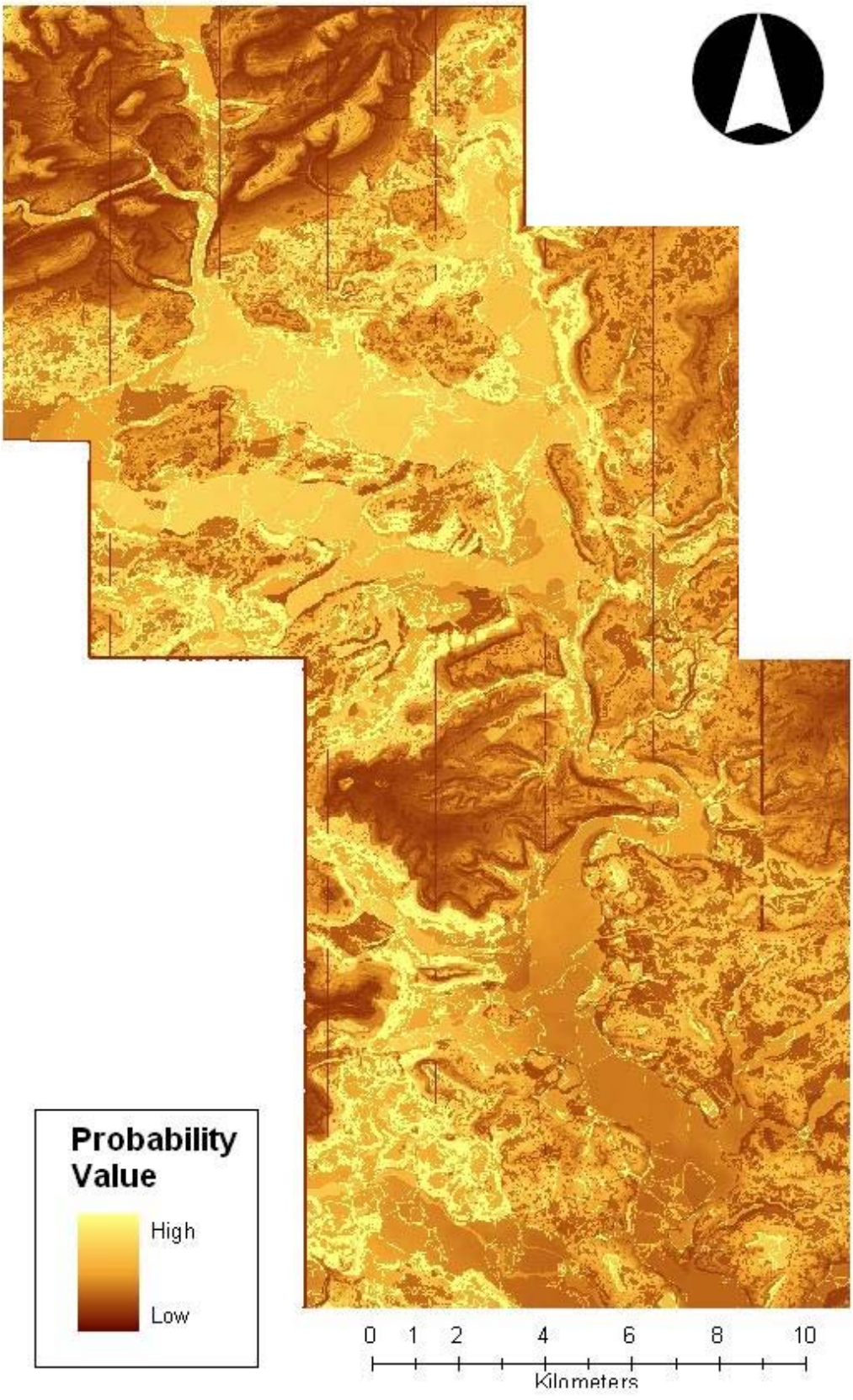
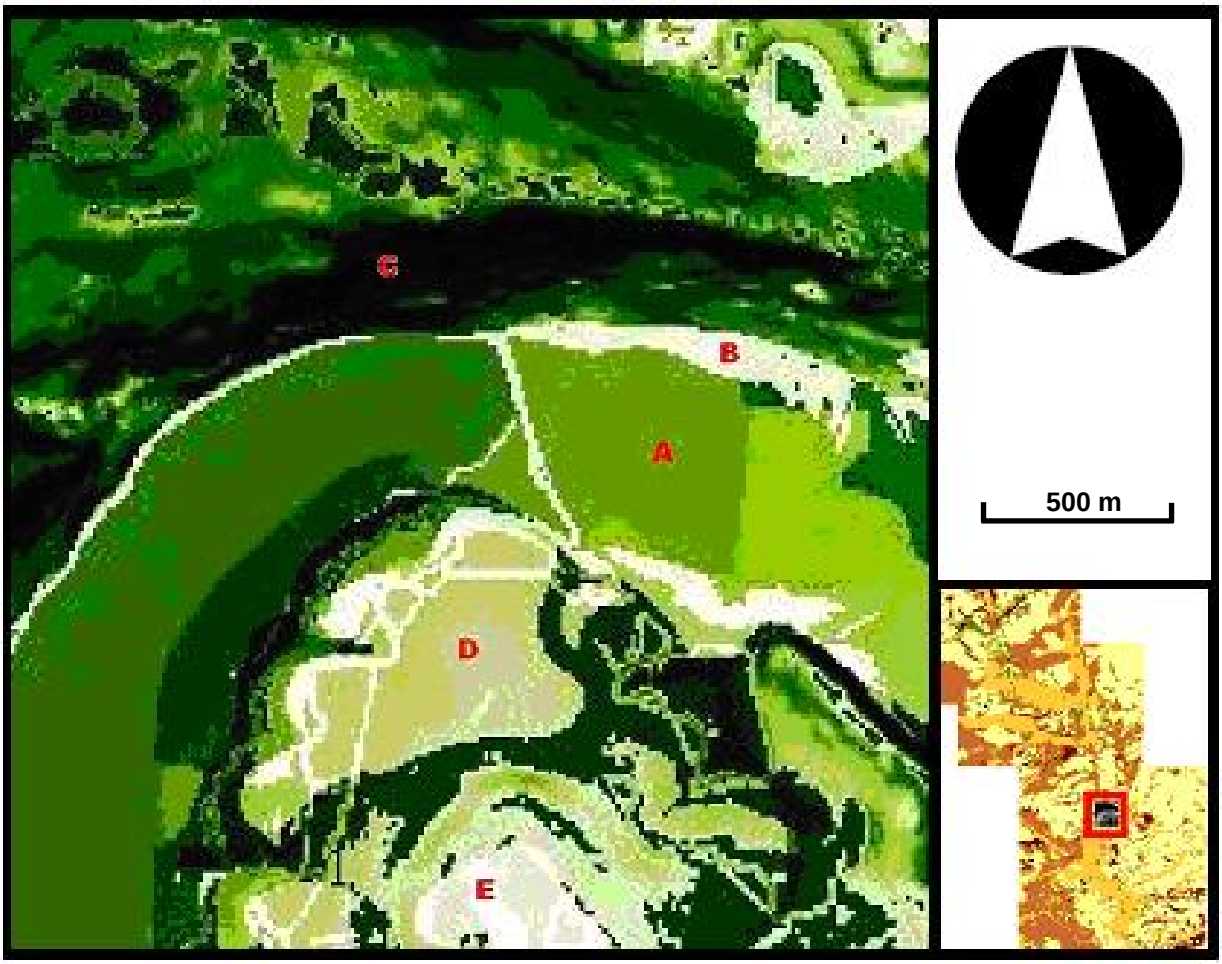


Figure 47: Map indicating the probability of Post Medieval archaeological sites being located on the Lugg Valley floor west of Bodenham. Dark colours indicate low probability and light colours high probability (A = 0.8%, B = 2.7%, C = 0.08%, D = 1.2%, E = 4.6%).



4.6 Archaeological Field Evaluation and Mitigation Strategies

Introduction

4.6.1 *Objective and scope*

This section of the assessment reviews the methodology of archaeological evaluation and mitigation work in the Lower Lugg Valley area over the last 20 years.

The aim is to assess the success of archaeological interventions in the Lower Lugg to date, and to examine the scope for development of new techniques and strategies to further improve future archaeological evaluation and mitigation approaches in the Lower Lugg context.

From the aggregate extraction context analysis in **Section 2**, it is clear that the principal foreseeable threat to the archaeological resource of the Lower Lugg is associated with aggregate quarrying in the flood plain/alluviated area of the Lower Lugg between Bodenham and Lugg Bridge. The discussion in this section therefore specifically focuses on the archaeological field evaluation and mitigation issues associated with that alluvial zone.

The evolving process of archaeological investigation and mitigation at Wellington/Moreton Quarry since 1986 (**Section 4.1**) provides the key reference point for this section. The work at Wellington quarry has not only led to the development of specific archaeological techniques for working in the Lower Lugg alluvium, but the discoveries there have unequivocally demonstrated the high archaeological potential of the flood plain area.

4.6.2 *Background information*

This discussion should be read in conjunction with other sections of this resource assessment which provide the detailed background to the present analysis:

- The evolution of archaeological work and mitigation/field evaluation strategies used at Wellington Quarry since 1986 is detailed in **Section 4.1**.

- The patterns of archaeological/geoarchaeological discovery associated with the valley bottom area (principally Wellington/Moreton) are detailed in **Section 4.1**.

- The geomorphological context, the character of the Lower Lugg alluvium, and understanding of the formation processes which created the modern flood plain zone, are detailed in **Section 4.1** (with specific reference to archaeological field evaluation at Wellington) and **Section 3.1** (Lower Lugg geology, geomorphology and pedology general critical review).

Archaeological evaluation and mitigation in the Lower Lugg alluvium

4.6.3 *Potential*

The Holocene alluviation of the valley bottom area means that all archaeological information earlier than the Medieval period is buried within alluvial deposits which can be up to 3 metres deep (**Section 3.1**). This offers:

- High quality preservation of organic, environmental and some cultural materials in anaerobic conditions.

- The potential to recover archaeological data from deeply buried sealed contexts largely untouched by later disturbance and contamination.

- The potential to relate cultural finds to similarly sealed surrounding landscapes which are contemporary with them and which include features such as river palaeochannels and former gravel islands.

- The in principle potential, within deeply buried contexts associated with good organic preservation, to establish detailed stratigraphic and absolute dating sequences allowing for close analysis of change in human settlement patterns through time and the interaction of these with the natural formation processes of the river valley.

4.6.4 *Constraints*

The high potential of the area in question is counterbalanced by a series of difficulties which serve as constraints upon our ability to gauge potential from an existing knowledge base, and to reach full understanding of the nature of the buried archaeological resource. Nine such constraints/challenges are identified here:

Poor level of current archaeological knowledge. Beyond the Wellington Quarry excavations, existing knowledge of the archaeology of the Lower Lugg alluviated area for all periods before the Medieval is very limited (see **Section 4.2**). There is therefore no existing resource of 'desk top' information to inform archaeological detection.

Surface masking of deeply buried deposits. Indications of buried archaeology in terms of surface scatters of cultural material recoverable by field-walking or casual discovery are few and far between because of the deep burial of most relevant deposits (Dinn and Moran 1996).

Poor air photography results. Alluvial sealing of buried deposits means that crop marks do not generally occur on the flood plain, and only relatively recent (Medieval and later) earthworks features are usually visible there. In some areas, cropmark complexes on the adjacent gravel terraces appear to be sharply truncated by the edge of the alluvium, and this may imply that those features do continue within the alluviated areas (**Section 4.3**).

Ineffectiveness of geophysics. Established geophysical techniques (principally in archaeological contexts fluxgate gradiometry, electrical resistance survey, magnetic susceptibility and Ground Penetrating Radar) have not proved effective in terms of defining archaeological features in deeply buried alluvial contexts generally, and in the Lower Lugg alluvium in particular (Terra Nova 2002, Dinn and Moran 1996). Depth of penetration is poor, and in any event the naturally low magnetic susceptibility of the Lugg valley alluvium has hindered effective application of magnetometry techniques in particular (Terra Nova 2002). The lack of other kinds of comparative survey data also makes geophysics results that much more difficult to use and interpret.

Practical trenching limitations. The depth of the alluvium imposes considerable practical limitations on archaeological trenching strategies used in conventional field evaluation exercises. Small trenches/test pits are not practically viable in terms of safe and stable excavation in deep waterlogged/fine grained alluvial conditions where standing sections are

prone to slumping and collapse. However, excavation of larger trenches effectively limits the spatial coverage which can be achieved within any given total sample area size.

Scale of quarrying. Modern valley bottom quarrying in the Lower Lugg (**Section 2.6**) impacts on large landscape areas creating a fundamental logistical challenge for effective evaluation and mitigation, especially in deeply buried contexts. The usual problem with commercial viability versus satisfactory archaeological coverage is therefore even more apparent in this situation.

Nature of the archaeology. The character of the archaeology is complex and distinctively reflects the specialised use by human populations of the valley bottom zone. In some places and periods (for example, Early Neolithic pit groups, later prehistoric ritual deposition in the river or Early Medieval mills) the nature of that particular exploitation creates dispersed features which are small, not obviously connected to broader patterns of archaeology, and therefore difficult to predict and detect in advance of large area excavation.

Close interrelationship of archaeological and geomorphological contexts. A full understanding of archaeological features in alluvium can only be gained by first achieving a close understanding of site formation processes, and the relationship of archaeological features to patterns of river change (Terra Nova January, February and October 2002). Indeed, there is often a close relationship in the river valley zone between natural features and the managed environment (with, for example, re-use of palaeochannels for later water management etc., **Section 4.1**).

Specific circumstances of visibility of archaeological features in the alluvium. In the specific context of the Lugg valley alluvium, the visibility of archaeological features is closely associated with the character of the alluvium itself. At Wellington, the visible alluvial stratigraphy essentially consists (with localised variation) of 3 principle units (**Sections 4.1 and 3.1**). Immediately above the gravel substrate, a thin band of gravely red/brown material (typically not more than 30 cm in depth) forms Unit 3. Unit 2 is a buff coloured silty/clay deposit which can be over a metre in depth. The topmost Unit 1 is a red/brown silt and clay layer, which can be up to 1 metre deep, but is usually less than this. Archaeological features are generally only visible within Unit 2, essentially imposing a significant practical constraint on recognition and recovery of archaeological data.

4.6.5 *Established archaeological field evaluation methodologies in the Lower Lugg*

Following normal archaeological Development Control procedures, recent assessment and investigation of archaeological areas in the Lower Lugg associated with quarrying development has proceeded according to PPG16 planning conditions (**Section 4.1**). This has essentially involved a two stage process of evaluation and subsequent mitigation. Except for the designation of the Roman Villa 'core area' within the original 1985 application area at Wellington, mitigation has focussed on strategies of preservation by record rather than preservation in situ.

At the evaluation stage, the limited utility in the flood plain of conventional non-intrusive archaeological field evaluation techniques (use of air photography, fieldwalking, conventional geophysics, desk top analysis of known data) means that prospection in the Lower Lugg alluvial areas is heavily reliant on effective direct sampling methods. Approaches that have been used by WHEAS at Wellington include (**Section 4.1**, Jackson and Dalwood 2007):

- Use of borehole data (where this is available commercially or where borehole survey can be undertaken for archaeological purposes) and auger survey. Analysis of groups of borehole and auger samples helps to develop understanding of subsurface alluvial sequences, and therefore to inform the probability that cultural material will be present in particular environmental contexts. It is also possible that cultural material will be directly recovered within core samples.

- Use of test pits (where viable) to supplement bore hole and auger data and to increase opportunity for recovery of cultural materials.

- The use of wide evaluation trenches (minimum of 5 metres). As well as allowing safe working, wide trenches facilitate sufficient exposure of areas of deeply buried horizons to maximise the chance of identification of cultural materials/features in a given trench. Larger areas also offer better opportunity for complementary sampling of palaeoenvironmental and geomorphological data.

- Flexible use of this suite of methods to supplement each other as required and to maximise sample area.

- Use of additional specialist on site advice to inform palaeoenvironmental and geomorphological sampling procedures, ensuring these are an integral part of the archaeological field evaluation process.

4.6.6 *Established archaeological mitigation methodologies in the Lower Lugg*

Following on from evaluation, the WHEAS mitigation methodology developed at Wellington now features a process combining watching briefs, salvage recording, and full (usually area) excavation. As well as following up the results of evaluation, this aims to provide archaeological control during general quarry stripping operations, and to utilise 'geoarchaeological' awareness within the data recovery and recording work. The key elements of the WHEAS approach (paraphrased from Jackson and Dalwood 2007) are:

Use of an archaeologically controlled approach to overburden stripping. This features alternating long sections through the deposits at the same times as areas are stripped in plan to variable archaeologically determined depths. The areas revealed in plan provide opportunities for the identification and investigation of archaeological features, while the long sections enable sampling and recording of associated alluvial and paleaoenvironmental deposits.

The depth of stripping to reveal areas in plan is varied, as the depths at which archaeological remains occur vary across the valley floor. The process is informed by evidence from the long sections and the previous strip. Provision is made for excavation to more than one plan horizon during any one strip since significant deposits potentially occur at different levels within any one area.

Specialised recording of alluvial sequences and associated palaeochannels is undertaken, ideally with the assistance of a geoarchaeologist. At Wellington, David Jordan of Terra Nova has worked with WHEAS archaeologists to create a system for recording alluvial sequences. Deposits revealed in section are drawn, and detailed alluvial profiles are recorded at regular intervals using a specialised pro-forma. Alongside a 'traditional' context based stratigraphic record, the alluvial recording system provides details of subtle variations in sediment structure, ped structure, staining, mottling, panning, coatings and evidence of rooting, cracking, and

worm action. Photographs, box samples and monoliths are taken to accompany the record. Ideally, periodic visits by the specialist geoarchaeological team are made ensure that the system is being properly used and that atypical alluvial strata are examined. This process of recording facilitates recognition of post-depositional change, especially in relation to its effect upon stratified deposits and feature/layer definition. It also ensures that the future archive can be used to determine whether the boundaries of texture and colour relate to parent material, depositional, or post-depositional processes rather than conventional archaeological interpretations.

Contingencies are agreed in advance to allow for excavation and recording of areas of important archaeological or palaeoenvironmental deposits which are unexpectedly revealed. Generally, it is hoped that evaluation is sufficiently rigorous and effective to identify major concentrations of activity. It is accordingly hoped that any deposits that contingency sums may be required to address are of limited extent, perhaps only comprising small single fill features such as isolated pits. In such cases, the establishment of a contingency (both time and budget) should allow the relatively rapid excavation of deposits with bulk sampling ensuring the maximum retrieval of artefacts and ecofacts as well as material which may be of use for AMS dating.

Critical analysis of established archaeological field evaluation and mitigation process

4.6.7 *How successful are current approaches?*

It is unquestionably clear that the methods evolved and adopted at Wellington quarry since the mid 1980s have identified, recovered and facilitated detailed contextual recording of highly significant archaeological sequences (**Section 4.1**). However, it is the very outputs of the evolved Wellington methodology which define understanding of what is likely to be found in the Lower Lugg alluvium, and as a result it is also hard to say in specific terms what might have been missed by following that particular approach.

It is therefore important to try to evaluate the success of current methods given the particular challenges of archaeological investigation in the Lower Lugg alluvium. The limits of effectiveness need to be defined in reference both to basic uncertainties about the nature of archaeological survival in the alluvium, and the practical issues of fieldwork strategy. These aspects are therefore subject to close scrutiny in the following sub-sections of this report.

4.6.8 *Post depositional change in the alluvium and differential archaeological preservation*

A fundamental constraint upon the investigation of archaeological sequences in the Lower Lugg is that understanding of the observed alluvial 'stratigraphy' in the area is still poorly developed. This is important to recognise because, aside from issues of the linking of interpretation of archaeological features to wider environmental data , it means that there is no fully developed understanding of how and why archaeological features are differentially preserved in the alluvium in the way that they are.

Among the key problems is the fact that, even in superficial terms, the three apparent stratigraphic units commonly observed at Wellington are not closely dated or related to specific depositional processes (see **Sections 3.1 and 4.1**). Moreover, there are considerable local variations in relative unit thickness and total alluvial depth across the flood plain even within a Wellington area which may not be closely relevant to the Lower Lugg flood plain as a whole. Both the underlying contour of the gravels and the topographic position with respect to

absolute height (and therefore to incidence of flooding episodes) are significant factors in determining such variation.

More fundamentally, it is not clear what the distinction between the units actually means in site formation process terms. Roseff (1992) argued that the contrast between Units 2 and 3 in particular primarily reflected differences in parent material, and that the discontinuity was therefore associated with a chronological point of significant change in erosion patterns in the Lugg catchment. However, more recent analysis (Terra Nova 2002) has argued the observed units may have more to with post depositional chemical alteration of deposits. Jordan has argued that fluctuation in winter water levels in the alluvium causes cycles of oxidation and reduction resulting in mottling and gleying which create 'false' colour change effects. He suggests that the apparent Lower Lugg alluvial stratigraphy may be substantially an outcome of such secondary processes (Terra Nova 2002). Although this debate is not resolved, the possibility of significant post depositional change in the alluvium does have important consequences in terms of the effectiveness or otherwise of established strategies for recovery of archaeology from the Lower Lugg flood plain deposits.

Jordan has concluded that the main result of the mottling/gleying process is effectively to 'strip out' the real stratigraphy as a phenomenon visible in section to the naked eye, and also to cause archaeological features to 'disappear' in some affected zones (Terra Nova 2002). This might well explain why archaeological features are not generally visible until the buff coloured Unit 2 is reached. For example, at Moreton Camp, linear boundaries which were evidently dug through at least the lower part of Unit 1 were only observed and recorded where the base of the ditches cut into Unit 2 (**Section 4.1**). However, the corollary is that the loss of information (lost in the sense that that features cannot be seen and therefore cannot be excavated stratigraphically and recorded) in Unit 1 is extremely hard to quantify, except for the fact that since Unit 1 is shallower/later, the observed pattern evidently privileges the earlier over the later periods. The assumption has been that Unit 1, being stratigraphically younger, is associated with relatively late deposition, and consequently the 'wiping' of the archaeology within it is confined to recent periods.

However, even where the archaeological features are visible in Unit 2, post depositional change is probably still an influence on what is being seen and the extent to which it can be understood against the normal frames of reference used in archaeological fieldwork. Firstly, loss of stratigraphic definition in terms of the detailed alluvial horizons of Unit 2 means that all features/periods effectively sit in one stratigraphic unit. As a result the relative interrelationship between features can only be shown where they directly intersect (essentially what cuts or overlays what), or where artefact associations or absolute dating techniques can be brought to bear on the chronological analysis of spatially disparate contexts.

Moreover, it may also be that some degree of differential selection of the relative visibility of different archaeological features is occurring even in Unit 2. One possible post-depositional process at work here is that stratigraphic boundaries which are sufficiently defined to form a marked hydrological discontinuity (such as some archaeological features) are paradoxically made more visible by superficial colour change in this particular context (Terra Nova 2002). However, if that analysis is right, it is not necessarily the case that such a process affects all Unit 2 archaeological features of all types and all periods in the same way. Moreover, it has been observed that archaeological features are visible at *different levels* within Unit 2, not necessarily with any clear stratigraphic inter-relation. The visible record in this horizon is therefore not a known quantity, and may be more incomplete than has generally been supposed.

A further issue is that if the Unit 1/2 distinction is indeed purely a post depositional effect, then it has little value as a generally applicable chronological boundary. Where the apparent stratigraphic change falls will be a local consequence of the precise micro-chemistry of different locations within the alluvium, and will relate in part to alluvial depth and variable conditions of waterlogging at given points in the floodplain. This is also means that it is not actually a safe assumption to suppose that only late features are being lost in Unit 1 - the Unit1/2 boundary could as well be effectively a late prehistoric 'cut off' in one place as a Post Medieval one in another. This also means that observed distributions of features from a given period within the alluvium may have more to do with differential preservation and discovery than the actual recovery of real patterns.

At one level, this complex group of issues does not alter the fundamental realities of 'doing' effective archaeological fieldwork in the Lower Lugg alluvium; archaeologists can only recover the features they are able to observe through pragmatic techniques of observation and analytical intervention. As noted above, the work at Wellington has already evolved to include detailed geomorphological recording of sediment size, type and disposition. The purpose of this has precisely been to go beyond the generalised observation of the superficial alluvial stratigraphy (which may not really be stratigraphy at all), and to develop specific understanding of the interaction of past human activity and particular geomorphological episodes at defined locations. Nevertheless, it remains the case that the broadly visible units structure the appearance of the archaeological record in the Lower Lugg alluvium, and that the effect of this on differential visibility of the archaeology in separate alluvial contexts is not as yet satisfactorily understood. Consequently, however effective the detection and recording of particular features or groups of features, there is a fundamental uncertainty in evaluating the consistency and overall value of the recovered archaeological sequence.

4.6.9 *Effectiveness of archaeological field evaluation methodologies*

In overall terms, there remains a significant question mark over the effectiveness of current evaluation strategies in the Lower Lugg. The key issue is the constraint of absolute sample size in large areas *vis a vis* archaeological patterns which are typically associated with small and dispersed features. In effect, the cumulative experience of Wellington is that the only certain method to identify the complex and deeply buried archaeology there is to observe large stripped areas, and that is obviously not possible to any degree within accepted definitions and funding parameters of 'archaeological field evaluation'.

Particular issues are:

- Borehole and auger data are not easy to interpret. In isolation from larger sectional exposures, the subtle textural and colour transformations in the Lugg alluvium are difficult to analyse, especially where some of that detail may have been smeared and obscured by the augering/boring process itself. Practical cost constraints within standard evaluation provisions mean that it is not generally possible to undertake a sufficient density of auger and borehole coverage to allow detailed understanding of the interrelationship of observed subsurface horizons, or to effect a degree of coverage which is likely to identify exiguous archaeological deposits (even if those can be recognised in core samples).

- Use of test pits is not practical/safe in deeper alluviated areas, and in any case does not necessarily add significantly to data from coring processes. Although vertical sections can be exposed and defined more clearly, and there is a marginally greater chance of

recognition of archaeological features and materials, lack of area coverage (both within and between test pits) still means this is a very restricted form of archaeological observation in large scale alluvial environments.

- Wide trenching is more effective in terms of quality of observation and potential for recognition of archaeology within trench areas, but it has the obvious practical/cost constraint that it can only be applied to a very limited sample of total quarry extraction areas. Moreover, the logistical capacity to undertake such work effectively is dependent on the depth of alluviation, and the most deeply buried areas inevitably pose limitations on the practicality and safety of restricted trenching.

4.6.10 *Effectiveness of archaeological mitigation methodologies*

It is clear the evolved system of post archaeological field evaluation mitigation has been a successful approach, both in allowing detailed recording of archaeological contexts, and crucially (given the uncertainties of the archaeological field evaluation process) in providing an adequate degree of broad level watching brief coverage allowing ongoing detection of archaeological features across the whole site area.

Nevertheless, a number of limiting conditions should be noted:

- Involvement of specialist geomorphologists and geoarchaeologists in the recording of alluvial sequences and palaeochannels is expensive, while such a specialist may not in any case be readily available alongside their other commitments (Jackson and Dalwood 2007). For both these practical reasons, it may be difficult to sustain consistent specialist input, and to maintain effective long-term recording control upon all alluvial contexts.

- It has already been noted that the evolved method of observing long section stripping to variable and archaeologically determined depths is a pragmatic response to the method and speed of overburden removal employed to date by successive quarry companies at Wellington. Although successful as an archaeological approach, it does fundamentally rely upon the continuation of established extraction approaches by the quarry company. Should, for commercial or other reasons, a different method and/or rate of 'overburden' removal be adopted by the quarry company, current archaeological watching brief and salvage recording methodologies may be significantly undermined.

- One practical weakness of observation of longtitudinal strips is that relationships between features in adjacent strips (and interrelationship of common levels) may be obscured by the differential removal/recording process. This is especially true because of the problems of stratigraphic recognition in the alluvium (see above). While in theory it will be possible to reconstruct larger areas from the record, in practice this requires consistent control of stripping depth and close application of uniform recording methodologies. This may not always be easy in the variable circumstances of day to day site working between one strip and the next.

- The established process of mitigation is reliant upon effective contingency planning, including funding and arrangements to cope with unexpected archaeological discoveries. Since PPG16, this has worked at Wellington via a good relationship between the MPA, successive quarry companies and the established archaeological contractor (WHEAS). It has moreover so far been the case that prior evaluation has 'worked' to the degree that additional discoveries have not demanded an archaeological response beyond the scope of

agreed contingency arrangements. Although it would be useful to take that as confirmation of the effectiveness of the existing arrangements, it cannot be guaranteed that this balance will always work out in the future, especially given the uncertainties over the effectiveness of archaeological field evaluation strategies.

- With the exception of the Roman Villa 'core area' preserved in the original 1985 application area at Wellington, 'mitigation' has exclusively meant preservation by record rather than preservation in situ. In the process, at least two sites of national importance (the Mid Saxon water mills examined in 2002 and 2004, **Section 4.1**) have been destroyed, even though their rarity and significance would have merited preservation is situ. There is a considerable concern that sites of similar or greater significance could be encountered in the future with no more capability for their satisfactory preservation (or, indeed, in purely financial terms, their investigation and recording).

Developing refined approaches

4.6.11 *Balancing evaluation and mitigation strategies*

In bald terms, it could be argued that the most archaeological field evaluation has achieved at Wellington Quarry in the post PPG16 era has been to give some detail to an expected archaeological resource that has then been recovered anyway within combined mitigation approaches (and that would have been so recovered without the evaluation stage). Indeed, it might be said that archaeological field evaluation in the alluvium has most often tended to confuse matters (and understanding of archaeological liability for quarry operators) by tending to give the impression that there is less archaeology in a given area than has actually proved to be the case. Such a situation also runs the risk of prejudicing the imposition of adequate archaeological conditions within a subsequent planning permission should the implications of prior archaeological field evaluation be misunderstood. The fact that archaeological excavation conditions were not applied to the 1990s planning permissions for the Lugg Bridge Quarry (where low percentage evaluation did not reveal cultural features) perhaps illustrates that danger.

One archaeological resource management response to this situation might simply be to drop the evaluation stage and focus all resources on the proven methodologies of post planning mitigation. In this scenario, all parties would accept from the outset that archaeological mitigation of the Lugg valley alluvium is a significant requirement, and would agree in advance parameters and contingencies to effectively deal with that situation in a post-planning context. Strategy and contingencies would be specified on the demonstrable basis of the experience of 20 years of archaeological work and discovery in the Wellington area, and the known density and character of archaeology in all areas of the Lower Lugg alluvium which have so far been subject to proper archaeological investigation. Archaeological resource managers/contractors would consequently have flexibility to identify and engage with (via preservation by record) the complex and dispersed archaeological sequences they know are almost certain to be present. The quarry company, for their part, would have some advanced definition of their liabilities/responsibilities, and avoid the up-front cost of archaeological field evaluation.

There are two obvious problems with adoption of such an approach. The first is that it does absolutely rely on adequate prior agreement via PPG16 between the MPA, archaeological curators, archaeological contractors and the quarry company. The good working relationships of this kind which are well established with respect to Wellington Quarry are obviously

desirable in any scenario, but cannot be taken as a given with respect to all future quarry sites in the area. It is an assumption that archaeological deposits of similar density and character to Wellington will continue to be found throughout the Lugg alluvium, and if quarry companies/the MPA decline to accept that proposition, then agreement will probably not be reached with respect to adequate post-planning archaeological mitigation arrangements. Dropping the evaluation stage only gives an archaeological resource management advantage if the principle and detail of significant archaeological intervention at the post-planning stage is accepted from the outset by the quarry company and the MPA. Arguably, such an approach would need to be predicated upon a wider field-based evaluation of the extent and nature of the geomorphological context and the associated archaeological 'risk'.

A second more fundamental problem is that removal of the archaeological field evaluation stage effectively undermines any potential for consideration of archaeological issues in the determination of planning applications (i.e. the criteria for determining whether a planning application is granted or not). The assumed archaeological resource (however potentially rich) has no value in terms of minerals planning assessment criteria which require demonstration of the regional and national significance of known archaeological deposits (see **Section 2.4**). Only hard evidence of archaeology could (in principle at least) be used to facilitate rejection of minerals extraction applications in the Lower Lugg for archaeological protection reasons. In the current state of understanding of the Lower Lugg alluvium, only prior archaeological field evaluation of proposed quarry areas can (however imperfectly) provide such evidence.

Such potential strategic problems do need to be balanced against the pragmatic realities of the situation. It is perhaps unlikely that current archaeological field evaluation strategies actually will yield archaeological information of a kind (such as clear demonstration of national importance of remains surviving in any particular location) which could then realistically form a basis for wholesale rejection of a planning application. Indeed, it could be argued that a more likely way to achieve an element of preservation in situ of archaeological deposits in proposed extraction areas would be to broker agreement with the quarry company through the planning process to the effect that some areas of high archaeological interest may be excluded from quarrying as a post planning mitigation strategy. This would, however, require the attachment of a planning condition whose consequences could not be quantified at the time of granting of the permission except in terms of contingent risk.

Of course, in situ preservation of this kind clearly comes with significant limitations. It is only likely to permit preservation of relatively small areas, and would ultimately be on the basis of mutual agreement rather than clearly defined and binding conditions; applying the principle might be a good deal more difficult than agreeing to it in general terms. Moreover, retention of isolated flood plain remnants might well be ineffective as a preservation strategy for vulnerable archaeological materials where surrounding quarrying significantly alters the hydrological and chemical circumstances of these remaining alluvial 'islands'.

These complex issues are, of course, relevant to realising effective archaeological resource management in river valley environments right across Britain, and ultimately the debate needs to be pursued at that broader level. In a sense, the determining factor is what archaeological resource management in a context such as the Lower Lugg flood plain is ultimately aiming to achieve. If preservation by record is felt to be the best way to retain the archaeological value of these environments, then a pro-active emphasis on maximising post-planning archaeological engagement makes considerable sense. It could reasonably be argued that current WHEAS methodologies in the Lower Lugg give a well tested basis for doing just that - at least within

existing processes of quarrying and current assumptions about the potential for archaeological recovery from the Lower Lugg alluvium.

However, if there is a serious intention of realising mitigation which facilitates viable large scale preservation of a (nationally significant) proportion of the resource in situ - and that means in planning terms having good quality prior knowledge of archaeological sequences - then there needs to be proper consideration of how evaluation of the archaeological resource in alluvial contexts can be improved. The aggregate extraction context section of this resource assessment (**Section 2**) has emphasised that the threat to much of the alluvium of the Lower Lugg is real. Consequently, it does also need to be understood that a strategic archaeological management decision which effectively removes the opportunity to oppose quarry development may also remove the future chance to ever re-visit the archaeology of a flood plain zone which may be largely quarried out in the next 50 years.

4.6.12 *Improving archaeological field evaluation methodologies*

The most obvious way to improve the effectiveness of evaluation in the Lower Lugg alluvium would simply be to increase the sample area in terms of large area trenching (with at the least the minimum 5% coverage now widely recommended for effective evaluation of archaeological sites with a definite or likely prehistoric component - see IFA guidance). However, the logistical and cost constraints on doing this in the context of large quarry areas simply cannot be ignored, and would almost certainly be resisted by the quarry companies. Aside from the financial and contractor time implications, the opening of large areas in deep alluvial deposits out of sequence with systematic overburden stripping is not popular with the quarry operators, and can create additional site management problems in terms of subsequent aggregate extraction patterns (Jackson and Dalwood 2007).

In effect then , the only way evaluation might realistically become more effective is if less intrusive extensive survey techniques can be developed to detect buried archaeology in alluvial contexts. In all cases a crucial component of this process will be to refine and improve collaborative recording and analytical procedures integrating other specialist geomorphological and 'geoarchaeological' approaches.

Geophysics. Although, as noted above, use of orthodox archaeological geophysical methods in the Lower Lugg alluvium have had limited success beyond detection of superficial features such as shallow ridge and furrow (Terra Nova 2002), specialised geophysical approaches may permit better detection both of archaeological features, and buried landforms which may be associated with archaeological deposits. Options may include:

- Use of Electromagnetic (EM) survey techniques which use variable conductivity to map gravel islands (low conductivity) and possible palaeochannels (high conductivity). In conjunction with supporting intrusive methodologies such as systematic borehole/auger sampling, it may be possible to begin to develop improved modelling of palaeotopography and better assessment of likely areas for recovery of archaeological features.

- Use of Ground Penetrating Radar. Although GPR has only produced limited results to date in the Lugg Valley alluvium (notably the detection of buried field markers at Lugg Meadows (Stone 1994), it has been demonstrated that GPR can detect former ground surfaces and peat bodies in deep alluvia (Terra Nova 2002, White 2003). The success of the technique relates to the electrical conductivity and moisture content of the soil (radio waves cannot penetrate wet/conductive ground), so it may be spatially variable in its effectiveness

according to these factors. Further GPR experimentation in the Lugg alluvium does have the local potential to show improved results.

- Use of high sensitivity Caesium type magnetometry. Although the Lugg Valley alluvium has naturally low magnetic susceptibility (Terra Nova 2002), use of Caesium magnetometry (as employed in the Walton Basin surveys of the mid 1990s, Gibson 1999) may facilitate improved detection of archaeological features at least up to depths of 1.5 metres. Even in low susceptibility soils where human activity has only limited magnetic enhancement effects, the sensitivity of the Caesium instrument has the potential to detect this small variation and still produce clear delineation of archaeological features.

Geochemistry. Detection of enhanced geochemical signatures caused by human activity - particularly linked to metal and phosphate deposition in areas of human settlement - does offer potential for detection of archaeological sites in alluvial contexts in association with analysis of core and test pit samples. Earlier attempts to use such methods at Wellington were not successful (Terra Nova 2002), but the potential to further assess this technique remains.

Improved coring and borehole techniques. The limited effectiveness of past archaeological coring strategies in the Lower Lugg in part reflects the problem of achieving sufficient density of uniform coverage (Dinn and Moran 1996). Across large areas, this poses evident logistical and cost problems. Solutions could include:

- Combining an extensive initial coring reconnaissance pattern followed by targeted coring at greater density to clarify initial results and further test more complex areas of underlying deposits.

- Using a large diameter corer mounted on a lorry. Although expensive on a daily basis, such an approach allows broad diameter cores to be taken allowing greater definition of core detail, and rapid coring permitting a relatively large number of samples to be taken per day.

- Liasing with the quarry companies to collectively undertake borehole/coring surveys, so reducing effective costs of archaeological data recovery by coring, and expanding the practical capacity to achieve large area coverage. Coring is a basic element of the geological prospection process for assessing the commercial viability of aggregate deposits. Collaborative working with the quarry companies would potentially allow mutual use of this data for both archaeological prospection and aggregate quality assessment purposes.

  Clearly this would require significant co-operation and mutual agreement between quarry companies and archaeological curators at an earlier stage than is normal. It would be necessary to resolve issues such as the commercial confidentiality of information. Advantages for the quarry company would be better definition of potential archaeological mitigation issues before proceeding with planning applications, and reduction of the need to pay for repeat coring work at the archaeological field evaluation stage.

Combining techniques effectively. Whatever the individual survey strategies, they will only work in relation to one another. Building up better understanding of how to combine techniques most effectively (also including the established trenching, test pitting, and detailed alluvial recording methods) is a key element of improving archaeological evaluation in the alluvium. Almost certainly there will be local variation in the effectiveness of different integrated methodologies, and a 'one size fits all' strategy is unlikely to be equally successful in

all places. There is therefore an important need to develop alternative suites of combined evaluation strategies, and to experimentally test those in controlled circumstances.

4.6.13 *Improving recovery of archaeological information*

The established post-planning mitigation strategies at Wellington quarry represent a well tested and pragmatic approach to recovery of archaeological data from the Lower Lugg alluvium (or at least the alluvium in the Wellington area). Nevertheless, the poor understanding of post-depositional change issues and the detailed depositional history of the alluvium still leaves a significant gap in understanding of the archaeology which is typically recovered from the alluvium. To be confident of maximising data recovery and analytical value of that data, it is important to overcome this deficit. Approaches may include:

'**Geoarchaeology**'

- Application of Thermoluminescent Dating to give better chronological definition to alluvial sequences, and to help identify absolute local depositional episodes beyond the superficial post-depositional appearance of alluvial units

- Use of close analysis of laminar structures in the alluvium to build better understanding of rates of accumulation and deposition, and the interaction of these variations with human settlement episodes

- Detailed sampling and dating of organic horizons in the alluvium to provide tighter chronological frameworks for associated archaeological features

- Full recording/dating of palaeochannel sequences to establish detailed patterns of development rather than assuming single channel sequence

Archaeology

- Maximising use of artefact studies and distribution analysis as a means of identifying 'missing' features and activity zones in contexts where post depositional change has removed evidence of 'features' (especially in Unit 1)

- Experimentally develop alternative trenching strategies to assess the 'lost' archaeological potential of Unit 1. One approach may be use of localised grids of test pit differentially excavated to different levels to facilitate close comparative observation of adjacent horizons. This will maximise the potential for recognition of 'erased' archaeological features via micro-observation of subtle stratigraphic and sedimentary change.

- Localised use of geochemical and magnetometry techniques (see above) within layered excavation of Unit 1 horizons to attempt to aid archaeological feature recognition

4.6.14 ***Conclusions***

- **The evolved WHEAS process of archaeological engagement with the Lower Lugg alluvial zone has provided (in tandem with current quarry operation practices) pragmatic and effective archaeological mitigation of quarrying of the Lower Lugg**

alluvium. That mitigation is essentially realised through maximising post-planning identification and preservation by record of the archaeological resource.

- **The difficulty of effective pre-planning archaeological field evaluation in the Lower Lugg alluvium (and indeed in all deeply buried alluvial contexts) is a significant issue. Standard archaeological field evaluation techniques are of limited and uneven effectiveness in the flood plain zone. However, any attempt to undertake larger scale intrusive investigation at the evaluation stage carries significant logistical and resourcing issues in the context of very large quarry areas.**

- **Under the minerals planning framework, archaeology has no meaningful potential to affect the determination of minerals extraction planning applications unless the presence of archaeological deposits of proven national/regional significance can be demonstrated. In the alluvium, only prior archaeological field evaluation is likely to provide such evidence. Given the problems of archaeological field evaluation, the effective result is that the capacity for preservation in situ of the archaeological resource of the Lower Lugg is currently very limited.**

- **Differential preservation and visibility of the archaeology in the specific circumstances of the Lower Lugg alluvium imposes significant but as yet unknown limitations on data identification and interpretation. Issues such as post depositional chemical effects on the visibility of archaeological features within the alluvium are not well understood. As a result it is not currently possible to absolutely define the effectiveness of existing archaeological fieldwork and analytical approaches.**

- **To maximise the successful curation of the archaeological resource of the Lower Lugg alluvium, it is important to continue to develop new fieldwork approaches which will improve archaeological field evaluation processes, increase the range of data recovery, and improve the interpretative potential of archaeological information.**

- **Experimental development of new techniques is unlikely to happen or be viable through existing developer funded archaeology processes, and indeed it is important that the ongoing application of proven methodologies is not undermined.**

- **There is a strong argument for a closely targeted research project to specifically pursue development of new archaeological methodologies in the Lower Lugg alluvium. That argument is underpinned both by the significance of what has been identified so far (Sections 4.4), and by the likelihood of increased quarrying activity in the Lower Lugg alluvium (Section 2).**