# NATIONAL MAPPING PROGRAMME:

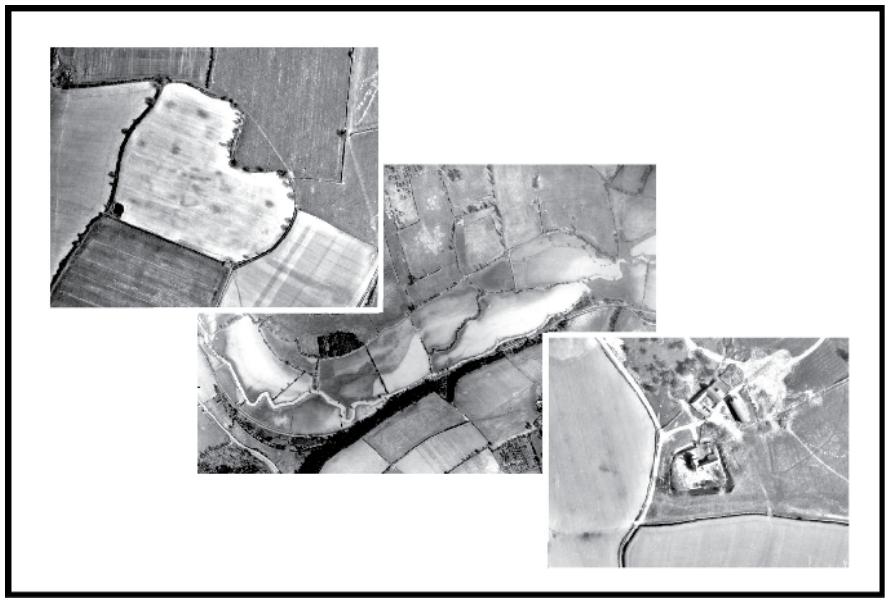
# THE LEADON VALLEY SAND AND GRAVEL AGGREGATE AREA

# (The Leadon Valley, ALSF)

PROJECT No. 4832

by

Russell Priest, Steve Crowther and Amanda Dickson



Gloucestershire COUNTY COUNCIL

ENGLISH HERITAGE

# Contents

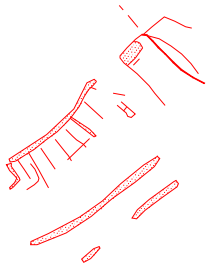
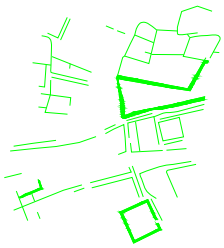
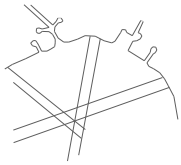
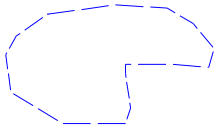
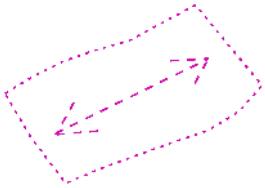
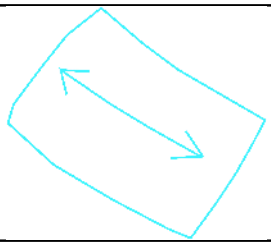
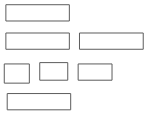
## List of figures

## Acknowledgements

English Heritage funded the Leadon Valley NMP Project through the Aggregates Levy Sustainability Fund. Thanks are due to Buzz Busby, English Heritage Project Officer and Kath Buxton, English Heritage ALSF Programme Manager at the Historic Environment Commissions Team. The National Monuments Record Enquiry and Research Service team and the Cambridge University Unit for Landscape Modelling (ULM) provided the photographs, and they are gratefully acknowledged for providing the loans. HER data was provided by Tim Grubb at Gloucestershire County Council Archaeological Service (GCCAS), and by Keith Ray and Lucie Dingwall of Herefordshire Archaeology at Herefordshire County Council.

Additional thanks go to Toby Catchpole at Gloucestershire County Council Archaeological Service for his support and to Adrian Chadwick for his editing skills. Thanks are also due to members of the English Heritage staff who provided training and assistance on all aspects of the project; particularly Sharon Bishop and Helen Winton.

## Mapping conventions

| | | | |
|---|---|---|---|
| Bank |  | Ditch |  |
| Extent of Area |  | Large Cut Feature |  |
| Levelled ridge and furrow |  | Extant ridge and furrow |  |
| Structure |  | | |

These are the mapping conventions used throughout this report unless otherwise stated. See Appendix 3 for the standard NMP map conventions and layouts.

## Summary

*This report describes the results of the Leadon Valley Sand and Gravel Aggregates Area National Mapping Programme (NMP) (ASLF Project 4832), which was carried out by the Archaeological Service of Gloucestershire County Council on behalf of English Heritage. The survey was funded through the Aggregates Levy Sustainability Fund (ALSF) and was carried out to National Mapping Programme (NMP) standards.*

*Using aerial photographs, the project sought to identify and assess historic and archaeological assets within the potential aggregate producing area of the Leadon Valley, an area with an apparent low density of archaeological records. The information obtained from this survey will be essential to understanding the extent and nature of the archaeological resource visible on aerial photographs, and hence identify some of the likely archaeological impact of proposed aggregate extraction or other development plans.*

*The survey area covers 126 km², taking in the River Leadon valley to the north-west of Gloucester. The project area is a five kilometre wide strip, located between Highnam and Churcham in the south to Staunton in the north; then extending west to Gorsley and north to Little Marcle. As a result of the aerial survey, a total of 187 new monument records have been added to the National Monuments Record (NMR) database (AMIE), and 25 existing monument records have been revised. The latter records were updated where the form or extent of the site could be clarified, or where more detailed information was necessary to provide a better understanding of the site. The Leadon Valley NMP survey has resulted in a 103% increase in the number of recorded monuments in the National Monuments Record (NMR) for the study area. National Mapping Programme data now constitutes 51% of the NMR record of the Leadon Valley area (see Appendix 4 for details).*

*Many of the sites identified in the project area represent the remains of agricultural land use and settlement activity during the medieval and post-medieval periods, including old field boundaries, moated sites and deserted settlements. Blocks of contiguous ridge and furrow are concentrated in the south-east and north-east of the project area. There is some archaeological*

*evidence of flood defences and water meadows bordering the River Leadon, reflecting past attempts to control and manage water resources.*

*Second World War military sites were located around Highnam in the south-east of the project area; representing both early war training establishments and camps, and late-war invasion preparations prior to D-Day in the form of US Army tented camps and a more substantial military hospital.*

*Many new sites relate to past industrial activities within the Leadon Valley including brick making, quarries, a canal and a colliery. Twelve groups of charcoal burning platforms have been mapped in fields surrounding Dymock Forest, Limbury Hill and Highnam Woods. These features were not visible when under pasture or woodland in earlier aerial photographs, but were identified and recorded as soil marks when ploughed in subsequent years. The identification of such features clearly demonstrates the importance of studying many different sequences of aerial photographs in order to identify and interpret past activities, and highlights the potential for locating and recording further as yet unidentified archaeological sites following any future changes in land use and agricultural regimes. Such changes can only be documented through continued targeted flying programmes, however.*

*The aim of this NMP aerial photographic survey was to increase the amount and the quality of archaeological information for the Leadon Valley, and it has significantly improved the existing archaeological record with the mapping of many new archaeological features. It has also identified broader archaeological themes such as the importance of post-medieval and early modern industry to landscape development. The results of the survey are not definitive, however. A significant area within the Leadon Valley remains an apparent gap in the archaeological record, but the possible reasons for this are discussed later in this report, along with potential means of addressing this problem. It is important to note, however, that aerial photographic interpretation alone cannot identify many forms of archaeology, and it has to be complimentary to other investigative techniques such as geophysical survey. In many instances such as the charcoal burning platforms, sites identified from the air may require fieldwork in order to establish their state of preservation, date and purpose.*

# 1. Introduction

The need to identify potential sites for sand and gravel extraction within Gloucestershire to supplement mineral extraction in the Upper Thames Valley led to the Leadon Valley Sand and Gravel Aggregate Area (No. 4832) National Mapping Programme (NMP) aerial survey, which aims to identify and assess historic and archaeological assets (as defined in Appendix 1) visible on aerial photographs within the potential aggregate producing area of the Leadon Valley (Grubb and Catchpole 2007). The Leadon Valley had an apparently low density of archaeological records (Mullin 2005) in comparison to neighbouring areas of the Forest of Dean, the River Severn valley and estuary and the Malvern Hills Area of Outstanding Natural Beauty (AONB) (see Figure 2). NMP aerial surveys that are currently ongoing or have been completed have contributed greatly to the archaeological record in the National Monument Record (NMR) for those areas.

The data collected from the Leadon Valley NMP aerial survey will be used to inform future planning and management decisions regarding the potential archaeological impact of aggregates extraction and other developments, within Future Mineral Local Plan reviews, reviews of existing minerals planning permissions and assessments of new applications for mineral planning permission (Grubb and Catchpole 2007). The NMP aerial survey also aims to enhance the archaeological record for the Leadon Valley area and the data collected will be added to the NMR, disseminated to Gloucestershire County Council's Historic Environment Record (HER) and through this portal, the data will also be available to members of the public and other interested parties (Grubb and Catchpole 2007).

The Archaeology Service of Gloucestershire County Council was commissioned to undertake the project, and aerial photographic transcription and mapping commenced in June 2007. This report presents the results of the archaeological aerial survey under the auspices of the National Mapping Programme (NMP), conducted by members of Gloucestershire Archaeology Service at the Aerial Survey and Investigation Department of English Heritage, at the National Monument Record Centre (NMRC), Swindon.

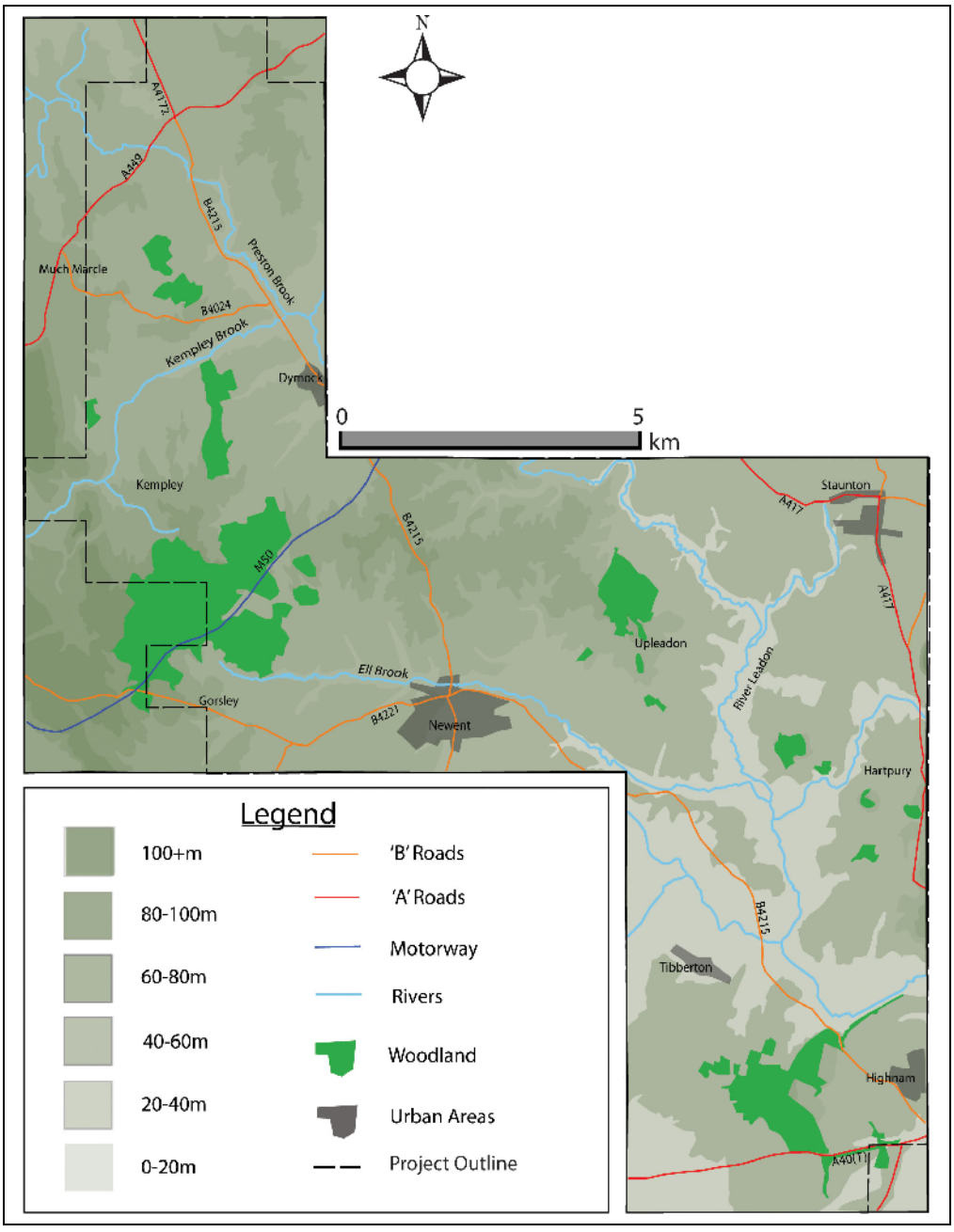



*Figure 1. Leadon Valley NMP (ALSF) aerial survey area*. Based on Ordnance Survey mapping © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008.

As shown in Figures 1 and 2, the Leadon Valley NMP (ALSF) project covered an area of 126 km² west of the River Severn and north-west of Gloucester; and also south-west of the Malvern Hills, north-east of the Forest of Dean and bounded along its northern and western edge by the modern Gloucestershire-Herefordshire-Worcestershire county boundaries. It is a five kilometre wide strip extending from Highnam and Churcham in the south, north to Staunton, then west to Gorsley and northwards again to Much Marcle and Little Marcle.

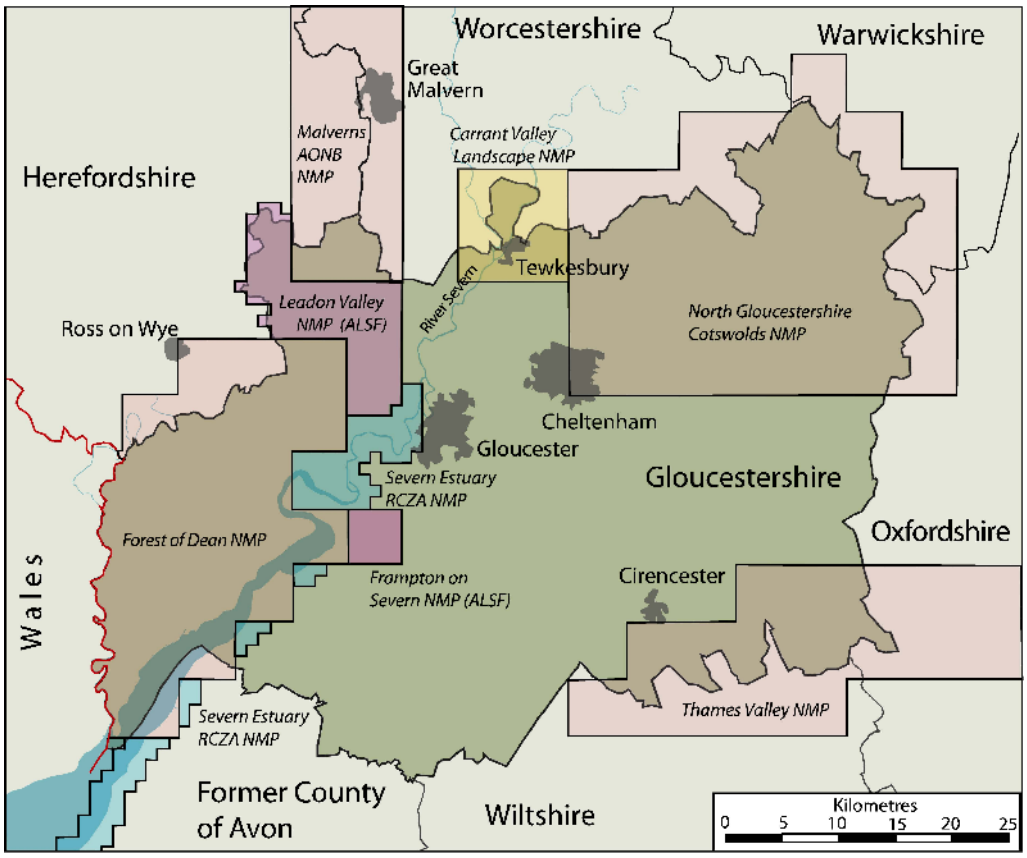



*Figure 2. The Leadon Valley NMP (ALSF) aerial survey, in relation to nearby National Mapping Programme projects.* Based on Ordnance Survey mapping © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008.

## 2. Methodology

NMP methodology entails the digital transcription, mapping and interpretation of all archaeological features visible on aerial photographs from the prehistoric period up to the post-war era, including all Second World War features and structures. This entails a systematic, detailed examination of all available oblique and vertical photographs derived from a number of sources, including the vertical and oblique aerial photographic collection of the National Monuments Record (NMR) held at the National Monument Record Centre (NMRC) by English Heritage in Swindon, as well as the aerial photographic collection held by Cambridge University's Unit for Landscape Modelling, formerly known as CUCAP (see Appendix 2 for details).

Vertical air photographs were examined with a stereoscope that allows a three-dimensional view of the landscape, in which upstanding earthworks and changes in relief appear more clearly (Wilson 2006: 32). This aids the identification and recording of archaeological features such as ditches and banks, as well as structures such as military defences. Aerial photographs were rectified using University of Bradford software (Aerial 5.29) and archaeological features were mapped using Autodesk Map 3D 2007. Standard NMP drawing conventions were used throughout (see Appendix 3 for details). New sites and amendments to existing sites were recorded on the NMR AMIE database and will be disseminated to the main HER database/GIS at Gloucestershire County Council.

Other sources of information used to interpret archaeological features identified in the aerial survey were:

- Aerial photographs from other collections, including images held by Gloucestershire County Council Historic Environment Record;
- Relevant geological information from the British Geological Survey (BGS);
- Historic Ordnance Survey mapping;
- The Gloucestershire County Historic Environment Record;
- The Herefordshire County Historic Environment Record;
- The National Monument Record. Including both published and unpublished text and maps;
- Documentary evidence such as Victorian County Histories; and books, reports and journal articles;
- Internet research resources such as British History online.

## 3. Photographic coverage

The majority of the aerial photographs examined were from the National Monuments Record collection at Swindon, where a total of 1053 aerial photographs were viewed – 826 were vertical images, and the remaining 129 were specialist archaeological oblique photographs. A further 51 vertical and 47 oblique photographs held by Cambridge University Unit for Landscape

Modelling (ULM) were also examined. Many ULM oblique photographs were general landscape records of the project area and thus only of limited application for the identification of archaeological features. A small number of photographs taken by Meridian Airmaps in the 1970s consisted of large-format vertical shots in continuous runs that covered the majority of the survey area.

Unrestricted air space over the Leadon Valley meant that there were few gaps in the aerial photographic cover. Most photographs used for this survey were vertical photographs taken by the Royal Air Force (RAF) and Ordnance Survey (OS) for mapping purposes, though these sorties were not as frequently flown as noted in other regions, as for example in the Severn Estuary Rapid Coastal Zone Assessment NMP aerial survey (Dickson and Crowther 2007) and the Forest of Dean NMP (Small and Stoertz 2006).

# 4. Factors affecting the archaeological survey

There were several underlying factors that affected the results of the Leadon Valley NMP (ALSF) aerial survey, and these are divided into two broad themes – the aerial photographs themselves, and the nature of the Leadon Valley's landscape and geology.

## 4.1. Aerial photographs

Vertical air photographs for the survey area were available from 1946 onwards, with sorties occurring on average every five to ten years. There were no photographic sorties available from the 1950s and 1960s, however, that provided full coverage of the survey area. A potential disadvantage of vertical aerial photographs is that they are not usually taken with archaeological purposes in mind (Wilson 2000), and although they usually provide more comprehensive coverage of a particular region, there is often less archaeological detail discernible on them.

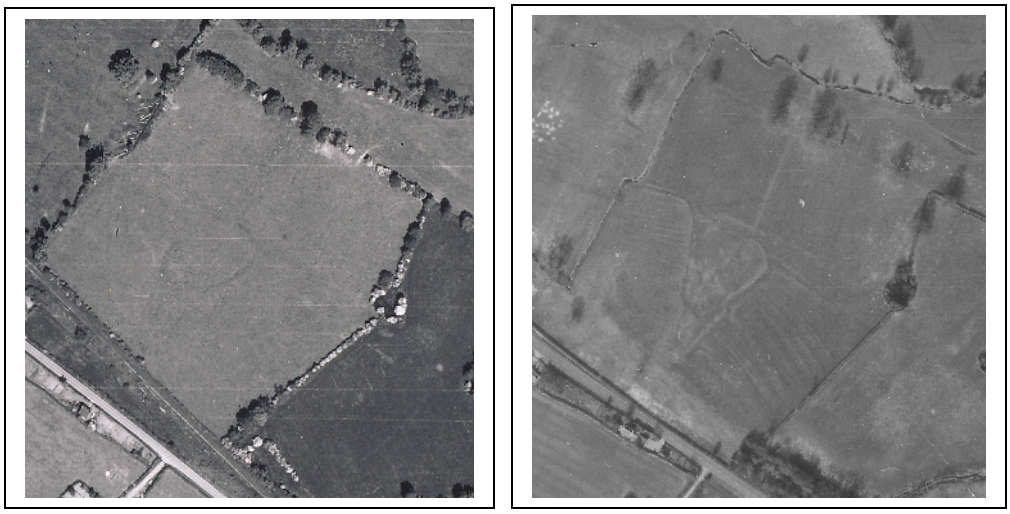


*Figure 3. (Left) Malswick near Newent, on a vertical photograph taken towards the height of summer close to the middle of the day.* (RAF/CPE/UK/2110 4414 28-MAY-1947 English Heritage (NMR) RAF Photography). *(Right) The same field in low winter sunlight, revealing details of the earthworks. Note too that the hedgerows and railway line have been removed.* (NMR OS/85009 033 11-MAR-1985 © Crown copyright. Ordnance Survey).

The effectiveness of the vertical aerial photographic coverage from the 1940s and 1950s was often limited, because lower image quality along with the season and time of day that the photographs were taken meant that these vertical images were often not suitable for identifying earthwork features such as ridge and furrow. In vertical photographs taken during the 1970s and 1980s by the Ordnance Survey in more favourable conditions, earthwork features were more apparent (see Figure 3).

Ordnance Survey vertical aerial photographs were often taken on large format cameras, showing great detail at a high resolution. The RAF tended to use medium format cameras, producing prints that are not as clear. Most vertical aerial photographs are taken for mapping purposes and the flying altitude is chosen to reflect the scale on the print, usually 1:10000 or 1:10560. Flying height can usually be controlled to within about 1%, but there may be variations between frames due to turbulence. Topographic relief and camera tilt can also cause slight scale variations (Read and Graham 2002: 9-12). Despite these limitations, vertical air photographs are invaluable for systematic archaeological surveys, particularly the three-dimensional images afforded by overlapping vertical photographs under a stereoscope (Wilson 2000: 52).

There has been little coverage of the Leadon Valley area from specialist oblique aerial photographs, and no additional aerial photography was commissioned for this project. The oblique and panoramic photographs obtained from Cambridge's ULM were of limited value, mainly due to the high altitude at which they were taken and a lack of control points for rectification. A future programme of specialist oblique archaeological photography within the Leadon Valley may help to address some of these issues.

## 4.2. Factors affecting cropmark and soil mark formation

The aerial photographs provide a record of landscape changes over the past 60 years. There has been a noticeable transition from mainly pastoral to arable farming within the survey area, and the removal of many hedgerows and orchards. Cider and perry production were once a key part of the rural economy (Newman 1982), but most orchards visible on aerial photographs taken in the 1940s and 1950s have subsequently been grubbed out.

Cereal production and dairying were the predominant agricultural regimes within the Leadon Valley during the 20th century, along with some fruit production (Juřica 2007b). Cereals generally produce good cropmarks but even sugar beet may still be responsive, and pasture can produce parch marks in grass (Jones and Evans 1975: 2; Riley 1983: 72; Wilson 2000). Relatively few cropmarks were identified during the NMP survey, but this does not necessarily imply a corresponding paucity of surviving subsurface archaeological features. Cropmark formation is greatly influenced by soil type, and lighter, more well drained soils are generally more conducive to cropmark formation than heavier, more poorly drained soils (Riley 1983; Whimster 1989: 20-22; Wilson 2000). The Leadon Valley contains light, coarse-grained and sandy well-drained soils in the west, but heavier, moisture-retaining clayey mudstone soils in the east, as shown in Figure 5. In addition, work on river floodplains elsewhere has shown that alluvium, colluvium and peat deposits may mask archaeological features (Knight and Howard 1995: 80-81; Riley 1980: 62-63; Whimster 1989: 20-22). The formation of cropmarks is thus likely to be extremely variable across the NMP survey area, and without further investigation their distribution cannot be taken as representative of the presence or absence of archaeological features.

Many oblique aerial photographs revealed cropmarks of post-medieval features such as field and land boundaries, tracks and enclosures; some of which were recorded by the Ordnance Survey for their first edition series of maps in the 1880s, as illustrated by the cropmarks in Figure 4.

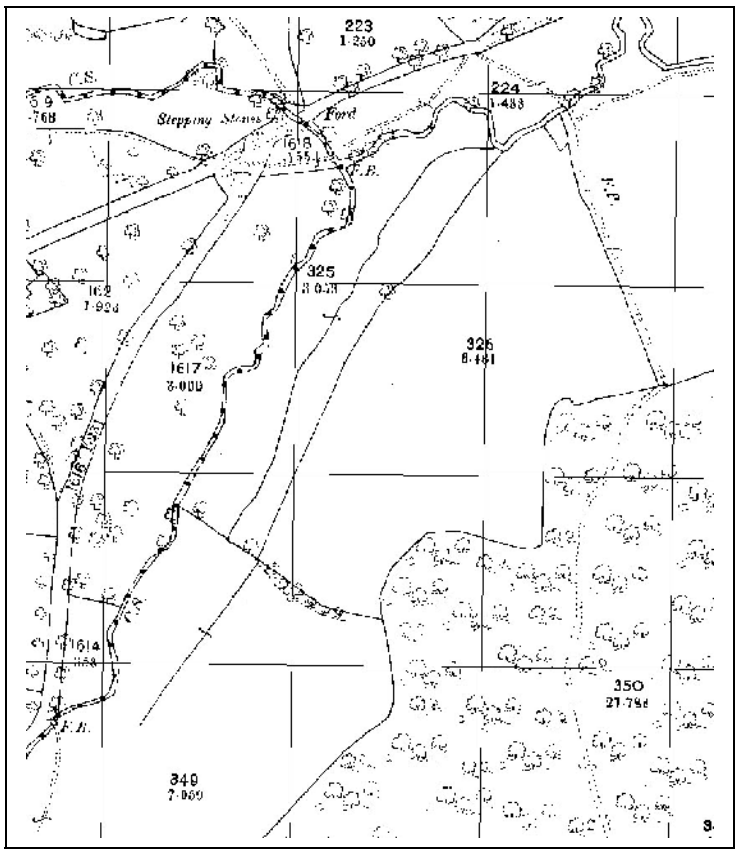



*Figure 4. (Above). Cropmarks of post-medieval field and woodland boundaries* (NMR SO 6925/5 (4220/17) 13-APR-1988 © Crown copyright NMR); *also visible (Bottom) on the 1883 1st Edition 1: 2500 scale Ordnance Survey map of Gloucestershire.* (1: 2500 scale OS Gloucestershire map 1883 © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

# 5. Landscape character

## 5.1 Geology, soils and topography

The landscape of the Leadon Valley NMP survey area can be grouped into three broad zones – the hills and vales around Newent; the lower undulating landscape around Dymock; and the flat, low-lying Vale of Leadon where it meets the Severn Vale.

As shown in Figures 1 and 5, the meandering course of the River Leadon itself dominates the eastern part of the project area. The lower reaches of the River Leadon between its junction with the River Severn at Over and south of Redmarley D'Abitot form a low-lying, flat floodplain and gently undulating river terraces with heights above Ordnance Datum (m OD) varying between 0-40m OD. Triassic mudstones and sandstones of the Mercia Mudstone Group underlie much of this area and give rise to slightly acidic loamy and clayey soils that have a tendency to become waterlogged after heavy rainfall, particularly in winter (National Soil Resources Institute 2007). Later fluvio-glacial drift deposits of sand and gravel overlie these soils, in addition to alluvium deposited by the River Leadon and its tributaries.

The central part of the NMP project area north of Newent is characterised by a 'domed' unit of soft red Bromsgrove Sandstone from the older Triassic Sherwood Sandstone Group, which over millions of years has been eroded to form a series of dry valleys separated by distinctive interlocking hillocks (Landscape Design Associates 2002). The latter usually vary between 25m OD to 50m OD in height, with the highest point at 95m OD at Hill View Farm, east of Dymock wood. The rich red soils derived from the Bromsgrove Sandstones are freely draining and slightly acidic and loamy in texture (NSRI 2007). Carboniferous Coal Measures underlie the Bromsgrove Sandstone and are exposed along a faulted zone. This coal seam, which is also present further south in the Forest of Dean, formed the basis of much past industrial activity (Countryside Agency 2006). There are few glacial deposits in this part of the study area, although Ell Brook, a tributary that flows eastwards into the River Leadon, deposited alluvium of Quaternary date (Figure 1).

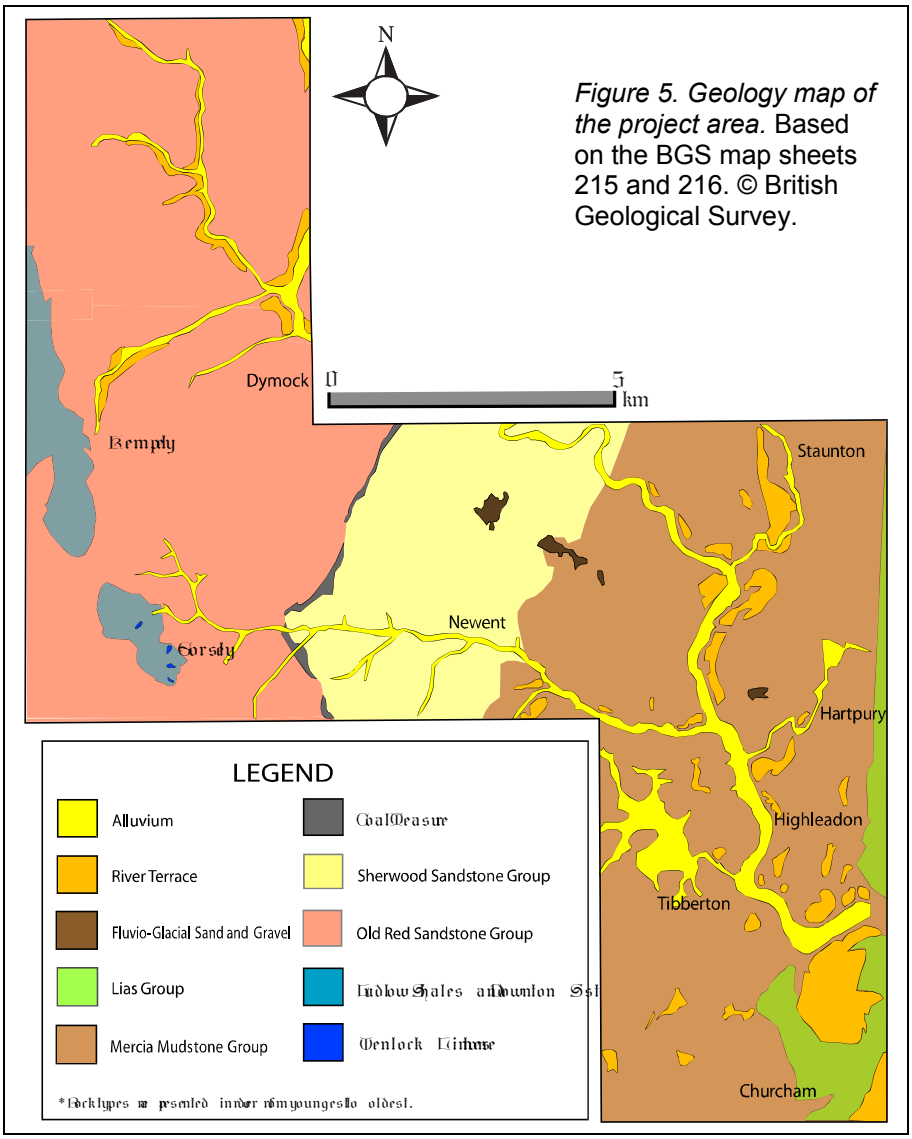



*Figure 5. Geology map of the project area.* Based on the BGS map sheets 215 and 216. © British Geological Survey.

The western part of the Leadon Valley in the area around Gorsley and west of Kempley has broad rounded hilltops with heights of 40m-100m OD with gently sloping hillsides. The hills give way to the north to a lower-lying landscape drained by the Preston Brook that flows south-east, and the Kempley Brook that flows north-east. Raglan Mudstone from the Silurian Old Red Sandstone unit underlies this area, with thin beds of sandstone and cornstone (calcareous conglomerates). These give rise to slightly acidic, loamy and clayey soils with poorer drainage (NSRI 2007). Small outcrops of Silurian shales and limestone from the Ludlow and Wenlock formations also occur, and the latter has been the focus of past extraction. Quaternary deposits in this area comprise head deposits and sands and gravels from river terraces of the Leadon and its tributaries, with alluvium within the river floodplains.

## 5.2. Land use

The modern settlement pattern within the Leadon Valley NMP project area consists mostly of small hamlets and farmsteads, arranged around churches or alongside roads and winding lanes. Some larger farmsteads and manor houses are associated with medieval moated sites, illustrating some continuities of rural settlement. The largest urban centre is Newent, which developed from a small medieval market town but might have earlier origins. A Chartist settlement at Snig's End, Staunton, in the north-east part of the survey area resulted from a social and political experiment of the 1840s that attempted to bring the 'working classes' back onto the land, in response to the deprivation caused by the Industrial Revolution. Only some Chartist cottages remain unchanged today (Lockie 2007).

*Figure 6. General aerial landscape view, looking across Highnam Court towards the Leadon Valley.* (NMR SO 7919/8 (18630/11) 15-DEC-1999 © English Heritage NMR).

The land use within the survey area is diverse. Arable farming predominates due to the fertile soils, but as shown in Figure 6 there is also a patchwork of meadows and orchards, particularly in the western and eastern blocks of the survey area. The modern tree cover consists of small deciduous copses and shelterbelts, as well as larger woodland at Highnam and Gorsley, but was much more extensive in the past. The largest wooded area is Dymock Forest, north of Gorsley, with evidence of coppicing and assarting over the last 100 years. Orchards were also more extensive than today, and the cider and perry industry was at its height during the 18th and19th centuries (Newman 1982).

The modern B4125 road might lie along the route of a possible Roman road (1325937/Linear 614) that linked Gloucester to the south-east with the fort at Stretton Grandison (Margary 1973, RR610). Possible traces of this Roman road were noted on aerial photographs (Figure 12; but see discussion below). The more recent M50 motorway cuts through Dymock Forest. In 1793, construction began of the Hereford and Gloucester Canal (112342/SS 64 SE 44) to transport coal from Newent Colliery to Hereford, but the colliery ended production before the canal become commercially viable and it was not completed until 1845. Part of the route was later turned into the Gloucester and Ledbury Railway (113567/Linear1764), built between 1881 and 1885, but this too eventually became disused. Sections of the canal and railway are still visible within the landscape today (Historic Herefordshire 2007).

Mineral extraction is no longer a major industry within the NMP project area, but evidence of past exploitation is still visible within the landscape. Small-scale local quarrying of sandstone and Wenlock limestone took place to provide building materials, and the surface Carboniferous coal measures exposed around Gorsley and Newent were dug for fuel. There is also evidence of clay extraction used in the pottery and brick industries. The principal mineral resources today are the river valley deposits of sands and gravels, used mostly in the aggregates industry. To date, these deposits have not been intensively exploited within the NMP project area, but to the north of the survey area at Bromsberrow, an area of sand and gravel is currently being extracted (Grubb and Catchpole 2007). This NMP project is thus a valuable opportunity to inform management and development plans before any large-scale extraction takes place.

# 6. Introduction to the archaeological evidence

The Leadon Valley NMP survey area has the lowest known monument density of any of the 'sand and gravel' sub-units highlighted as possible extraction areas in the Aggregates Landscape of Gloucestershire report (Mullin 2005). The later prehistoric, early medieval and modern periods within the Leadon Valley in particular are little understood (Grubb and Catchpole 2007).

## 6.1. Previous archaeological study and aerial survey

Prior to commencement of the NMP aerial survey, the English Heritage NMR database was consulted for monument records of all archaeological monuments and records of fieldwork such as excavations or fieldwalking, both within the Leadon Valley survey area and in the areas bordering it.

Some areas of Gloucestershire and Herefordshire contiguous with the Leadon Valley NMP project area have been subject to significant archaeological study. The Forest of Dean NMP aerial survey (Small and Stoertz 2006) covered an area 280 square kilometres in extent to the south-west of the Leadon Valley NMP (ALSF) survey. This was the largest single heritage survey of a wooded landscape ever undertaken in the UK (Hoyle 2007). As part of this project, the Forestry Commission and Gloucestershire County Council commissioned a LiDAR (Light Detection and Ranging) survey. The Forest of Dean and aspects of its industrial history have also been extensively studied by individuals such as Cyril Hart and by groups such as the Dean Archaeological Group (DAG).

Immediately north-east of the Leadon Valley NMP survey area, the Malvern Hills Area of Outstanding Natural Beauty (AONB) was also the subject of an NMP aerial survey (Winton 2005), as part of a wider English Heritage study that included ground-based survey (Bowden 2005; Hoverd 2003). Part of the Severn Estuary Rapid Coastal Zone Assessment (RCZA) aerial survey abuts the southern and south-eastern boundary of the Leadon Valley NMP area. This was commissioned to assess the potential archaeology and to inform future management of the Severn Estuary's intertidal areas and coastal hinterland, from Gloucester to Porlock Weir. Phase I of this project included an

aerial survey conducted as part of the National Mapping Programme (Dickson and Crowther 2007, forthcoming).

In Herefordshire, on the west and north-western borders of the Leadon Valley NMP (ALSF) project area, a significant quantity of archaeological survey and research has been undertaken. Between 2002 and 2006, the Herefordshire Aerial Survey conducted an extensive flying programme with the aim of increasing both the quantity of archaeological aerial photography and knowledge of Herefordshire's archaeological sites for incorporation into the county's Historic Environment Record (HER). This aerial survey project recorded many new sites (Musson and Ray 2007). Only one sortie overflew the Leadon Valley project area, however, over Much Marcle in 2006. During 1998 to 2001 the earlier Millennium Air Survey of Herefordshire was undertaken in conjunction with Herefordshire HER and Woolhope Naturalists Field Club (Richardson and Musson 2004). No photographs from these two projects were available for the Leadon Valley NMP (ALSF) survey, however.

A Historic Landscape Chararacter assessment of Gloucestershire was conducted by Landscape Design Associates in 2006 (LDA 2006), whilst a similar assessment of the Forest of Dean was undertaken in 2002 (LDA 2002). Herefordshire Archaeology also conducted a Historic Landscape Characterisation survey in 2004, leading to the publication series *Herefordshire Studies in Archaeology*.

These NMP aerial surveys and archaeological fieldwork undertaken in the regions surrounding the Leadon Valley highlight the comparative absence of investigation within the Leadon NMP area itself. Gloucester, Cheltenham and Tewkesbury are more densely populated and urbanised than the Leadon Valley, and consequently there has also been more developer-led archaeological fieldwork in those areas (Grubb and Catchpole 2007). NMP aerial surveys can dramatically increase the number of recorded sites within a survey area, and the results of the Leadon Valley ALSF NMP project has increased the number of known monuments in the National Monuments Record (NMR) in the Leadon Valley survey area by 103% (see Appendix 4). These aerial survey results, shown in Figure 7, are a first step in addressing this apparent paucity of data.

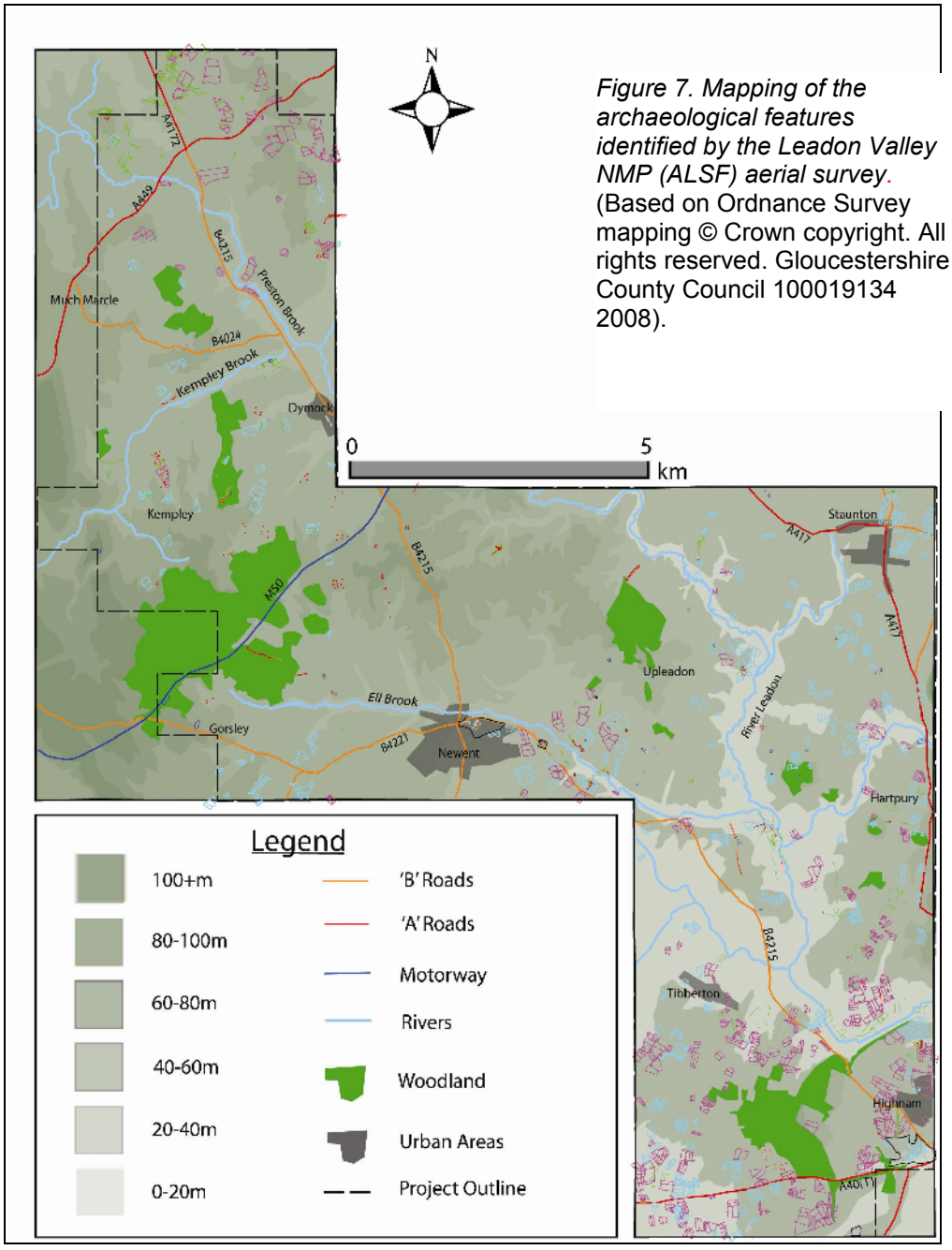



*Figure 7. Mapping of the archaeological features identified by the Leadon Valley NMP (ALSF) aerial survey.* (Based on Ordnance Survey mapping © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

## 6.2. The archaeology of the Leadon Valley

The results of the Leadon Valley NMP (ALSF) aerial survey are shown in Figure 7. A significant number of earthwork sites were recorded during the aerial survey, including many ditched or embanked features. Only a few archaeological features were recorded as cropmarks, although the relatively small number of oblique photographs that were viewed indicates the potential for recording future cropmarks with more systematic aerial sorties.

The majority of the archaeological sites identified and recorded in the Leadon Valley by the NMP survey are provisionally interpreted as being medieval or later in date, including some moated sites and other forms of settlement, and remains of agriculture and industry. The many industrial sites identified reflect the diverse geological and mineral resources in the survey area. Few archaeological features were identified as being prehistoric or Romano-British in date, but the wider region is known to have been occupied and exploited in these periods (Hart 1971), and numerous finds and archaeological sites have been previously recorded on the NMR and HER. The apparent lack of such sites is thus most likely to reflect the physical and methodological limitations of aerial survey in the Leadon Valley NMP area (discussed above) rather than a true lack of occupation during these periods. Few 20th century sites were recorded, but in addition to remains of stations on the Gloucester to Ledbury railway, the most significant features were Second World War military sites located close to Gloucester, two of which were previously unrecorded.

## 7. Prehistoric and Romano-British

The NMP mapping of the Leadon Valley ASLF project has identified and broadly categorised some possible prehistoric and Romano-British sites in the Leadon Valley study area. There are several recorded flint scatters from the Mesolithic, Neolithic and Bronze Age, along with isolated finds such as polished stone axes; but no readily identifiable features from these earlier periods have been recorded on the aerial photographs. Mesolithic features are slight and ephemeral, and are often largely destroyed by medieval and more recent plough action. Apart from burial or 'ritual' monuments such as long barrows and round barrows, even Neolithic and Bronze Age archaeology is vulnerable to later destruction. Several features have been identified as possibly late prehistoric (Late Bronze Age or Iron Age) or Romano-British in origin, mostly settlement enclosures tentatively classified as such on the basis of their morphology. There is also ambiguous evidence for possible sections of a Roman road (but see discussion below). The apparent lack of sites means that it is difficult to identify relationships between them; although it seems likely that far more late prehistoric and Romano-British settlements were once present than has actually been identified from the aerial photographs.

## 7.1. Enclosures

It is extremely difficult to date or classify enclosures or enclosed settlements from aerial survey alone, and some could range in date from the Bronze Age to the medieval period. Basic morphological classifications have been tested through fieldwork elsewhere, however, and this suggests that the examples within the Leadon Valley are most likely to be Iron Age or Romano-British in date, although of course this would have to be verified through geophysical survey, fieldwalking and excavation. A common form of late Iron Age and Romano-British settlement in lowland Britain was a single-ditched sub-circular or sub-rectangular enclosure (Cunliffe 2005; Dark and Dark 1997; Hingley 1989). These may have represented the farmsteads of extended family groups, although it is not know exactly how households were constituted. In addition to functional purposes, the ditches of enclosures may have been used to demarcate social space and express ideas of identity and even status (Bowden and McOmish 1987; Chadwick 1999; Hingley 1990; Thomas 1996).

It is often difficult to distinguish between Iron Age and Romano-British occupation, as even excavated enclosures often reveal marked continuities in settlement, particularly on small-scale rural sites (e.g. Chadwick 1999; Dark and Dark 1997; Hingley 1989; Taylor 1997, 2001; Willis 1997). Some sites were occupied continuously during this transitional period; some had a hiatus in occupation, whilst others seem to have experienced alternate phases of inhabitation and disuse over the course of many centuries. It is increasingly recognised that 'Romanisation' was an extremely complex, two-way series of cultural interactions (e.g. Barrett 1997; Chadwick 1999; Creighton 2006; Freeman 1997; Mattingly 2007; Taylor 2001), and although new crops, forms of material culture and trade networks were introduced by the Roman occupiers, there was a great deal of regional and temporal variation to this. Even settlements close to one another may produce very different quantities of Roman-style material culture. On the majority of Romano-British non-villa rural settlements, many aspects of everyday life would have remained essentially unchanged from the late Iron Age.

The enclosures in the Leadon Valley were visible as cropmarks in the 1980s, but there is a possibility that some have since been ploughed out or truncated. Only further fieldwork and continued aerial sorties specifically for oblique

archaeological images could answer questions about the dating, form, function and preservation of sites, and to better understand their original distribution within the landscape.

There is a possible Iron Age enclosure on a hilltop just west of Brand Green, Pauntley (91457968/SO 72 NW93), with three sides of a roughly sub-rectangular enclosure visible (Figure 8). Although recorded as a cropmark on aerial photographs from 1947, is not visible on images after this date, and may have been ploughed out or otherwise destroyed.

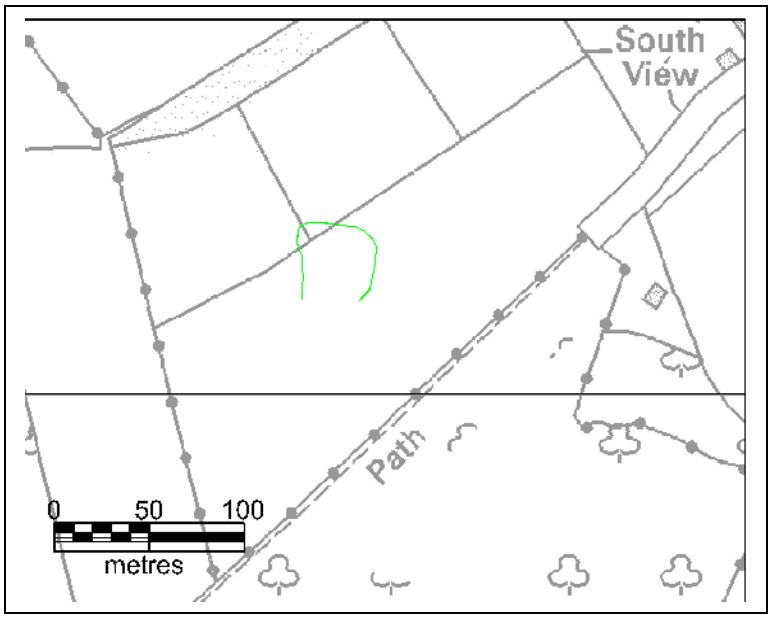



*Figure 8. Possible prehistoric enclosure near Brand Green, Pauntley parish.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

No other hilltop enclosures have been identified in the study area. There is no definite evidence of inhabitation such as pits or building remains, and also no evidence of contemporary trackways or a field system. Along with its relatively exposed location on a hilltop, this suggests that it was probably not a 'domestic' enclosure but associated with livestock, and in this regard the presence of springs and a stream only a few hundred metres to the south and east may be significant. Daily and seasonal movements of livestock around the landscape, onto both rich floodplain pasture and more elevated grazing areas, were a key part of Iron Age and Romano-British rural life (e.g. Chadwick 2007; Cunliffe 2004; Jennings et al. 2005).

Two further sub-rectangular cropmark enclosures were also recorded, in Dymock and Upleadon parishes. The Dymock example (Figure 9a) is a single ditched rectangular enclosure with a possible south-east orientated entrance (916750/SO 63 NE37), and is similar to simple late Iron Age and Romano-British enclosures (Cunliffe 2005: 261; Miles 1982: 72-76, Winton 2001: 21-24). It is close to a Roman road, the A417, between Dymock and Leominster (Margary 1973: 327-329). A small circular feature in the northern part of the enclosure may be a pit or well, indicating that other internal features might also survive, though these are often not visible as cropmarks.

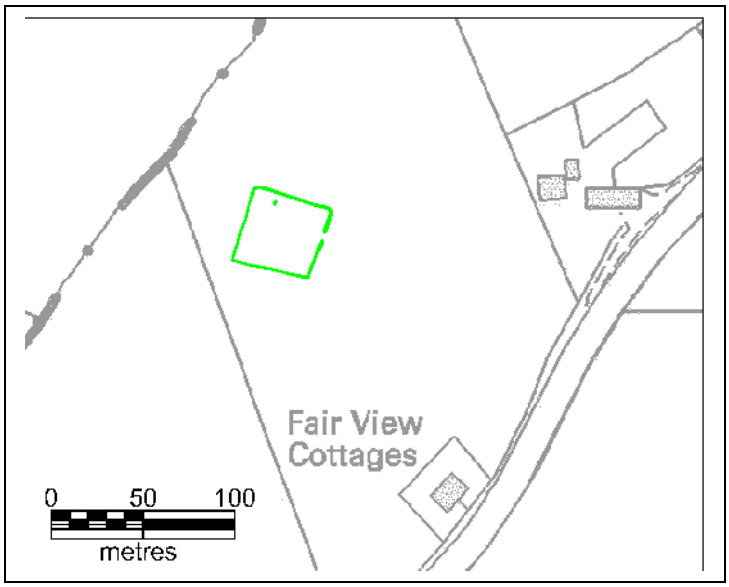
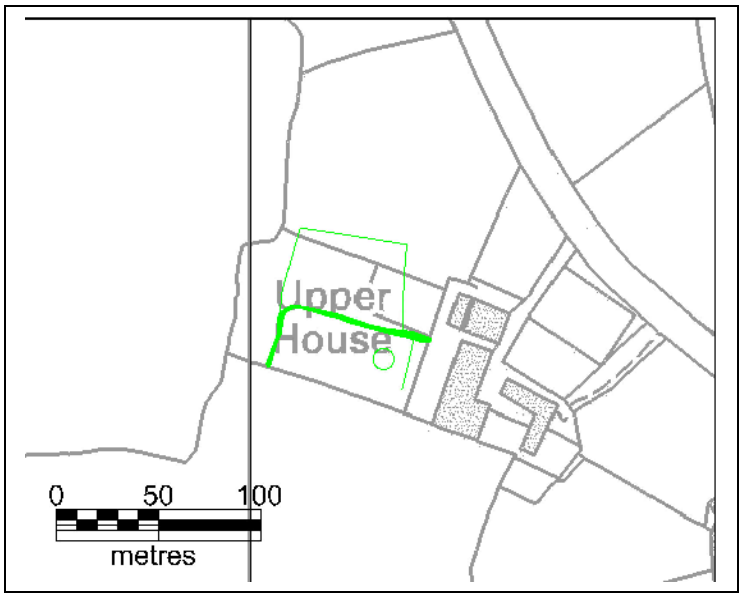



*Figure 9a. (left). Sub-rectangular late Iron Age or Romano-British enclosure near Preston Cross in Dymock parish.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Base map © Ordnance Survey).

*Figure 9b. (right). Late Iron Age or Romano-British enclosures and hut circle near Okle Green, in Upleadon parish.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Base map © Ordnance Survey).



More complex late prehistoric or Romano-British cropmarks in Upleadon parish (916812/SO 72 NE15) (Figure 9b) appear to show two sides of a sub-rectangular enclosure defined by a single ditch, with a possible internal subdivision defined by a narrower ditch or gully. Three narrower ditches to the north form part of a trapezoidal enclosure apparently appended to the larger example. Within the broader ditched enclosure, a circular feature approximately 10m across may be a Bronze Age ring ditch or barrow, or more likely the ring gully of an Iron Age or Romano-British roundhouse (Cunliffe 2005; Pope 2003, 2007). Again, this may suggest additional internal features may survive. The broader enclosure ditch forming a right angle seems to be perpendicular to medieval or post-medieval field boundaries. This might suggest it was contemporary with or later in date to the medieval landscape, but there may actually be many reasons why the cropmark was not visible in the field to the south, including vegetation type and ripening state. It may be the case that the later boundaries respected what was then still an upstanding earlier earthwork. Only detailed fieldwork would be able to address this.

Both enclosures are comparable with other probable late Iron Age or Romano-British enclosures (Dark and Dark 1997; Hingley 1989; Winton 2005). It is difficult to draw any conclusions about the character and location of these sites, though both are within 1km of the projected line of a Roman road. Their visibility is probably based on a fortuitous combination of conditions conducive to cropmark formation, and of having survived medieval and post-medieval ploughing. The visible ditches probably only represent the most substantial features of the sites, and other settlement evidence may well survive.

## 7.2. Roman roads

One Roman road within the Leadon Valley NMP study area ran from Dymock to Stretton Grandison (Margary 1973: 328-329, no. 610). From Dymock the course of two roads has been projected – one eastwards to a crossing over the River Severn, and one to Gloucester via Newent (Gethyn-Jones 1966; Leech 1981), although to date there is little evidence for these (Catchpole et al. 2007: 132-133). Another route linked Gloucester to *Ariconium* (near modern Weston under Penyard). In Highleadon parish (1457156/SO 72 SE52) there are two sinuous north-west to south-east orientated banks, separated by

a gap (Figure 10) through which the track to Highleadon Court runs. There are also irregular, possible quarry features that may have been contemporary with the post-medieval construction of the track to Highleadon Court.

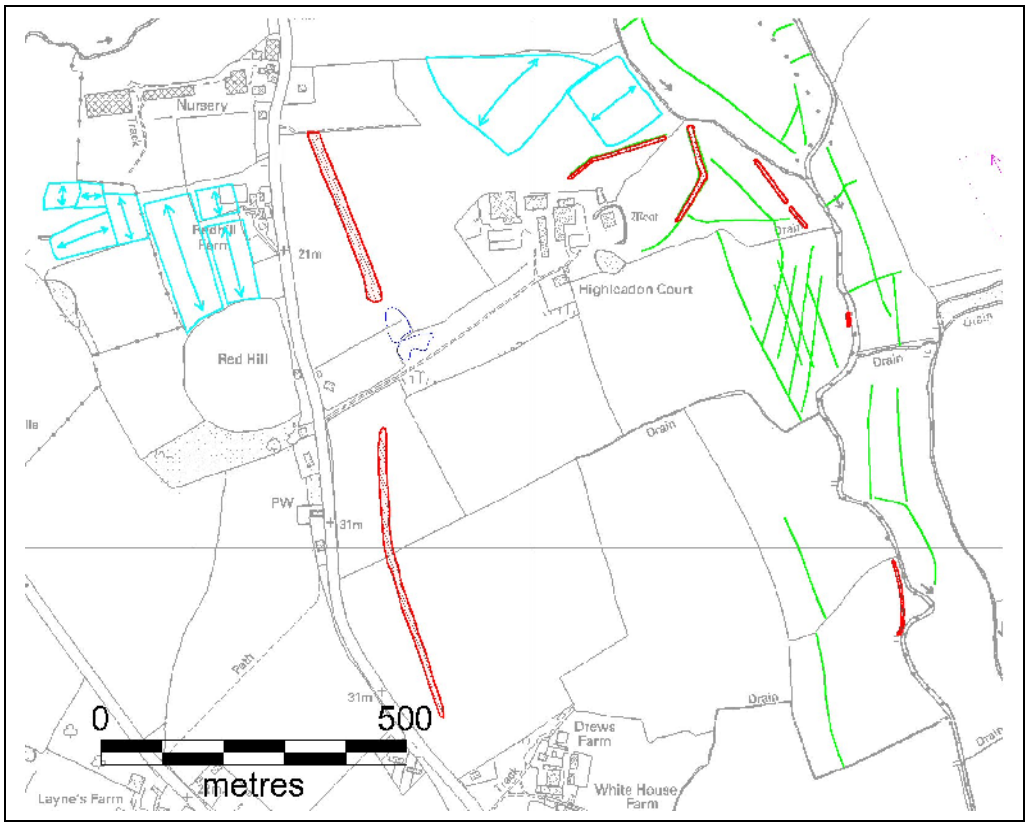



*Figure 10. Sinuous banks showing the possible course of a Roman road near Highleadon Court.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

In earlier drafts of this report, the two banks were proposed as being part of the presumed Roman road from Gloucester to Dymock. It was thought that the visible features were not themselves necessarily Roman in date, but might represent medieval or later re-use of a Roman route. It is notable, however, that the sinuous banks are broadly parallel to the line of the modern road, which may be medieval or post-medieval in origin, and although the post-medieval drive to the estate at Highleadon Court runs through the gap, it is not clear if the banks were cut by this track, or actually respected it. It is thus much more likely that the banks are themselves medieval or post-medieval in date. They may either be the remains of an earlier trackway that then shifted westwards, or the surviving earthworks of a headland associated with ridge and furrow agriculture. It may be significant that the banks are broadly parallel with some of the other ridge and furrow recorded in the area.

The northern section of the bank appears to be marked on the 1st Edition Ordnance Survey map (1883-1884) as an undefined trackway, and also appears on Ordnance Survey map editions from 1889 to 1974. The southern part of the road does not appear on any historical map, indicating that it was not a public right of way, or was never used as a trackway. It is noticeable that the northernmost bank appears to be broader than the southern example, perhaps the result of this later re-use as a trackway.

Features of another possible Roman road are visible near Highnam Green (Figure 11), where two parallel, north-south aligned ditches 5-9m apart may have been dug alongside a road (1325937/LINEAR 614). It is unusually straight for a medieval road and does not fit with the network of existing medieval roads, although as it is orientated directly towards Highnam Court some 250m to the south it may thus be a post-medieval carriageway or drive.

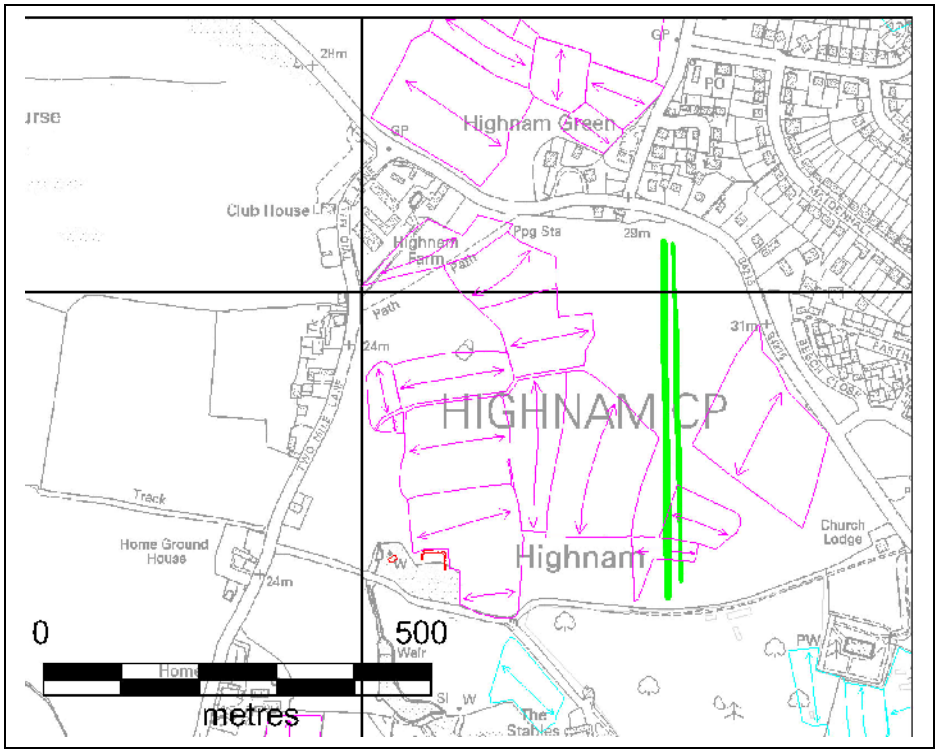



*Figure 11. Cropmarks of the parallel ditches of a possible Roman road near Highnam.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

These ditches are only visible on aerial photographs taken after 1999, after the probably medieval ridge and furrow obscuring it had been levelled. There is a serious possibility that this was a carriage drive leading to Highnam Court, and therefore post-medieval in date. Figure 12 shows both of the possible

Roman roads identified during this project, along with the projected course of Roman roads based on Gloucestershire County Council HER data. Such projections are often problematic, as generally they are assumed to be a straight line between settlements. Margary's discussion of the road between Gloucester and the fort at Stretton Grandison states that the road must cross the River Severn at Over. There are few indications of a Roman road between Gloucester and Dymock (Catchpole et al. 2007), and Dymock is where the first traces of an alignment are visible (Margary 1973: 328). Indeed, the *agger* of the Roman road north of Dymock was mapped as part of the Malverns NMP project (Winton 2001).

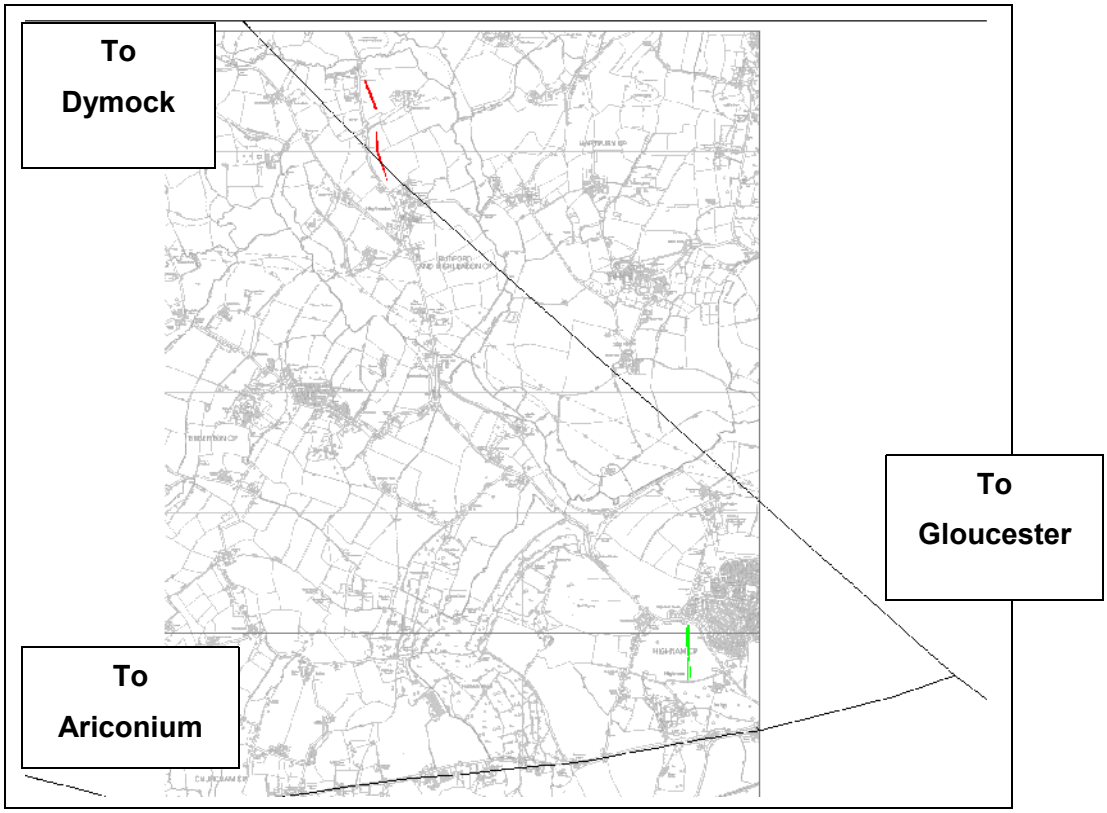



*Figure 12. The two possible sections of Roman road found during this survey project, shown as banks (red) and ditches (green) respectively. The darker lines are the projected course of Roman roads, taken from Gloucestershire County Council's HER data. Gridlines are at 1km intervals. Both are problematic.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

As Figure 12 indicates, neither group of features fit in with the projected Roman road network, and although the southern ditched features might have been a possible minor routeway linking two major Roman routes, their close spatial association with Highnam Court may suggest a post-medieval date. Further aerial photography, geophysical survey and fieldwork might be able to confirm whether any of these features are Roman in date or not.

## 7.3. Conclusions

Aerial photographic evidence for prehistoric and Romano-British inhabitation of the Leadon Valley is thus rather sparse. The Leadon Valley was situated between several large Roman settlements, however – Gloucester, Cirencester and Kenchester in Herefordshire. At Dymock there is evidence of a substantial Roman-period settlement with extensive pottery production and iron working (Catchpole et al. 2007; Leech 1981: 30-34). It is therefore likely that the Leadon Valley would actually have been a well-exploited rural landscape. In addition, the numerous find spots of prehistoric and Romano-British pottery and other artefacts recorded on the Gloucestershire HER indicate that the area was intensively settled, despite the lack of evidence for occupation on aerial photographs. In the adjacent Malvern Hills NMP project area for example, 8 to 10 morphologically similar sub-rectangular enclosures were identified, including three close to the upper reaches of the River Leadon (Winton 2001: 21-24). These settlements were recorded in areas more conducive to cropmark formation, however.

As outlined above in section 4.2, there are many contributory factors to cropmark and soil mark formation that can explain the apparent paucity of Iron Age and Romano-British sites within the Leadon Valley NMP project area. The low-lying floodplains and river valleys contain alluvium and colluvium deposits that may have masked some archaeological features. Long-term ploughing and cultivation, particularly medieval ridge and furrow and more recent intensive agricultural practices, may have resulted in the truncation and destruction of archaeological features, especially on hilltops and other areas with thinner soils. Nevertheless, the main reasons behind the lack of recorded cropmarks and soil marks are probably the heavier, poorly-drained soils found across extensive areas of the Leadon Valley, and the relative lack of targeted oblique aerial photography. There need to be many more archaeologically focused aerial reconnaissance sorties in the future, coupled with geophysical survey and field walking. Until such additional archaeological work is undertaken, assessing the likely original extent and state of preservation of late prehistoric and Romano-British features within the Leadon Valley NMP area from aerial photographs alone is likely to remain extremely problematic.

# 8. Medieval

The historic landscape pattern of the Leadon Valley seems to have been varied. It is located between the largely pastoral uplands of the Malvern Hills, and the wooded and more industrial Forest of Dean. Western England, including the study area, has been described as 'ancient countryside' characterised by a pattern of hamlets, small towns and older isolated farms (Rackham 1986:1-5). Hedges are mixed rather than dominated by hawthorn, and are rarely straight. Roads too are often sinuous, and there may be many holloways and sunken lanes. Woods are usually more frequent in such 'ancient countryside', and upstanding remains of older monuments, post-medieval water meadows and medieval settlements may in some instances more readily survive (see Figures 23 and 42), as such features might have been destroyed if there had been more extensive enclosure and intensive agriculture. Nevertheless, subsurface archaeological features frequently survive even after earthworks have been ploughed out.

The Tudor official John Leland travelled through the area in the 1530s and described it as largely 'champion' in nature, with large open-field systems (Smith 1964). This does not seem to be reflected in the distribution of areas of medieval or post-medieval ridge and furrow plotted from the aerial photographs, however (see Fig. 7). Although there are a few areas of extensive ridge and furrow, as around the modern settlements of Little Marcle, Preston, Tibberton and Highnam for example, surviving cultivation remnants are mostly smaller in extent and located near to extant farms or the earthworks of abandoned settlements.

Although the Leadon Valley was situated on the northern margins of the Forest of Dean, it was never within the boundaries of the medieval Forest itself or subject to Forest Law. Medieval settlement and economic practices within the Leadon Valley nevertheless owed much to the close proximity of the Royal Forest. The present Forest of Dean represents only approximately one third of its known historic extent, as it has been progressively reduced through assarting and by industrial activity (Hart 1971, 1995). The Forest of Dean was historically unenclosed, and it was specifically excluded from the 1845

General Enclosure Act (Tate 1943: 28). The first large-scale enclosure was of 208 acres in Dymock granted in 1862.

There has been little notable development in the study area since the 1st Edition Ordnance Survey maps were published in the 1880s, except for some new suburbs added to larger settlements such as Newent. The extent of many villages and woodlands changed little between 1880 and 1945 (Rackham 1986). It therefore seems likely that the medieval landscape within the Leadon Valley was characterised by some 'champion' areas with open fields around nucleated villages, but also 'wood pasture' with hamlets and scattered farmsteads interspersed with smaller fields, many of these assarts. There is widespread evidence of assarting (see Fig. 25), evidenced both by irregular intakes at the edges of woodland, and also features such as charcoal-burning platforms that would originally have been within woodland. These were recorded from vertical aerial photographs from the 1960s and 1970s, as soil marks in what is now arable land (see Figs. 50, 51 and 54). Assarting and charcoal-burning platforms are difficult to date, but much of this activity is likely to have been medieval or early post-medieval. Charcoal production is discussed further in the section on industrial evidence below.

One of the primary difficulties in interpreting the historic landscape is the problem of differentiating medieval from post-medieval features. Many agricultural processes and patterns of settlement were similar or reflected continuous occupation and social practices. Ridge and furrow can actually date anywhere from 12th to the 18th centuries, though in practice the older patterns can normally be identified. Large-scale changes including enclosure and the industrial revolution did not become widespread until the early 17th century, well into the post-medieval period (Wade Martins 2004). Features such as building platforms, small-scale quarry hollows, lynchets and holloways can be very difficult to assign to one period or another, and are rarely able to be dated from aerial photographs alone.

For the purposes of the NMR, the early medieval period is defined as the period between AD 410 and AD 1066. No cropmarks, soil marks or visible earthworks in the Leadon Valley NMP study area can be confidently assigned to this period. Even on lighter, well-drained soils more conducive to cropmark formation, remains from this period are notoriously difficult to identify. They

consist largely of pits and postholes, with only a few characteristic features such as rectangular, post-built timber halls, or sunken-featured buildings (*Grubenhäusen*). The medieval period is defined as the period AD 1066 to AD 1540. Many villages in the Leadon Valley study area have been continuously occupied since the medieval period, whereas other settlements contracted or were deserted altogether. Several medieval or post-medieval holloways and trackways were identified that might have related to contemporary settlements or individual farmsteads, and at least one earthwork wood bank in the study area might be medieval or early post-medieval in date. Much of the surviving ridge and furrow is likely to be post-medieval in date, but some of it has the distinctive 'reverse-S' outline more typical of medieval ploughing.

## 8.1. Settlements

The Leadon Valley NMP project identified several medieval settlements, the most extensive being the village of Lassington, Highnam (113424/SO 72 SE9) (Figure 13), focused around a moated homestead. The earthworks consist of a series of linear banks and ditches, probably the remains of old field boundaries that enclose blocks of largely levelled ridge and furrow. A possible channel or leat running from the stream may indicate that there was once a mill present, and/or a fish pond.

The Abbey of St Peter at Gloucester owned a one third share in Lassington Court and estate (Page 1907: 53-61). The site of medieval Lassington now consists of Lassington Court and the adjacent Astman's Farm. The remains of a church are also marked on the Ordnance Survey map, but few extant earthworks were noticeable on the aerial photographs. The ridge and furrow immediately to the west and south of Lassington is relatively narrow and straight, and probably represents the remnants of post-medieval ploughing or orchards. To the north, however, broader and more curvilinear ridge and furrow may be the remnants of medieval features. A number of modern ditches appearing between 1946 and 1969 cut some of the medieval ditches.

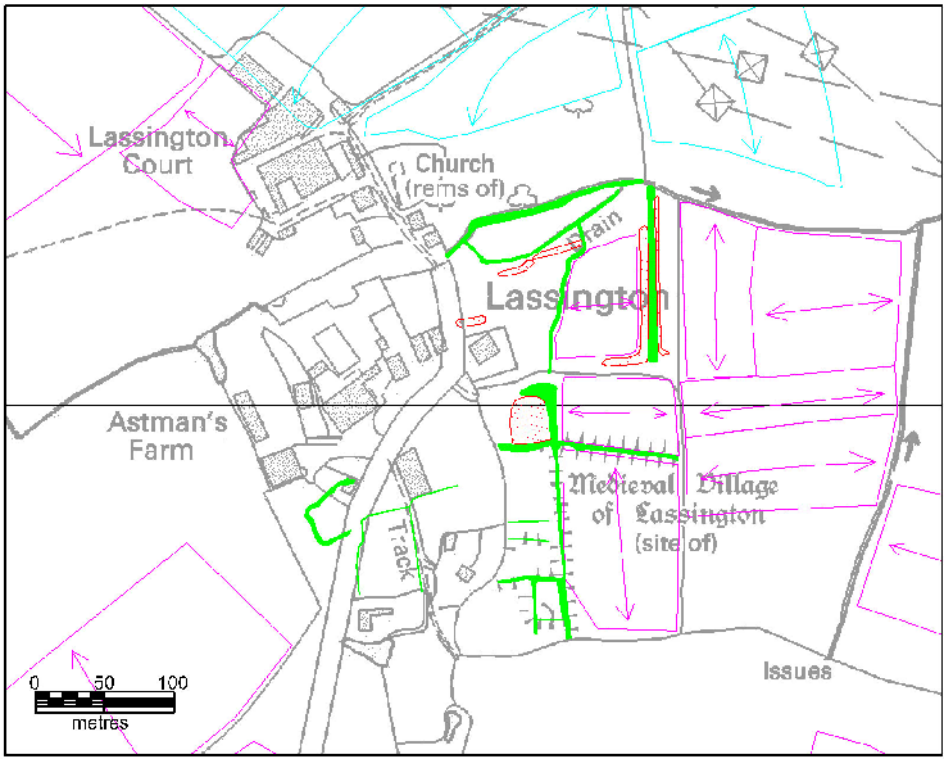



*Figure 13. Aerial photograph (above) and transcription (below) of Lassington shrunken medieval village.* (NMR OS/69076 019 04-APR-1969 © Crown copyright. Ordnance Survey © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

At Little Marcle (111964/SO 63 NE8) (Fig. 14), the earthworks consist of two tracks or holloways, a building platform and a number of possible clay extraction pits. To the south-west are several ditches around Laddin Farm. The earthworks may represent one dispersed settlement, associated with the ruined church noted towards the northern edge of the map; or perhaps two settlement sites, although it is not clear if these were contemporary with one another. It is more likely that Laddin Farm and Alderbrook Farm probably represent the surviving remnants of a shrunken medieval village or dispersed hamlet, one large enough during the medieval period to have its own church.

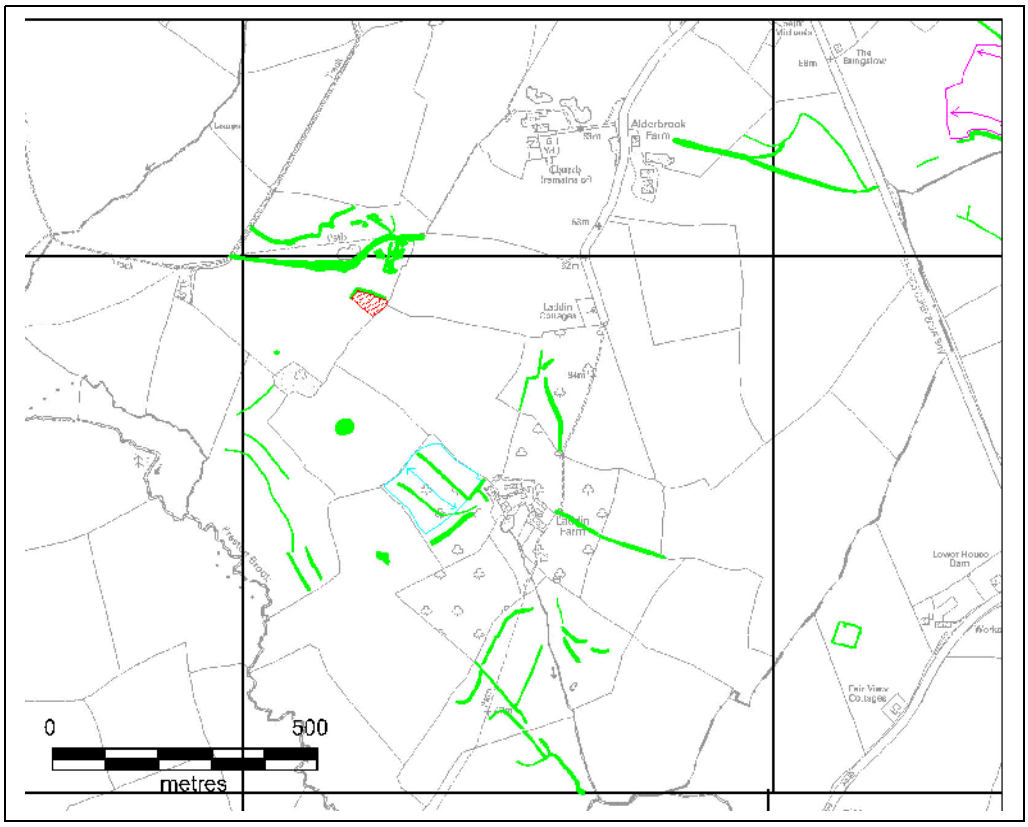



*Figure 14. Transcription of the earthworks around Little Marcle village.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

At Leddington in Dymock parish, earthworks mark another possible medieval settlement (1457495/SO 63 SE46) (Fig. 15), located within a field immediately north of Judgements Cottage also featuring two possible windmill mounds (1457300/SO 63 SE36). Narrower ditches to the north are probably the traces of trackways and sub-rectangular enclosures. The broader L-shaped ditch is probably a medieval or post-medieval field boundary, as it represents a continuation of a hedge line from the west, and continues to the south as the

line of a footpath. It is also possible that these features represent several different phases of occupation, some pre-medieval in date.

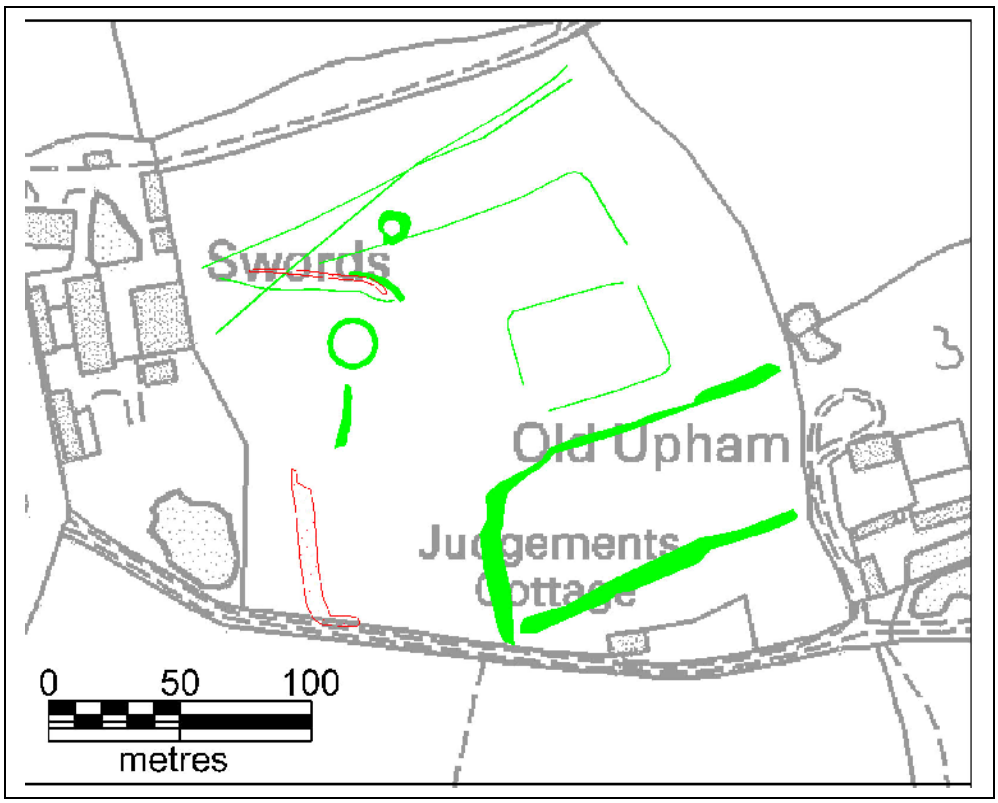



*Figure 15. Transcription of the cropmarks and earthworks around Leddington.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

Located to the north and east of Old Grange, north-west of Dymock are several holloways, along with other features likely to represent former boundary ditches or field boundaries (762985/SO 63 SE27) (Fig. 16). There are no obvious building platforms or tofts and crofts, however. The grange was almost certainly the manor house of a monastic estate a Cistercian monastic estate belonging to Flaxley Abbey, founded in the medieval period (Gloucestershire County Council SMR). At least some archaeological features were probably destroyed when this was a manor house, but also during the construction of the golf course now on the site. A nearby mill was still standing in the 1880s. At Malswick east of Newent, there are the remains of what was either a deserted farmstead and settlement, or possibly a medieval moated site (916806/SO 72 NW38). This consists of several holloways and ditches, along with blocks of ridge and furrow (Figs 17 and 18).

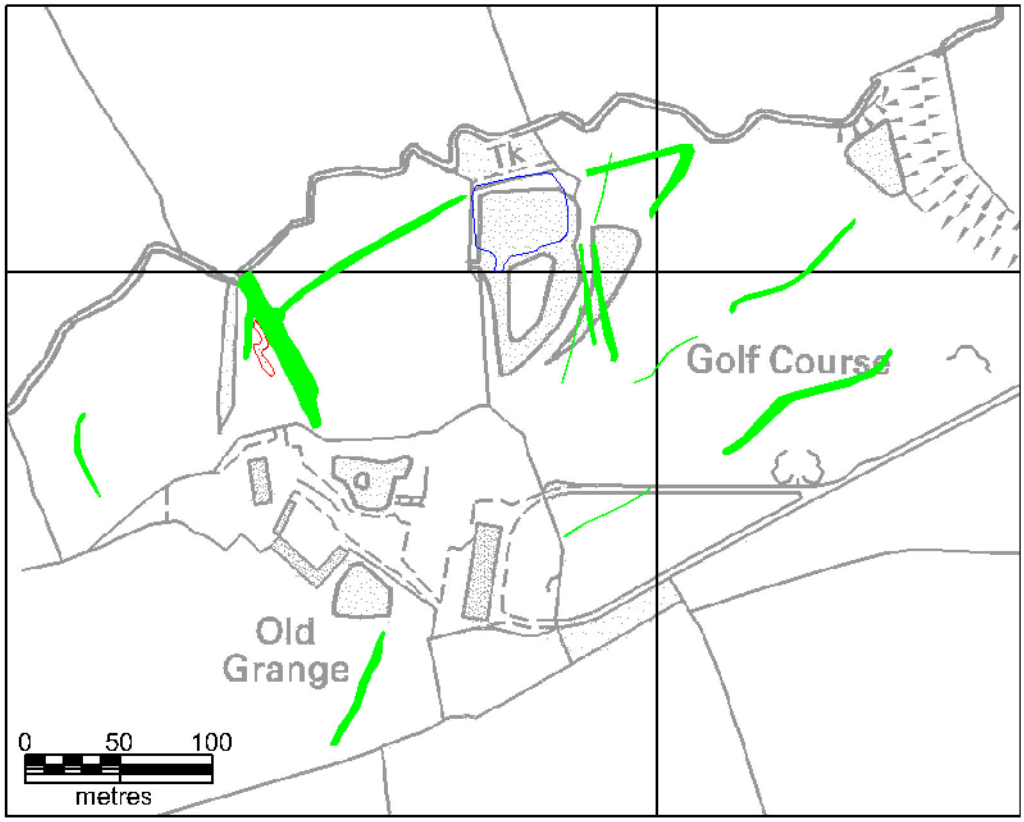



*Figure 16. Transcription of the earthworks around Old Grange, Dymock.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

*Figure 17. Aerial photograph of Malswick medieval settlement.* (NMR OS/85009 033 11-MAR-1985 © Crown copyright, Ordnance Survey).

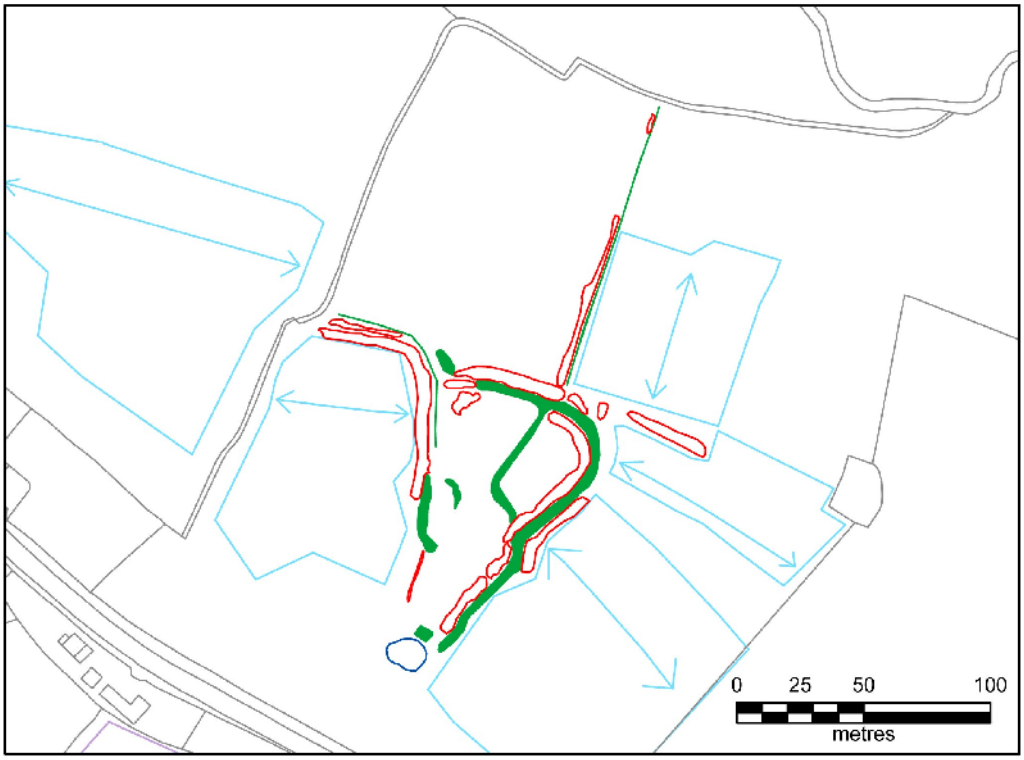



*Figure 18. A plan of medieval ditches, banks and ridge and furrow at Malswick, south-west of Newent, adjacent to the medieval route to Newent and Dymock.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

At Malswick, a broad ditch with a kink in its eastern extent defined a sub-triangular area, and fainter traces of another ditch visible running south-west from this kink may indicate two phases of construction. There may have been one enclosure linked to another, or a southern sub-rectangular enclosed area added to a pre-existing triangular feature. The enclosed areas are undulating and contain additional earthworks that cannot be plotted in detail through aerial survey, but which might suggest the presence of internal divisions and/or building platforms. There is a circular cut feature to the south-west. The complex is similar in plan to a group of features identified in the eastern Mendip Hills ALSF (Truscoe 2006: 21, fig. 9). At Malswick, the ridge and furrow respecting the features is broad, curvilinear and irregularly spaced, suggesting that it is medieval in date. The apparent absence of adjacent building platforms at Malswick might suggest that there was no closely associated settlement, although ditches and banks to the north, east and west defined additional areas orientated to the sub-triangular area. Additional detailed topographical and geophysical survey of this interesting complex would be extremely useful.

## 8.2. Field boundaries, trackways and holloways

Located within the southern part of Haind Park Wood in Dymock parish is a sinuous series of banks and depressions that probably represents the remains of a 'braided' holloway that may have once linked Kempley Green and Dymock (1457896/SO 62 NE27) (Figs 19 and 20). This substantial feature was only visible on aerial photographs because the trees had been felled in several large sections. The holloway might also have been re-used for moving timber, charcoal or quarried material out of the woods.

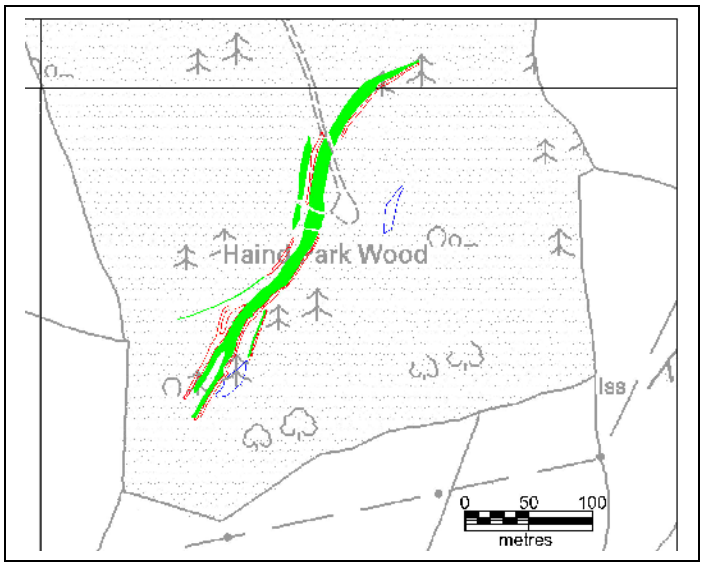



*Figure 19. (left). Plot of the substantial holloway within Haind Park Wood.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

*Figure 20. (right). Aerial photograph of the holloway in Haind Park Wood.* (NMR OS/71069 190 12-APR-1971 © Crown copyright. Ordnance Survey).

To the south, west and north-east of the village of Little Marcle (111967/SO 63 NE9 and 1456812/SO 63 NE46) are the earthwork remains of field boundaries pre-dating the 1st Edition Ordnance Survey map, some likely to represent part of the pre-enclosure medieval or post-medieval landscape (Fig. 21).

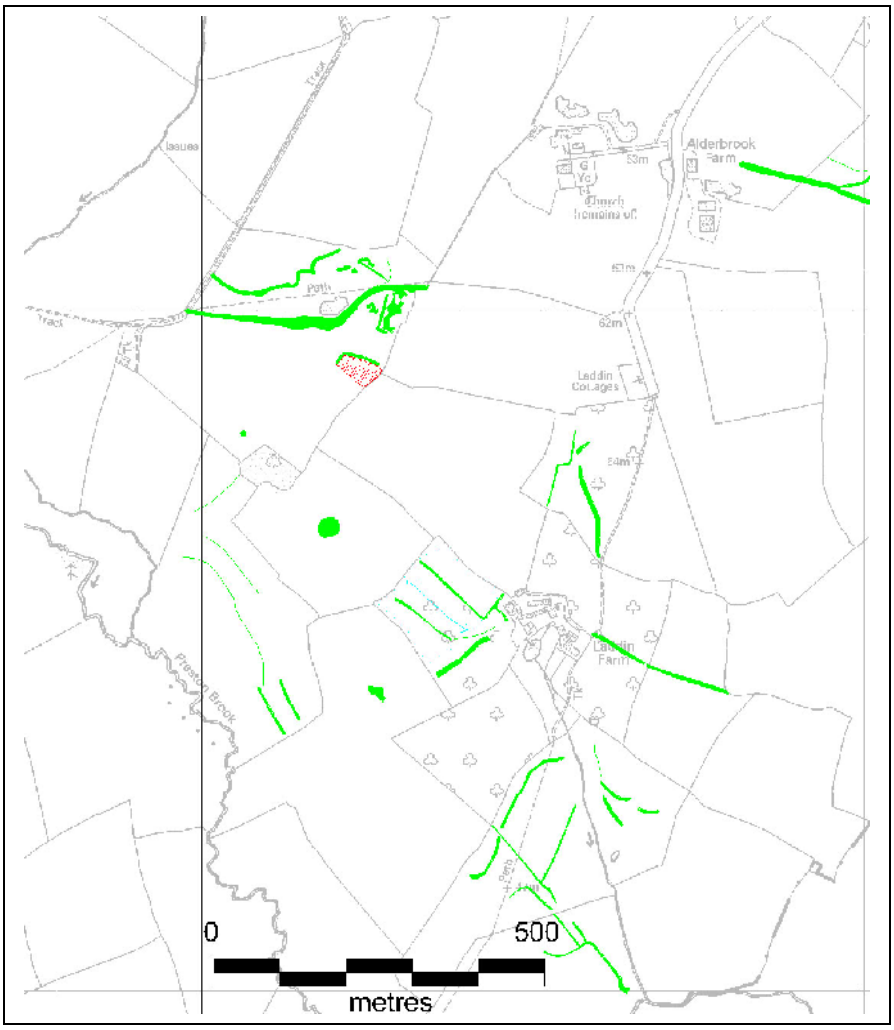



*Figure 21. Transcription of the features around Little Marcle.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

## 8.3. Ridge and furrow

The distribution of ridge and furrow earthworks suggests that they are concentrated around surviving or former farmsteads and moated sites, as at Malswick deserted farmstead (1457919/SO 72 NW68), Bellamys Farm (1457492/SO 63 SE45), Little Marcle (1456812/SO 63 NE46) and Tweenhills Farm (1457144/SO 72 SE44). Two broad types of ridge and furrow were identified in the aerial survey. The first has irregularly spaced ridges of broad

but variable width in 'reverse S' shapes, and this is probably medieval in date and created by ox-drawn plough teams (Hall 1982). The second type has straighter, narrower and more uniformly spaced ridges, and results from either post-medieval horse-drawn ploughing, or in the most regular examples early modern steam engine drawn ploughing (Allen 1992; Aston 1988). In addition, some ridge and furrow was later re-used in cider and perry orchards, with the trees planted along the old ridges. Most ridge and furrow recorded in the Leadon Valley is probably of post-medieval date, although in some instances these fields may have been under cultivation since the medieval period.

### 8.4. Windmill mounds and earthwork banks

The Leadon Valley NMP survey also recorded windmill mounds, woodland banks and banks on the River Leadon floodplain.

*Figure 22. The cropmark of a possible medieval windmill mound (arrowed) at Leddington. The lines running diagonally across the field are geological in origin.* (NMR SO 6934/2 (15158/24) 19-JUL-1994 © Crown copyright NMR).

At Leddington in the field north of Judgements Cottage, a possible medieval windmill mound (1457300/SO 63 SE36) was a circular earthwork in 1960s

aerial photographs, but by 1994 ploughing had reduced it to a ring ditch cropmark (Figs 15 and 22).

Sections of a sinuous earthwork bank with an associated ditch were recorded in Hay Wood, north of Gorsley and Kilcot (Fig. 23), perhaps a woodland boundary with the bank on the 'inner', wood side (Rackham 1986: 114). The earthworks were mapped from aerial photographs taken during 1946-1985, as areas of the wood were progressively felled. A further section of bank is visible as a cropmark extending from Hay Wood towards White House.

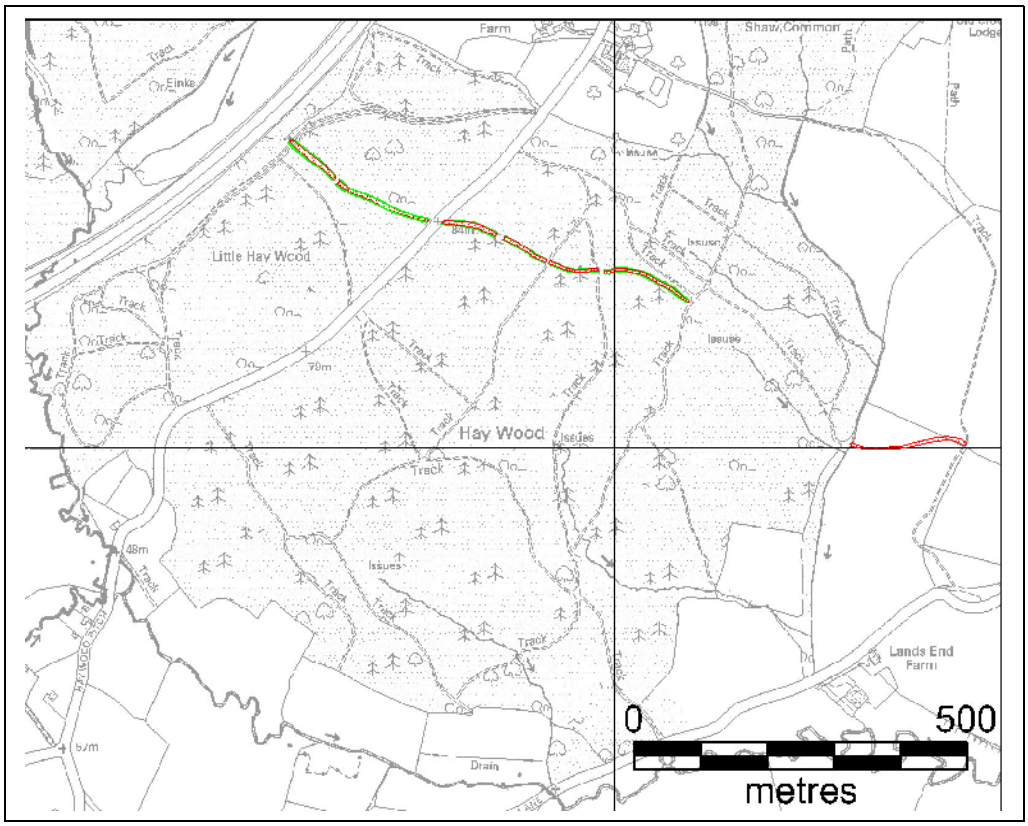



*Figure 23. Transcription of the earthwork boundary in Hay Wood.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

These earthworks are likely to have been a significant landscape boundary rather than an internal subdivision of the wood, as the bank alone is over five metres wide. The bank and ditch may indicate the original boundary of Hay Wood, or it could be a boundary that pre-dated the wood. Hay Park now extends beyond this bank as a plantation to the north, whilst assarting has changed the shape of the wood to the south, and possibly reduced it in size to the east. Hay Wood was once part of the more extensive Dymock Forest, now

bisected by the M50 motorway. Additional fieldwork, new aerial photography, and historical map regression would be useful to identify further stretches of earthwork and to help confirm the likely age and function of the boundary.

A series of banks east of Highleadon Court by the River Leadon (1457159/SO 72 SE55 and 1457160/SO 72 SE56) may have been flood defences for the moated house (Fig. 24), but are more likely to have been linked to a network of narrow ditches forming part of a post-medieval water meadow system.

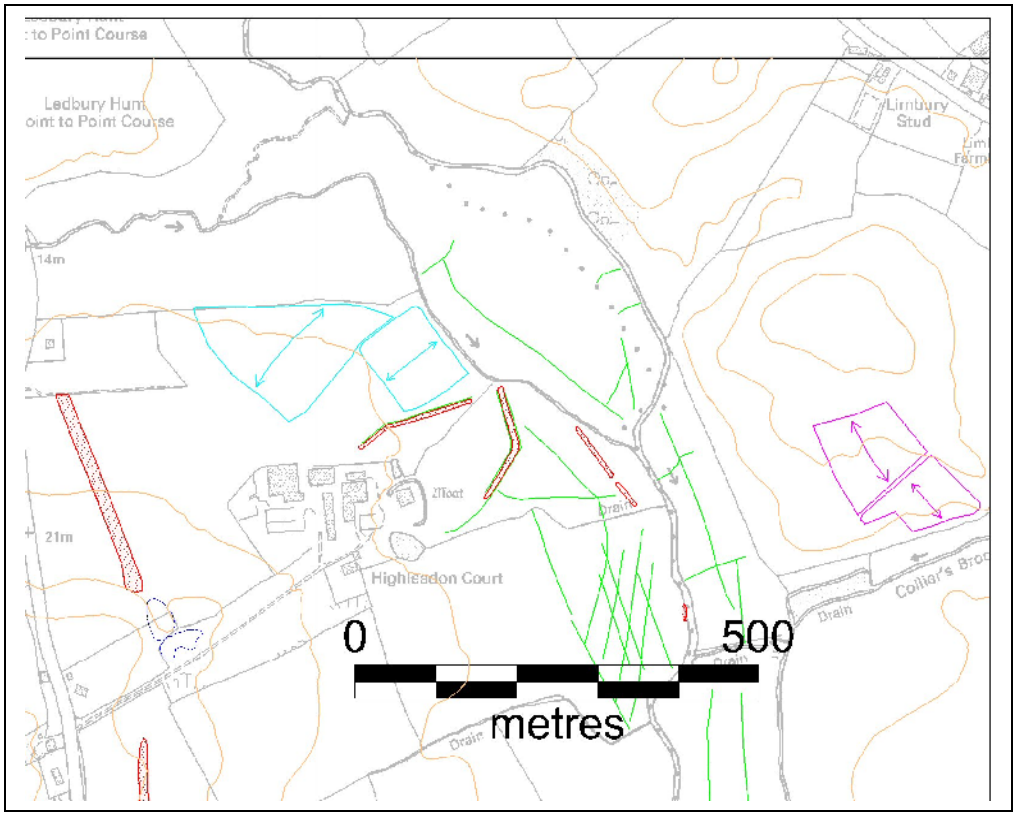



*Figure 24. Highleadon Court showing banks and water meadow features, and illustrating the flat river floodplain.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

## 8.5 Moated sites

More substantial medieval remains include several moated sites, most already known, and a motte. Several moated sites such as Highleadon Court and Greenway House were not clearly visible due to vegetation cover. Most moated sites recorded in the Gloucestershire HER are still existing farms, and many moats have been filled-in or obscured by modern farm buildings.

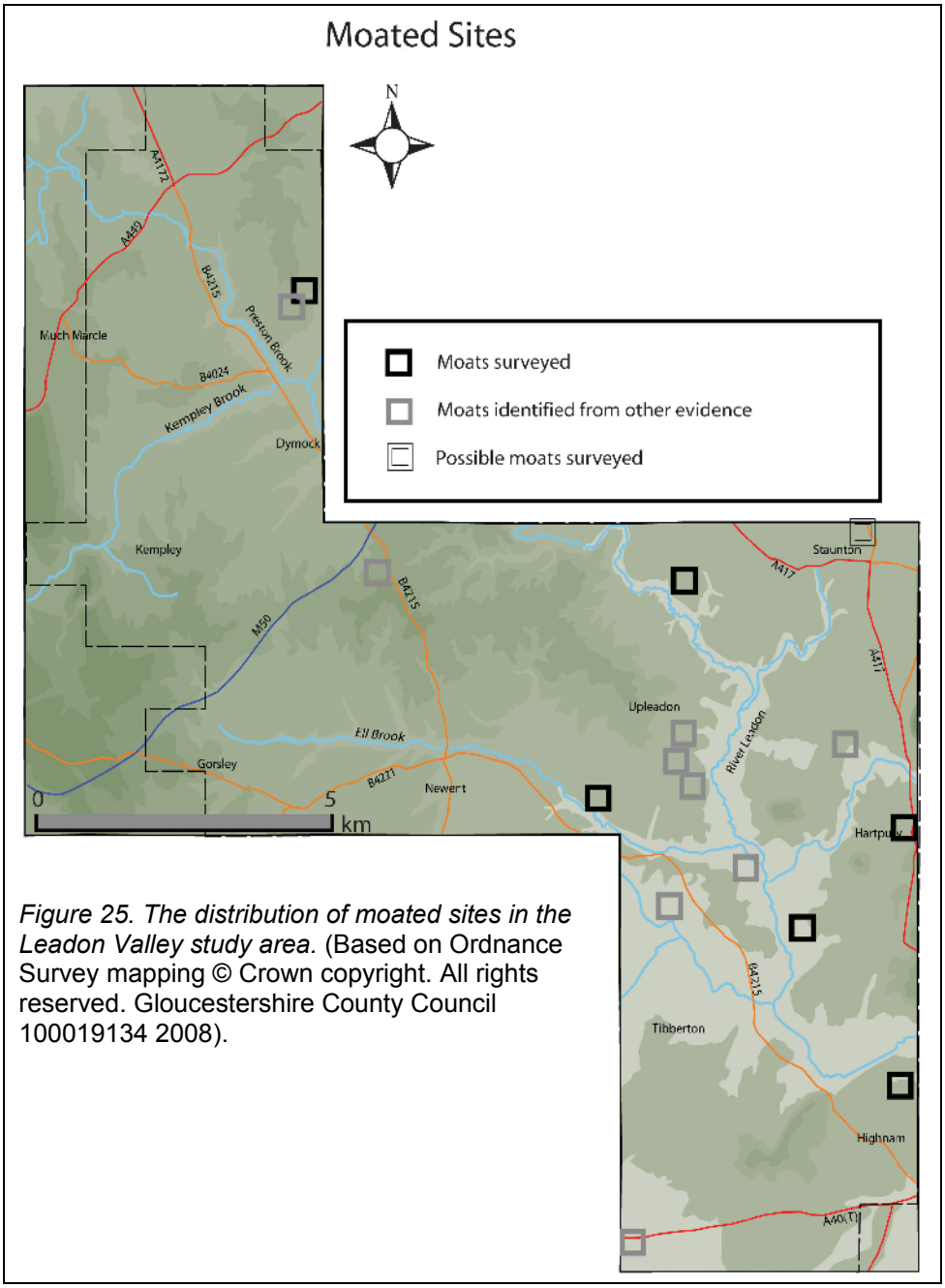



*Figure 25. The distribution of moated sites in the Leadon Valley study area.* (Based on Ordnance Survey mapping © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

Moated sites are quite common in Gloucestershire, as shown in Figure 25. Although normally regarded as defensive features, these moats may have had a variety of additional functions as ornamental garden features, ponds for fish and wild or domestic fowl, and also for watering stock. A moat could be used for several of these functions (Bond 1978: 77; Taylor 1978: 5). Though status symbols, moated sites were not necessarily elite residences, but more often occupied by 'upwardly mobile' socially aspirant yeoman classes, who were not permitted to have parks, dovecotes, battlements or other trappings of nobility,

but could have moats (Bowden 2005: 40; Rackham 1986: 360-363). Bond has shown that there was not necessarily any direct link between the form of a moat and the status of its inhabitants (Bond 1978: 77). Many moated sites are still occupied by medieval buildings or their post-medieval successors. Most were probably originally manor houses or monastic granges with origins in the late 12th to early 14th centuries, although it is possible that some moats were remodelled from the 16th sixteenth century onwards as ornamental features of 'polite' formal landscape gardens.


*Figure 26. Aerial photograph (above) and transcription (below) of the moat around Bellamy's Farm, in Dymock parish.* (NMR OS/71069 182 12-APR-1971 © Crown copyright. Ordnance Survey © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

Transcription of the Scheduled trapezoidal moat at Bellamys Farm (112080/SO 63 SE3/SAM 32339) (Fig. 26 above), south of Leddington, indicated that the moat has been reshaped more recently, during the period it

has been recorded on aerial photographs between 1946 and 1974, with the corners becoming more rounded over time. The feature still seems to be very well defined, and is likely to have been re-cut.

Most moated sites within the Leadon Valley NMP area are located on fertile land in valley bottom locations. This contrasts with the distribution of moated sites in the Malverns, where moats are smaller and in more peripheral locations close to parish boundaries and on heavier soils (Bowden 2005: 40); and in Worcestershire, where there may be a correlation between the distribution of moated sites and assarting (Bond 1978: 71-72, fig. 24). No comparable sites were recorded in the Forest of Dean NMP survey, with the exception of the large defensive moat around St Briavels castle, and the area does not have a similar pattern of manors, granges and large medieval farms.

*Figure 27. Aerial photograph of the Staunton moated site.* (NMR OS/69076 033 04-APR-1969 © Crown copyright Ordnance Survey).

A previously unrecorded moated site was identified at Staunton, north of Stone Walls Farm (1457382/SO 72 NE33) (Fig. 27), and consists of a moat fed by a leat, enclosing a sub-rectangular area. A nearby field called 'The Moat' near Moat Farm possibly refers to a different and unrecorded site not identified by the aerial survey. At Lassington (Fig. 13), the aerial survey recorded the partial remnants of a medieval moat (113424/SO 72 SE9), gradually plough-levelled over time.

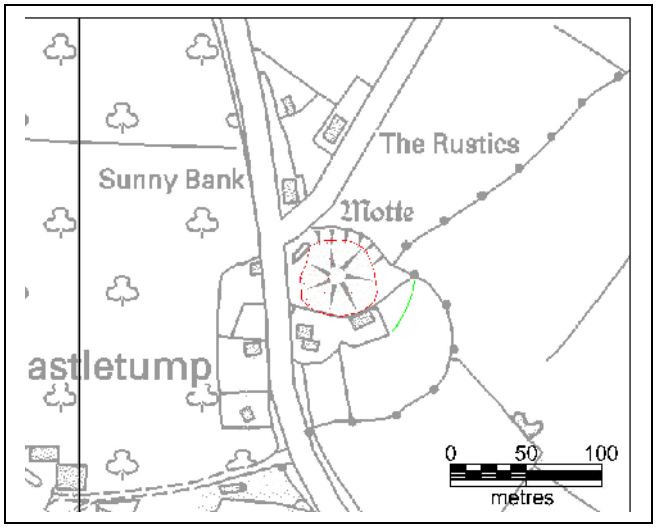



*Figure 28. Aerial photograph (above) and transcription (below) of Castletump motte, Dymock. Note the extensive orchards visible in the photograph.* (NMR OS/79055 002 26-JUN-1979 © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

The earthwork motte and ditch at Castletump were recorded (113377/SO 72 NW4/SAM 28863), together with the remnants of a surrounding bailey (Fig. 28). This was probably built in the first few decades after the Norman Conquest. The castle was granted temporarily to William de Braose by Roger, Earl of Hereford between AD 1148-1154) and was apparently garrisoned for the King by Sir John Wintour during the Civil War (Lewis 1848: 121). Although the short length of ditch recorded is probably an inner defensive ditch around the motte, if the site was refortified during the English Civil War it is possible that the feature is later in date. Only excavation could determine this.

## 8.6. Conclusions

In addition to the examples noted above, a number of additional trackways, holloways, industrial features and grubbed out hedgerows were also recorded. Although these are possibly medieval in date, they are more likely to be post-medieval, and are discussed elsewhere in this report.

Deserted medieval settlements and medieval moated sites both seem to have been concentrated in the west and south of the Leadon Valley NMP area, although there are also earthworks of a significant abandoned medieval settlement around Little Marcle. This distribution may reflect the location of fertile farmland. The central area of the Leadon Valley has a far higher concentration of charcoal burning platforms, probably indicating widespread coppiced woodland in the medieval period, and further evidence of woodland industries might be found by field survey of areas still wooded today. The earthwork evidence from Hay Wood may also indicate that some areas of modern woodland reflect areas that were forested during the medieval period.

With the exceptions of small hamlets such as Malswick, most medieval settlements seem to have been dispersed. Although ridge and furrow can be difficult to date, at least some seems to be medieval and related to settlement earthworks. Although aerial photographs are a valuable resource for studying rural medieval and/or post-medieval settlement, future research would also have to be combined with map regression analyses, documentary research and further fieldwork utilising walkover and topographic survey, field walking and geophysical survey. Such additional future work may then be able to address some of the questions relating to the development of the settlement pattern in the Leadon Valley.

# 9. Post-medieval and early modern rural activity

The post-medieval period is defined for the purposes of the NMR database as the period AD 1540 to 1901, but this overlaps with definitions elsewhere of the early modern period as 1800-1900. Features from the period 1540-1901 comprise the majority of records from the Leadon Valley NMP survey. Many post-medieval features are agricultural, especially ridge and furrow recorded as cropmarks and earthworks. As stated above in section 8.3 it is often difficult to distinguish medieval from post-medieval ridge and furrow, but much of the later ridge and furrow discussed here is the result of steam ploughing or the planting of orchards along older ridges in formerly arable fields during the height of cider and perry production in the 18th and 19th centuries. Many of these orchards were then grubbed out during the early to mid 20th century.

## 9.1. Newent Court

Newent Court (1457662/SO 72 NW53) is a 19th century manor house with associated grounds, recorded in detail as it has now been destroyed (Figures 29-32). In some circumstances, garden features constructed after 1901 were recorded. New Court (later Newent Court) was built in about 1810 for James de Visme, who had inherited the estate, once a Benedictine priory, through his wife. The house was a square Regency villa, with grounds including a walled garden, a ha-ha, an ornamental lake and a large number of tree plantings. The family only lived in the house for a few years before moving to Bath in 1819, and the building was then empty for much of the 19th century, changing hands several times in the early 20th century. A serious fire in the house in 1942 led to its abandonment soon afterwards (Kingsley and Hill 2001: 287).

Aerial photographs from 1946 show the house without its roof, and the main house had been demolished by 1966, although its many outbuildings were still standing and the grounds appear to have been maintained, probably by the council. By 1970, however, all the buildings were demolished and the ground levelled. Aerial photographs from 1979 show modern housing in the process of being built over the house and grounds, and have thus been a valuable record of the slow destruction of the estate.

*Figure 29. Photograph of Newent Court, probably taken in the 1930s. Photographer S. Pitcher. B.B. 55/50.* Reproduced by permission of English Heritage. NMR.

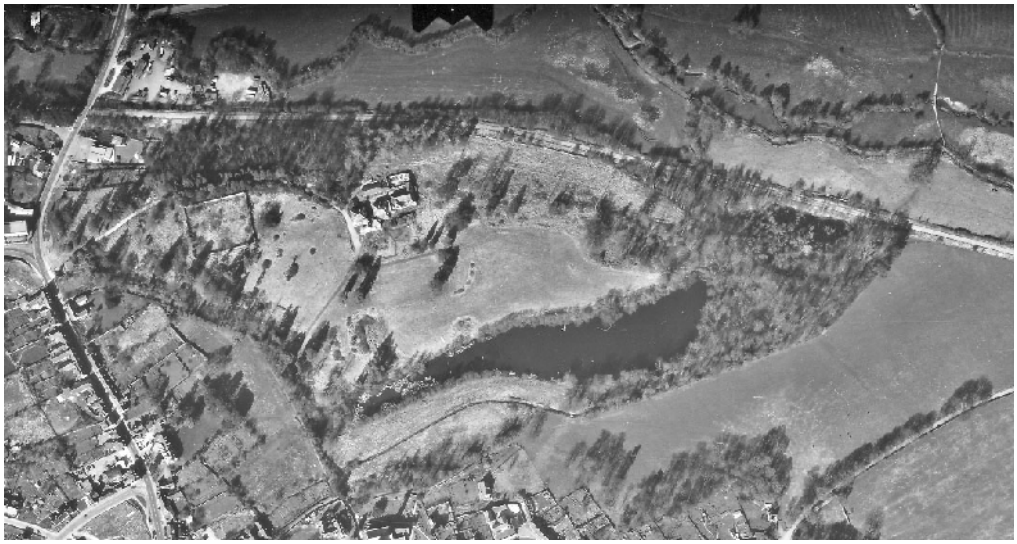


*Figure 30. The house and grounds of Newent Court in 1947. Note the ha-ha, walled garden and flower beds, but also the missing roof*. (RAF/CPE/UK/2110 4417 28-MAY-1947. © English Heritage (NMR) RAF Photography).

In addition to the 19th century landscape garden features, a series of garden paths, glasshouses and a fountain or possible statue were also recorded (see Fig. 32). Although the trees and shrubs were maintained and pruned for several decades after the house itself was abandoned, it is likely that some features in the landscape garden were under-recorded or missed altogether due to tree cover.

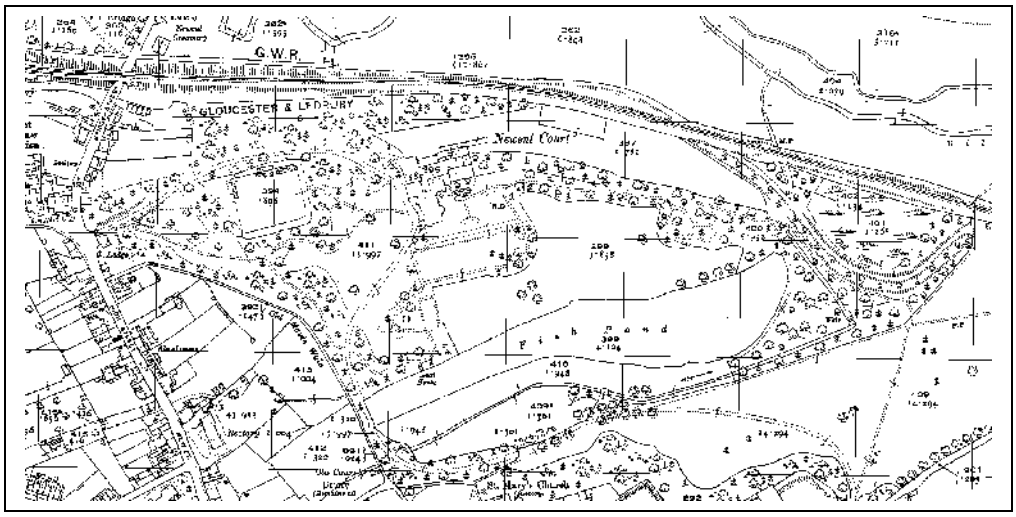



*Figure 31. Newent Court and grounds on the 3rd Edition Ordnance Survey 1: 2500 map of 1922-1923. The gridlines are at 100 metre intervals.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

The 3rd Edition Ordnance Survey map (Figure 31) shows most of the features recorded from the 1946-1947 aerial photography, though the ha-ha is only shown schematically and the circular fountain and flowerbeds do not appear. The latter may therefore date to between 1923 and 1942, or might been considered too unimportant to map. The map shows several paths and earthworks, particularly around the walled garden and in the woods, which were not visible on aerial photographs, along with the boathouse and associated paved area that were not depicted on the 2nd Edition map of 1902.

The recent aerial photographs and Ordnance Survey mapping show how the walled garden has been incorporated as a feature of the housing estate, with a cul-de sac built inside it. In the past the lake has been interpreted as being the fish pond of the former Benedictine Alien priory (113380/SO 72 NW5), and is marked as 'Fish Pond' as late as the 3rd Edition Ordnance Survey map. Parry (1990) has suggested that Newent Lake was excavated in the 1820s, however, and the medieval fish pond or ponds may have been located under the present railway. The 1922-1923 map (Figure 31) depicts this area as marshy ground, and the 1947 photograph (Figure 30) shows marshy vegetation. Parry suggested that there were originally three fishponds, and that the lake was dug to join and enlarge them, a plausible interpretation as this feature was clearly designed to be an ornamental lake viewed from the house, in the manner of many elite 'polite' landscapes (Williamson 1995).

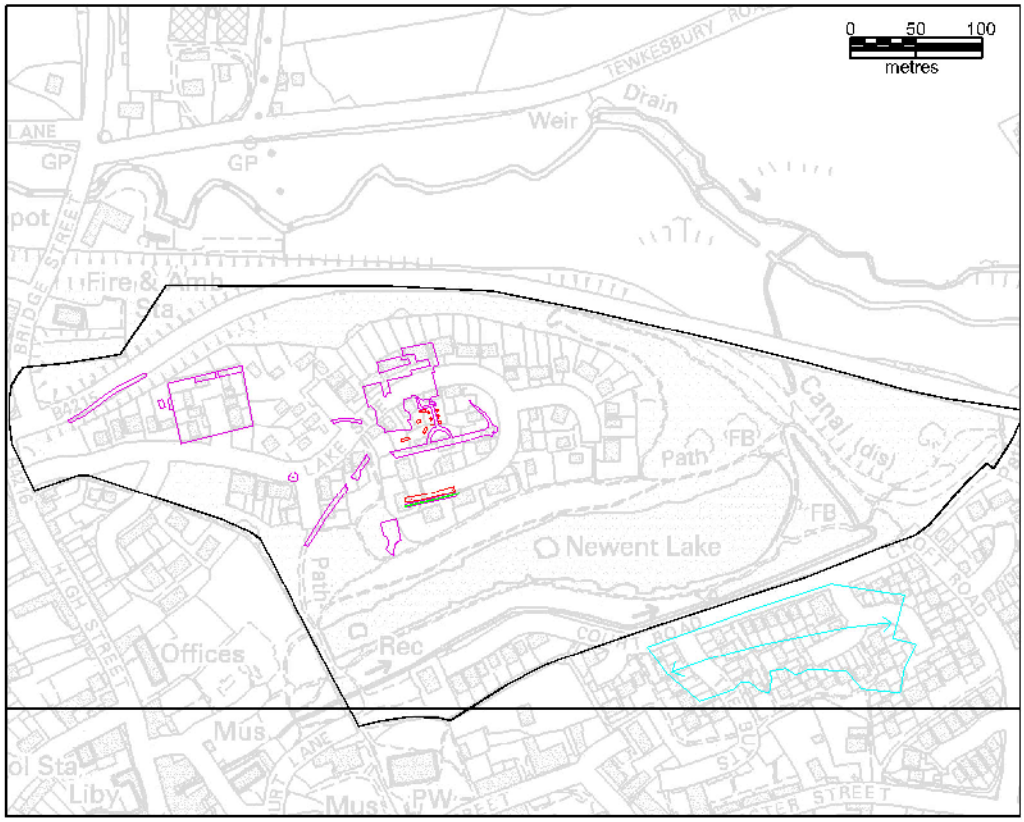



*Figure 32. Newent Court showing the original extent of the grounds and garden features in relation to the modern urban landscape. Note the small circular fountain south-east of the main house.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

## 9.2. Ridge and furrow

Ridge and furrow has been recorded as both cropmarks and earthworks and represents the majority of features recorded in the Leadon Valley NMP programme. The 19th and 20th centuries saw increasing amounts of land being used for arable that had been previously used only as pasture, at least since the medieval or early post-medieval period. Improvements in technology made ploughing easier and more efficient (Wade Martins 2004). Some ridge and furrow in the Leadon Valley is in smaller interlocking blocks, often because field boundaries have been removed either following Parliamentary enclosure or more recently, leaving a single large field with ridge and furrow orientated in several directions. Much of the later post-medieval ridge and furrow was laid out in large fields with narrow straight rigs or ridges parallel to the hedges (Hall 1982: 11). The aerial photographs recorded ridge and furrow earthworks surviving in the 1940s that has since been plough levelled.

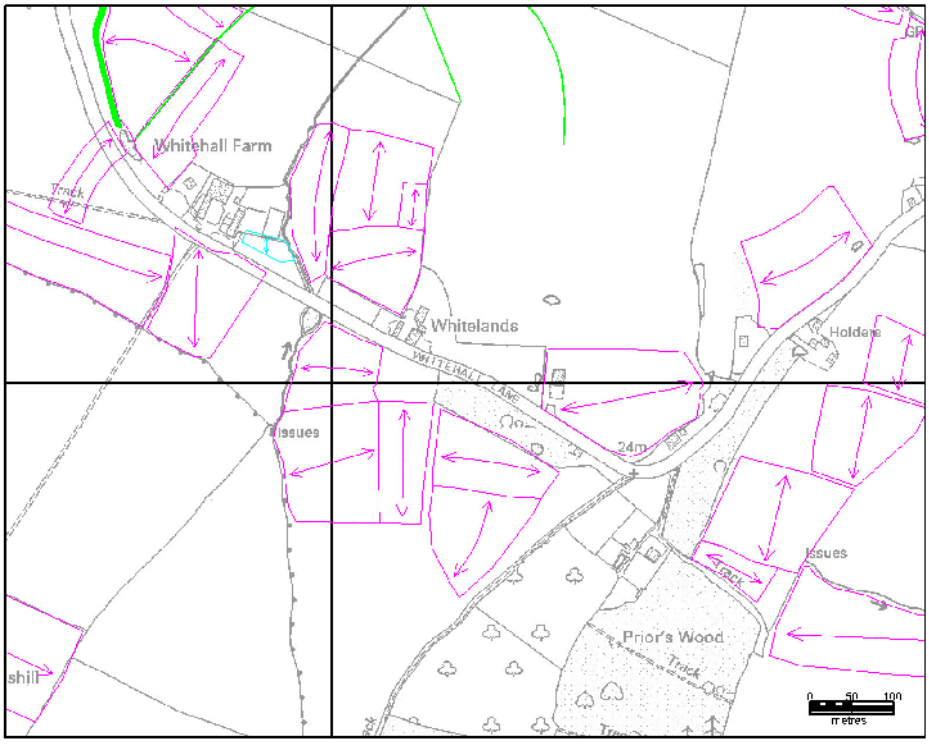



*Figure 33. Ridge and furrow visible as cropmarks around Whitehall Farm (1457117/SO 72 SE26), in Rudford and Highleadon parish. Some of the more sinuous ridge and furrow may be medieval, other blocks post-medieval.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

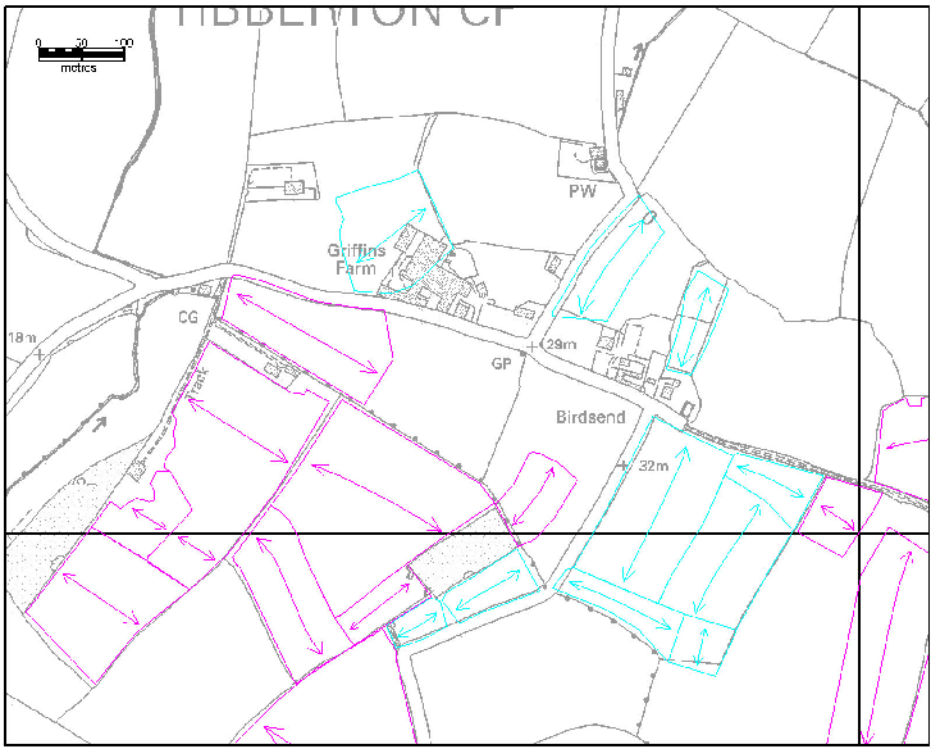



*Figure 34. Blocks of levelled and extant ridge and furrow around Griffins Farm (1457098/SO72SE22) in Tibberton parish, many probably later re-used as orchards.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

Figures 33-35 illustrate small, abutting blocks of ridge and furrow close to existing farms. Many were re-used for planting apple and pear trees, and have subsequently been mechanically grubbed out. In some instances, new 'ridge and furrow' may have been dug for orchards. Further detailed map regression and documentary research could assess and record these changes, as this form of horticulture has declined markedly during the past 60 years.

*Figure 35. (left). Okle Clifford Farm near Newent, showing narrow ridge and furrow to the east, west and south-east (1457768/SO 72 NW64). In the field to the west of the farm, some apple trees still survive.* (NMR OS/85009 033 11-MAR-1985 © Crown copyright. Ordnance Survey. NMR/OS 85009 033 11-MAR-1985. © Crown copyright. Ordnance Survey).

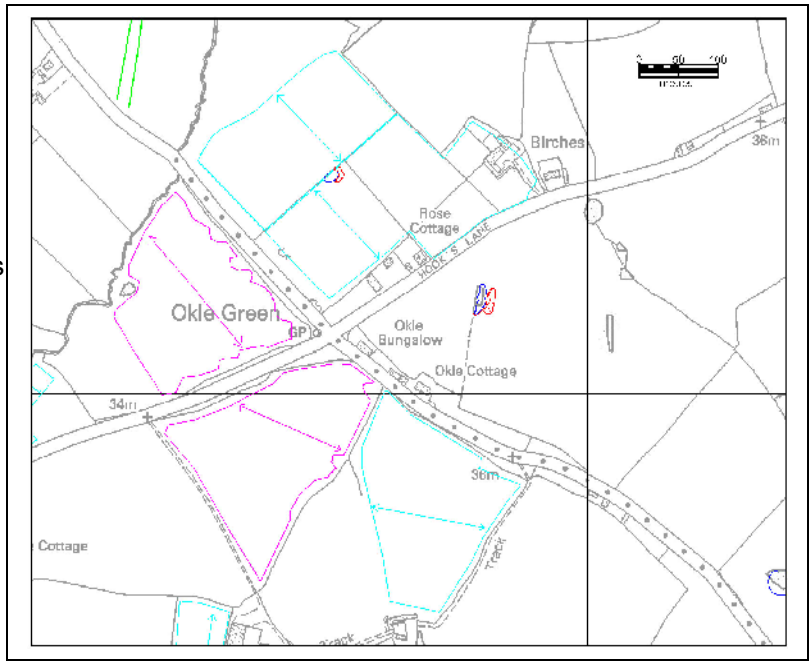



*Figure 36. (right). Levelled and extant ridge and furrow around Okle Green (1457961/SO 72 NW92), parish of Newent.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

Much of the ridge and furrow around Okle Green is characteristic of post-medieval ridge and furrow – large blocks with narrow, closely spaced rigs parallel or perpendicular to existing field boundaries (Fig. 36). These blocks of ridge and furrow may represent the ploughing of fields in the 19th century after neighbouring pastures were joined. The place name Okle Green suggests a clearing in an area of oak woodland, and the roads are of at least 12th century date (Smith 1964: 177), and some of the broader, more sinuous ridge and furrow may reflect older medieval or early post-medieval ploughing.

Another characteristic of agriculture in the Leadon Valley has been the straightening and removal of hedges. A large number hedgerows recorded on 1st Edition Ordnance Survey maps from 1883-1884 were only identified as linear cropmarks. Since the latter half of the 20th century, increased mechanisation and use of fertilisers and pesticides, agricultural intensification, and changes in agricultural labour and patterns of agricultural subsidy have driven the move to larger fields.

### 9.3. Trackways, holloways and water meadows

Other possible post-medieval features visible on aerial photographs include several holloways and trackways, some of which can be related to existing farms, whilst others are more isolated. In Fig. 37, a pair of faint parallel ditches (1457799/SO 72 NW70) is visible, running from A to B. These are quite regularly spaced a relatively similar distance apart, and they are probably ditches flanking a trackway or droveway.

Archaeological features like this are extremely difficult to date from the aerial photographic evidence alone, but the ditches could represent a former medieval or post-medieval trackway running along a hedgerow that has since been removed. Alternatively, the trackway feature may be Iron Age or Romano-British in date. Detailed regression analysis of historic maps and additional investigation through geophysical survey might be able to provide confirmation of this.


*Figure 37. Two faint ditches near Okle Green, aligned between A to B. RAF/CPE/UK/ 1652 2014 11-JUL-1946* © English Heritage (NMR) RAF Photography

The Leadon Valley NMP survey also identified and recorded the site of several post-medieval water meadow systems. At Lassington, Highnam (1457188/SO 72 SE75), a water meadow was situated along a length of the River Leadon, defined by a system of drainage ditches, most of which still survived as low earthworks in 1970 (Fig. 38). Several banks leading to Lassington Court might be medieval or post-medieval flood defences, or more likely were part of the overall water management system. Similarly, at Highleadon Court (1457185/SO 72 SE64), a water meadow was located alongside the River Leadon. It was defined by a system of drainage ditches that were still in use and were being flooded in 1947, but many of which had been were plough-levelled by 1970 (Fig. 39).

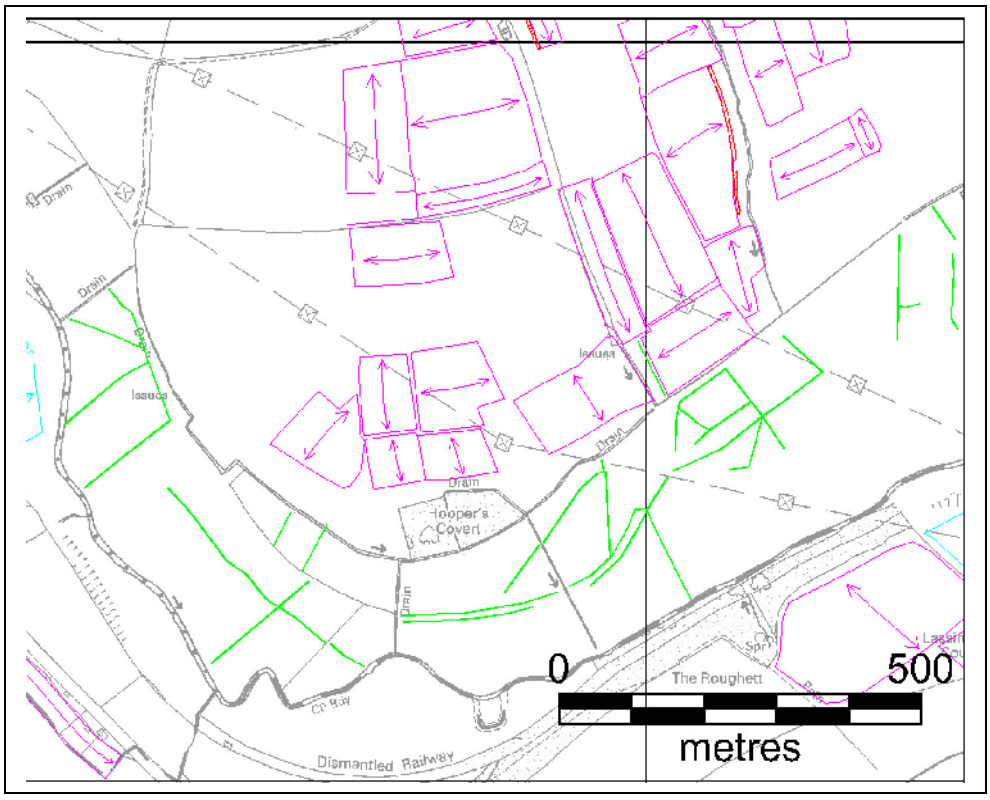



*Figure 38. Water meadow system at Lassington.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

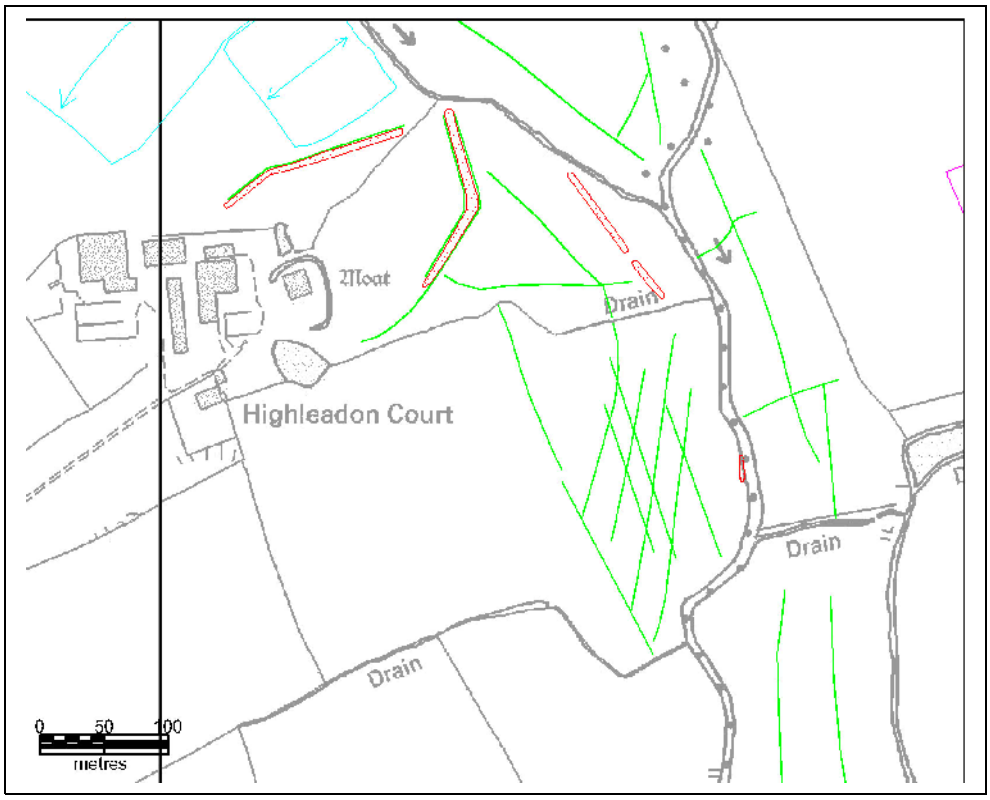



*Figure 39. Water meadow system at Highleadon Court.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

At Hayes Farm, north of Botloe's Green (Fig. 40), the remains of an elevated catch meadow were identified (457874/SO 72 NW84), comprising a series of ditches or leats. At the top of the slope, a possible sub-rectangular enclosure may surround a building platform. The leats are channelled around the enclosure and through gaps in its bank, so the catch-water system and the building were probably in use at the same time. The building platform and enclosure were largely destroyed by the construction of a barn in the 1970s.

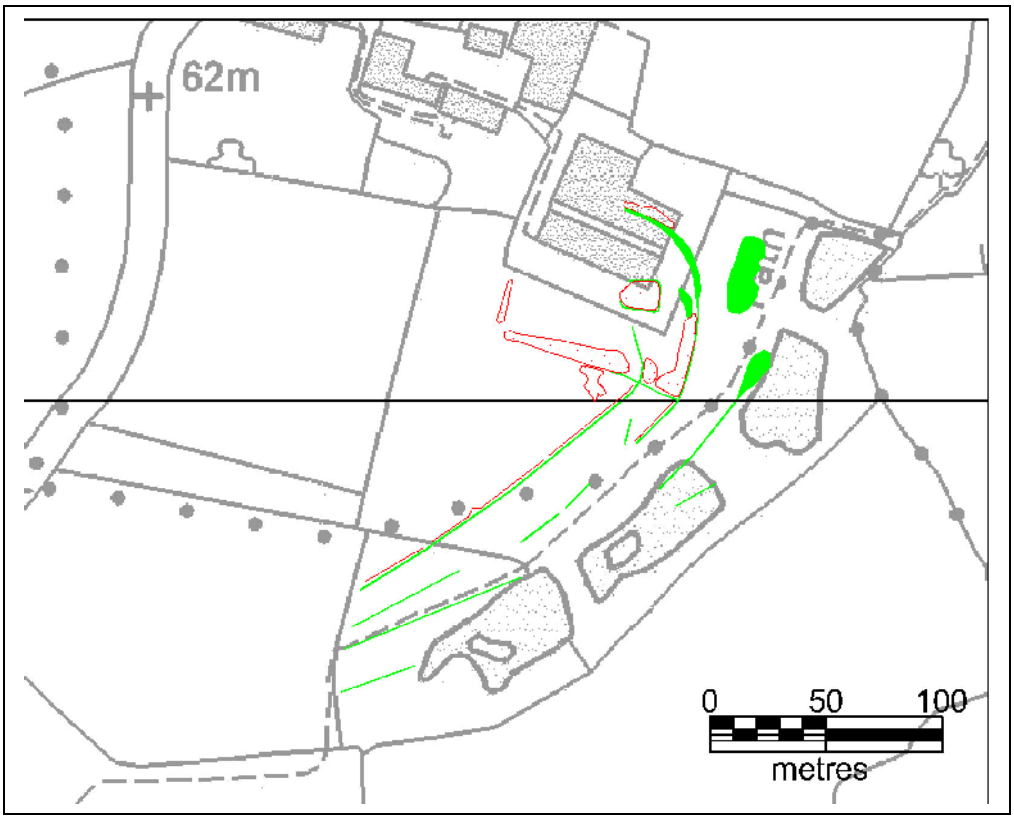



*Figure 40. Catch-water system at Haye's Farm, Pauntley.* (© Crown copyright. All rights reserved Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

Documents from the 14th and early 15th centuries mention the deliberate flooding of fields on monastic estates, but no related archaeological traces relating to this have been found (Brown 2005: 84; Faull and Moorhouse 1981). A book of 1523 alludes to the principle of irrigating meadows, and Rowland Vaughan claimed to have invented the system on his farm in Herefordshire in the 1580s, publishing an account of his work in 1610 (Rackham 1986: 338), but this now seems to relate to catch-water systems (Taylor et al. 2006). Water meadows may have had a 16th century Wessex origin, and like catch meadows were adopted and became widespread across south and south-western England by the 17th century (Cook et al. 2003; Cook and Williamson

1999, 2006). They evolved over a considerable period, however, becoming more formalised and better designed over time.

'Drowning' water meadows or bedwork systems were networks of interconnecting ditches constructed on valley floors and floodplains. Water meadows allow grass growth and animal grazing earlier in the spring to provide grass as fodder in March or April, six weeks earlier than could normally be expected, through the water raising the ground temperature. This meant that livestock could be taken to market earlier, and the extra hay produced allowed larger numbers to be maintained. These systems could also often permit two crops of hay in one year. Wherever possible, the water was further improved as a fertilizer by mixing it with manure from farmyards (Brown 2005; Cook et al. 2003). Many water meadows were abandoned during the early 19th century, and the ditches silted up.

Catch-water meadows became most prevalent in the west of England, where the earthworks also have better chances of survival (Brown 2005: 85). Catch-water systems relied on head dykes that channelled water along contours to feed a system of shallow ditches or leats. These were allowed to overflow and a thin film of water to saturate the grass (Brown 2005: 84-85). This again raised the ground temperature.

## 9.4. Conclusion

The post-medieval rural evidence from the Leadon Valley NMP suggests a changing agricultural landscape. New agricultural practices resulted in much more previously pastoral land being converted to arable, and during the 18th and 19th centuries many orchards were planted, but were then subsequently removed in the later 20th century. Post-medieval water meadows were introduced, but were later abandoned in the late 19th or early 20th centuries. Many field boundaries in the survey area had been removed, and only survived as sub-surface features visible as cropmarks or soil marks. Aerial photography and map regression analyses proved extremely useful tools in documenting these landscape changes. Further map regression analyses, archive research and fieldwork would be useful in order to further investigate these features and a more detailed chronological framework.

## 10. Post-medieval and early modern industrial activity

The Leadon Valley NMP aerial survey recorded industrial-related sites across the project area (see Figure 41), including remains of extractive industries, railways and canals. The location of some industrial sites was also established through documentary evidence, primarily from the early editions of Ordnance Survey mapping. Some of the most numerous features recorded were extraction pits and quarries, visible either as earthwork cuttings and hollows or, in the case of backfilled features, cropmarks and soil marks.

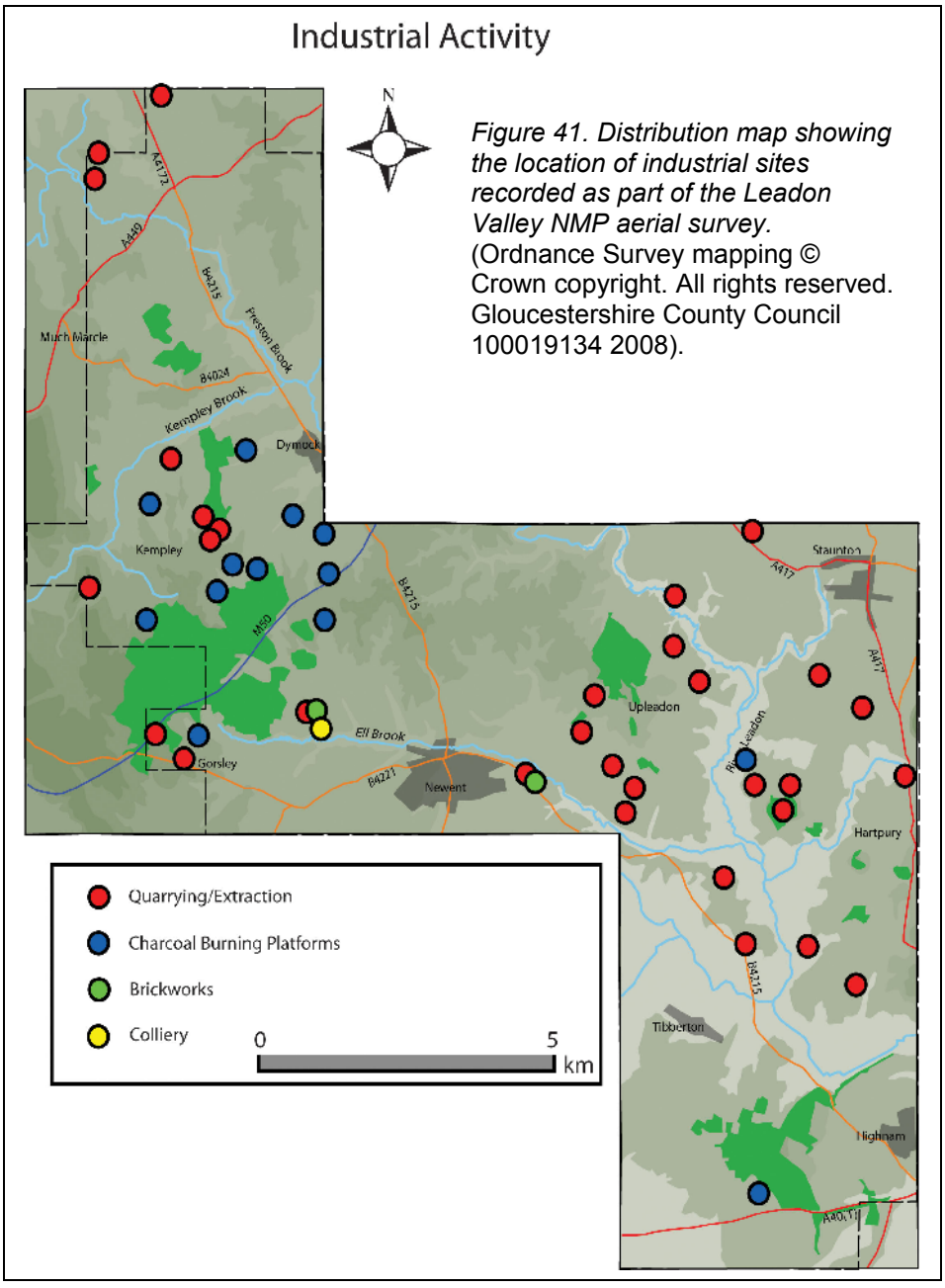



*Figure 41. Distribution map showing the location of industrial sites recorded as part of the Leadon Valley NMP aerial survey.* (Ordnance Survey mapping © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

Other soil marks relate to charcoal production. In the Forest of Dean area this was largely to supply the iron industry, although some was also for domestic use (Hart 1971). The Forest of Dean has a long history of mineral exploitation and industrial activity dating back to the Iron Age (Small and Stoertz 2006). The Leadon Valley NMP survey established that the mineral extraction and charcoal production recorded in the Forest of Dean NMP survey continued into the Leadon Valley, though at a smaller scale.

## 10.1. Mineral extraction

The aerial survey recorded 44 mineral extraction sites exploiting coal, limestone, sandstone, clay, sand and gravel resources, as shown in Figure 42.

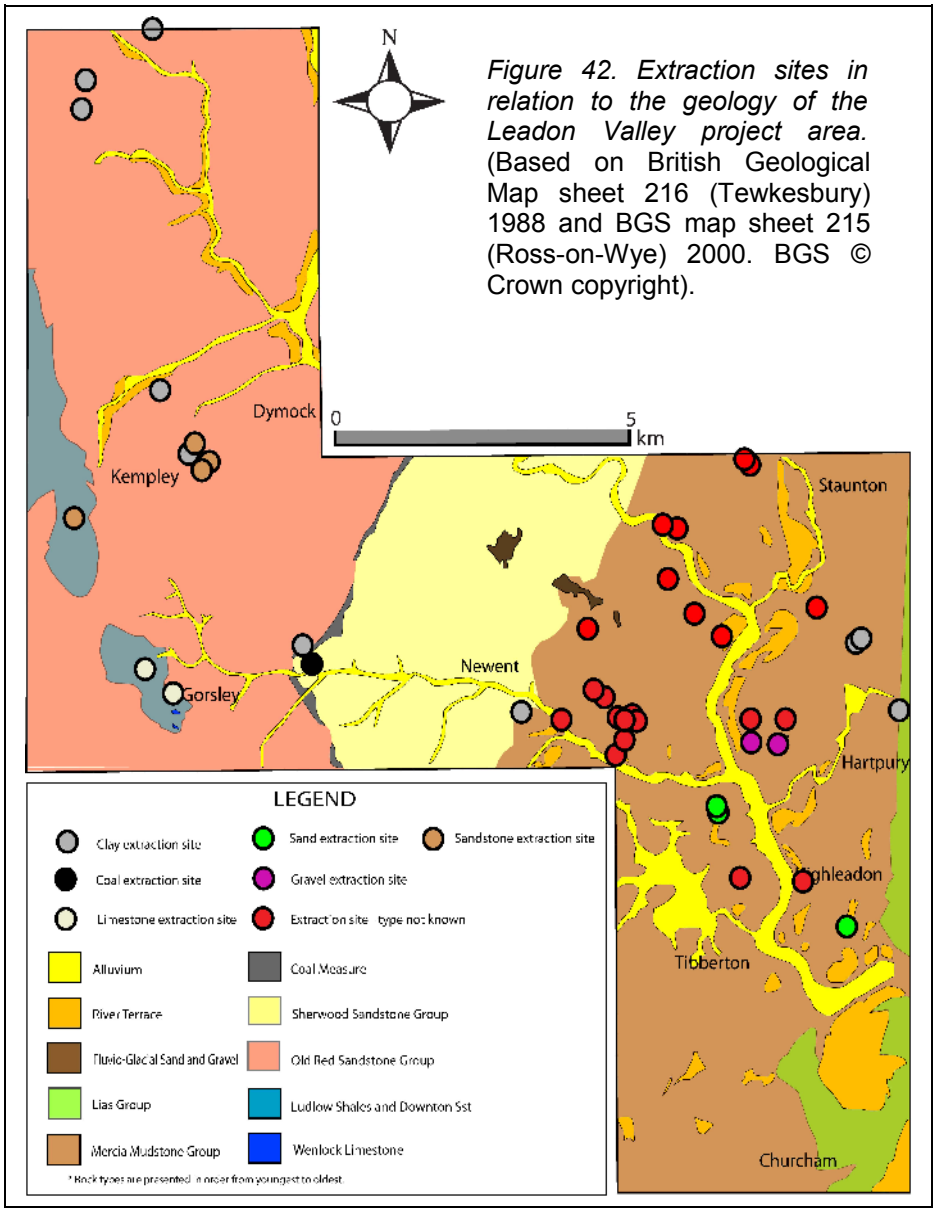



*Figure 42. Extraction sites in relation to the geology of the Leadon Valley project area.* (Based on British Geological Map sheet 216 (Tewkesbury) 1988 and BGS map sheet 215 (Ross-on-Wye) 2000. BGS © Crown copyright).

## 10.2. Limestone quarrying

Within the Leadon Valley, the small outcrops of Silurian limestone and shales from the Ludlow and Wenlock formations were exploited. Three limestone quarries have been recorded, all located in the western part of the NMP project area. The two large limestone quarries at Gorsley Common and Linton Wood (111853/SO 62 NE21 and 1457916/SO 62 NE37) are shown on Ordnance Survey maps (Figure 43).

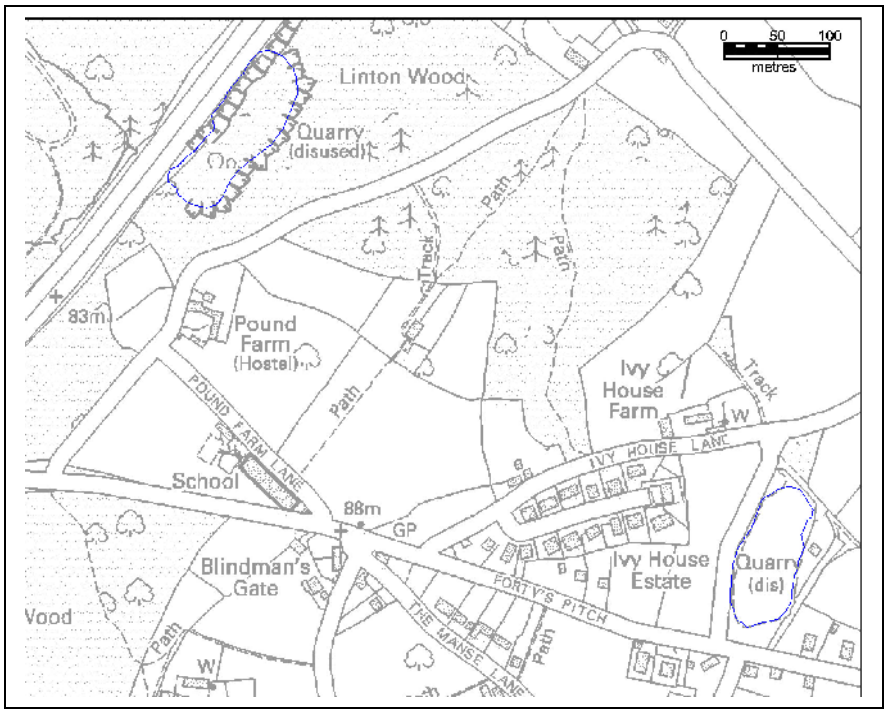



*Figure 43. Two of the four limestone quarries in and around Gorsley Common.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

A documented lime kiln in Linton Wood (111853/SO 62 NE21) was not visible on aerial photographs due to vegetation cover. Dating these quarries is problematic, but the Linton Wood may have been worked until the middle of the 19th century (Abberley and Malvern Hills European Geopark 2007).

## 10.3. Sandstone quarrying

A sandstone quarry was recorded at Chibler's Rough (1457903/SO 62 NE30), west of Fishpool in Kempley parish. As shown in Fig. 44, the quarry was heavily overgrown in the 1940s, but had been cleared out and used as a site for agricultural buildings by the 1960s.

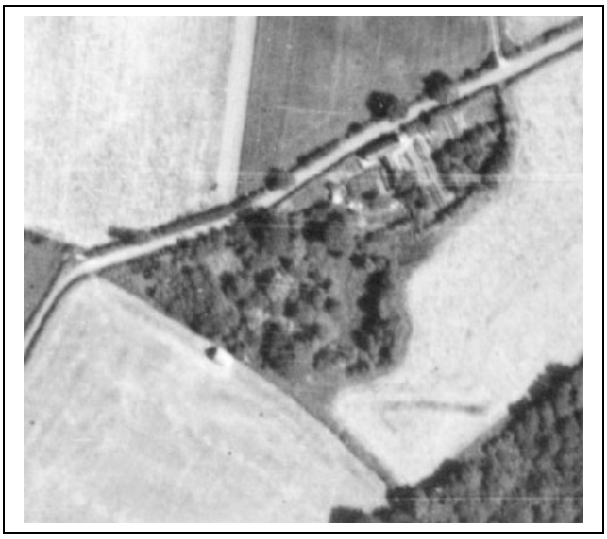
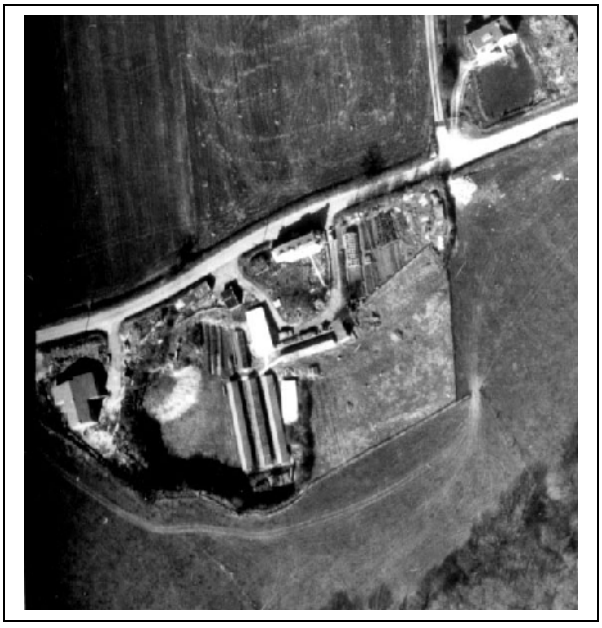


*Figure 44. Chibler's Rough disused sandstone quarry (above), heavily overgrown in 1946.* (RAF 106G/UK/1652 5132 11-JUL-1946 © English Heritage (NMR) RAF Photography). (Below). B*y 1966, cleared and used for agricultural buildings.* (NMR OS/ 66006 212 18-MAR-1966 © Crown copyright. Ordnance Survey).



Three linear sandstone quarries were also mapped in Haind Park Wood in Dymock parish (Fig. 45), a park recorded in the 13th century as belonging to Flaxley Abbey (Juřica 2007b). Located on Old Red Sandstone geology, they resemble similar linear sandstone quarries identified during the Forest of Dean NMP aerial survey (Small and Stoertz 2006). A braided holloway (1457896/SO 62 NE27) (see section 8.2 above, Fig. 20) within Haind Park Wood passes extremely close to two of these quarries, and whilst there is no evidence that this was a contemporaneous feature, it is possible that the route could have served to transport the quarried sandstone to Dymock or to Kempley Green.

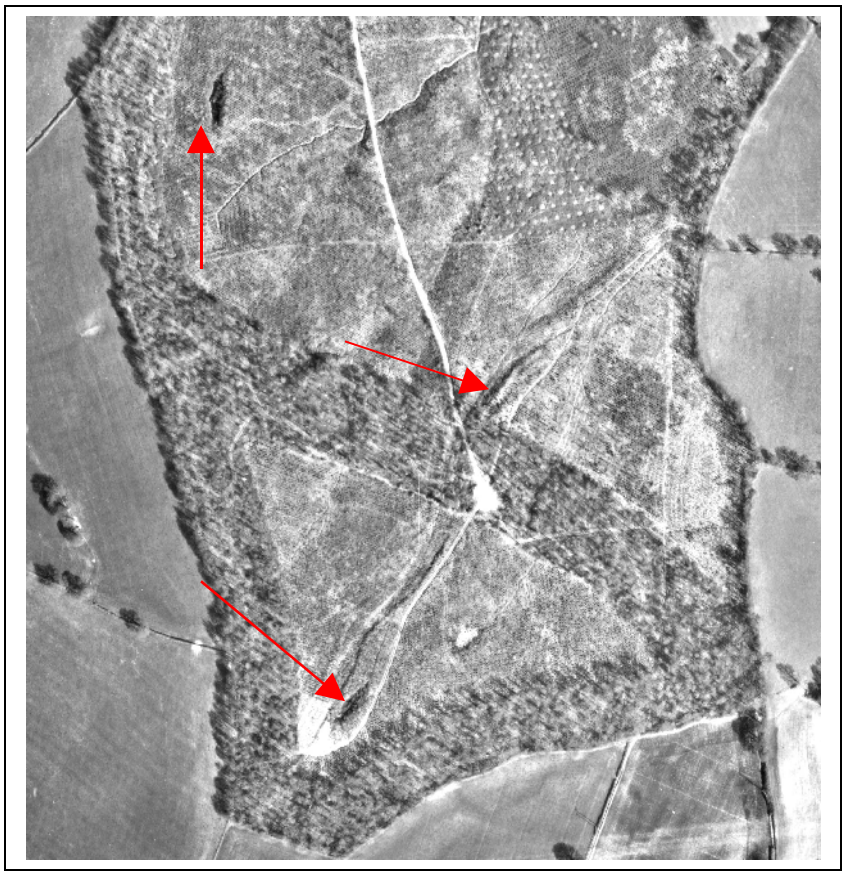


*Figure 45. Three linear sandstone quarries (arrowed) in Haind Park Wood, Dymock.* (NMR OS/71069 190 12-APR-1971 © Crown copyright. Ordnance Survey).

## 10.4. Clay extraction

Of the ten clay pits positively identified by the Leadon Valley NMP aerial survey, two were directly associated with adjacent post-medieval brickworks that were marked as working sites on the 1st Edition Ordnance Survey map of Gloucestershire, published in 1883-1884.

East of Newent, a clay extraction pit supplied a post-medieval brickworks (1457700/SO 72 NW59), also shown on the same 1st Edition Ordnance Survey map. By 1947, however, the features were only visible as earthworks, and these had been levelled by 1970. Similarly, at White House north of Kilcot, a clay pit was located immediately adjacent to post-medieval brickworks (1457950/SO 62 NE41) (Fig. 47). Although this was still a working site on the 1st Edition Ordnance Survey map, it was only visible as undefined earthworks in aerial photographs taken in 1946, as dark, irregular soil marks in 1966, and by 1985 it was no longer visible.

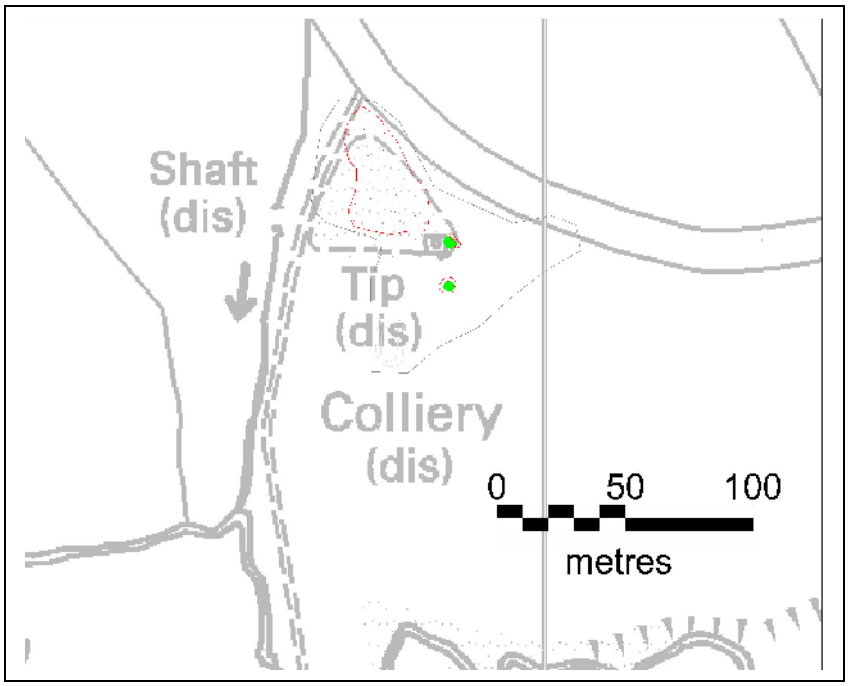



*Figure 46. Transcription of colliery, brickworks and probable adit east of the White House, Oxenhall parish.* (© Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008. Background map © Ordnance Survey).

The clay pit and brickworks (see Fig. 47) were approximately 300 metres north-west of a colliery (1457939/SO 62 NE38, Fig. 46), and were probably sited to exploit the shale spoil heap that was a by-product from coal mining. The shale was ground up and added to the clay in the bricks. Brick making in the Forest of Dean was a well-established industry by the later 19th century, and brickworks opened when the Commissioners of Woods licensed the digging of clay in 1838. As at White House, late 19th century brickworks at Nailbridge and Steam Mills also utilised shale from colliery spoil heaps, and by the 20th century even mining companies had themselves opened brickworks, such as the Lydney and Crumpmeadow Collieries Co. at Broadmoor colliery (Currie and Herbert 1996). With this association between the two industries and the reliance on shale as part of the brick making process, once the colliery ceased operation the White House brickworks may then have subsequently closed as the shale supply from the spoil heap was exhausted. It was no longer marked as a working brickworks on the 2nd Edition Ordnance Survey map of 1903, but simply as an 'old clay pit'.

A large number of extraction sites (22) recorded in the Leadon Valley NMP survey, however, could not be proven to relate to specific mineral resources. As shown on Figure 42, these were restricted to the eastern part of the survey

area, mainly on Mercia Mudstone or river terraces geology. Most of these sites were small-scale, isolated pits or shallow hollows, and they probably represent local clay, sand or gravel extraction. Many features subsequently filled with water and became ponds, or were backfilled and levelled. Extraction activity such as quarrying is difficult to date from aerial photographs alone, but the documentary evidence indicates that activity ended at many of the sites described during the 19th century.

## 10.5. Sand extraction

The aerial survey recorded three small sand extraction sites (1457158/SO 72 SE54 and 1457180/SO 72 SE62), situated on the edge of a small, roughly L-shaped deposit of the Fourth (Kidderminster) Terrace of Avon and Severn sand and gravels, west of Highleadon Court (BGS 1988). Two pits are first marked on the 3rd Edition Ordnance Survey map, dating the commencement of quarrying to between 1903-1924. The third sand pit north of Fairfields Cottages is marked on the 1st Edition Ordnance Survey map as an 'old sand pit', suggesting that it was disused by 1883-1884. All three sites survived as earthworks on photographs taken in 1970. These are the only confirmed sand extraction sites identified within the Leadon Valley NMP area.

## 10.6. Gravel extraction

Two gravel extraction sites (1457442/SO 72 NE58 and 1457472/SO 72 NE65) were recorded on Limbury Hill, an isolated deposit of fluvio-glacial sand and gravel, and were marked on the 1st Edition Ordnance Survey map. The more extensive spreads of gravels between Highleadon and Staunton do not seem to have been exploited.

## 10.7. Saw pits

North of Drews Farm, a rectangular saw pit (1457183/SO 72 SE63) is marked on the 1st Edition Ordnance Survey map, and still survived as an earthwork on aerial photographs taken in 1970.

## 10.8. Canal spoil heaps

Five earthwork mounds recorded by the Leadon Valley NMP survey (1457866/ SO 72 NW82, 1457855/SO 72 NW80, 1457852/SO 72 NW79, 1457848/SO 72 NW78 and 1457863/SO 72 NW81) proved to be the spoil heaps from 20 shafts sunk during the construction of the Oxenhall Tunnel, part of the Hereford to Gloucester Canal (112342/SO 64 SE44). Work on the canal began in 1793 and it was completed by 1845, but it closed in 1885 as a financial failure (Herefordshire and Gloucestershire Canal Trust 2007).

## 10.9. Coal

As shown on the geology map of the Leadon Valley NMP project area (Fig. 5), a small coal seam located between the Sherwood Sandstone and Old Red Sandstone group runs north-south between Newent and Gorsley. At White House west of Oxenhall, located along this seam, the earthwork remains of a post-medieval colliery were recorded (1457939/SO 62 NE38) (Figs 46-47). This mine is marked on the 1st Edition Ordnance Survey map, though labelled as disused. The colliery features comprise an irregularly shaped spoil heap, two mine shafts and the demolished walls of a rectangular mine building, although the latter feature was not visible on aerial photographs.

The 1: 50 000 scale Solid and Drift map indicates the presence of an adit to the north of the colliery (BGS 1988) (Fig. 47), but its precise location could not be identified due to vegetation cover. The mine probably pre-dated the 19th century, and was situated at the edge of workable coal deposits, on the outermost of three roughly concentric coal deposits around the Forest of Dean. Mining in the Forest of Dean has a long and complex history, but small enterprises like this coal mine were probably peripheral, and the coal may have been either for local use or to supply oast houses in Herefordshire (Currie and Herbert 1996). The short Oxenhall Branch or ‘coal branch’ of the Herefordshire and Gloucestershire Canal was constructed in 1793-1798, south of the Oxenhall Tunnel, to transport coal from the Newent coalfield near Oxenhall to market. The resulting coal was considered so inferior, however, that the canal was then used to bring coal into the area, and this ended the small mining industry (Herefordshire and Gloucestershire Canal Trust 2007).

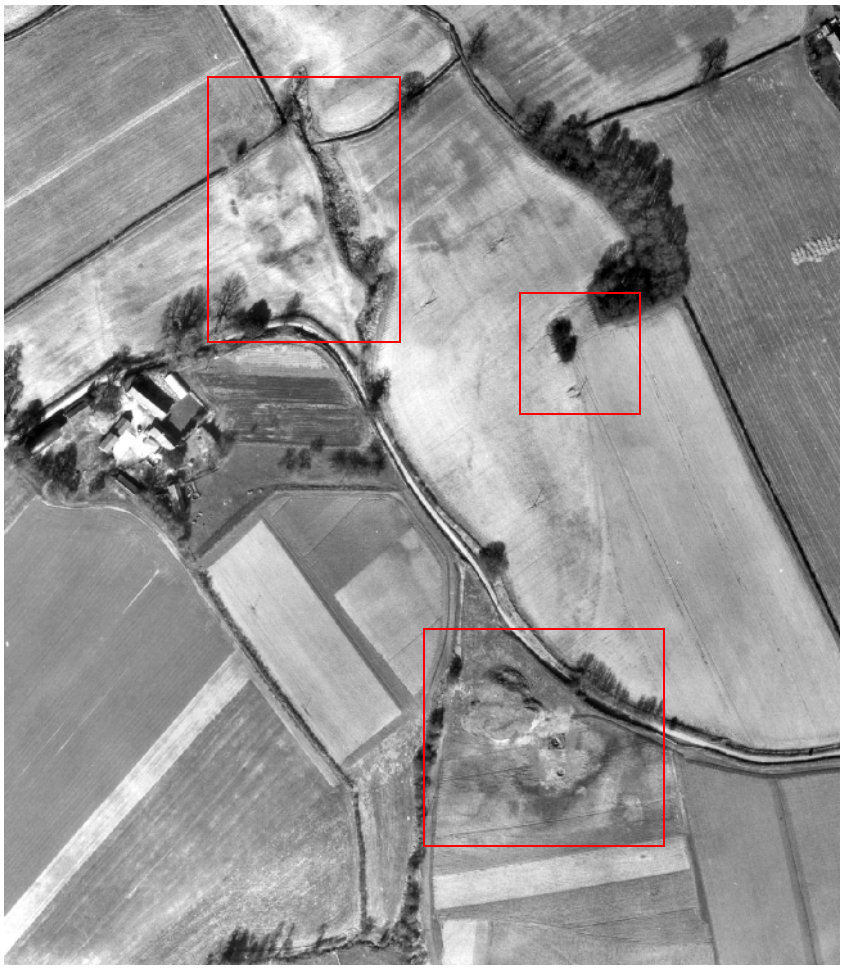


*Figure 47. White House, near Oxenhall. A post-medieval colliery (bottom right), possible mine adit (upper right) and brickworks (top left) have been highlighted in red.* (NMR OS/66006 263 18-MAR-1966 © Crown copyright Ordnance Survey).

## 10.10. Charcoal burning

The Leadon Valley NMP survey identified 112 charcoal burning platforms across the project area (Fig. 48), in clusters of two to 31 features. They were visible as irregular or sub-circular dark grey or black soil marks, resulting from the build-up of charcoal-rich soil through repeated burning on the same spot. Wood was converted to charcoal by slowly 'roasting' it in oxygen reducing earth-covered stacks or clamps (Kelley 1996). Those features with irregular shapes might have resulted from the repeated re-use of some sites, perhaps over decades of seasonal and cyclical exploitation of managed coppiced woodlands (Foard 2001). Many of these sites were recorded adjacent to existing woodland, or woodland that has subsequently been cleared since the 1st Edition of Ordnance Survey maps were drawn up.

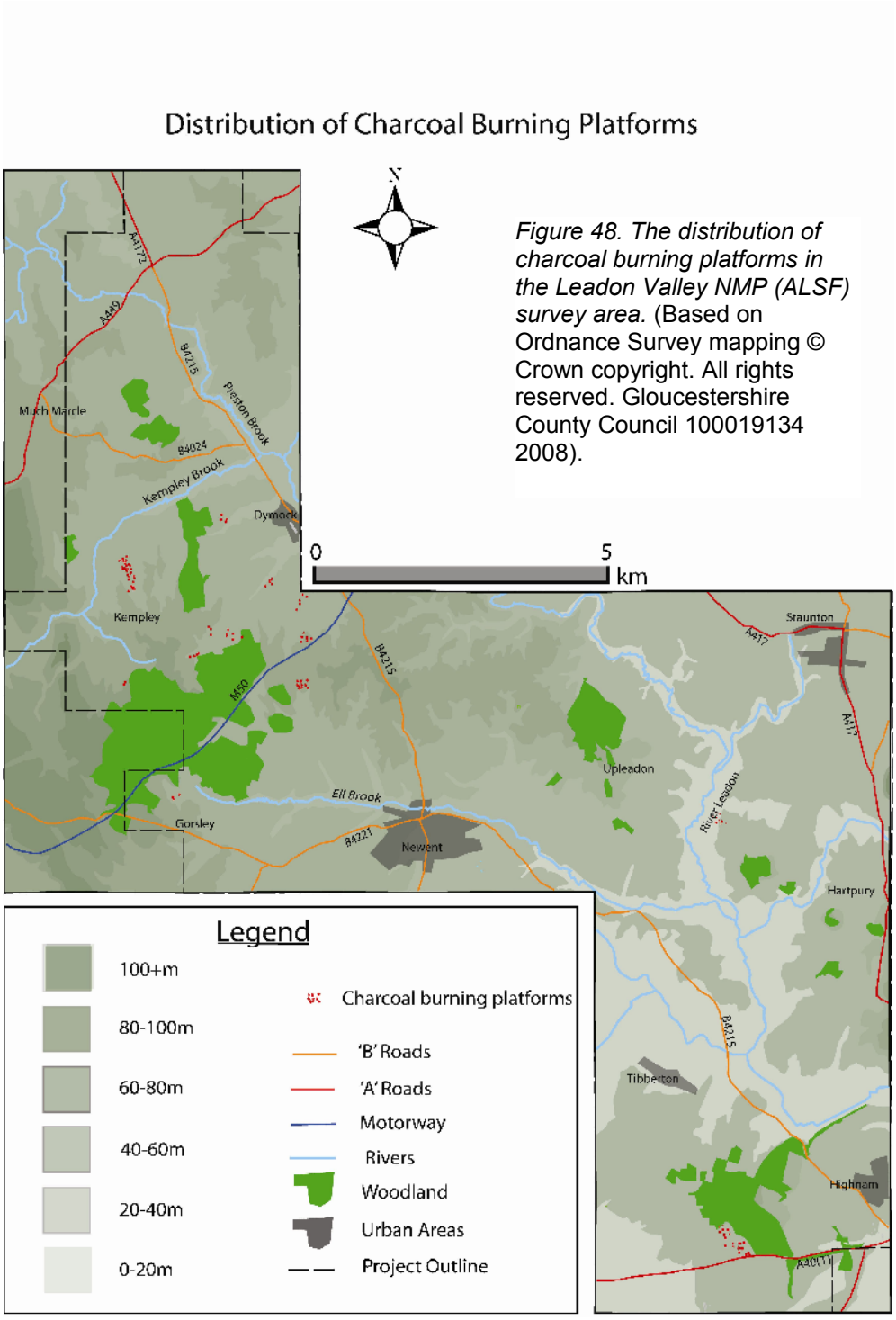



*Figure 48. The distribution of charcoal burning platforms in the Leadon Valley NMP (ALSF) survey area.* (Based on Ordnance Survey mapping © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2008).

Plough action has given an indistinct outline to the edges of many features, as in the largest cluster south of Kempley Court (Fig. 49). This group of 31 charcoal burning platforms (1457302/SO 63 SE38) was not visible in 1946, but were revealed by 1971 when ridge and furrow in the field had been ploughed out. Haind Park Wood is currently some distance away, and these platforms therefore provide evidence of the former extent of the woodland and its subsequent piecemeal assarting.

*Figure 49. Some of the 31 charcoal burning platforms identified at Kempley Court (1457302/SO 63 SE38), visible as dark, sub-circular soil marks.* (NMR OS/71069 282 12-APR-1971 © Crown copyright. Ordnance Survey).

The Forest of Dean NMP project recorded similar charcoal burning platforms as soil marks in arable fields, but LiDAR and survey also identified them as surviving earthworks within the woodland, and approximately 900 are now known (Hoyle 2005, 2007; Small and Stoertz 2006). An aerial survey of Rockingham Forest, Northamptonshire identified hundreds of charcoal burning platforms from soil marks (Foard 2001). At Four Oaks in Oxenhall parish, 11 charcoal burning platforms (1457909/SO 62 NE35) were recorded as soil marks in 1966 within an arable field. In earlier aerial images from 1946, however, these features lay within Wetherlocks Grove, east of Dymock Wood. This woodland was progressively clear-felled in the twenty years between the two aerial photographic sorties shown in Fig. 50, and this might indicate that such features may still survive as earthworks within other woodland areas. Further field survey would be required to ascertain this.

*Figure 50. (Above). Wetherlocks Grove wood in an aerial photograph of 1946.* (RAF 106G/UK/1652 4127 11-JUL-1946 English Heritage (NMR) RAF Photography). *(Below). Charcoal burning soil marks revealed in 1966, following woodland clearance and plough levelling.* (NMR OS/66006 216 18-MAR-1966 © Crown copyright. Ordnance Survey).

Dating charcoal burning platforms is problematic. Charcoal was required to smelt iron from the Iron Age through to the 18th century, when coke began to replace it as a fuel for iron production (Walker 2001). There is evidence for quite substantial iron production at several sites to the north of the Forest of Dean during the late Iron Age and early Roman periods, particularly at *Ariconium* or Weston-under-Penyard in Herefordshire, but also at Newent and Dymock. Most charcoal burning platforms recorded in the Leadon Valley and Forest of Dean NMP surveys are likely to be of medieval or post-medieval date (Foard 2001; Hoyle 2005). During the 17th century, charcoal was

extensively used in the Forest of Dean to fuel the iron smelting industry, to burn lime and for domestic heating (Hart 1971). Iron smelting sites were probably originally sited quite close to charcoal sources, as it has been suggested that due to its friable nature, charcoal was not transported more than 5-6km from production sites (Cleere and Crossley 1985: 135). These features have rarely been excavated, but at Brigstock Great Park in Northamptonshire, two black circular soil marks were investigated and oak charcoal produced radiocarbon dates of AD 1190-1400 (Foard 2001).

It is likely that charcoal production in the Forest of Dean extended into the Leadon Valley, although its extent and importance cannot be determined from aerial survey alone. The Malvern Hills AONB NMP survey to the north-east of the Leadon Valley survey area did not identify any soil marks similar to those in the Leadon Valley NMP, but numerous charcoal burning pits have been recorded in woodland there (Bowden 2005: 49; Hoverd 2003: 39). Although charcoal burning is described in this report as 'industry', it is extremely unlikely that charcoal production was a full-time occupation. Instead, the work was likely to have been seasonal, with coppice or pollard poles harvested at particular times of the year when sap was lowest and burning would be most efficient. The people undertaking this work were likely to have been either farmers, making use of relatively 'quiet' periods in the agricultural year; or woodland-edge communities who also carried out wood turning, hurdle making and other woodland-related crafts (Evans 2004).

## 10.11. Aerial photographs and extractive industrial features

In addition to the many problems of dating extractive industrial features, especially small-scale quarry hollows and scoops, it can also be difficult to identify through aerial survey alone which mineral was being extracted in particular locales, as Fig. 50 illustrates. Nevertheless, when aerial photographs are used in conjunction with British Geological Survey maps and Ordnance Survey mapping, and/or combined with documentary evidence, it is often possible to determine to a degree which mineral was being exploited (e.g. Small and Stoertz 2006).

*Figure 51. (Above). A gravel pit.* (NMR OS/70054 053 28-MAR-1970 © Crown copyright. Ordnance Survey). *(Below). A clay pit.* (RAF/CPE/UK/2110 4405 28-MAY-1947. English Heritage (NMR) RAF Photography). *Without supporting documentary evidence and geology maps, it would not be possible to positively identify the mineral being extracted from these aerial photographs alone.*

For example, Linton Quarry is one of four disused quarries near Gorsley, two of which are situated within the NMP project area (111853/SO 62 NE21 and 1457916/SO 62 NE37, see Fig. 44). All four are located on discrete areas of Wenlock Limestone, as shown in Fig. 52. This fairly precise correlation of the quarries with mineral resources indicates the observational skills of past geologists and quarry workers, but also demonstrates that even these relatively large quarries, like the other extractive sites within the project area, did not represent large-scale industry. Instead, these were more opportunistic enterprises, supplying local lime kilns and providing their local areas with construction material for buildings, walls and tracks. These quarries were likely to have been exploited until the limestone near the surface had become exhausted, but deeper quarrying would have been uneconomical.

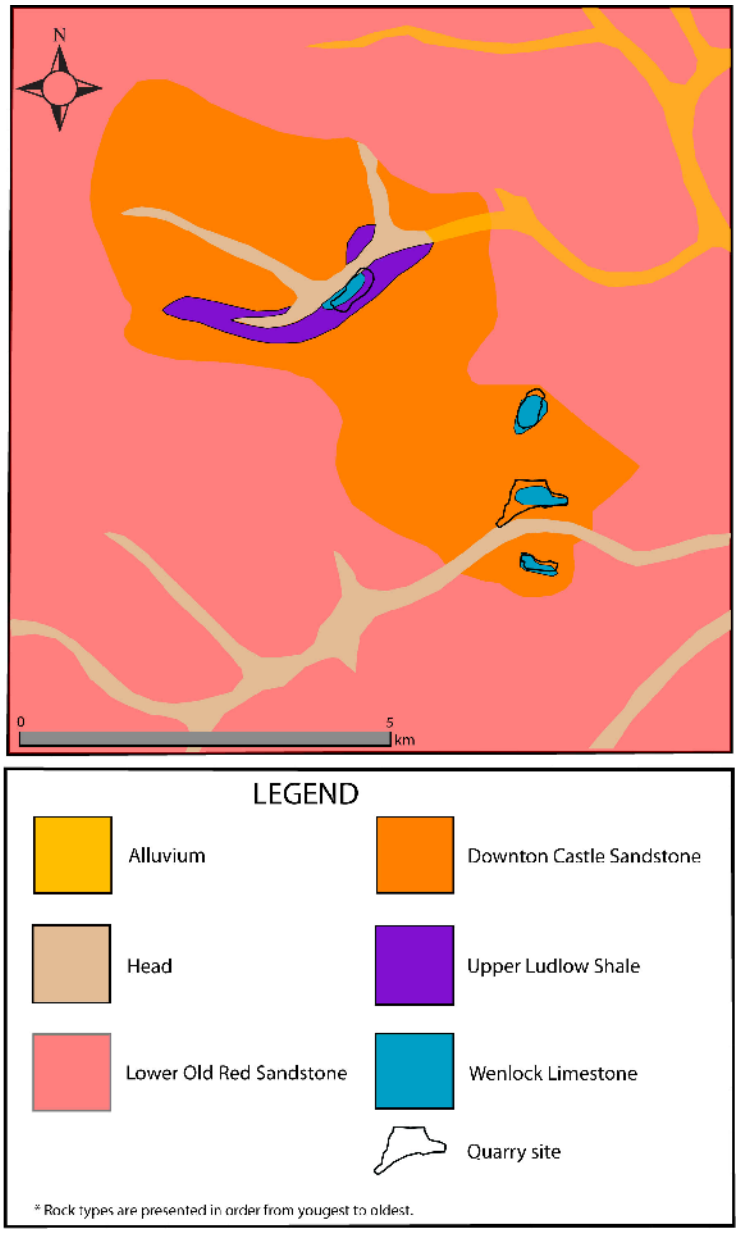



*Figure 52. Four quarries near Linton Wood/Gorsley Common, illustrating their close correlation with discrete areas of Wenlock Limestone.* (Based on British Geological Survey mapping © Crown copyright BGS. All rights reserved. Gloucestershire County Council 100019134 2008).

As shown in Figure 42, although the aerial survey identified sandstone extraction sites on Old Red Sandstone geology, it did not record any extraction sites on the Bromsgrove series of the Sherwood Sandstone geology, in the central part of the Leadon Valley. The absence of known extraction sites on Bromsgrove sandstone may be the result of unfavourable or inadequate aerial photographic coverage, but it may also be that the geological properties of Bromsgrove sandstone were not suited to commercial exploitation, and the lack of recorded extraction sites actually reflects their original distribution. None of the extraction sites identified within the Leadon

Valley NMP project area are still being used for their original purpose. Linton Quarry is now a geological Site of Special Scientific Interest (SSSI), and part of the Abberley and Malvern Hills European Geopark (Abberley and Malvern Hills European Geopark 2007).

### 10.12. Conclusions

The relatively small and isolated nature of mineral extraction in the Leadon Valley suggests that the majority was not undertaken on a commercial scale, but for the most part limited to providing the raw material resource for local needs (Abberley and Malvern Hills European Geopark 2007). Although during the medieval and post-medieval periods the Leadon Valley was a largely rural landscape, it also contained many features relating to small-scale industrial activity, similar to parts of the nearby Forest of Dean. Our own clear modern distinctions between rural and industrial landscapes would not therefore have been recognised by the people inhabiting the area during the medieval and post-medieval periods.

## 11. Twentieth century archaeology

### 11.1. Non-military sites

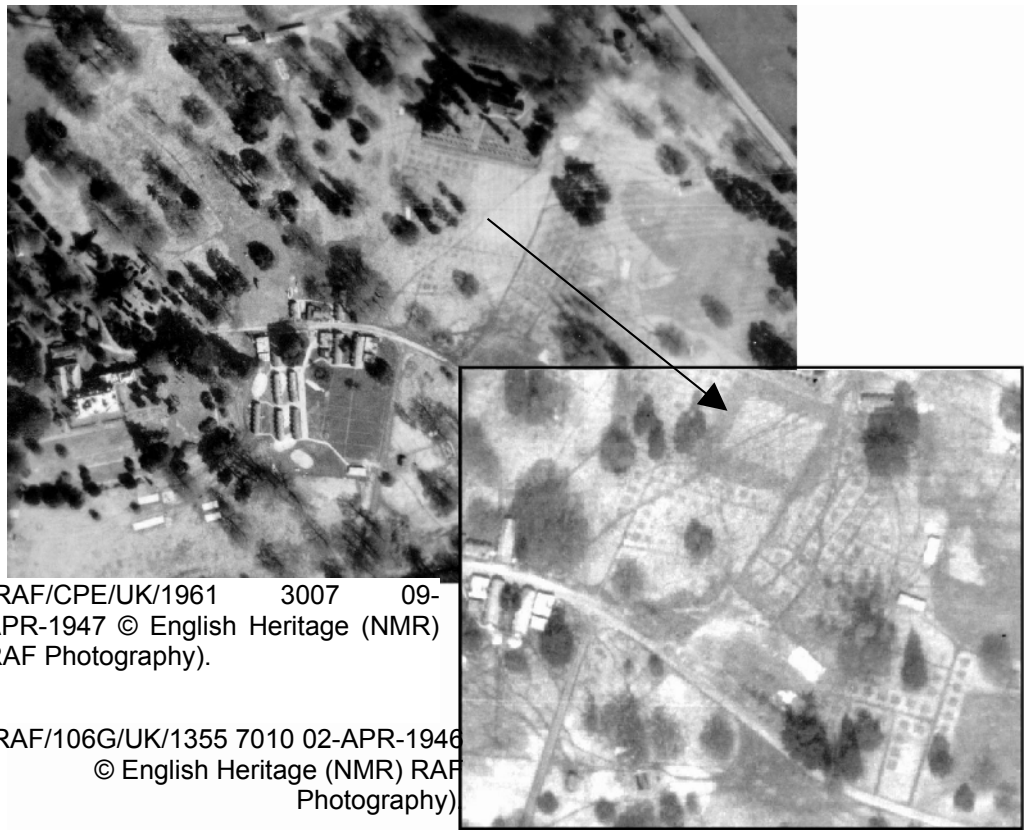
The only significant non-military 20th century features recorded within the Leadon Valley NMP (ALSF) aerial survey are two railway stations on the Gloucester to Ledbury Railway. The first is a small railway stop known as Greenway Halt that was opened in 1937 by the Great Western Railway (GWR) as an addition to the Gloucester to Ledbury Railway. The second is Dymock station, south-west of the modern town. The station consists of two platforms, a booking office and waiting room and some goods sheds. The railway line opened in 1885 to connect the Hereford to Worcester Railway with the South Wales line via Newent, but was closed to passenger traffic in 1959, and to goods traffic in 1964. By 1984, neither Greenway Halt nor Dymock railway station were visible on aerial photographs. Dymock station was demolished

ahead of residential housing schemes, with only one goods shed surviving on aerial photographs in 1984. The aerial photographs thus represent an important pictorial resource of 19th and 20th century infrastructure that has largely disappeared within the survey area, and complements the evidence from documents and historic Ordnance Survey maps.

## 11.2. Second World War archaeology

Only four Second World War sites were identified within the Leadon Valley NMP survey area. Few were anticipated, however, due to the essentially rural nature of the area, its small urban areas and relatively undeveloped transport infrastructure, and therefore a corresponding lack of obvious strategic targets for the Luftwaffe and other German forces. Similarly, its distance from major road, rail and port links meant that few large military units would have been based there prior to the D-Day landings in Normandy. Although in the later war years the threat of German invasion and large-scale Luftwaffe bombing raids had receded; it is still notable that the military camps and the possible hospital identified within the study area had no clearly identifiable defences such as pillboxes or anti-aircraft guns.

Highnam Court was used as a military training site (1456617/SO 71 NE69) throughout much of the Second World War. The Highnam Court park grounds were first used by the Royal Naval Training Establishment and became known as HMS Ganges, and between 1940 and 1942 new recruits were trained there in basic seamanship in readiness for service in the Royal Navy (Thomas 2007a). In February 1944, the grounds became home to three battalions of United States Army combat engineer troops, around 2000 men, in preparation for the Allied invasion of Europe. The main accommodation for the soldiers consisted of canvas bell tents, with an average of 8 men per tent. The tents caused numerous parchmarks in the grass, visible on aerial photographs (Fig. 53), and were arranged in rows separated by laid trackways. Highnam House itself was still in use as a residential home, and also served as officer accommodation. Nissen huts, other temporary structures and even a possible parade square have all been identified (seen on the left of the image). The Royal Naval and US Army presence at Highnam Court has been well documented (Thomas 2007a, 2007b).



(RAF/CPE/UK/1961 3007 09-APR-1947 © English Heritage (NMR) RAF Photography).

(RAF/106G/UK/1355 7010 02-APR-1946 © English Heritage (NMR) RAF Photography)

*Figure 53. Military camp at Highnam Court showing the parchmarks caused by numerous bell tents. A group of Nissen huts can also be identified. The rectangular feature (shown by arrow in the larger-scale image) may be a parade ground.*

A much smaller probable military camp (1456615/SO 71NE67) was identified at Churcham. The complex consisted of a cluster of 21 buildings next to an orchard, 10 of which appear to be Nissen huts that probably provided accommodation (see Fig. 54*)*. South of the buildings is an area of disturbed ground that may relate to associated military training activity. The light marks may result from lighter subsoil being thrown up from the digging of foxholes, weapons pits or other small emplacements.

Interestingly, although no documentary evidence could be found to indicate what type of military activity, if any, was taking place here and what units it involved, the area is still referred to as the 'Old Army Camp' (Forest of Dean District Council Planning Applications. 2007). Some of the buildings still survive, as shown by the modern Ordnance Survey Map, but are now used as part of a business park. Further more detailed documentary research might provide new information concerning this complex.

*Figure 54. Probable military camp, Churcham. The arrow in the upper part of the photograph indicates Nissen huts and other military buildings. To the south, there is evidence for some form of training activity, with vehicle tracks and possible dug emplacements visible.* (RAF/106G/UK/1355 7014 02-APR-1946© English Heritage (NMR) RAF Photography).

To the east of Hygrove House, north-east of Minsterworth, a probable military hospital was identified (1456616/SO 71 NE68). The covered walkways and adjacent sewage works suggest a hospital function, and the complex has similar features to the known St Wulstan's wartime hospital at Upper Welland (Winton 2005*).* The western block (on the left of Fig. 55) was later re-used as a mushroom factory, but the remaining buildings are now demolished.

The Leadon Valley NMP aerial survey also identified a previously unknown camouflaged factory (1457813/SO 72 NW74) north of Newent. This was probably used for some kind of military production during the Second World War, possibly of armaments. Again, additional documentary research might provide more details of this in the future.

*Figure 55. Possible Second World War military hospital near Hygrove House. Note the small sewage works indicated by the arrow.* (RAF/106G/UK/1355 7012 02-APR-1946© English Heritage (NMR) RAF Photography).

Royal Air Force (RAF) aerial photography from 1946 and 1947 was crucial to identifying the new Second World War sites in the Leadon Valley NMP study area. The military hospital near Hygrove House and the probable military camp at Churcham were previously unrecorded, as was the camouflaged factory. Although in the future more extensive and detailed documentary research might clarify the interpretations of these two sites, the aerial photographs remain an invaluable archive record of these military sites.

## 12. Conclusions

The main aim of the Leadon Valley NMP (ALSF) aerial survey in an area of potential aggregate production with an apparent low density of archaeological records, was to identify and assess the archaeological assets of the area. The new records are important to understanding the extent and nature of the surviving archaeological resource and will provide an effective data source to identify the potential archaeological impact of any proposed mineral extraction schemes or other developments (Grubb and Catchpole 2007).

As a result of the Leadon Valley NMP survey, a total of 187 new monument records have been identified, representing a 103% increase in the number of recorded monuments in the National Monuments Record (NMR) for the survey area (see Appendix 4). This significant increase means that the primary aims of the NMP survey have been addressed – providing data to inform minerals extraction planning and development control, and to assist further research projects in the Leadon Valley. The NMP survey results will be added to the NMR and Gloucestershire HER for public access, meeting a further objective of the project design for the survey (Grubb and Catchpole 2007).

No evidence of any archaeological features likely to date before later prehistory was identified. Three probable Iron Age or Romano-British enclosures were identified, and sub-surface archaeology probably survives at these sites. Nevertheless, the relatively few Iron Age or Romano-British features recorded from these periods are likely to considerably under-represent the number of sites. This apparent absence of evidence probably results from the nature of the soils within the Leadon Valley, the lack of specialised archaeological oblique aerial photography, and in some areas the masking of sub-surface features by ridge and furrow and/or extant woodland.

Additional archaeological work including new oblique aerial photography, fieldwalking, projects, geophysical survey and palaeo-environmental sampling of alluvial deposits should be able to provide a better understanding of the inhabitation of the Leadon Valley landscape during the Iron Age and Romano-British periods, and this must be one priority for future research. Elsewhere in Britain and Europe, more recent detailed survey of areas with heavier soils not conducive to cropmark formation and previously thought to have been avoided in the prehistoric and Roman periods has revealed often widespread occupation of this date (e.g. Clay 2002; Mills and Palmer 2007; Timby et al. 2007). The potential for finding such archaeology within the Leadon Valley must therefore remain high. Similarly, the extent and nature of any early medieval occupation is largely unknown, and for this period too the Leadon Valley would benefit from future archaeological investigation.

Evidence for later medieval settlement and agricultural practices was better represented in the Leadon Valley NMP (ASLF) survey. Deserted and shrunken settlements, holloways, woodland banks, field boundaries and

possible evidence of industrial activity such as charcoal burning platforms were all identified from aerial photographs. Many of these features probably reflect post-medieval inhabitation too. Post-medieval industrial features included quarries, brickworks and charcoal burning. The Leadon Valley NMP survey area shares many characteristics of the Malvern Hill AONB – a largely agricultural medieval and post-medieval character with some 'champion' open fields and nucleated villages but also much wood pasture and dispersed hamlets, and moated sites. Cultivation increased considerably during the post-medieval and early modern periods, and the growth and decline of the cider and perry industries would be worthy of additional research. More detailed map regression and fieldwork might be able to add greater chronological resolution to these patterns, particularly regarding the impact of enclosure. Military sites from the Second World War, in the form of camps, a hospital and a factory were also mapped and recorded from aerial photographs, but previously unrecorded sites would benefit from further documentary research.

The Leadon Valley has a decidedly mixed character, reflecting both aspects of the agricultural landscape of the Malvern Hills, but also sharing elements of the industrial landscape of the nearby Forest of Dean. The archaeological remains of the Leadon Valley thus in some respects reflect an intermediate zone in terms of human activity between the two better-known landscapes.

The vertical aerial photographic coverage available for this area was satisfactory, with near complete aerial coverage by RAF vertical photographs from the 1940s and from Ordnance Survey vertical coverage from the 1970s and 1980s. This photographic coverage was not always acquired under ideal conditions for the identification of archaeological features, however. In contrast, the number of useful oblique photographs available for archaeological assessment during the NMP survey was low. It is therefore recommended that a programme of specialist archaeological oblique aerial photography should be undertaken at optimum times, especially as continued land-use changes in the Leadon Valley may reveal additional cropmarks and soil marks. In addition to documenting new sites, such work would also inform the monitoring and management of existing archaeological resources.

## 13. Bibliography

**Abberley and Malvern Hill Geopark.** 2007. Linton Quarry. World Wide Web http://www.geopark.org.uk/blog/_archives/2006/5/29/1991784.html (Accessed 7th September 2007).

**Allen, J.R.L.** 1992. A reconnaissance map of medieval ploughlands in the Vale of Berkeley, Gloucestershire and Avon. *Transactions of the Bristol and Gloucestershire Archaeological Society* 110: 87-97.

**Aston, M.** (ed.). 1988. *The Medieval Landscape of Somerset.* Taunton: Somerset County Council.

**Barrett, J.C.** 1997. Romanization: a critical comment. In D.J. Mattingly (ed.) *Dialogues in Roman Imperialism. Power, Discourse, and Discrepant Experience in the Roman Empire*. Journal of Roman Archaeology Supplementary Series 23. Portsmouth, RI: Society for the Promotion of Roman Studies, pp. 51-64.

**Bond, C.J.** 1978. Moated sites in Worcestershire. In A. Aberg (ed.) *Medieval Moated Sites*. Council for British Archaeology Research Report 17. London: CBA, pp. 71-77.

**Bowden, M.** 2005. *The Malvern Hills: an Ancient Landscape*. Swindon: English Heritage.

**Bowden, M. and McOmish, D.** 1987. The required barrier. *Scottish Archaeological Review* 4 (2): 76- 84.

**British Geological Survey.** 1988. *Tewkesbury, England and Wales Sheet 216, Solid and Drift Geology*. 1: 50 000 series maps. Southampton: Ordnance Survey.

**British Geological Survey.** 2000. *Ross-on-Wye, England and Wales Sheet 215, Solid and Drift Geology*. 1: 50 000 Provisional series. Nottingham: British Geological Survey.

**Brown, G.** 2005. Irrigation of water meadows in England. In *Památky Archeologické Supplementum* 17. Ruralia 5. Water Management in Medieval Rural Economy: 84-92.

**Carter, S., Jenkinson, L., Fine, R. and Houlston, I.** 2006. Gloucestershire Landscape Character Assessment. Unpublished report: Landscape Design Associates.

**Catchpole T., Copeland, T. and Maxwell, A.** 2007. Roman Dymock: archaeological investigations 1995-2002. *Transactions of the Bristol and Gloucestershire Archaeological Society* 125: 131-245.

**Catchpole T.** 2007. Excavations at the Sewage Treatment Works, Dymock, Gloucestershire 1995. *Transactions of the Bristol and Gloucestershire Archaeological Society* 125: 137-219.

**Chadwick, A.M.** 1999. Digging ditches, but missing riches? Ways into the Iron Age and Romano-British cropmark landscapes of the north midlands. In B. Bevan (ed.) *Northern Exposure. Interpretative Devolution and the Iron Ages in Britain*. Leicester: Leicester Archaeological Monographs, pp. 149-171.

**Chadwick, A.M.** 2007. Trackways, hooves and memory-days – human and animal memories and movements around Iron Age and Romano-British rural landscapes. In V. Cummings and R. Johnston (eds.) *Prehistoric Journeys*. Oxford: Oxbow, pp. 131-152.

**Clay, P.** 2002. *The Prehistory of the East Midlands Claylands*. Leicester Archaeology Monograph 9. Leicester: Leicester University Press.

**Cleere, H. and Crossley, D.** 1985. *The Iron Industry of the Weald*. Leicester: Leicester University Press

**Cook, H.F., Stearne, K. and Williamson, T.** 2003. The origins of water meadows in England. *Agricultural History Review* 51 (2): 155-162.

**Cook, H.F. and Williamson, T.** (eds.) 1999. *Water Management in the English Landscape: Field, Marsh and Meadow*. Edinburgh: Edinburgh University Press.

**Cook, H.F. and Williamson, T.** (eds.) 2006. *Water Meadows. History, Ecology, and Conservation*. Oxford: Windgather Press.

**Countryside Agency.** 2006. Joint Character Area: South Hereford and Over Severn (104). Unpublished report: Countryside Agency.

**Countryside Agency.** 2006. Joint Character Area: Severn and Avon Vales (106). Unpublished report: Countryside Agency.

**Creighton, J.D.** 2006. *Britannia: the Creation of a Roman Province*. London: Routledge.

**Cunliffe, B.** 2004. Wessex cowboys? *Oxford Journal of Archaeology* 23 (1): 61-81.

**Cunliffe, B.** 2005. Iron Age Communities in Britain: an Account of England, Scotland and Wales from the Seventh Century BC until the Roman Conquest (4th edition). London: Routledge.

**Currie, C.R.J. and Herbert, N.M.** 1996. Forest of Dean: Industry. In A.P. Baggs and A.R.J. Juřica (eds.). *A History of the County of Gloucester: Volume V*. Victoria History of the Counties of England. Oxford: VCH.

**Dark, K. and Dark, P.** 1997. *The Landscape of Roman Britain.* Stroud: Sutton.

**Dickson, A. and Crowther, S.** 2007. Rapid Coastal Zone Assessment for the Severn Estuary. Archaeological Aerial Survey. National Mapping Programme Interim Report. English Heritage/Gloucestershire County Council Archaeology Service.

**Dickson, A. and Crowther, S.** forthcoming. 2008. Rapid Coastal Zone Assessment for the Severn Estuary. Archaeological Aerial Survey. National

Mapping Programme Report. English Heritage and Gloucestershire County Council.

**Dreghorn, W.** 1967. *Geology Explained in the Severn Vale and Cotswolds*. Newton Abbot: David and Charles.

**English Nature.** 1997a. *Avon and Severn Vales (NA 56)*. Ledbury: English Nature.

**English Nature.** 1997b. *Dean Plateau and Wye Valley (NA 61)*. Ledbury: English Nature.

**Evans, H.** 2004. Who's afraid of the Big Bad Woods? Forest Wilderness in the Middle Ages. In A.M. Chadwick (ed.) *Stories from the Landscape: Archaeologies of Inhabitation*. British Archaeological Reports (International Series) S1238. Oxford: Archaeopress, pp. 73-86.

**Faull, M.L. and Moorhouse, S.A.** 1981. *West Yorkshire: an Archaeological Survey to AD 1500. Volume 3*. Wakefield. West Yorkshire Archaeology Service.

**Finberg, H.P.R.** 1975. *The Gloucestershire Landscape*. London: Hodder and Stoughton.

**Foard, G.** 2001. Agriculture and industry in Rockingham Forest. *Medieval Archaeology* 45: 41-96.

**Forest of Dean District Council.** 2007. Forest of Dean Planning Applications: Planning application number P0297/07/DFTEL. World Wide Web http://planning.fdean.gov.uk/WAM/pas/findCaseFile.do;jsessionid=74360683895924CCC9A89C87CF5BFB55?councilName=Forest+of+Dean+DC&appNumber=P0297%2F07%2FDFTEL (Accessed 20th September 2007).

**Freeman, P.W.M.** 1997. 'Romanization' – 'Imperialism': what are we talking about? In K. Meadows, C. Lemke and J. Heron (eds.) *TRAC 96: Proceedings*

*of the Sixth Annual Theoretical Roman Archaeology Conference.* Oxford: Oxbow, pp. 8-14.

**Gloucestershire County Council.** 2006. Aggregate landscape of Gloucestershire: predicting the archaeological resource. World Wide Web http://www.gloucestershire.gov.uk/index.cfm?articleid=7795 (Accessed: 29th August 2007).

**Grubb, T. and Catchpole, T.** 2007. National Mapping Programme: the Leadon Valley Sand and Gravel Aggregate Area Project Design (4832 PD). Unpublished report: Gloucestershire County Council Archaeology Service.

**Hall, D.** 1982. *Medieval Fields*. Princes Risborough: Shire Publications

**Hart, C.** 1971. *The Industrial History of Dean*. Newton Abbot: David and Charles.

**Hart, C.** 1995. The Forest of Dean: New History 1550-1818. Stroud: Alan Sutton.

**The Hereford and Gloucester Canal Trust.** World Wide Web http://www.h-g-canal.org.uk/building.htm (Accessed 11th September 2007).

**Hingley, R.** 1989. *Rural Settlement in Roman Britain*. London: Seaby.

**Hingley, R.** 1990. Boundaries surrounding Iron Age and Romano-British settlements. *Scottish Archaeological Review* 7: 96-103.

**Historic Herefordshire Online.** The Hereford and Gloucester Canal. World Wide Web
http://www.smr.herefordshire.gov.uk/post-medieval/canals/hereford_gloucester.htm (Accessed 23rd August 2007).

**Hoverd, T.** 2003. *The Archaeological Survey of Herefordshire Woodlands in the Malvern Hills AONB*. Herefordshire Archaeology Report 101. Hereford: Herefordshire County Council Archaeology Service.

**Hoyle, J.** 2005. The Forest of Dean, Gloucestershire. Archaeological Survey. Stage 1: Desk-based data collection. Volume 1. Unpublished circulation draft report: Gloucestershire County Council Archaeology Service.

**Hoyle, J.** 2007. The Forest of Dean, Gloucestershire. LiDAR Survey of selected areas of woodland and the Aggregates Resource Area. Project Number 4798 Main. Forest of Dean Archaeological Survey Stage 3A. Project Report Volume 1: Methodology, Results, Discussion and Recommendations. Draft for Circulation and Discussion. GCCAS draft typescript report.

**Jennings, D., Muir, J., Palmer, S. and Smith, A.** 2005. *Thornhill Farm, Fairford, Gloucestershire: An Iron Age and Roman Pastoral Site in the Upper Thames Valley*. Thames Valley Landscapes Monograph 23. Oxford: Oxford Archaeology.

**Jones, R.J.A. and Evans, R.** 1975. Soil and crop marks in the recognition of archaeological sites by air photography. In D.R. Wilson (ed.) *Aerial Reconnaissance for Archaeology*. Council for British Archaeology Research Report 12. London: CBA, pp. 1-11.

**Juřica, J. 2007a.** Preston. Unpublished draft text for the Victoria History of Gloucestershire, Volume 12. World Wide Web http://www.victoriacountyhistory.ac.uk/webdav/harmonise?Page/@id=92&Session/@id=D_XQA1CCR4HhrxQfVEKjwl&Section[@stateId_eq_SubNav]/@id=3068&Document/@id=7874&Section[@stateId_eq_County]/@id=3055 (Accessed 5th July 2007).

**Juřica, J. 2007b.** Dymock. Unpublished draft text for the Victoria History of Gloucestershire, Volume 12. World Wide Web http://www.victoriacountyhistory.ac.uk/webdav/harmonise?Page/@id=92&Session/@id=D_dLaWiuWKekvtGblncsic&Section[@stateId_eq_SubNav]/@id=3068&Document/@id=4774&Section[@stateId_eq_County]/@id=3055 (Accessed 14th September 2007).

**Kelley, D.W. 2002.** *Charcoal and Charcoal Burning.* Princes Risborough: Shire Publications.

**Kingsley, N. and Hill, M.** 2001. *The Country Houses of Gloucestershire Volume 3, 1830-2000.* Chichester: Phillimore and Co. Ltd.

**Knight, D. and Howard, A.J. 1995.** *Archaeology and Alluvium in the Trent Valley*. Nottingham: Trent and Peak Archaeological Trust.

**Landscape Design Associates.** 2002. Forest of Dean District Landscape Character Assessment. World Wide Web http://www.fdean.gov.uk/content.asp?nav=765,808&parent_directory_id=200 (Accessed 29th August 2007).

**Landscape Design Associates.** 2006. Gloucestershire Landscape Character Assessment. Oxford: LDA

**Leech, R.** 1981. *Historic Towns in Gloucestershire.* Committee for Rescue Archaeology in Avon, Gloucestershire and Somerset (CRAAGS) Survey No. 3.

**Leland, J.** (ed. L.T. Smith) [1964]. *The Itinerary of John Leland in or about the years 1535-1543*. London: Centaur Press.

**Lewis, S.** 1848. *A Topographical Dictionary of England* (7th ed.). London: S. Lewis and Co.

**Lockie, R.** 2007. GENUKI: Staunton (nr. Newent), Gloucestershire. *World Wide Web* http://www.genuki.org.uk/big/eng/GLS/StauntonNewent/index.html (Accessed 23rd August 2007).

**Margary, I.** 1973. *Roman Roads in Britain.* London: John Baker Publishers.

**Mattingly, D.J.** 2006. *An Imperial Possession: Britain in the Roman Empire 54 BC – AD 409*. Harmondsworth: Penguin.

**Miles, D.** 1982. Confusion in the countryside: some comments from the Upper Thames region. In D. Miles (ed.) *The Romano-British Countryside: Studies in Rural Settlement and Economy*. British Archaeological Reports (British Series) 103 (i). Oxford: BAR, pp. 53-79.

**Mills, J. and Palmer, R.** (eds.) 2007. *Populating Clay Landscapes*. Stroud: Tempus.

**Mullin, D.** 2005. The aggregate landscape of Gloucestershire: predicting the archaeological resource. ALSF Project 3346. Unpublished draft report: Gloucestershire County Council Archaeology Service.

**Musson, C. and Ray, K.** 2007. The Herefordshire aerial survey 2002-6. Herefordshire Archaeology Report No. 199. Hereford: Herefordshire Council.

**National Soil Resources Institute.** 2007. Soilscapes. World Wide Web http:// www.landis.org.uk/soilscapes/ (Accessed 24th August 2007).

**Newman, R.** 1982. The effect of orcharding and the cider industry on the landscape of West Gloucestershire *c*. 1600-1800. *Transactions of the Woolhope Naturalists Field Club* 44 (2): 202-214.

**Parry, C.** 1990. Old Maid's Walk, Newent. Archaeological evaluation. Unpublished report: Gloucestershire County Council Archaeology Service..

**Pilbean, A.** 2006. *The Landscape of Gloucestershire*. Stroud: Tempus.

**Pope, R.E.** 2003. *Prehistoric Dwelling: Circular Structures in North and Central Britain c. 2500 BC – AD 500*. Unpublished PhD thesis: University of Durham.

**Pope, R.** 2007. Ritual and the roundhouse: a critique of recent ideas on the use of domestic space in later British prehistory. In C. Haselgrove and R. Pope (eds.) *The Earlier Iron Age in Britain and the Near Continent*. Oxford: Oxbow, pp. 204-228.

**Rackham, O.** 1986. The History of the Countryside: The Classic History of Britain's Landscape, Flora and Fauna. London: J.M. Dent.

**Read, R. and Graham, R.** 2002. *Manual of Aerial Survey: Primary Data Acquisition.* Latheronwheel, Caithness: Whittles Publishing.

**Richardson, R. and Musson, C.** 2004. *Herefordshire Past and Present: an Aerial View*. Almeley: Logaston Press.

**Riley, D.N.** 1980. *Early Landscape from the Air*. *Studies of Crop Marks in South Yorkshire and North Nottinghamshire*. Sheffield: Department of Prehistory and Archaeology.

**Riley, D.N.** 1983. The frequency of occurrence of cropmarks in relation to soils. In G.S. Maxwell (ed.) *The Impact of Aerial Reconnaissance on Archaeology*. Council for British Archaeology Research Report 49. London: CBA, pp. 59-73.

**Small, F. and Stoertz, C.** (eds.) 2006. Gloucestershire Forest of Dean National Mapping Programme Report. English Heritage Research Department Series no. 28/2006. Unpublished report: English Heritage.

**Smith, A.H.** 1964. *The Place Names of Gloucestershire: Volume 3. The Lower Severn Valley and the Forest of Dean.* English Place Name Society Volume XL. Cambridge: Cambridge University Press.

**Tate, W.E.** 1943. Gloucestershire Enclosure Acts and Awards. *Transactions of the Gloucestershire Archaeological Society* 64: 1-70.

**Taylor, C.C.** 1978. Moated sites: their definition, form and classification. In A. Aberg (ed.) *Medieval Moated Sites*. Council for British Archaeology Research Report 17. London: CBA, pp. 5-13.

**Taylor, C.C., Smith, N. and Brown, G.** 2006. Rowland Vaughan and the origins of downward floated water-meadows: a contribution to the debate. *Landscape History* 26: 35-51.

**Taylor, J.** 1997. Space and place: some thoughts on Iron Age and Romano-British landscapes. In A. Gwilt and C. Haselgrove (eds.) *Reconstructing Iron Age Societies*. Oxford: Oxbow, pp. 192-203.

**Taylor, J.** 2001. Rural society in Roman Britain. In S. James and M. Millett (eds.) *Britons and Romans: Advancing an Archaeological Agenda*. CBA Research Report 125. London: CBA, pp. 46-59.

**Thomas, D.A.** 2007a. The Royal Navy at Highnam Court. World Wide Web http://www.4front.cwc.net/WWII/Ganges/HighnamGanges.html (Accessed 3rd September 2007).

**Thomas, D.A.** 2007b. U.S. Combat Engineers in Highnam. Available from: http://www.4front.cwc.net/WWII/GIS/WW2USGIs.html (Accessed 3rd September 2007).

**Thomas, R.** 1997. Land, kinship relations and the rise of enclosed settlement in first millennium B.C. Britain. *Oxford Journal of Archaeology* 16 (2): 211-218.

**Timby, J., Brown, R., Hardy, A., Leech, S., Poole, C. and Webley, L.** 2007. *Settlement on the Bedfordshire Claylands: Archaeology along the A421 Great Barford Bypass*. Bedfordshire Archaeology Monograph 8. Oxford: Oxford Archaeology.

**Truscoe, K.** 2006. The Aggregate Landscape of Somerset: Predicting the Archaeological Resource. Aggregates Levy Sustainability Fund Project number 3994PD. Interim report for aerial survey component Eastern Mendip Block 1: ST 66 41 to ST 71 46. Unpublished report: English Heritage/Somerset County Council.

**Wade Martins, S.** 2004. *Farmers, Landlords and Landscapes: Rural Britain 1720 to 1870*. Macclesfield: Windgather Press.

**Walker, K.** 2001. *Forest of Dean History: Charcoal Burning*. World Wide Web http://www.fweb.org.uk/dean/deanhist/charcoal.htm (Accessed 20th August 2007).

**Whimster, R.** 1989. *The Emerging Past. Air Photography and the Buried Landscape.* Abingdon: RCHME.

**Williamson, T.** 1995. *Polite Landscapes: Gardens and Society in Eighteenth-Century England*. John Hopkins University Press.

**Willis, S.** 1997. Settlement, materiality and landscape in the Iron Age of the East Midlands: evidence, interpretation and wider resonance. In A. Gwilt and C. Haselgrove (eds.) *Reconstructing Iron Age Societies*. Oxford: Oxbow, pp. 205-215.

**Wilson, D.R.** 2000. *Air Photo Interpretation for Archaeologists* (2nd edition). London: Tempus.

**Winton, H.** 2005. Malvern Hills AONB: A report for the National Mapping Programme, survey report AER/4/2005. Unpublished report: English Heritage.

# Appendix 1: Archaeological scope of aerial mapping

**Levelled archaeology**

All cropmark and soil mark features identified as archaeological in origin that cannot be explained by features mapped on the first edition Ordnance Survey map will be plotted.

**Earthwork archaeology**

All extant and vestigial archaeological features will be plotted. Available ground survey plans will be used directly to assist and enhance the air photographic transcription and interpretation.

**Ridge and furrow**

The presence of all extant, vestigial, soil mark and crop mark evidence of ridge and furrow will be noted. The extent of ridge and furrow will be outlined, with reference to the original furlongs, where these can be identified, or units of common ploughing trend. A single arrow indicates the principal direction of ploughing within each outlined unit.

**Extraction sites**

Areas of quarrying for aggregates will be outlined either from appropriate vertical photographs or documentary and cartographic sources.

**Industrial archaeology**

Medieval and post-medieval industrial remains such as canals, roads and wagon-ways that are visible as levelled or upstanding features on air photographs will normally be plotted with schematic conventions only when they are not identified as operational on earlier photographs or fully recorded by 1st Edition Ordnance Survey or later mapping. Bell pits, shafts, processing areas and related structures such as leats and dams will be mapped where they are visible on aerial photographs (OS 1st Edition will be used to assist interpretation and mapping).

**Modern military archaeology**

In general former military sites and installations will be mapped. Extensive sites such as airfields (including civilian) will be outlined. Significant features

within outlined areas may be mapped either ‘as seen’ or more schematically. Where no further information is available a simple note will be added to the appropriate monument record stating whether the monument was seen or not on the photographs consulted.

**Buildings**

Building remains and/or foundations observed as crop marks, soil marks, parch marks, earthworks or ruins will be mapped and recorded; upstanding buildings, roofed or unroofed will not (with the exception of 20th century military remains as noted above).

**Post-medieval and modern field boundaries**

Former field boundaries, whether upstanding or levelled, that are extant on earlier photographs, 1st Edition Ordnance Survey or later mapping will not be recorded.

**Parkland, landscaped parks, gardens and country houses**

Earthwork and levelled landscape and garden features associated with this category will be mapped. Modern park and garden features will not usually be mapped.

**Geological features**

In general geological features will not be recorded.

## Appendix 2: Sources

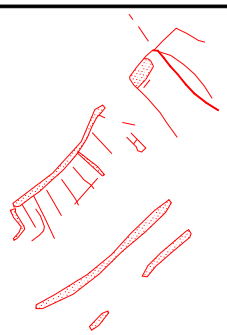
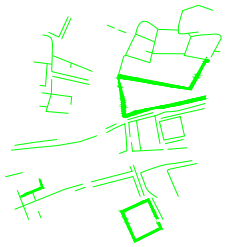
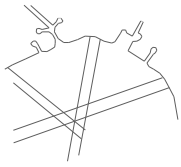
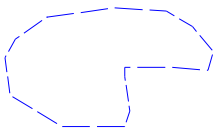
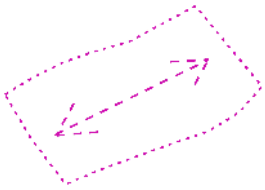
1. NMR Enquiry and Research Services
   National Monuments Record
   English Heritage
   Kemble Drive
   Swindon SN2 2GZ

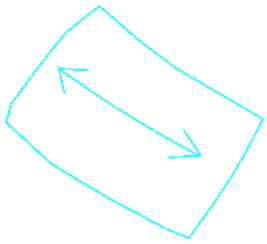
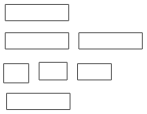
2. Unit for Landscape Modelling
   University of Cambridge
   Sir William Hardy Building
   Tennis Court Road
   Cambridge CB2 1QB

3. Gloucester County Council Sites and Monuments Record
   Gloucester County Council Archaeology Service
   Environment Department
   Shire Hall
   Westgate Street
   Gloucester GL1 2TG

4. Herefordshire County Council Sites and Monuments Record
   Herefordshire Archaeology
   PO Box 144
   Hereford HR1 2YH

## Appendix 3: AutoCAD NMP conventions and layers

| Layer name Colour | |
|---|---|
| BANK (red)<br>The outline of all features seen as banks or positive features, e.g. platforms, mounds and banks; also to be used for the *agger* of Roman Roads. Thin banks will appear on this layer as a single line.<br>BANKFILL (red)<br>A stipple that fills the bank outline 'bank'. |  |
| DITCH (green)<br>All features seen as ditches; also excavated features, e.g. ponds and pits.<br>DITCHFILL (green)<br>A solid that fills the ditch outline |  |
| EXTENT OF AREA (grey)<br>The extent of large area features such as the perimeters of airfields, military camps, mining/extraction areas. |  |
| LARGE CUT FEATURE (blue)<br>Formerly the 'T-hachure', now represented by a dashed line. To be used for large cut features such as quarries, ponds, and perhaps scarps that cannot easily be depicted with the use of either bank or ditch. |  |
| RIGARRLEVEL (magenta)<br>Arrow depicting direction of rig in a single block ridge and furrow, seen as earthworks or cropmarks, but known to have been ploughed level.<br>RIGDOTSLEVEL (magenta)<br>Outline of a block of ridge and furrow, seen as earthworks or cropmarks, but known to have been ploughed level. |  |

| Layer name Colour | |
|---|---|
| RIGARREWK (cyan) Arrow depicting direction of rig in a single block of ridge and furrow seen as earthworks on the latest available aerial photographs.<br>RIGDOTSEWK 4 (cyan) Outline of a block of ridge and furrow still surviving as earthworks on the latest available aerial photographs. |  |
| STRUCTURE (grey) Used for buildings, walls and features that do not easily fit into other categories because of their form, e.g. tents, radio masts, paint (camouflaged airfields). |  |
| TRAMWAY (purple).<br>Used to indicate the presence (or implied presence) of tramways, mainly associated with industrial areas. |  |

# Appendix 4: NMR archaeological database (AMIE)

The Leadon Valley sand and gravel aggregate area, NMP – Collection Record: AF00233

Gloucestershire County Council: The Leadon Valley, ALSF NMP – Event

| Drawing Number | Mapsheet | Existing NMR monuments | New NMR monuments | Amended NMR monuments | SMR monuments |
|---|---|---|---|---|---|
| MD002152 | SO 63 NE | 41 | 6 | 3 | 3 |
| MD002153 | SO 63 SE | 30 | 12 | 4 | 77 |
| MD002154 | SO 62 NE | 24 | 16 | 1 | 43 |
| MD002155 | SO 72 NW | 38 | 48 | 3 | 147 |
| MD002156 | SO 72 NE | 15 | 50 | 6 | 107 |
| MD002157 | SO 72 SE | 21 | 46 | 6 | 84 |
| MD002158 | SO 71 NE | 12 | 9 | 2 | 30 |
| | | 181 | 187 | 25 | 491 |

As a result of the aerial survey project, a total of 187 new monument records have been identified and created in the NMR database (AMIE), as well as the revision of 25 existing records. The existing records were updated and/or revised where the form or extent of the site could be clarified, or where more detailed information was necessary to provide a better understanding of the site.

## Appendix 5: NMP methodology

All photographs are rectified using the Aerial 5.29 computer rectification package. A digital terrain model function is also used to compensate for steep or undulating terrain. Due to the nature of some photographs, control points may be hard to obtain and in these instances control points are taken from soft boundaries such as hedges, river courses, intertidal watercourses and diffuse field boundaries. All control points have an average error of less than 2 metres, however, and are accurate to within 0.90m of each other. All archaeological features are then transcribed at 1: 2500 scale and mapped using English Heritage standard mapping conventions in AutoCAD. An average level of accuracy of less than 2 metres to the map is achieved and this gives an overall accuracy of plotted features, to true ground position, within 1.25 to 3.75 metres.

New archaeological features that are identified as significant are recorded in the National Monuments Record database, known as AMIE. Any existing AMIE records are updated or revised where the form or extent of the site can be clarified or where more detailed information may provide a better understanding of the site. Newly recorded monuments are given an indexed and textual description and are translated onto the English Heritage in-house Geographic Information System (WebGIS).